MULTI-MODAL TRAIL NETWORKS IN WATKINSVILLE, GEORGIA

by

MICHAEL HANS

(Under the Direction of Brad Davis)

ABSTRACT

Small-town Watkinsville, Georgia consists of just 3.3 square miles in and accompanies about 3,000 residents. However; times are changing and this rural town is developing at an alarming rate. Several Mixed-Use and Multi-Family developments are expected to increase the population by 30% in just the next couple years. This thesis seeks to analyze how the use of multi-modal transportation connections can help mitigate these growth problems and help service Watkinsville economically, socially and ecologically. Through a literature review, analysis of case studies on similar trail applications in nearby areas, and a survey of town citizens; this thesis explains how greenways can increase accessibility, provide public health, environmental, economic benefits, as well as mitigate problems caused by growth and give Watkinsville a sense of identity.

INDEX WORDS: landscape architecture, environmental impact, economic impact, social impact, connectivity, urban design, urban planning, population density, aesthetic quality, landscape design, multi-modal transportation, trail networks, greenways, multi-modal trail system, active transportation, urban sprawl

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TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

Each generation must newly consider what it means to make a home, live a productive and meaningful life, and leave a world for the next generations to inherit. What will the quality of this world be? Contemporary society in the 2020's continues to wrestle with the socioeconomic and environmental pressures of living life in a physical world, at least in western society and many other places, dominated by the automobile and subsequently the oil industry. Even as the era of the electric car appears to emerge, issues of automobile and pedestrian space and their inherent conflicts will continue. Landscape architects and urban designers must continue to work to plan and design livable and integrated environments for the walking human and the car. This thesis examines to role of greenway trails and pedestrian systems in small town planning and growth over time.

The author of this thesis is from the Southeastern United States, and the town of focus, Watkinsville, Ga. Having observed the growth challenges and pressures over a 14-year time span, this thesis provides a vehicle to reach better solutions for the long term in a place that is well understood. This thesis explores how the connectivity provided by greenway infrastructure can contribute to the quality of the cities and towns they service economically, socially, and ecologically. This thesis identifies ways of maximizing the impacts of ongoing greenway projects across the Southeast. Nearby Georgia piedmont projects like the Firefly trail, currently

in various stages of planning and construction, and others across northeast regions of Georgia, serve as excellent and timely reference points used to inform this study.

Figure 1: City Limits of Watkinsville

RESEARCH QUESTION AND SUPPORTING QUESTIONS:

Research Question:

- What are Watkinsville's resident's attitudes toward greenway infrastructure?

Supporting Questions:

  - How can greenways help a community maintain its sense of space while also providing relief from growth pressure?
  - What are the drivers of growth?
  - How does the Watkinsville compare to other towns across rural Georgia in terms of its population and growth rate?
  - How do greenways relieve people of the lack of space caused by development?
  - What steps is Watkinsville taking in designing its greenway system to help accommodate the suburban expansion that is happening?
  - How does one measure the social, ecological and economic impacts of greenway infrastructure?
  - How does one accurately measure the economic impact of greenways?
  - What is the best balance between development and preservation?
  - How much development is too much?
  - What ratio of development to conservation provides people with the best quality of life?

In 2018, Atlanta was ranked the number one most expensive commute in the country. Atlanta-area workers commute an average of 26 miles roundtrip daily, one of the highest in the country (Thomas 2018). Because of this phenomenon, urban greenway projects in Atlanta, especially the Atlanta Beltline, have seen high rates of use throughout the past several years. This emphasizes the need for more active transportation routes in areas that are growing in population.

While current and planned projects in the Southeast are encouraging, the Southeastern U.S. lags behind other more populated areas of the U.S. and abroad. This provides a great opportunity to learn from other places and apply best practices in the planning of future growth in the Southeast. This thesis addresses the challenges of increasing development pressure and growing suburban populations while maintaining town character, sense of place, and quality of life, through the planning and future implementation of a greenway trail. Chapter one provides an introduction into the thesis topic and argument. Chapter two provides background information and population growth in Watkinsville, literature review of relevant research and supporting arguments. Chapter three addresses methodology and case studies. Chapter four will cover Watkinsville's greenway plan and analysis of major connections, destinations and improvement areas. Chapter five will present survey results along with advantages and disadvantages of greenway systems. Finally, chapter six will provide an application to Watkinsville, a summary of conclusions and lessons learned, and suggestions for future research.

CHAPTER 2

LITERATURE REVIEW

In the late 1800's, Frederick Law Olmsted was credited as the creator of the field of landscape architecture. The Green Revolution was nearly a century away and Olmsted wasn't concerned with creating something trendy; instead, he was promoting the creation of new and healthier cities with more livable neighborhoods within those cities. Olmsted understood that people that interacted with nature and were outside, were naturally healthier than those who were not. Olmsted was discovering this in a time period where growth was rapid, industrialization was covering cities with smog and disease was spreading in these dense metropolitan areas. These unhealthy living conditions began to promote the creation of urban parks to create more livable cities, and thus the field of landscape architecture was created (Tavella 2012). As cities grow across the world at an exponential rate, our natural resources and beautiful landscapes are slowly shrinking away (Rudel 2009). Since WW2, city populations have been steadily increasing, spilling over into the suburbs and more rural areas (Fuchs 2012). World populations are expected to continue to grow and expansion into previously rural or undeveloped land will continue. This rise in population is simultaneously creating a rise in a growing list of negative impacts such as a rise in traffic, lower standards of living in the form of longer and more expensive commutes, adverse effects on the environment and food scarcity, just to name a few. Landscape architects, city planners and engineers have been the ones in charge, trying to solve these problems. This begs the question… What are landscape architects doing to alleviate the problems that

population expansion and exponential growth will cause? Problems like urban sprawl, which has continuously been at the center of many issues, is caused as urban areas expand and populations grow. Throughout history, the proper arrangement of space between urban and rural has taken many forms. In medieval times, walled cities provided dense protected urban cores with food growing lands often outside the fortified core (Lilley 2000). In the early 1800's America, urban centers like New York City were beginning to industrialize and living conditions for urban dwellers were poor. (Fairchild and Rosner 1999). Fredrick Law Olmsted, one of the earliest urban planners and designers to be called a landscape architect, saw the many needs of city dwellers and advocated for green space for all. When designing New York's Central Park, Olmsted said "It is one great purpose of the Park to supply to the hundreds of thousands of tired workers, who have no opportunity to spend their summers in the country, a specimen of God's handiwork that shall be to them, inexpensively, what a month or two in the White Mountains or the Adirondacks is, at great cost, to those in easier circumstances." Olmsted recognized the importance of parks and greenspaces as a valuable community resource for people's own health and well-being.

In current times, one of the biggest challenges facing landscape architects and planners is finding a way to seamlessly connect urban developments with natural environments. Towns and cities should be designed to encourage people's interactions with the environment. An important feature that should be integrated into current and future designs is that of providing people with a means of active transportation throughout their town. There is a "tipping point" where urban density and mass transit go hand in hand. In the inner regions of cities, where population density is at its highest, mass transit is successful and has been deemed necessary. Currently, no forms of mass transit or active transportation exist in Watkinsville. It can be argued that the

implementation of mass transit in Watkinsville is unnecessary because of the small size of the town; however, this makes it the perfect place to implement more active transportation routes. The rise of individual transportation is a result of many factors, primarily urban sprawl. The irreversible social and economic impetus to the dispersion of population and employment, multiplied by the rise in motorized transportation, has created a world in which mass transit is not only inconvenient but also less economical than the automobile (Barrett 1975). Many people entering the global middle class will want to buy cars: automobile sales are expected to increase from about 70 million a year in 2010 to 125 million by 2025, with more than half forecasted to be bought in cities. Some automotive analysts have gone as far as predicting that on the existing trajectory, today's 1.2 billion strong global car fleet could double by 2030. The existing urban infrastructure cannot support such an increase in vehicles on the road (Bouton, Knupfer, Mihov and Swartz 2015). Suburban sprawl has been at the center of this issue going back many years, new forms of transportation and the rise in automobile use has created a type of urban growth that is wasteful from the economic standpoint and disadvantageous socially. This type of urban growth forces more people to rely on their own personal cars for transportation, making this disadvantageous to those who cannot afford their own car (Walsh and Nechyba 2004). This expansion of city dwellers into the suburbs has made the adoption of mass transit difficult in these growing areas. Many times, commuters drive to the mass transit stations and then commute on a train or bus from there (Walsh and Nechyba 2004). However; this does not solve the problem urban expansion is causing and alternate modes of transportation methods must be explored. As planners are looking for different options, one such solution is to promote and integrate non-motorized modes in transportation systems, planned and developed for habituated areas (Rastogi 2011). Sustainable and non-motorized transportation should be easily accessible,

continuous, affordable or free, limit emissions and waste that motorized transportation causes and should foster to the development needs of the individual and community. One of the most effective ways of designing for active and sustainable transportation is integrating greenway systems and other multi-modal transportation methods into designs. A combination of a centralized greenway plan along with supporting pathways of other pedestrian infrastructure like, sidewalks, side paths and trails will provide people with the most options in terms of commuting, exercising or recreation. Pedestrian pathways should connect through urban and rural areas, connecting downtown corridors to more suburban and rural environments. The acceptability of non-motorized transportation depends upon the proper design and installation of trail networks and greenways into these areas. This way, they can serve to provide people with a safe and effective way to travel throughout on foot or bike. Not only can the use of greenways and multi-modal trail systems help alleviate the problems caused by population growth and urban expansion, but they can also provide numerous other social and economic benefits to quickly expanding areas.

Greenways play a vital role in areas where people have a desire to use them for exercise, recreation, travel or more. Many studies have been conducted to perceive how the public views greenways and what the likeness is of people to use a given greenway system. The study *Ecosystem Services and Urban Greenways: What's the Publics Perspective?* studied two greenways located in two large Southern U.S. cities, those were: The Eastside Trail in Atlanta, Georgia and the Leon Creek Greenway in San Antonio, Texas. Researchers conducted a survey on site, at key points along the greenway, participants were picked at random as they passed by and asked to participate in a survey. This survey gained information about demographics, greenway use, intensity, activity type, greenway access, mode of access, distance traveled and

the focus of the study, perceived benefits associated with greenways rated on a scale from 1- strongly disagree to 5 - strongly agree. These results were analyzed and the results showed that the majority of participants recognized a wide variety of the benefits a greenway system can bring. Experiential benefits were the most widely recognized benefits on both trails (acknowledged by 98.2% of respondents), followed by cultural (90.3%) and environmental benefits (74.1%) Their findings support the assertion that greenways provide a number of diverse, interacting benefits to urban residents (Larson Et. Al. 2016).

Greenways are receiving a growing amount of attention due to their implications for sustainable development of 21st century cities (Weber Et. Al. 2017). Many studies have been performed on greenway users in an effort to make greenways safer, more sustainable and more suited to the audience they are attracting in developing areas; however, the perceptions of property owners in close proximity to greenways has not thoroughly been investigated. This is important for a variety of reasons; greenways and other trail systems have been shown to directly affect adjacent properties in both positive and negative ways. A study was conducted on the Atlanta Beltline with the main goal of gaining the concerns and ways that greenway development alleviates these concerns from property owners that live near the Atlanta Beltline. This study was performed by researchers from the University of Georgia and the U.S. Forest Service and was completed through surveying two socio-economically different neighborhoods adjacent to the Beltline. The survey identified the main concerns of people living in proximity to the beltline, those main concerns included increasing property values, slightly increasing litter, crime, vandalism and property taxes. However, the Beltline was also perceived by residents to be increasing property values, providing them a place for outdoor recreation and social spaces for gathering (Weber Et. Al. 2017). A separate study was also conducted to predict resident support

for the Atlanta Beltline by measuring their frequency of use and perceived economic impact caused by the greenway as well as how the Beltline functions to psychologically, social and politically empower or disempower them. Overall, the results of this study concluded that the Beltline did empower residents in all areas, psychological, social and political. Majority of residents responded that they were psychologically, socially and politically empowered by the Beltline, the strong majority (~70%) also recorded seeing economic benefits of the greenway and were in support of the greenway. Out of the surveyed field of 598 participants, only 21.5% recorded never having used the greenway and 26. 6% recorded using it multiple times a week (Boley Et. Al. 2017). Another study showed that the two greatest benefits identified by property owners near a greenway were convenience and ease of access (Corning, Mowatt and Chancellor 2012). This study identified that access to recreation, the natural world and neighbors far outweigh the negative effects of living adjacent to a multi-use trail. Negative effects identified by surveyed participants included trespassing, loss of privacy and dog waste, these were not very widespread and are problems that may be mitigated through trail design. Overall, most property owners had favorable perceptions of the trail (Corning, Mowatt and Chancellor 2012). The studies and literature outlined above explore a wide range of the problems facing growing communities, as well as advantages and disadvantages that greenways bring to their affected areas and how they can mitigate many of the issues that this growth will cause.

RATIO OF GREENSPACE TO DEVELOPMENT

Urban green space plays a vital role in the design process of a city and they have triggered a scientific discord on the amount of greenery individuals require and to what extent contemporary approaches address the question (Cirella and Russo 2018). Greenways and other forms of active transportation have the potential to help relieve areas of the lack of space that development has caused, by setting down the framework to expand areas of greenspace. Green space also promotes physical activity, psychological well-being, and the public health of urban residents. Many U.S. cities have implemented strategies to increase the supply of urban green space, especially in park-poor neighborhoods. Strategies include greening of remnant urban land and reuse of obsolete or underutilized transportation infrastructure (Wolch, Byrne and Newell 2014). Considering how greenspace can provide the public with multiple benefits, how much greenspace is too much and how much is not enough? More so, how much greenspace should the town of Watkinsville preserve as it grows and develops?

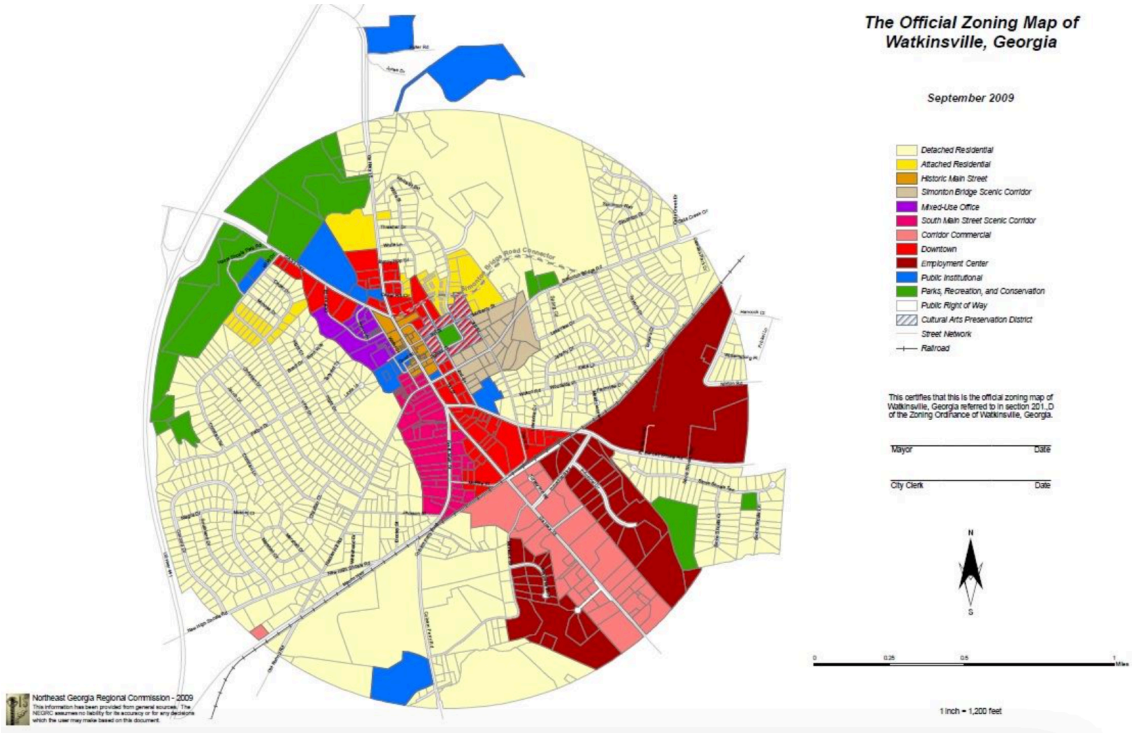

Figure 2: Zoning Map of Watkinsville (Northeast Georgia Regional Commission 2009)

Zoning and planning has led Watkinsville city limits to be recognized as the "density receiving zone". Majority of the land surrounding the city limits is composed of rural farmland, inhabited by families that make a living through farming or raising livestock. The town was designed this way to keep the outskirt areas rural so that these farms could prosper but also to reserve these areas for other industries. The city limits have been reserved for industry, public and private businesses, historic corridors and detached and attached residential. Since a large amount of the population has been squeezed into these 3.3 square miles, the city of Watkinsville is much more dense than those areas surrounding it. The density that exists within Watkinsville's city limits makes the area more prone to feel pressure from this towns growth. One way of relieving Watkinsville from this pressure of growth is by designing active transportation routes.

As Watkinsville's population grows, this can cause many problems to arise within the town. The Oconee County Joint Comprehensive Plan states that one of the biggest concerns expressed by the committee and the general public was as growth happens, the quality of life and community's unique character can erode (Oconee County Joint Comprehensive Plan 2018). The plan does outline several goals of the community, one of which is to help preserve and enhance the physical attractiveness of districts in the community, particularly gateway corridors or similar areas important to the community's image. The main goal of Watkinsville's land use plan is to promote growth that builds lasting value in the community by enhancing or complementing the existing character of the area (Oconee County Joint Comprehensive Plan 2018). The land use plan combats the threat of over development by specifying that parks should be included, and centrally situated, within new residential developments. This practice ensures that residents have access to greenspace as more dense housing is designed and constructed.

The Town of Highlands, North Carolina has a very clear land use plan which specifically outlines goals to help preserve and enhance the areas natural features. Much like the Oconee County land use plan, the Highlands land use plan strives to protect the natural environments of the Highlands Plateau, enhance the towns village character and preserve the community's cultural and historic heritage. In residential areas, their goal is to promote a small-town neighborhood atmosphere, composed of mainly low-density housing that blends with the natural environment that reflects the towns historical roots (Land Use Plan Update 2005). The land use plan includes a section that specifically outlines goals for the natural environments that exist in the town, which is to preserve and enhance the beauty of the natural scenery in the area. Other objectives of this section include, increasing minimum lot sizes, placing natural buffers, conservation easements, permeable surfaces, control development and expand and publicize the towns greenway system and existing greenspaces. Oconee County and The Highlands land use plan are very similar in their methods by which they both must outline how to make way for population growth while also preserving natural spaces. Different counties and towns have different land use priorities based upon their location and needs. The Highlands land use plan is a top-tier plan that many other towns and counties should use to shape their own, including Oconee County. Watkinsville's city limits can be identified as a high-density and mixed-use pattern which leaves space for the countryside, conservation, nature and recreation. These zoning areas include a well-ordered distinction between the city and countryside in physical appearance and land use functions to citizens of the town. This type of practice is believed to restrain urban sprawl by intensifying activity in more dense regions, reducing personal vehicle trips and providing diverse services through mixed land use and revitalization of old urban areas (Cirella and Russo 2018). This practice helps to limit the expansion of development and keep it within

specified boundaries, preserving other areas for farmland, agriculture, parks and recreation or conservation. This is the number one way Watkinsville is ensuring that development is not overpowering the town.

WHAT IS A GREENWAY?

The popularity of trails across the country and the world is rising. As it does, the world is starting to see the integration of more and more greenway networks into its cities and towns. A greenway is defined as "systems and networks of protected lands that are managed for multiple uses including: nature protection, biodiversity management, water resources, recreation, and cultural/historic resource protection. Greenway planning is defined as a strategic action that integrates theories from landscape ecology with theories and methods of landscape planning to focus on the goal of realizing a sustainable "greenway" network of protected lands, managed for compatible multiple purposes" (Ahern 1995). These designed greenways serve to link linear corridors and protected lands so that they are physically and functionally connected for humans and animals alike. Greenways usually include a shared-use path, paved or unpaved, constructed on undeveloped land that serves to provide people with recreational use or environmental protection (Little and Ashworth 1991). Not only do greenways connect protected lands but these pathways are also designed with the intent to connect neighboring towns, cities and neighborhoods alike in more urban areas. Per *Greenways as Strategic Landscape Planning*, greenways are strategically designed and spatially efficient for protecting and managing land because greenway resources are not randomly distributed but rather are concentrated in corridors (Ahern 1995). Greenways have gone through several generational changes, much like the rest of society. "They have formed as a response to classic human needs and are part of an evolving,

centuries old landscape form. They have become more than just park and amenities; greenways are an adaptation that helps to mitigate and provide counter point to the loss of natural landscape as a result of growing urbanism" (Searns 1995). Searns has dissected greenways down into three generations: Generation 1 is defined as axes, boulevards and parkways as being the ancestral greenways. Generation 2 is defined as trail-oriented recreational greenways that provide access to rivers, streams, ridgelines, rail beds and other corridors in the urban fabric. Lastly, Generation 3 is where greenways have evolved into today. They area described as "multi-objective greenways that go beyond recreation and beautification to address such areas as habitat needs of wildlife, promoting urban flood damage reduction, enhancing water quality, providing a resource for outdoor education, and other urban infrastructure objectives" they tie together the disciplines of civil engineering, landscape architecture, ecology and urban planning in an effort to address complex problems posed by expanding human developments (Searns 1995). These new generations of greenways are often designed on top of disused railways, utility or similar right of ways or unused industrial land. They can serve as pedestrian highways and virtually eliminate the risk of being struck by a car while riding a bike or traveling on foot. They are designed with the intended use in mind and should be a minimum of 10 feet wide, hard surfaced, and follow design specifications outlined under the American Association of State Highway Transportation Officials Regulations (Transportation Study, City of Watkinsville 2019). Greenways have multiple scales and they can travel a wide range of distances, anywhere from a just a couple miles to hundreds of miles. There are a few different designs of greenway infrastructure, the main ones being, a traditional greenway, a right of way that is cleared and graded to accommodate a trail system, a side path, a rail trail and a rail-with-trail design. Below, Figure 3 shows a section of the North Oconee River Greenway Trail in Athens, Georgia.

Figure 3: The North Oconee River Greenway, Athens, Ga (Athens Clarke County Leisure Services 2022)

The North Oconee River Greenway is an example of a traditional style greenway. A traditional greenway is constructed in areas of greenspaces, stream corridors, powerline easements and undeveloped land. They are constructed in areas where there is enough room for a 10 to 12-foot-wide paved path and a 25-foot-wide easement, giving enough space for runners, walkers and bikers to pass through in both directions. Traditional style greenways make up most of the proposed path in Watkinsville, running through many of the towns easements and undeveloped land. Figure 4 is an example of a cross section of a typical greenway.

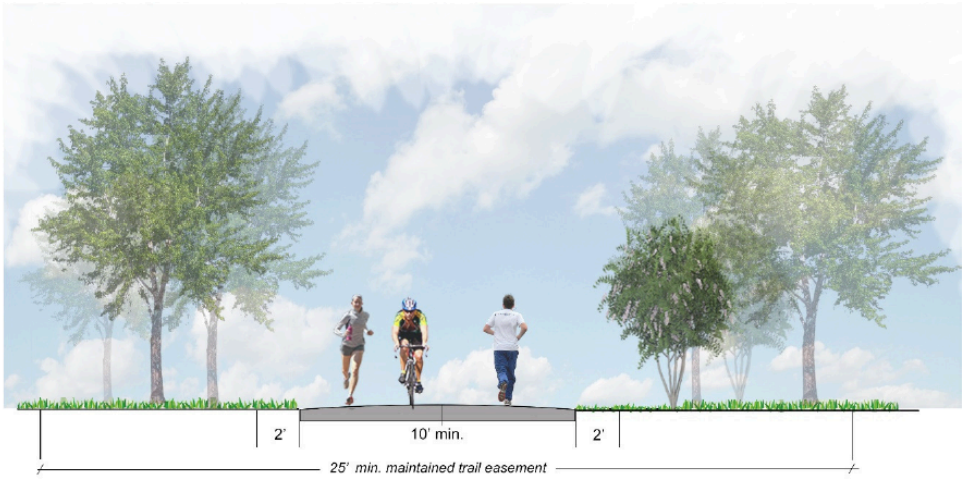

Figure 4: Traditional Greenway Cross Section (Transportation Study, City of Watkinsville 2019)

The second most popular greenway style that has been proposed in Watkinsville is the side path design. These are very similar in design to traditional style greenways but they differ in the fact that they are designed alongside main roadways and take advantage of the right-of-ways the roadway provides.

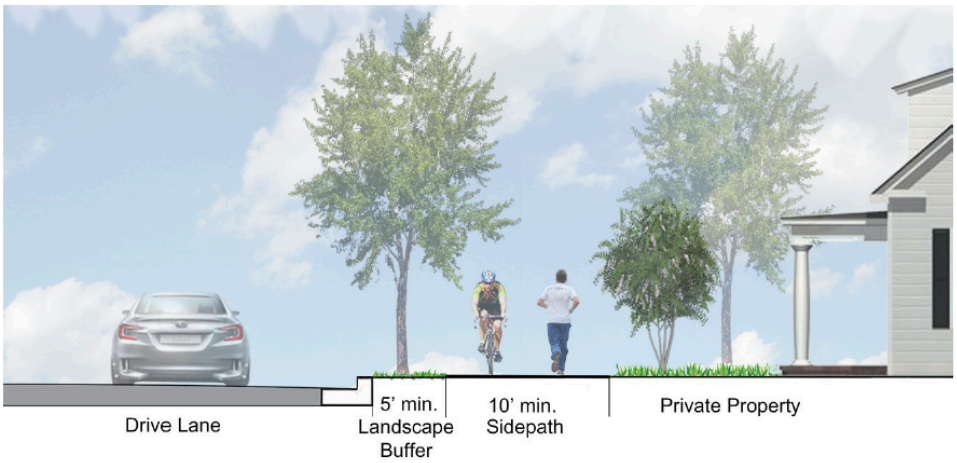

Figure 5: Typical Side Path Cross Section (Transportation Study, City of Watkinsville 2019)

Side paths have nearly the same design requirements as Watkinsville's traditional style greenways, except they don't require the same 25-foot buffer that traditional greenways require. Most of the side path designs in Watkinsville are placed adjacent to roadways, and these designs

are great alternatives to sidewalks. Unlike sidewalks, they have design standards that require them be a minimum of 10 feet wide, to have a 5-foot minimum landscaped buffer from the roadway and markers on the trail to heighten awareness that cyclists and other users are present (Transportation Study, City of Watkinsville 2019). These design elements are required so users have an increased feeling of safety and comfort compared to sidewalks. Below, Figure 6 shows an example of a side path used along Clairmont Road, in Decatur, Georgia.

Figure 6: Clairmont Road Side Path, Decatur, Ga (Transportation Study, City of Watkinsville 2019)

A rail trail is a type of greenway design that takes advantage of rail lines that have been abandoned and converts these railways to pedestrian pathways. Perhaps the biggest advantages of using these old rail lines is that they already contain the basic characteristics needed to design a greenway. These necessary factors include, gentle grades, well engineered rights of way like, bridges, tunnels, street crossings and passage through historical areas. These factors have led to the extreme rise in popularity of rail trails in the United States. However, one of the main

drawbacks of this style of greenway is that old rail lines can be hard to acquire and because of this, this style of greenway can sometimes take many years to be constructed. This design is also not possible if the rail lines are still active; which unfortunately, is the case in Watkinsville. Although, the main rail line that travels through the town only sees a train maybe once or twice in a year; it is considered lightly used and by law, the rail line is still considered active (Transportation Study, City of Watkinsville 2019). Therefore, Watkinsville must look for alternative ways for securing land for safe and effective trail connections. Luckily, the existing rail road through the town has an existing right-of-way that can be utilized for trail purposes. In addition, segments of the same rail line are being converted in the adjacent Athens-Clarke Counties as the North Oconee River Greenway which could provide connectivity to communities north of Watkinsville and into the Athens area (Transportation Study, City of Watkinsville 2019). This existing rail line right-of-way can be utilized to create a rail-with-trail system that would run through the town. This alternative design to a rail to trail greenway, takes advantage of these rail line right-of-ways and does not require the greenway to be constructed on top of the existing rail road lines. The rail-with-trail style greenway is the one that has been recommended by the transportation study and proposed along Watkinsville's main rail line corridor. Although this design still requires some grading and leveling off the ground surface alongside the lines, it does not require the construction cost of removing old lines and rail road ties, which saves a significant amount of money. Another advantage is that rails trails and rails-with-trails take advantage of the existing rail line grade, which on average is between 2 – 4%, this means that almost no grading is required when installing these types of greenways. Not only would this design be practical along the rail line in Watkinsville but it has also been shown that these trails can have many positive impacts on the surrounding community. Rail trails and rails-with-trails

prove to be among one of the most successful forms of greenway infrastructure. They frequently serve to revitalize a community and serve as its economic engine (Donovan and Morris 2004). Figure 7 is a snapshot of The Allegheny Highlands Trail, which is rail trail/rail-with-trail system spanning a total of 31 miles in Northern West Virginia (West Virginia Rails-to-Trails Council 2022). This image clearly depicts how the trail system is set back several feet from the rail line, keeping passersby a safe distance from trains that pass through.

Figure 7: The Allegheny Highlands Trail, WV (West Virginia Rails-to-Trails Council 2022)

BACKGROUND OF WATKINSVILLE:

Watkinsville first appeared in Clarke County records as early as 1791. In 1802, John Cobb gave up eight plots of his plantation to create the small city. After that, it became the seat for Clarke County and remained so until 1872, when Athens took over the roll (Luckett 2014). Shortly after, Oconee County was formed by dividing off a piece of Clarke County. Watkinsville then became the seat of Oconee County on February 25th, 1875 (Luckett 2014). Watkinsville first started out as a small village on the western frontier of the United States, wedged between Creek and Cherokee Indian territories. Fort Edward was located here and it was the town's main defense against any intruders. The Eagle Tavern now lies on the old resting place of Fort Edward. At one time, the tavern served as an old stagecoach stop and was the welcome center of Oconee County, but currently it serves as a museum, educating people on Watkinsville's history. Early on, Watkinsville's economy was based on agriculture, just like many other small towns in the south. Cotton was the crop of choice and in 1810 the United States census recorded 35 white people and 55 enslaved people in the town, by 1860, the population increased to 447 white people and 426 enslaved people (Luckett 2014). Across this fifty-year span, the population rose an average of 18.52% per year. As the population grew, so did industry. Watkinsville's economy now relies on small businesses, light industry, and the explosion of an arts community giving the town its motto of "The Artland of Georgia" (Cobb 2016). The nearby Oconee Industrial Park features many businesses and corporations located within in city limits, while the town center is a hub for many upscale boutiques, salons, and restaurants. The Historic South Main Street District is located on the National Register of Historic Places and includes places like the Ashford Manor, The Historic Haygood House, and the Ashford Memorial Methodist Church. Because of its trendy and small town atmosphere, Watkinsville has done nothing but grow even

larger in the past few years. A considerable part of Watkinsville's growth can be accredited to the fact that the University of Georgia campus is only a 6-mile drive away. UGA employs almost 11,000 people, 3,000 of which are faculty members (UGA By the Numbers 2022). Over 40% of the surveyed audience in Watkinsville has identified Athens as being their place of work (see Appendix C for complete list of survey results). As Athens and UGA grow, combined with growth from the outskirts of Atlanta, people are being pushed into towns like Watkinsville, and because of this urban sprawl, more people than ever before call Watkinsville home.

POPULATION GROWTH:

Per the United States Census, Watkinsville's population stood right at 2,896 people as of 2020, this makes up just 0.03% of Georgia's entire population (U.S Census Bureau). Currently, it is no surprise that Watkinsville is sitting at its peak population. Since the year 2000, the population has rose around 40%. The small city is growing moderately quickly and is growing faster than 87% of similar sized cities in the United States (Georgia Demographics 2022). In 2019, there were 14.6 times more White residents (2.54k people) in Watkinsville, GA than any other race or ethnicity. There were 174 Black or African American and 68 White residents, the second and third most common ethnic groups (Georgia Demographics 2022). Although, it is far from the biggest, this puts Watkinsville near the top of the list for one of the fastest growing cities in Georgia.

Table 1 graphs how much the population has grown since 1870, when the population was just a mere 643 people. The population has had a few ups and downs since then, but overall it has increased by 2,253 people, most of the growth happening in the past 50 years.

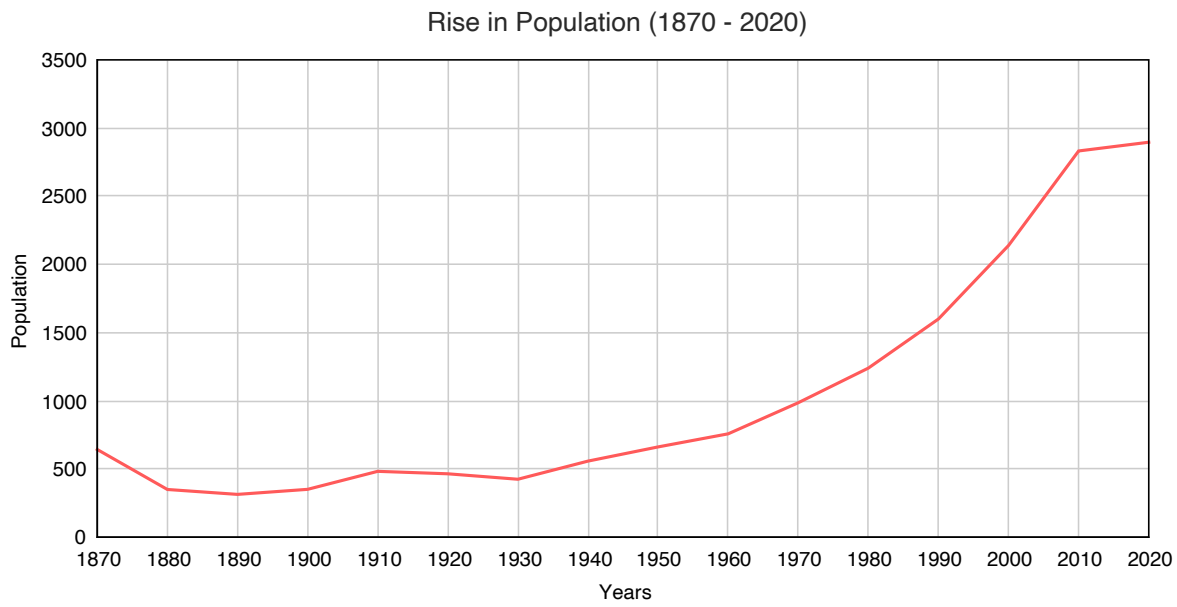

Table 1: Population Growth from 1870-2020

Based on the average growth rate of 2.29% per year over the past 50 years, one can estimate that the population of Watkinsville should be right around 3,356 people in the year 2030. This being the natural projection if there were an average amount of development and infrastructure per year. However, there has been a sudden and recent surge in the increase of housing and infrastructure in the town that this percentage does not account for.

Major projects that are contributing to this increase in housing include Wire Park, Trove and Wisteria Ridge. Wire park will construct 130 new residences, these include 20 townhomes, 50 single family lots, and 60 condominiums. Wire parks condos consist of 12 - 2 bed/2 bath floorplans and 48 - 3 bed/2.5 bath floorplans. These lots and condos will be move in ready come middle to late 2022 (Wire Park 2022). Trove will bring in 56 new single family lots just .75 miles from the downtown corridor. In addition to Wire Park and Trove, Wisteria Ridge Apartments will also bring in an additional 89-units just a quarter mile from downtown,

assuming all are filled, this could bring in as much as 220 people. These apartments are expected to be move in ready by early summer of 2022.

Watkinsville has an average of 2.48 people per household, and the addition of 275 of housing units, it can be estimated that 682 new people will call Watkinsville home in the next few years. This is in addition to the regular exponential growth rate that is expected. The data suggests that as many as 4,037 people will live in Watkinsville by 2030. Given the population in 2020, which stood at 2,896, this indicates an average yearly growth rate of 3.94% between 2020 and 2030. Meaning that, during the decade from 2020 to 2030, the population in Watkinsville will grow as much as 39% or at a rate of 3.94% annually. Equating a 1.65% rise in the yearly average population growth in this single decade compared to the past 5 decades. According to the U.S. Census Bureau, Watkinsville has an average of 2 cars per household. There are currently around 1,050 occupied households within city limits, which equates to around 2,100 cars. Given the increase in an additional 275 households, this increases the average number of cars in the town to 2,650. Naturally, the additional population rise will also increase traffic counts, creating a more congested Watkinsville.

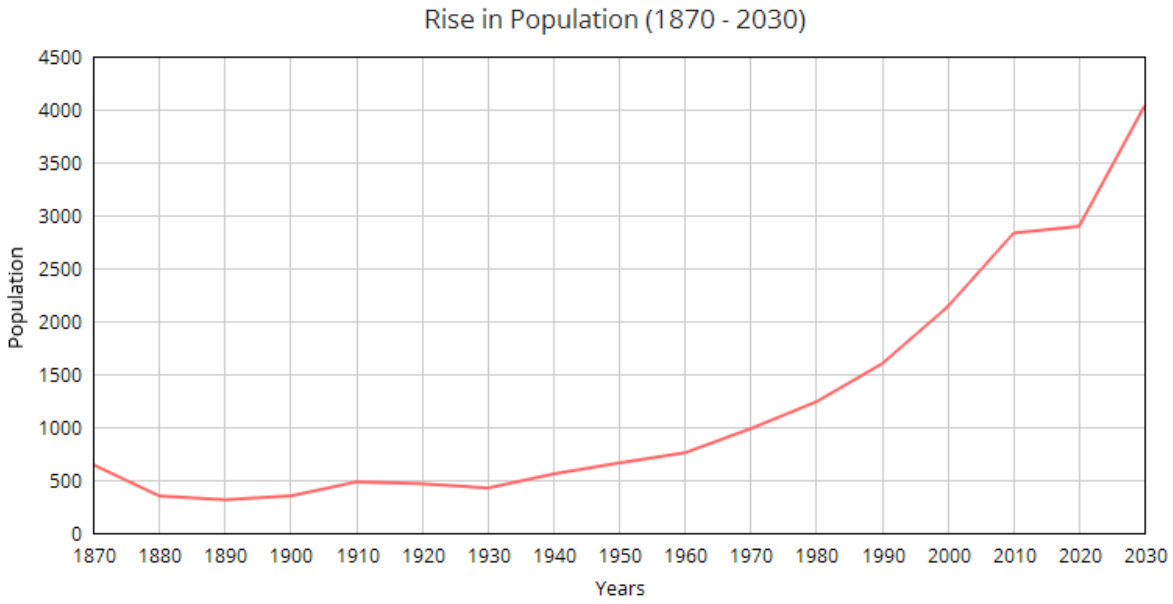

Table 2: Population Growth from 1870 - 2030

Table 2 graphs the projected population growth through the year 2030. The population started to plateau in 2010 and only had an increase of 64 people over the next 10 years leading up to 2020. It is easy to see that Watkinsville did not see that much growth during this decade. However, since the year 2020, the population has been steadily raising and with the addition of these new developments, a spike in projected population from 2020 to 2030 is expected and can be clearly be seen on this graph. This provides a clear visual comparison of how much the population will increase in this single decade compared to those in the past. This projected population growth does not account for people outside the city limits, this growth projection is calculated inside the 3.3 square miles of the city limits. The city has never seen a single spike in population this big before.

However, these calculations do not account for all the ongoing developments in Watkinsville. In 2019, a 17-acre property .35 miles from downtown was purchased by Athens Construction Group for 1.43 million dollars. The property was previously a pipe plant and it has

not been operational for most of the 2010's. Athens Construction Group has plants to rezone this property and construct a mixed-use commercial and residential development there (Prochaska 2020). Unfortunately, this is all the information available to the public at the time. However, given that this property is half the size of Trove, it can be estimated that this will bring in a number around half the size of that Trove will bring into the city. If this new development strictly constructs single family housing, it can be expected that anywhere from an additional 70 – 100 people will move into the town. However; if the development builds apartments or condominiums at this location, this number could easily double or even triple. Upon the completion of this project, Watkinsville could potentially push the 2030 projected population to well over 4,200 people. For ease of reference, this development will be referred to as the Pipe Plant Development throughout the rest of this document. It is important to note that all four of these developments are not just simply replacing old housing with updated new housing. Each development is taking land that had been previously used for industrial and agricultural practices and is rezoning it so that it can hold single family housing, apartments, condominiums, and townhouses. These developments are not taking away or demolishing any current housing from Watkinsville, they are only adding on more, causing the spike in population to be more dramatic.

SUPPORTING ARGUMENTS:

There are many benefits that the implementation of a greenway system can bring to a specific area or town. Along with many quantitative benefits, comes many other qualitative benefits. *Multi-Use Trails and Greenways as Economic Development Engines*, written by Professor Laura Brown of the University of Connecticut describes many of these other benefits; they include, improved health, increased property tax and property valuation, reduced health care costs,

congestion reduction, ecosystem services, climate mitigation and safety benefits (Brown 2020). Each one of these benefits are relevant to the town of Watkinsville. As data has been collected, sources have been picked and survey results have been analyzed, a total of six main arguments have been identified. These six arguments for the greenway system in Watkinsville were identified because of their importance and relevance to the projects goals and location they are: increase accessibility, provide public health, environmental, economic benefits, as well as mitigate problems caused by growth and give Watkinsville a sense of identity. The Transportation Study of the City of Watkinsville outlines the main vision and goals of the greenway plan, "The vision identified at the summit was to transform Watkinsville into Georgia's "Most Compelling Community" by honoring our history, building community, and creating opportunities for citizens to engage and do business with one another every day. The goals identified at the summit include: developing an effective land use plan and infrastructure that supports pedestrian safety and long term growth" (Transportation Study, City of Watkinsville 2019). Using this vision and these goals, the six main arguments were formed, each one citing literature that is specific to its own topic. The sources cited throughout the identified arguments consist of long term transportation plans, regional reports from the areas specific to Northeastern Georgia, academic journals pertaining to the specific arguments and survey information gathered from the citizens of Watkinsville.

CHAPTER 3

METHODOLOGY

RESEARCH METHODS:

1. Planned Development:

Local firms are the first to be aware of major developments planned in the area. This provides the research with an inside look on how and where Watkinsville is growing, whether that is in the more rural areas of town or closer to the downtown scene. The local firm of Smith Planning Group (SPG 2022) provided up-to date information on current and upcoming planned developments for the City. These are included in the analysis and potential impacts in greenway consideration for Watkinsville.

2. Transportation Studies

KAIZEN Collaborative (KAIZEN 2019) conducted a transportation study in the town of Watkinsville that outlines the planned greenway trail in the town. It also outlines all major roads, intersections, and pedestrian pathways that people are using to move throughout the town, while also describing who controls roadways, different roadway classifications, traffic volumes, pedestrian facilities, and pedestrian levels of stress. This document is crucial in further developing plans for a trail system as it outlines where many necessary connections need to be

made and provides information on how to interconnect these areas of town utilizing proper right-of-ways.

3. Referencing Case Studies:

Similar case studies done on nearby projects provide local relevant examples and useful information for this study. This will allow the research to analyze the strengths and weaknesses of different trail systems, providing Watkinsville with opportunities to strengthen the proposed plan. Trails like the Firefly Trail in Athens and the Silver Comet Trail in northeast Georgia are relevant trail systems and greenways that will be utilized and outlined in this research. These two case studies were selected because they both travel long distances, are rail trails, they connect larger towns to smaller ones and run through urban and rural environments, in addition, both studies have cited economic impact models. These case studies are also both in the state of Georgia and these greenways travel through areas with similar populations and demographics of Watkinsville. These case studies will help this thesis determine benefits that greenway infrastructure can bring to the town of Watkinsville as well as provide this thesis with the framework to determine the possible economic impact of the greenway system of Watkinsville.

4. Public Input:

One of the most useful methods of data collection this thesis takes advantage of is surveying. As a designer, it is important to serve as a liaison between planning officials, firms and members of the community whose lives will be directly impacted by plan proposals and designs. This survey was designed and distributed in a way so that it was only available to those who live inside the city limits of Watkinsville and those who live in close proximity to the city

limits. This was done in order to directly reflect the needs and wants of the community of Watkinsville, especially those who will be impacted by the greenway in Watkinsville. Additionally, this made sure that the data collected was not skewed by those living far outside city limits and that it was as accurate as possible. This was extremely important in order for the thesis to accurately gauge the economic and social impacts of a greenway in the town. This process was completed by distributing the survey at a monthly Watkinsville City Council Meeting and sharing it to citizens of Watkinsville via the county's email list serve (see Appendix A for a copy of the Survey Questionnaire).

Providing a link between the designer and the stakeholder is often used in the design field to make sure that designs reflect the needs of the community and those invested. A survey was designed and approved for distribution by the Institutional Review Board (IRB) at UGA, study number 00005276 (Appendix A). The purpose of this study was to gauge public opinion of greenway infrastructure. It asked questions like: How often do you go on walks outside or exercise? Would you be willing to use a greenway system if there was one near your house? And, what major destinations in the town do you think would benefit if connected by a greenway? The survey can be viewed in Appendix B, and a full summary of the findings can be seen in Appendix C. The survey was distributed as an online link through the software Qualtrics, survey participants used a QR code or an online link sent to them to access and take the survey on their smartphone or computer. The survey was distributed to roughly 25 citizens of Watkinsville via city council meeting on Feb. 16th, on Feb, 17th, the survey was sent out via email list serve shared by the city. Hard copies were also available to survey participants at the city council meeting who did not have access to a smartphone. The exact sample size was not recorded; however, a total of 159 responses were recorded when the data was extracted on Feb.

23rd. By gaining citizen input on a trail system and working along with them to help further develop the ideas outlined by this research, designs can be more inclusive and can address the communities most pressing needs. The survey includes questions regarding people's knowledge and use of trail networks, their demographics and their opinions of Watkinsville's most important features. Questions like these can help to determine the number of people who have access to available trail systems and how likely they are to use them. This way of data collection will clearly outline problem areas in the community and define elements that need to be addressed in the overall greenway plan of Watkinsville. Community input can also help garner future support, when community members feel that their voices have been heard and they have an active role in shaping their own place, they are more likely to support the ideas and designs.

5. Analysis:

Research was conducted by collecting and analyzing data from local firms, transportation studies, case studies, public input, and a survey that distributed to over 150 Watkinsville Residents. An analysis provides a synthesis of the information with recommended actions for future greenway development, including proposals beyond current planning documents. This analysis will clearly show where problems have been identified within the community, and begin to address ways to eliminate these and other issues using design. This thesis provides preliminary quantitative estimates of the economic impacts to Watkinsville and the potential growth the greenway will bring into the town. It will also provide estimates of greenway system use and identify some of the main drivers of growth in the area. Qualitative factors are also identified such as environmental access and awareness, social connections, health benefits and rural and ecological preservation.

The five research methods outlined above are the different ways that data will be collected with the intent of answering the research question outlined earlier in this document. What are Watkinsville's resident's attitudes toward greenway infrastructure? As this thesis determines Watkinsville's resident's attitudes toward greenway infrastructure and explains all the advantages and disadvantages relevant to Watkinsville, it will formulate a stronger argument for the implementation of the greenway system in Watkinsville. As survey results are analyzed and digested, these will play a key role in answering whether residents support the implementation of a greenway in the town or reject it. Some supporting questions that this thesis will answer along the way include:

- What are the drivers of growth in Watkinsville?
- How does the Watkinsville compare to other towns across rural Georgia in terms of its population and growth rate?
- How do greenways relieve people of the lack of space caused by development?
- How much of a potential economic impact will the greenway system have in Watkinsville?
- How can greenways help a community maintain its sense of space while also providing relief from growth pressure?
- What steps is Watkinsville taking in designing its greenway system to help accommodate the suburban expansion that is happening?

ANALYSIS OF WATKISNVILLE:

Some might argue that Watkinsville is a town where change happens more gradually over the course of many years; however, this is no longer the case. Given the current growth rate and projected growth rate through the next decade, Watkinsville will soon need to find new ways to alleviate problems caused by this growth. This thesis has demonstrated that throughout the next decade, Watkinsville will expand its population nearly 30%. This is the biggest surge in population growth the town has ever seen. The influx of business and people into city limit boundaries has been clearly outlined through research involving past and current U.S. Census Records combined with extensive research and knowledge of all current and future development in the area, this has allowed for accurate predictions to be made on how the population will be affected over the next several years. These numbers have made it clear that the town of Watkinsville shows no signs of slowing down.

DISCUSSION OF ARGUEMENTS AND APPLICATION TO WATKINSVILLE:

The 6 arguments outlined in Chapter 2, combined with research of literature studies relevant to the topic and Watkinsville's resident's opinions of the greenway design, demonstrates strong community support for such a project. Watkinsville's proximity to UGA, Atlanta, its small town feel and rural atmosphere, and exponentially growing population all play a significant role in helping Watkinsville to become the perfect location to implement such a plan. The greenway system will do much more than relieve the town of traffic, it will improve the quality of life for all people who live in and around Watkinsville and those who come to visit it. It will facilitate the growth of a new, healthier community, increase pedestrian access across the town, create a safer community, promote ecological systems and environmental stewardship, increase

the already present sense of identity in Watkinsville and it will prove as a smart investment move for the towns business corridor.

CASE STUDIES:

THE FIREFLY TRAIL, *ATHENS, GA*

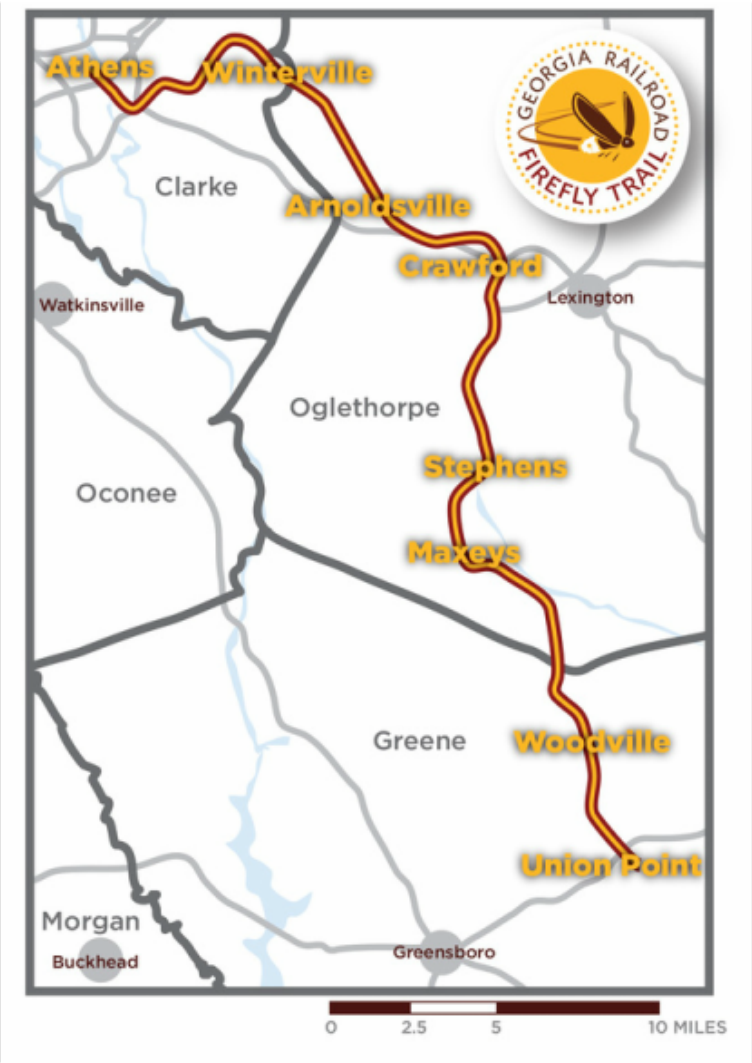

Figure 8: The Firefly Trail Map, Athens, Ga (Georgia Railroad Firefly Trail 2022)

The Firefly Trail is a planned 39-mile-long rail trail system connecting Athens to Union Point, Georgia. It connects Athens-Clarke, Oglethorpe and Greene counties. It is 14 feet wide and open to all types of non-motorized travel, except horseback riding. The full trail is also ADA accessible, making it easy for all to use. The Firefly trail also takes advantage of the historic Athens Branch of the Georgia Railroad which branches off to the still active Augusta to Atlanta line. This trail was funded through federal and state grants, a Special Local Option Sales Tax (SPLOST) tax, the Georgia Department of Transportation, the Athens-Clarke County Department of Leisure services as well as the many donors and riders in the community. The trail was designed with the goals of enhancing property values and protecting individual's property rights, while providing riders, runners and walkers with a quality

trail. Construction on the trail began in 2019 and is still underway today, most of the trail in Athens City limits has been constructed; however, the majority of the trail outside of Athens is still under construction (Georgia Railroad Firefly Trail 2022). The Firefly Trail directly connects into the 3.5-mile-long North Oconee River Greenway Trail in Dudley Park, Athens which then stretches north to the Sandy Creek Nature Center. Below, figure 9 shows an elementary school class walking along the Winterville Model Mile section of the Firefly Trail (Georgia Railroad Firefly Trail 2022). They can safely move throughout the town along this section that follows alongside Main Street in Downtown Winterville.

Figure 9: Winterville Section of the Firefly Trail (Georgia Railroad Firefly Trail 2022)

Because of its improvements in connectivity throughout Athens and the neighboring communities, it is predicted that The Firefly Trail will have a drastic economic impact on the

area. In 2016, Dr. Shatakshee Dhonge composed an Impact Analysis for Planning (IMPLAN) study, analyzing the potential economic impacts of the Firefly Trail. An output model was developed by this study, and it was determined that the construction of the project will lead to a one time increase of $32 million, while the estimated cost of the project would cost around $24 million (.62 million/mile of trail built). This implies that for every dollar spent on the trial will generate a total economic impact of $1.33. Construction would also generate 158 new jobs. An indirect impact of $5 million due to the purchases of goods and services made towards the construction of the project and an impact of about $3 million due to the time spending undertaken by employees on restaurants, shops and so on. Household incomes are expected to rise by $6.9 million. Assuming an annual turnout of about 1.13 million people to the trail once it is fully operational, total output is expected to increase by $14.7 million per year (Dhonge 2016). The Firefly trail will provide a much-needed economical boost to this area, it will generate economic benefits in multiple ways, through job creation and generation of additional tax revenue. Overall, the implementation of this trail network will not only jumpstart the local economy but it will also create a "destination" in of the area. People from surrounding communities will travel to the trailheads to come walk, run and ride the trail network. Because of the trails proximity into the downtown scene in Athens, it provides citizens with a safe way to travel throughout the town, and for those who work in Athens, they can safely commute to work. Because of the Firefly Trails proximity to Watkinsville, it is perhaps the most relevant case study for the Watkinsville greenway plan. Watkinsville is a bit bigger than the towns that the Firefly trail will have an impact on; therefore, based on these circumstances, the implementation of a

greenway trail in Watkinsville might bring along a lot of the same economic gains outlined in this model.

THE SILVER COMET TRAIL, *ATLANTA, GA*

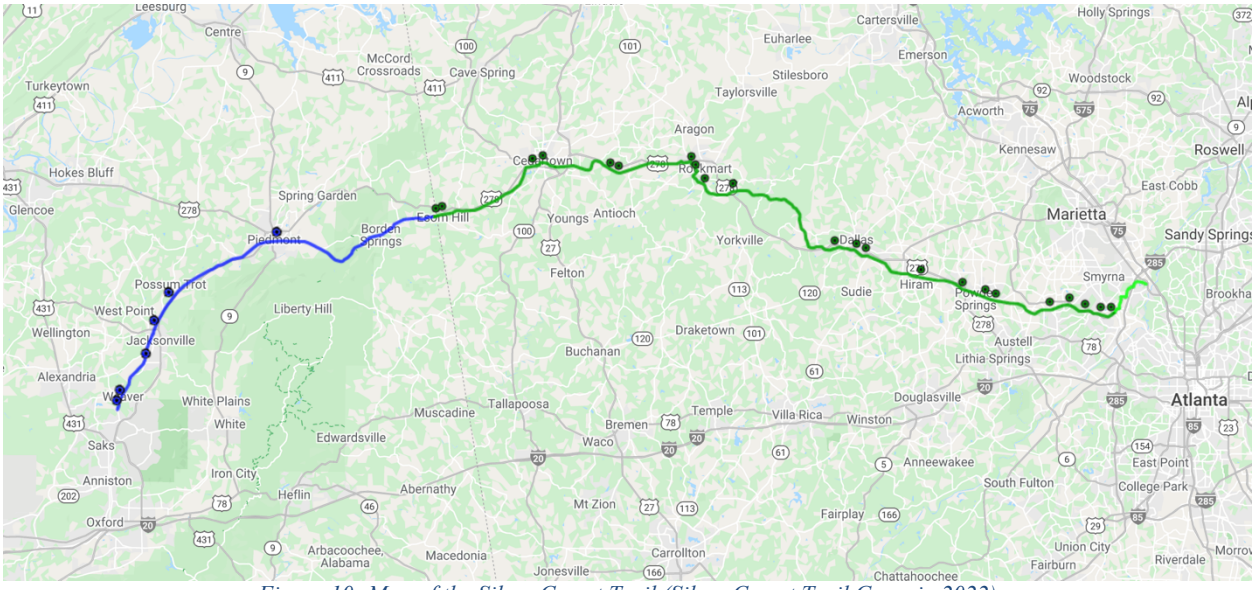

Figure 10: Map of the Silver Comet Trail (Silver Comet Trail Georgia 2022)

The Silver Comet Trail is located between Atlanta and Georgia's western border with Alabama. The Georgia section of the Silver Comet trail (shown in green on the map) spans a total of 61.5 miles. Upon entering Alabama, the trail connects with the Chief Ladiga trail (shown in blue on the map), extending the entire trail distance to 94.5 miles, making this trail system the longest continued paved path system in the United States (PATH Foundation 2022). Much like the Firefly Trail system, The Silver Comet Trail travels through many different counties and towns. It passes through Cobb County, Paulding County and Polk County, traveling through around four different towns (Silver Comet Trail Economic Impact Analysis and Planning Study 2013). The Silver Comet Trail was built over an abandoned rail line and falls under the rail trail

category. In 1897 the original rail line was constructed, and it 1947 the Silver Comet passenger train was introduced to the rail line. Thus, giving the Silver Comet Trail its name. During the height of rail travel, this passenger train consisted of sleek passenger, sleeper, dining and observation cars. This rail line provided crucial connections to other rail lines, allowing travelers to travel to big cities to the north or south. The Silver Comet Rail was known for its scenic views as it traveled through small towns, thick forests, open farmlands and big cites (Silver Comet Trail Georgia 2022). When rail travel eventually declined in 1969, the Silver Comet discontinued their passenger, sleeper and observation cars and the trains just carried freight. The freight trains operated until 1989 and the rail line was abandoned until the line was purchased from CSX by the Georgia Department of Transportation in 1992. Originally the Georgia DOT wanted to explore the rail line for future transit use, this idea was later abandoned and it was decided that the rail line would be transformed into a multi-use trail for non-motorized travel instead. In 1998, the construction process began with a 12.8-mile-long section of the trail in Smyrna, Georgia. This section of the trail became very popular and remains as one of the busiest parts of the trail even today. Construction was completed in August of 2008, 10 years after it began (Silver Comet Trail Economic Impact Analysis and Planning Study 2013).

Figure 11: Spring Time on the Silver Comet (Silver Comet Trail Economic Impact Analysis and Planning Study 2013)

The Silver Comet Trail remains one of Georgia's most prominent trails because of its gentle 2% grade along almost the entire 61 miles, this can be attributed to its construction on top of the old rail lines. The trail also features many pedestrian friendly amenities along the way, restrooms, water fountains, benches and trash receptacles. Along with these necessary features, the trail is also known for its trestles, a 700-foot-long tunnel, and proximity to nearby towns with restaurants and shops. This trail is a cyclists and runners dream because of its long stretches of uninterrupted trails, which has become extremely hard to find in this area of the state. The trails construction was made possible with donations from the PATH Foundation, Cobb County Parks and Recreation as well as the Georgia Rails into Trails Society Incorporated, otherwise known as G.R.I.T.S.

ECONOMIC IMPACT OF THE SILVER COMET TRAIL:

Many efforts have been made to try and understand the impacts of the Silver Comet Trail along its many different portions but in 2013, an intensive economic study of the entire 61 mile

stretch of the Silver Comet Trail was done. The study was made possible by the Northwest Georgia Regional Commission, Atlanta Regional Commission and the Georgia Department of Transportation (Silver Comet Trail Economic Impact Analysis and Planning Study 2013). It aimed to answer many questions about the trail, some of those being:

- How many people are using the trail and where are they using the trail?
- Who is using the trial? Runners, bikers, walkers, skaters?
- When and how often are people using the trail?
- Do people spend money in the communities along the trail and if they do, what are they spending their money on?
- What impact on property values did the trail have on surrounding properties?

The answers to these questions, the planning team developed a data collection methodology specific to this project but also one that is in line with national best practices. The methodology was developed as part of the National Bicycle and Pedestrian Documentation Project and the project was co-sponsored by Alta Planning + Design and the Institute of Transportation Engineers (ITE) Pedestrian and Bicycle Council. Surveys and trail counts were the two main methods that data was collected from the public.

To understand the scale of the economic, impact the Silver Comet Trail has on its surrounding areas, it is important to first understand the trail users and their activity habits. According to the trail study, their data suggests that the trail sees an annual turnout of about 1.9 million visitors to the trail every year with 400,000 of those being from out of state. More males use the trail than females throughout every segment of the trail, 62% male and 38% female. 97% of people use the trail for recreation or exercise, though many people do use the trail for commuting or to access nearby destinations, especially in urban areas. 71% of people travel the

trail by bike, 28% travel it on foot (running/walking) and 1% use it for another reason, the biggest other reason being to enjoy nature. People have traveled from 23 different countries and 8 different states to come visit the trail. In addition, it was also found that when surveyed, most people spend money on food and may spend up to 50 dollars per visit (Silver Comet Trail Economic Impact Analysis and Planning Study 2013). All this information was collected through counts and surveys at nine locations along the trail using the methodology from the National Bicycle and Pedestrian Documentation Project outlined above.

The data identified 6 different ways that recreational activities along the rail trail boosted economic development in the region.

- Recreational Spending (bike rentals, food and drink, sporting equipment)
- Tourism (defined as spending by out of state users on lodging, transportation and dining)
- Spillover Impacts (additional jobs and worker spending)
- Fiscal Impacts (sales tax revenue generated)
- Increased Property Values (increased household wealth near SCT)
- Property Tax Revenue (benefitting municipalities and school districts)

Table 3 shows the summary of the impacts for the existing Silver Comet Trail.

Summary of the Economic Impacts of the Existing Silver Comet Trail:	Current Trail Network:
Recreational Spending	$47 Million
Tourism Spending	$10 Million
Regional Spillover	$98 Million
State Spillover	$118 Million
Statewide Fiscal Impact	$4 Million
Property Value Increases	$182 Million
Property Tax Gains	$2 Million
Total:	$461 Million

Table 3: Summary of the Economic Impacts of the Existing Silver Comet Trail (Econsult Solutions Inc.)

The effects of the trail system generated a local increase of $24 million in recreational spending, $5 million in tourism, $130 million increase in property values and $1.7 million in annual property tax revenues to municipalities and school districts. The regional and state effects proved to be even larger. Per this study's findings, it has been estimated that for every dollar spent on the Silver Comet Trail, Georgians expect to see a $4.64 gain in direct and indirect economic benefits. This translates to an over 400% return on investment for local communities, the region and the state, making the Silver Comet Trail a major economic engine for the surrounding area (Silver Comet Trail Economic Impact Analysis and Planning Study 2013).

CHAPTER 4

WATKINSVILLE, GA

WATKINSVILLE'S TRAIL NETWORK PLAN AND CONNECTIONS:

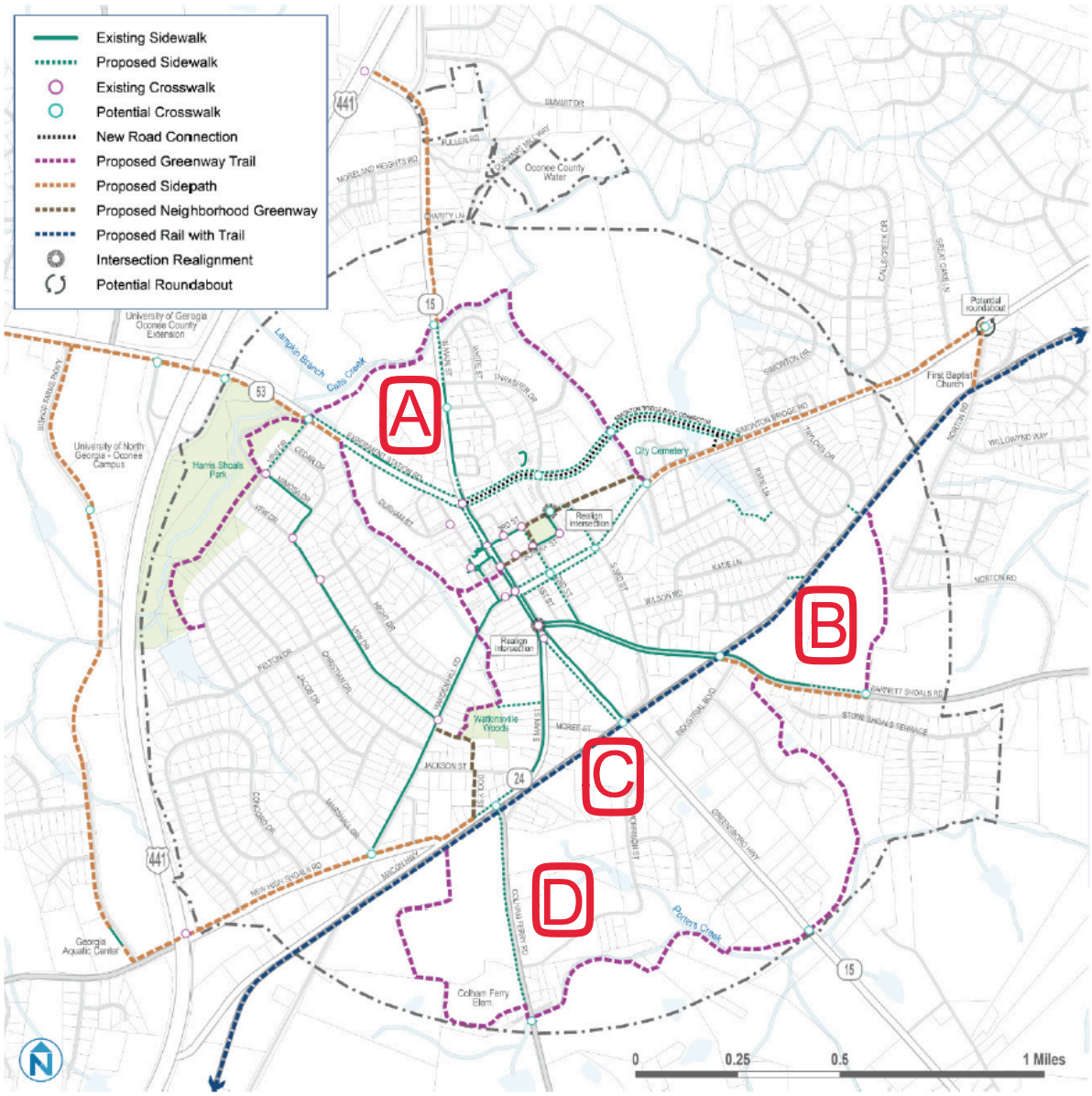

Figure 12: Proposed Trail Network in Watkinsville (Transportation Study, City of Watkinsville 2019)

Figure 12 is the proposed trail system in Watkinsville that was outlined in the 2019 Transportation study of the city. Important locations are outlined by A, B, C and D. These are the locations of the four major developments currently being constructed inside the towns city limits. These locations are as follows:

Development:	Total Units:	Estimated Population:	Automobile Traffic Generated:	Distance to Downtown:
A. Wisteria Ridge (multi-family)	89	221	442	.4 Miles
B. Wire Park (mixed-use)	130	322	644	.7 Miles
C. Pipe Plant Development (mixed-use)	40	99	198	.3 Miles
D. Trove (single-family)	56	139	277	.8 Miles
Totals:	315	781	1561	

Table 4: Development Breakdown in Watkinsville

Wisteria Ridge (A) is a multi-family, 89-unit apartment complex .4 miles from downtown, adding approximately 221 people and 442 cars. Wire Park (B) is a mixed-use, 130-unit development consisting of a mix of condominiums, single-family housing and apartments .7 miles from downtown, adding approximately 130 people and 322 cars. The Pipe Plant Development (C) is going to be a mixed-use development consisting of approximately 40 units of apartments, condominiums and single-family housing .3 miles from downtown, adding approximately 99 people and 198 cars. Trove (D) is a single-family development consisting of 56 single family lots .8 miles from downtown, adding approximately 139 people and 277 cars. Upon completion, these developments will add around 315 units, 781 people, and 1,561 cars, all within .8 miles of downtown Watkinsville.

The plan above shows all the existing and proposed sidewalks, cross walks, rail-with-trails, side paths and greenways. This plan makes use of stream corridors, major roadways, right of ways and unused land between properties. Of the four major developments currently happening in Watkinsville, two of them are located right along the proposed rail-with-trail line. Wire Park and The Pipe Plant Development properties border the proposed rail-with-trail going through the

center of Watkinsville. The other two are a short distance from the rail-with-trail and are connected into the downtown corridor using other sidewalks and greenways. The entrance of Trove is located only a quarter of a mile away from the rail-line, which equates to about a five-minute walk or less than a two-minute bike ride. Wisteria Ridge is about .9 miles away from the proposed rail-with-trail, which equates to about a 15-20-minute walk or 5-minute bike ride.

Of the 160+ people surveyed, it was determined that the two most popular destination spots for the town were Harris Shoals Park and the downtown corridor, which can both be seen in Figure 12. Connections between these two areas do not currently exist; however, connections have been proposed by the transportation study. After analyzing this existing and proposed trail network, it has become clear that many of the popular destination spots of the town have been connected by the proposed pedestrian infrastructure. Including, two of the main topics that were reappearing in the survey data collected was a connection between one of Watkinsville's main shopping plazas, Butlers Crossing, and downtown Watkinsville, the other was a connection between downtown Watkinsville and the local schools. Figure 12 shows a fix to this issue, a side path has been proposed down Experiment Station Rd, which leads out of Downtown Watkinsville and into Butlers Crossing. The distance between downtown Watkinsville and Butlers Crossing is around 1.8 miles.

FUTURE CONNECTIONS:

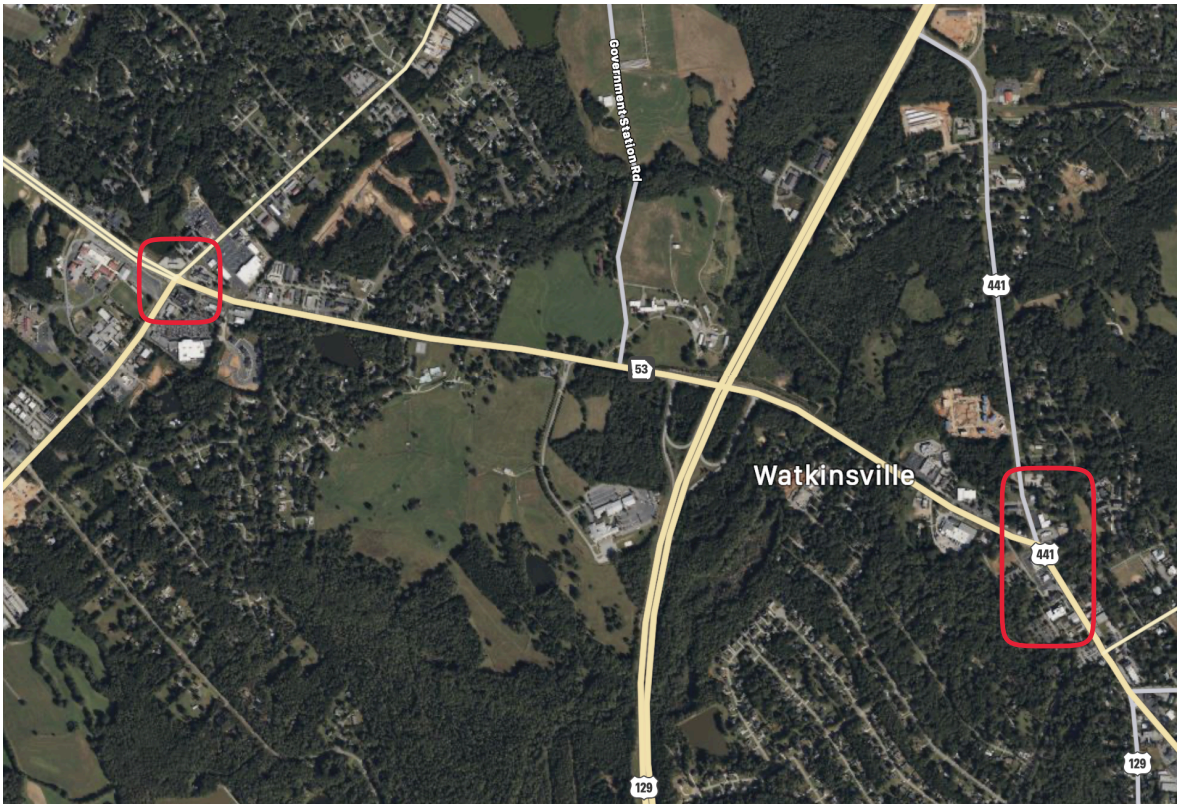

Figure 13: Connection between Watkinsville and Butlers Crossing

Butlers Crossing and Downtown Watkinsville:

Figure 13 shows where Butlers Crossing (left) is, in relation to Downtown Watkinsville (right). The plaza is connected to downtown Watkinsville by State Route 53 (Experiment Station Rd). This side-path connection was requested by many citizens, mostly because Butlers Crossing is the location of many grocery stores and schools in the area that citizens visit on a regular basis. Oconee County Middle School and Oconee County Primary School are in Butlers Crossing, Oconee County High School is approximately a mile down the road from Butlers Crossing and there is already an existing sidewalk that connects Butlers Crossing to Oconee County High School. By extending the side path from downtown Watkinsville all the way down Experiment Station Rd and into Butlers Crossing, the transportation study provides Watkinsville's citizens

with a critical connection to not only their most busy shopping center but also to three of Oconee County's schools.

Rail-Line to Wire Park

The Transportation Study and the masterplan of Wire Park leave out a critical connection connecting Wire Park to the existing rail-line corridor. Wire Park's masterplan can be seen below in figure 14. Wire Park borders the existing rail-line that runs through Watkinsville. Number 8 in the plan does show a small connection to the rail-line; however, this connection is a proposed dirt path through the surrounding woods. This rail-line is the future site of the Athens Rail-Line Corridor Project, that would connect Athens to Watkinsville and Watkinsville all the way to the City of Madison about 20 miles south (Northeast Georgia Regional Commission 2011). The cities of Athens, Watkinsville and Madison do have plans to complete this project in the future; however, the rail-line must be purchased first. Given that Wire Park is one of Watkinsville's biggest incoming developments, that will house nearly 325 people and several new businesses, it needs to provide for a 10' – 12' wide, concrete connection to this rail-line corridor. This connection is crucial for the rail-line and Wire Park's success because Wire Park is only about 6 miles from downtown Athens if connected by the rail-line. Users of the Athens rail-line greenway should have a clean and clear entrance into and out of Wire Park, this can provide people with ample connections while also promoting business activity in the new development.

Figure 14: Wire Park Masterplan (Smith Planning Group 2020)

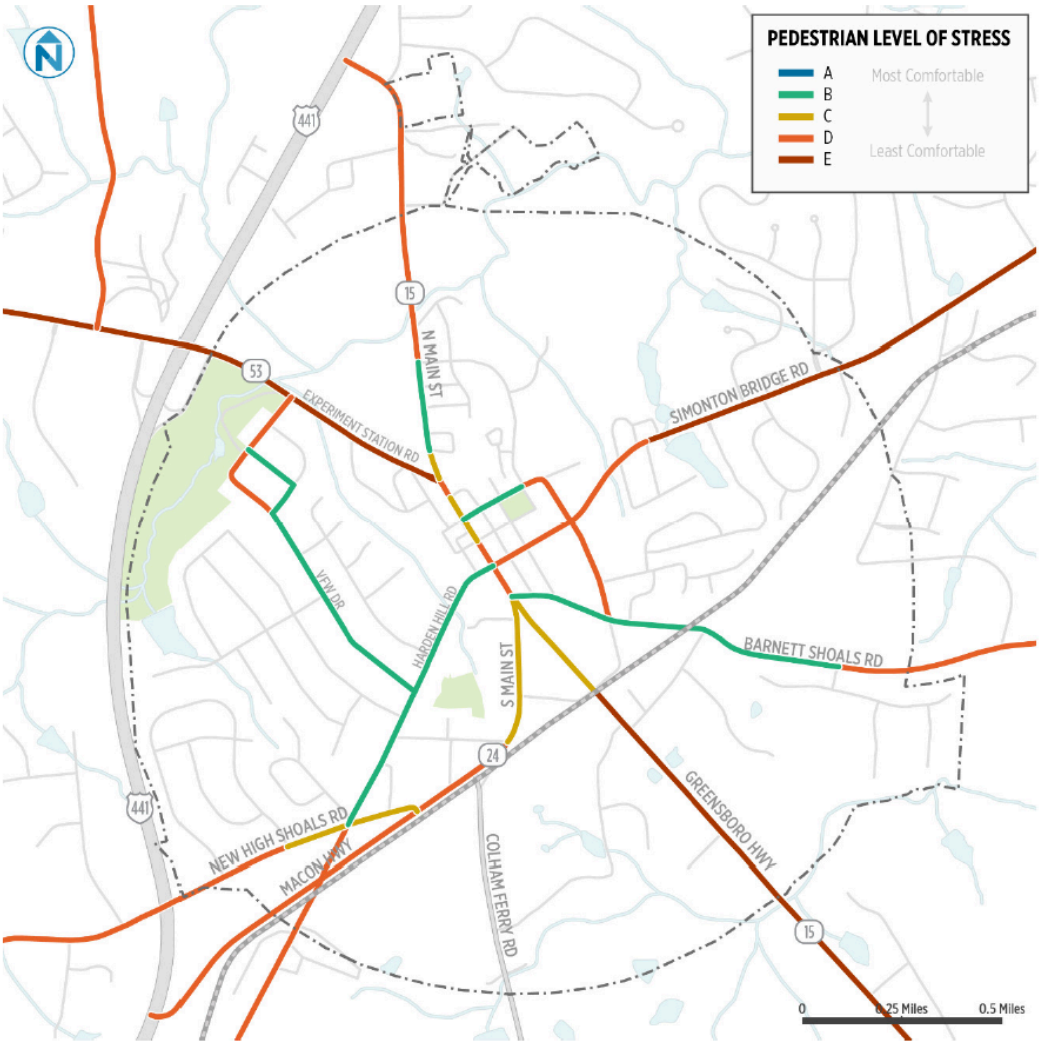

Figure 15: Pedestrian Levels of Stress (Transportation Study, City of Watkinsville 2019)

Some might ask, why does Watkinsville need improved pedestrian infrastructure in the first place? As outlined by the Transportation study, pedestrians in Watkinsville feel a greater amount of stress while walking along several of the major roadways in the town. There are also no defined bicycling facilities on or along major roads in Watkinsville, despite the high level of active people in the town. The comfort levels among riders is relatively low along roads where there is traffic and no shoulder present; however, comfortability levels are higher along road with wider shoulders.

Route	Conditions
Route A: SR 15 and Main Street	▪ Identified as the least bikeable portion of the network ▪ Potholes, broken pavement, debris, and uneven surfaces were identified ▪ Long waits at intersections with confusion on proper location for bicycle travel
Route B: Simonton Bridge Road and Harden Hill Road	▪ Heavy traffic volumes and speeds with a narrow bridge crossing ▪ Potholes, broken pavement, debris, and uneven surfaces were identified
Route C: SR 24/ Macon Highway and New High Shoals Road and Colham Ferry Road	▪ New High Shoals is bicycle-friendly with adequate space for cycling ▪ Macon Highway and New High Shoals Road have heavy, fast-moving traffic ▪ Potholes, broken pavement, and a challenging railroad crossing were identified
Route D: SR 5	▪ Heavy and fast traffic with inadequate space for cycling ▪ Long waits at intersections with confusion on proper location for bicycle travel
Route E: Barnett Shoals Road	▪ Wide, bicycle-friendly right of way with little traffic ▪ Potholes, broken pavement, debris, and uneven surfaces were identified ▪ Bumpy/angled broken pavement
Route F: VFW Drive	▪ Low traffic and good lighting ▪ No dedicated cycling space ▪ Cracked and broken pavement

Figure 16: Bicycling Conditions in Watkinsville (Bikeability and Walkability Audit for the City of Watkinsville)

Figure 16 outlines six routes evaluated by the Northeast Georgia Regional Development Center for their bikeability. This audit addressed major obstacles to safe and convenient cycling and walking in Watkinsville. All of these routes can be identified above in Figure 16. The main goals outlined by this transportation study are to create a more connected community, honor Watkinsville's history while welcoming innovation and accommodating change, and to provide opportunities for all as a welcoming and inclusive community (Transportation Study, City of Watkinsville 2019).

ATHENS RAIL LINE CORRIDOR, WATKINSVILLE SEGMENT:

As previously mentioned, the Athens Rail Line Corridor project would create a link between Downtown Athens and the city of Madison while crossing through the towns of Watkinsville, Bishop and Farmington, a total distance of about 30 miles. The proposed Watkinsville segment of this plan runs northeast to southwest through the heart of Watkinsville and is approximately 1.95 miles long. This project is significant because it would provide a connection that would link Watkinsville to Downtown Athens, a distance spanning approximately 6 miles. Making downtown Athens accessible to Watkinsville citizens by foot or bike. The average person bikes one mile in around 3 to 4 minutes, so this puts Downtown Athens within an 18 to 24-minute bike ride of Watkinsville. The Watkinsville Segment of the Athens Rail Line Project can be seen on the next page in Figure 17. The Watkinsville section of the rail-trail also plays a significant role in helping to link together three of the four major developments in the town. The trail would provide a connection between Wire Park, the Pipe Plant Development and Trove, allowing people in Trove and the Pipe Plant Development to ride their bike, walk or run to Wire Park within minutes, while simultaneously alleviating some of the traffic these developments will add to the town.

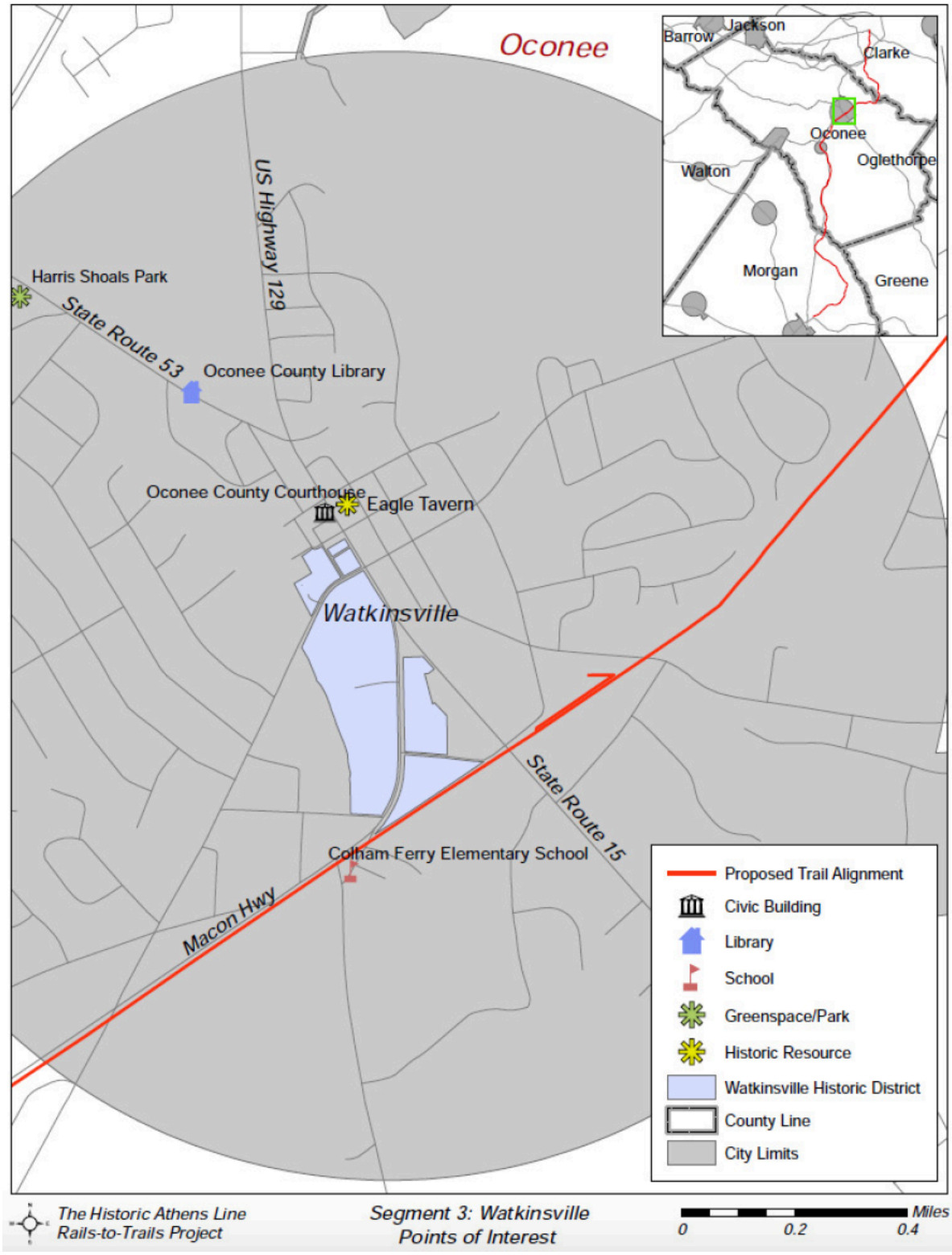

Figure 17: Watkinsville Segment of the Athens Rail Line Project (Transportation Study, City of Watkinsville 2019)

Colham Ferry Rd Intersection:

The Figures below outline an example of how the Athens Rail Line would be constructed as outlined by the Watkinsville Transportation Study.

Figure 18: Existing Conditions of Colham Ferry Rd

Figure 19: Proposed Design of the Colham Ferry Rd Intersection (Transportation Study, City of Watkinsville 2019)

ANALYSIS OF THE WATKINSVILLE SECTION OF THE ATHENS RAIL LINE PROJECT:

Cost:

The cost of constructing a multi-use trail varies widely based on a variety of conditions. Typography, urban and rural settings, environmentally sensitive areas, and many other conditions play a major role in the construction of a multi-use trail. It is only when a specific corridor has been identified can an individual analysis be developed for each corridor. Toole Design of Madison Wisconsin has developed a spreadsheet based trail cost calculator to provide probable cost for the construction of new trails at the conceptual level based on a variety of conditions. These cost calculations were developed by identifying major components of trail construction to determine a rough estimate of the cost per mile. This spreadsheet calculator has been modified for the area of Watkinsville and the specific multipliers and cost per mile has been adjusted. This spreadsheet calculator can be seen in the table below.

Multi-Use Trail COST CALCULATOR			
ITEM		MULTIPLIER	RUNNING SUBTOTAL
CONCRETE SURFACE PER MILE COST			$ 647,684.00
LENGTH	MILES	1.9	$ 1,230,599.60
WIDTH	FEET	12.0	---
SETTING	RURAL	1.2	$ 1,476,719.52
TERRAIN	FLAT	1.0	$ 1,476,719.52
RR GRADE	NO	1.0	$ 1,476,719.52
STREAM/RIVER	NO	1.0	$ 1,476,719.52
CONTINGENCY		30%	$ 1,919,735.38
DESIGN		15%	$ 2,207,695.68
FUNDING SOURCE	LOCAL	0%	$ 2,207,695.68
DESIGN ESCALATION	STATE	30%	---
(LOCAL)	FEDERAL	50%	---
	AVG COST/MILE		$ 1,161,945.10

Table 5: Trail Cost Calculator Watkinsville (Smith Planning Group 2022)

According to this calculator, the total cost of the 1.95 miles of the Watkinsville section of the Athens Rail Line Project comes to a total of 2,207,695.68 dollars. The trail cost calculator

does not include costs associated with easement/right-of-way acquisition, permitting, inspection, construction management, surveying, geotechnical investigation, documentation or mitigation. However, Smith Planning Group out of Watkinsville has put together a cost analysis of surveying, design development, construction documents and construction administration. These cost breakdowns can be seen below in Table 6.

PHASE	% OF TOTAL FEE	FEE
SURVEY	---	$ 55,400
SCHEMATIC DESIGN	20%	$ 57,592
DESIGN DEVELOMPENT	25%	$ 71,990
CONSTRUCTION DOCUMENTS	40%	$ 115,184
CONSTRUCTION ADMINISTRATION	15%	$ 43,194
	100%	$ 287,960
TOTAL + SURVEY		343,360

Table 6: Survey + Design Costs (Smith Planning Group 2022)

The addition of these survey and design costs puts the 1.95-mile-long section of the Athens Rail Line Project at a total of 2,551,055.69 dollars. This cost does not include land acquisition, maintenance costs, structures, street crossings, lighting, wayfinding signage and trail amenities.

PHASING AND FUNDING:

The construction of this multi-modal trail network across Watkinsville will not all be completed at once; the project will be divided into phases and each phase will be constructed over a set period of time. The Watkinsville Transportation Study divided this trail system construction into three different phases. Unlike the traditional phases, these phases were divided by their need and opportunity as opposed to time. The phases are identified as Quick Wins, Short

Term and Long Term. Quick Wins are projects that can be completed with minimal funding, within existing systems or have known additional paths to funding. These Quick Win projects include things like improvements to existing sidewalks, sections of a greenway trail in existing right-of-ways and the addition of new sidewalks. Short Term projects are those without known funding, but are most needed and can be coordinated with projects that are expected in the near term. These projects include high visibility crossings, sidewalk extensions, the addition of a side path, greenway extensions and signaling. Long Term projects are those who have no identified funding and may require extensive coordination with land acquisitions or partners. The Watkinsville Section of the Athens Rail Line Project falls under the Long Term Phase. Phases can only be completed once funding is identified and a clear plan has been put in place to complete the project phase in a timely manner.

In addition to phasing, one of the main challenges for these types of trail system installations is funding, Watkinsville's yearly budget sits right around 2,800,000 dollars. Many of the trail systems that are implemented today are funded through Local, Federal and State funding strategies. By identifying funding strategies early on, planning and phasing goals can be met in a timely manner. Per the Watkinsville Transportation Study, local strategies that Watkinsville can implement include:

- Allocations within city/county budget
- Bond referendums
- Special-purpose local-option sales tax (SPLOST)
- Development impact fees
- In-kind services

There are several Federal and State funding programs and opportunities for pedestrian and bicycle projects that Watkinsville might be able to make use of.

Federal funding opportunities include:

- Transportation Investment Generating Economic Recovery Discretionary Grant Program (TIGER)
- Federal Transit Administration Capital Funds (FTA)
- Congestion Mitigation and Air Quality Improvement Program (CMAQ)
- Highway Safety Improvement Program (HSIP)
- Land and Water Conservation Fund (LWCF)
- National Highway Performance Program (NHPP)
- Outdoor Recreation Legacy Partnership Program (ORLPP)
- Surface Transportation Block Grant Program (STBG)
- Transportation Alternatives Set-Aside (formerly Transportation Alternatives Program) (TA)
- Recreational Trails Program (RTP)

State of Georgia funding opportunities include:

- Georgia Outdoor Stewardship Program (GOSP)

The City of Watkinsville has plans to submit for funding under the Georgia Outdoor Stewardship Program (GOSP). The Georgia General Assembly passed the Georgia Outdoor Stewardship Program in 2018, this grant program provides successful applicants with a funding mechanism to support parks, trails, protect and acquire lands critical to wildlife, clean water and

outdoor recreation across the state. Applications are online and eligible proposals include projects that support state parks and trails, support local parks and trails of state and regional significance; provide stewardship of conservation land; or acquire critical areas for the provision or protection or clean water, wildlife, hunting, fishing, military installation buffering, or for natural resource-based outdoor recreation (Georgia Department of Natural Resources 2022). The 2020-2021 grant cycle produced 51 submitted applications requesting a total of $81 million dollars in funding. Eligible applicants included local governments, recreation authorities, state agencies, and certain non-profit organizations. The 9 applications that were approved for funding by the Georgia Outdoor Stewardship in 2020/2021 include:

1. Chattahoochee Nature Center
   Piedmont Riparian River Boardwalk and Connection Bridge; $997,501

2. Greene County
   Firefly Trail Southern Segment (Phase I); $2,109,375

3. North Georgia Mountains Authority
   Amicalola Falls State Park Visitor Center / Approach Trail entrance; $2,596,434

4. Tall Timbers Research Inc.
   Birdsong Nature Center Conservation Easement Purchase; $635,620

5. The Nature Conservancy
   Dugdown Corridor Acquisition and Restoration, Haralson, Paulding and Polk Counties; $1,989,895

6. Troup County
   Oakfuskee Conservation Center at West Point Lake; $1,800,000

7. Department of Natural Resources, Parks, Recreation and Historic Sites Division
   Campground Renovation - Vogel State Park; $2,609,859

8. Department of Natural Resources, Parks, Recreation and Historic Sites Division
   Visitor Center Reconstruction - Wormsloe State Historic Site; $3,241,616

9. Department of Natural Resources, Wildlife Resources Division
   Ceylon Acquisition (Phase 2), Camden County; $4,596,000

This cycle committed $20.58 million in funding to support local parks, trails systems and state-owned lands. These Grantees have also committed an estimated $40 million to match grant dollars. Although, the application process is extremely competitive and only about 50% of the funds are allocated to trail construction, Watkinsville's plan is clearly something that would fall into a category that would make them eligible for funding under the Georgia Outdoor Stewardship Program. If funded, Watkinsville would have to raise or match additional funds through a SPLOST tax and gain public support of the plan.

ECONOMIC IMPACT OF THE ATHENS RAIL-LINE PROJECT ON THE CITY OF WATKINSVILLE:

Studies show that the implementation of a rail-with-trail system can have a positive economic impact on its given town, but exactly how much? The Firefly trail saw an estimated 1.33 dollars in direct spending return for every dollar spent on the trail. The Silver Comet trail saw an impact of 4.64 dollars in return, in direct and indirect spending. The Silver Comet Trail Study performed a more in depth report of the trail system and took several things into account when calculating return on investment, things like: money spent on goods and services by tourists, recreational spending and tax revenue generated. These returns can be broken into two categories, direct and indirect effects. Direct effects are classified as the initial impact from spending on construction, land acquisition, and other immediate factors that affect the local economy. Indirect effects are classified as transactions likely caused from the direct effects, these include, revenue generated from recreational spending, tourism, spillover impacts, fiscal impacts, increased property values and property tax revenue. The direct and indirect returns can vary from

project to project depending on what factors they calculate and where the trail system is located. Both case studies are relevant to the Athens Rail Line Project because both the Firefly Trail and the Silver Comet Trail connect similarly sized areas with a very similar style trail system. They are also in the same region of the United States and are in the same state, making taxes and construction costs similar. The average increase in return for each dollar spent of these two studies is approximately 2.98 dollars. Using this average, it can be estimated that for every dollar spent on the implementation of the Watkinsville Section of the rail-with-trail, there will be a return of 2.98 dollars. The total cost of the 1.95-mile-long Watkinsville section of the Athens Rail Line Project came out to be approximately 2,551,055.69 dollars. Considering a 2.98 dollar return for every dollar spent, the city of Watkinsville can see a direct and indirect impact of 7,602,145.96 dollars. This is nearly a 300% return on investment for the surrounding local economies. 2.98 dollars is a high rate of return; however, even if this study uses the smaller number of the two (Firefly Trail - $1.33 dollar return for every dollar spent), Watkinsville could still see a direct and indirect impact of 3,392,904.07 dollars, which is nearly a million in profit. According to the *American Association of State Highway and Transportation Officials*, the construction of greenway infrastructure also creates the most jobs per million dollars spent out of any other type of infrastructure.

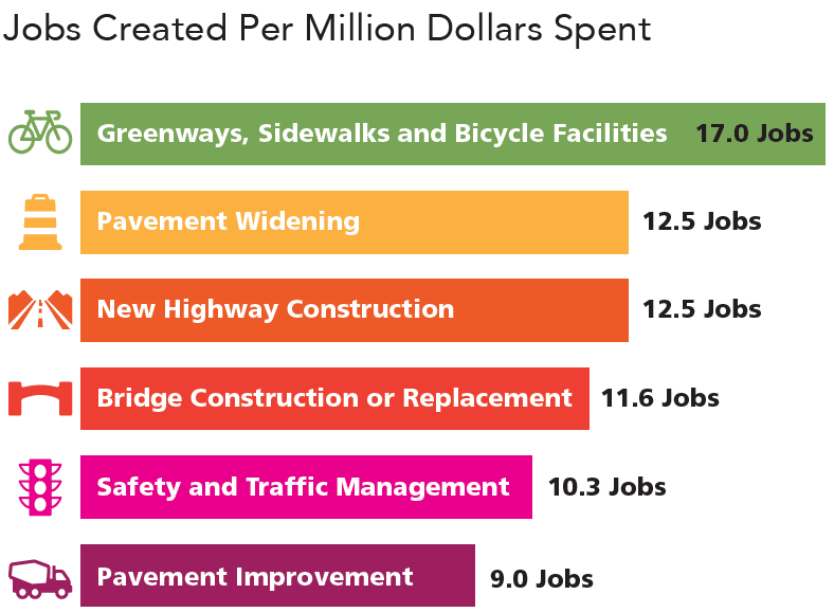

Figure 20: Greenway Construction Job Creation
(Dowell and Petraglia 2012)

CHAPTER 5

RESULTS AND DISCUSSION

As data has been collected, a total of six main arguments have been identified. These six arguments for the greenway system in Watkinsville were identified because of their importance and relevance to the projects goals and location. These arguments are outlined in this chapter and supported using a combination of literature review, survey results and regional reports.

SURVEY RESULTS:

Surveying citizens and landowners in close proximity to Watkinsville, helped to gain community input, identify areas of importance, and continue to identify arguments for the installation of the greenway plans in Watkinsville. The original survey is included as Appendix A in the back of this document and full report of its results are in Appendix C. A total of 159 people responded to the survey and the results are as follows:

1. Demographic focused questions:
    a. 70% of the audience was between the ages of 35 and 64, 70% female and 30% male, 90% white and 76% had kids.
2. Work focused questions:
    a. 52% of participants lived inside city limits and 48% outside, the furthest away being 15 miles, 40% worked in Athens and 30% selected “other”, on average,

people commuted 15-25 minutes to work from Watkinsville, but 37% said they would consider biking to work.

3. Living focused questions:
    a. Majority of people said that they have been living in Watkinsville anywhere from 5-15 years, 50% moved to Watkinsville from Athens or Atlanta and an overwhelming majority said that they moved to Watkinsville because of the School system in Oconee County. 70% of participants said they lived in a suburban area of town and 48% recorded going on daily walks.
4. Infrastructure focused questions:
    a. 70% of participants said they lived in a suburban area of town and 48% recorded going on daily walks.
5. Infrastructure focused questions:
    a. Only 30% of participants recorded being “satisfied” with Watkinsville’s sidewalk infrastructure, the main complaints: “not enough” and “poor conditions.” 85% of participants said that they would like to see improvements made to pedestrian infrastructure.
6. Greenway focused questions:
    a. 90% of participants are familiar with greenways and 75% have had experience using one before, 94% agreed that greenways were safe and that, if Watkinsville had its own greenway, they would utilize it.
7. Write in Connections:

a. When asked, “If Watkinsville had a greenway system, what areas of town would you like to see connected?” The top responses in order from most popular to least popular were:
    i. Downtown
    ii. Harris Shoals Park
    iii. Wire Park
    iv. Butlers Crossing
    v. Schools
    vi. Watkinsville Woods Pedestrian Park
    vii. Oconee Veterans Park
    viii. Nearby Neighborhoods
    ix. Along Main Roads
    x. Athens
    xi. Bishop

Overall, based on data collected by the survey, Watkinsville residents did show support for further improvements to pedestrian infrastructure and greenway paths. The survey did present data that strengthened the argument for a greenway system in Watkinsville. The survey also allowed citizens to give their input on future pedestrian connections to places inside the town’s city limits and connections to places that exist outside of city limits. The survey outlined several connections between areas of significance in Watkinsville that were brought up by residents of the community, those connections have been outlined and addressed in the Transportation Study

of Watkinsville. Improvements were recommended where problem areas were identified and connections that were already proposed were strengthened by these arguments.

ANALYSIS BASED IN ARGUMENTS:

The survey results were indicative of Watkinsville's population. The demographics of those surveyed were similar to the U.S. Census Report Data on Watkinsville's demographics (Appendix C). Most the results aligned with the research conducted; however, many of the write-in questions provided data that was not available by research. Survey results show that a clear majority of those who participated were not satisfied with Watkinsville's current pedestrian infrastructure. Many complains were made in reference to the limited number of sidewalks that exist within the town and the condition of them, many of those surveyed want to see improvements. Survey results identified many of the most popular connections between the town's most notable landmarks. A few of the write-in answers are outside Watkinsville City limits and are outside this thesis's scope of focus; although, these areas would provide benefits to the town if eventually connected. Most places that gained attention were places of ecological, recreational, historical, or business significance. The 2019 Transportation Study of the Town of Watkinsville shows proposed connections across all of these identified areas except for two of them. For the first connection, it does not mention a connection from the rail-line into Wire Park. And the second connection it does not mention is that from downtown Watkinsville to Butlers Crossing. Although the Transportation Study does show a proposed side-path leading from the downtown core of Watkinsville toward Butlers Crossing (Watkinsville's nearby shopping center), the text does not mention a connection to that area. These two connections were the biggest improvement areas from the data collected by the survey.

1. INCREASE IN ACCESS AND MOBILITY:

Watkinsville is a close-knit community, mostly connected with roadways and a limited number of sidewalks. People that live within the city limits are severely limited in terms of pedestrian infrastructure into the downtown area. With the implementation of the current greenway plans, this pedestrian access across the town will increase, therefore making it much easier for citizens to better enjoy their small downtown area. This increase in access will not only make it easier for pedestrians to ride their bikes, walk or run into the downtown area, but will also help bring the community closer together as it will increase accessibility between neighborhoods, public parks, and schools.

"Mobility is at the center of what Americans need to navigate their daily lives" (Bhattacharya, Mills and Mulally 1). Still, many challenges stand in the way of safe and effective mobility. According to the 2017 National Household Travel Survey, more than half of all the trip people take in the Unites States are within a 20-minute bike ride or less. Most trips are inside of 3 miles and majority of people use an automobile to cover this distance. The number one reason people took their automobile instead of walking or biking is because there is a limited amount of pedestrian infrastructure and it was unsafe for them to travel this distance in any other way (National Household Travel Survey 2017).

Of the people surveyed in the town of Watkinsville, 51.92% lived inside the city limits (Appendix C). Those who did not live within city limits, lived at most 10 miles away from downtown and were still relevant to the study because they are frequent passersby of Watkinsville. It was found that nearly 70% of the population lived in a more suburban area of town versus a more rural part of town, for example; living outside city limits. Participants were asked a number of questions pertaining to how often they went on walks, their satisfaction with

Watkinsville's pedestrian infrastructure, and what improvements they would like to see to Watkinsville's pedestrian infrastructure? Nearly half of all participants responded that they went on daily walks and a strong majority recorded being unsatisfied with the pedestrian infrastructure in the town.

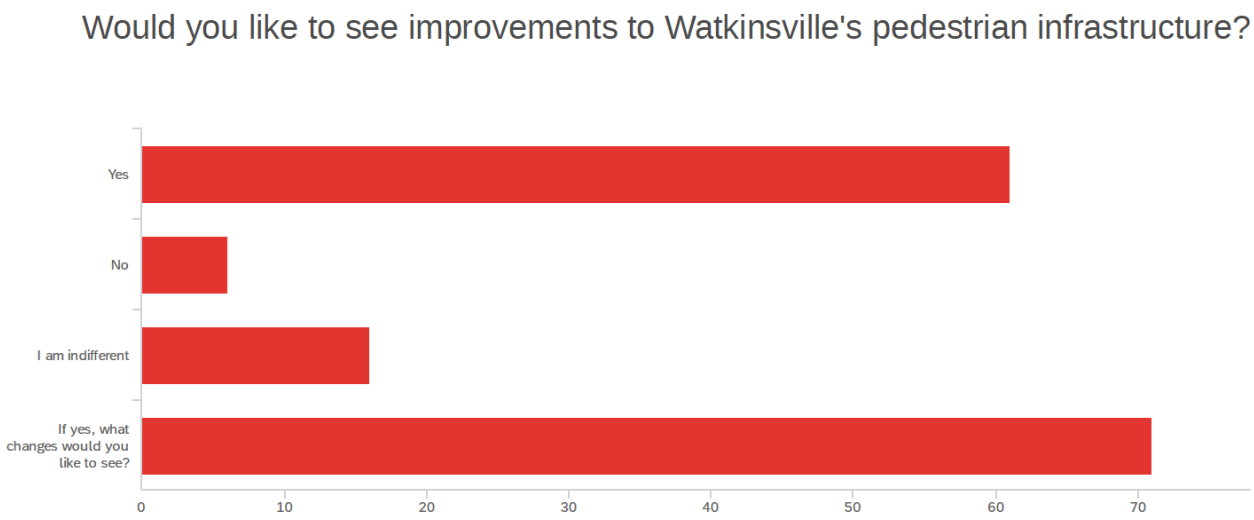

Table 7: Survey Results on Improvements

A total of 159 people responded to the survey, only 6 people responded that they would not like to see improvements made to Watkinsville's pedestrian infrastructure. 86% of participants wanted to see improvements made to the town's sidewalk infrastructure. The participants were given a space to fill in an answer for exactly what improvements they wanted to see, the number one complaint being: "not enough" sidewalks.

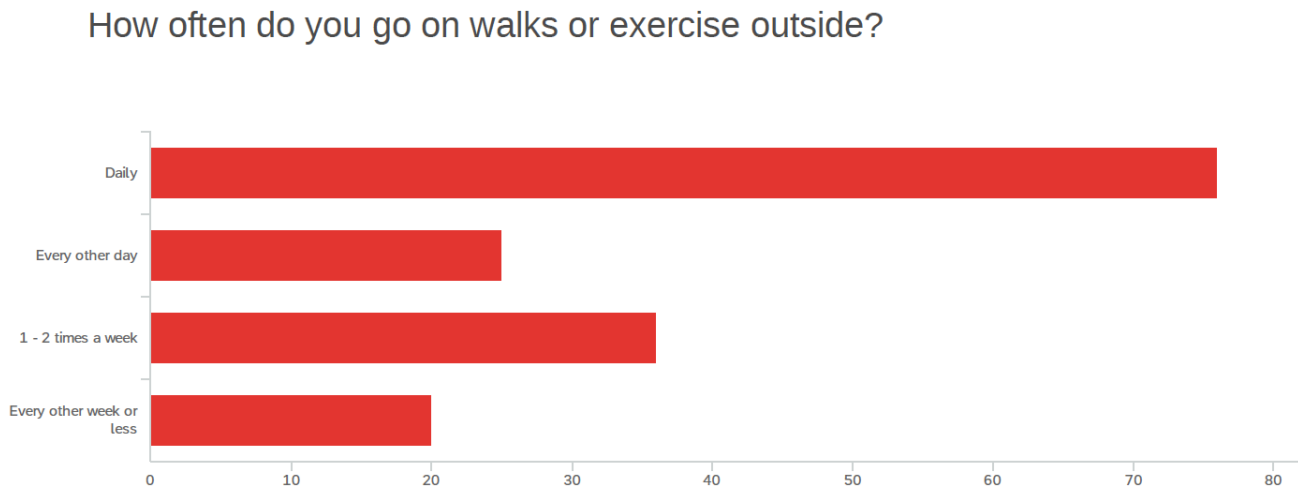

Table 8: Survey Results on Exercise

These results show that Watkinsville is a very active town with people frequently out and about on foot. The surveys data shows that most people are active at least once a day and nearly all participants would like to see improvements made in the towns pedestrian infrastructure. But if improvements were made, like the construction of a greenway through the town, would people make use of them? Survey shows that 94% of participants would take advantage of Watkinsville's own greenway system.

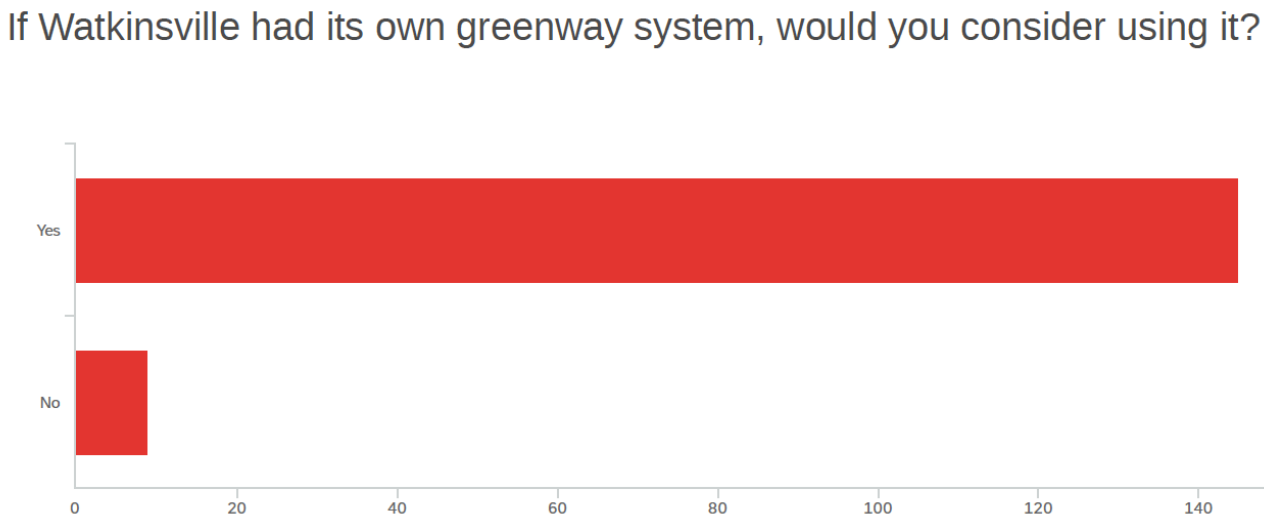

Table 9: Likelihood of Citizens to use Greenway Systems

Of 154 participants who answered the question, 145 recorded that they would use the greenway system. If the survey audience is an accurate and good sample source of those who live in the town, given the town's population of 2,896 in 2020, this 94% would equate to around 2,523 greenway goers. A mere 366 people in the town would not "use" the greenway for their travel, recreation or exercise.

Another major issue of concern for the city of Watkinsville is traffic. Thanks to rapid population growth that has taken place through the past couple years, there has simultaneously been a significant increase in traffic. From the author's personal experience, weekends are among some the worst times to be out driving through the town, along with weekday mornings and late afternoons. In the study done on *Multi-use trails and Greenways as Economic Engines* by Laura Brown, she found that weekends often see the most trail system use which aligns perfectly with the times of the week that Watkinsville is seeing the most traffic. The implementation of these trail systems in Watkinsville could cause a considerable decrease in traffic on weekends: instead of having to drive through the crowded town, people would have access into and throughout the town on foot, bike, and other human powered transportation instead of their cars. One of the main goals of the Watkinsville Transportation study was to increase pedestrian access to destinations to help reduce the use of automobile transportation throughout the town. The publication, *Promotion of non-motorized modes as a sustainable transportation option: policy and planning issues,* outlines how developing areas are facing problems such as congestion, environmental pollution, traffic jams, longer travel distances due to city sprawl, increasing cost of fuel imports and ill-health. However, solutions to these adverse effects of growth are outlined by the publication. Solutions like, promoting and integrating non-

motorized modes in transportation systems, planned and developed for habituated areas, can lead to a more sustainable and healthier community (Rastogi 2011).

In Watkinsville, students are discouraged to walk or bike to school. The local elementary school, middle school, and high school are all located on main roads, either without sidewalks at all or sidewalks that run adjacent to major roads. This makes it very unsafe for children to walk to school; a new trail system that safely connects schools with local neighborhoods could make walking to school a real and safe option. On page 27 of the Oconee County Schools System Handbook it states "Due to safety issues (such as congested intersections, the lack of sidewalks in many of our school communities, and no crossing guard at any of the school facilities), the school system has made the decision to discourage students from walking or riding their bicycles to/from school". It has become clear that there is a need for more pedestrian access and mobility in the town of Watkinsville and its surrounding community, the addition of these many different types of pedestrian infrastructure can solve these issues and provide Watkinsville with the necessary tools needed for its small and close knit community to thrive.

2. PUBLIC HEALTH BENEFITS:

For many years now, America has fought with the spread of obesity throughout much of its adult population. Georgia is facing its own obesity problems, 64.8% of the adult population in Georgia is overweight, of that 64.8%, 29.6% were considered obese and had a Body Mass Index of 30 or greater (U.S. Centers for Disease Control 2012). This increase in obesity can lead to an increased risk of heart disease (Georgia's #1 killer) and many other significant health problems (U.S. Centers for Disease Control 2022). Many factors have contributed to this problem; one of those includes people not having adequate and quick connections to greenways and trail systems

for exercise. *Investigating the Health Benefits of Trail Use; a Perspective from Park Practitioners*, was a study done with the goal of finding how trail use can benefit a community's health. A survey was conducted to investigate the health benefits of trail use. The findings were that the main reasons for using the trails was to increase physical activity through biking, walking or running. The most common type of activity on the trail is biking followed by walking and running. Overall, one-third and one-fifth of all participants were white biker men and white biker women, respectively. The survey also indicated that around 20% of participants said their main reason for not using a greenway system is because it is "too far away" or they were "not aware". This survey was conducted on 899 randomly selected participants were around an 18.6 long paved trail in Greenville, South Carolina. The same study also showed that participants felt an increase in overall quality of health and wellness, and quality of sleep and mood (Wolter, Ramos, Elliot and Smiley 2019). Informing people of surrounding greenway and trail infrastructure and providing them with adequate access will increase the number of people who will use the trail. After all, 94% of the surveyed population in Watkinsville responded that they "would use" the greenway system if it was constructed.

Greenways provide people with the safe and effective place to take an evening walk, morning run or weekend bike ride into town without ever getting on a busy road; the opportunities are endless. Providing people with a safe space to exercise and get outside will encourage the community to become healthier and more active, leading to a decrease in obesity. A healthier community is a happier one. In the study done on *Multi-use trails and Greenways as Economic Engines* by Laura Brown, she states that most Americans do not meet the 150 minutes of moderate to vigorous exercise per week that the CDC recommends. Giving people access to a nearby trail system could help to increase the number of people who exercise, as well as the

amount of exercise that they can get (Brown 2020). It has been demonstrated that increased walking and biking for both travel and recreation rank among one of the most effective ways to combat America's crisis of physical inactivity. Outlined in *Active Transportation Transforms America,* this inactivity crisis is a major factor in high and rising chronic diseases that plague the population, costing the U.S. health systems trillions of dollars each year, many of those falling onto taxpayers (Bhattacharya, Mills and Mulally 2019). Along with providing health benefits to the local population, America is entering the age of connectivity, and more than ever before, a priority has been placed on pedestrian safety. More greenway infrastructure will lead to less bikers, runners and even walkers on the roads, this could virtually eliminate the number of deaths caused by car strikes. Communities are shifting their concerns from automobile travel and searching for a means of safe and quick connections between areas through active transportation. The 2019 Transportation Study of Watkinsville has done exactly this. The demand and need for pedestrian connections has never been stronger, investing in walkability and safe pedestrian connections is investing in Watkinsville's future. The quality of living in Watkinsville has always been a priority to the people who live there and will continue to be. The use of multi-modal trail systems can provide people with the safe and effective pedestrian connections they need while also increasing their own quality of life and standard of living.

All forms of multi-modal transportation have their physical health benefits; however, these forms of pedestrian transportation can also increase knowledge of the community, involvement of social groups in trail activities and the engagement of community leaders (Griffin 2011). Connecting and providing citizens with a close, small town feel society is vital to making sure that Watkinsville's community is healthy. People should not only use multi-model connections to get from point A to point B, but they should be able to take advantage of these

trail systems to get together with friends, family, or neighbors, and meet up and go for a bike ride, run, walk. As more people get outside on foot or bike, they are more likely to interact with others in the community, leading to new friendships and connections throughout the town. By providing people with safe and adequate trail ways, benefits will be seen across all boards, providing citizens with many new opportunities. Watkinsville can make way for a healthier tomorrow for both the community and its citizens.

3. ENVIRNOMENTAL STEWARDSHIP:

Environmental Stewardship is defined as the responsible use and protection of the natural environment through conservation and sustainable practices to enhance ecosystem resilience and human well-being (National Oceanic and Atmospheric Administration 2022). Placing an emphasis on preserving Watkinsville's environmentally sensitive areas is important for a variety of reasons. Not only do greenways provide the world with a "more green" method of transportation, but they also play a vital role in connecting places of ecological significance, all while exposing these areas to the public, allowing them to appreciate the natural value these areas possess. Watkinsville is a town full of young and growing families. The implementation of the current greenway plan will provide families and kids with a way to connect with nature and the outdoors. Families that live in the most central downtown areas might have a hard time finding a place where they can go outside and walk to with the numerous small public parks the town has to offer. This increase in connectivity through the downtown areas as well as into more urban areas will allow a wider range of people to get outside and explore the parks and greenspaces Watkinsville offers. Harris Shoals Park and Watkinsville Woods are just two of the most popular parks found inside of city limits. Both parks are equipped with trail systems

throughout and provide the public with may educational opportunities, including informational signage about the area's natural ecosystems. By increasing traffic into Watkinsville's public parks, environmental awareness can be increased and the importance of preserving naturalized areas can become more widely-known and valued. This is key to helping the town to preserve its naturalized areas as the population rises.

Figure 21: Watkinsville Woods Conceptual Sketch (W&A Engineering 2014)

Since greenways are designed along right-of-ways, easements, streams and rivers and many forms of undeveloped lands, they often provide critical connections not only to humans but to animals. They create necessary corridors that animals can travel to reach the resources they need to survive. Per, *Continuing a Planning Tradition: The New England Greenway Vision Plan,* greenways can provide nature protection. These greenways are of ecologically significant

corridors and natural systems. Primarily along rivers, coastal areas and ridge lines, they serve to maintain biodiversity, provide for wildlife migration, and protect water quality (Ryan, Fabos and Lindhult 2002). More recreational greenways are networks of trails, both on land and along bodies of water, linking recreational sites and areas. These greenways provide recreational opportunities by functioning as hiking trails, bike paths, canoe trails, and scenic roads that often pass through diverse and visually significant landscapes (Yahner, Kent and Elliott 1995). Although, recreational greenways have an emphasis on exercise, they still play a significant role exposing people to many ecosystem services. *Future land-use scenarios and the loss of wildlife habitats in the southeastern United States,* outlines how habitat loss due to land change is one of the leading causes of major wildlife habitat loss and is a major threat to biodiversity globally (Martinuzzi et al. 2015). It is estimated that 39% of the Earth's terrestrial habitats have been replaced by cropland and urban settlements, and another 37% have been degraded and fragmented (Ellis et al. 2010). Green infrastructure can play an important role in solving the issue of fragmentation, by connecting ecosystems, providing corridors to animals, and linking urban green areas to regional woods and forests. Green infrastructure can also help to control flooding, to establish pervious green corridors, mitigate contamination from impervious surfaces runoff, enhance the environment-restoring riparian areas, conserve wetlands and assist in filtration within the watershed, and improve soil stability to control erosion (Hansen and Macedo 2021). This is the case along Calls Creek, a stream that runs inside the city limits that the greenway has been proposed along. Calls Creek has a long history of neglect, pollution, and erosion but by bringing light into this area with a greenway, the city and people will be more motivated to restoring it to the clean stream it once was. Other benefits to the ecosystem include those of relieving traffic, therefore reducing the amount of vehicle emissions in the area,

providing many ecological benefits to nearby lakes, streams, rivers, as well as increasing the air quality.

4. MITIGATE GROWTH PROBLEMS:

Enrique Penalosa, the former mayor of Bogota, Columbia and advocate for public mobility, wrote in his article *This Is What the Cities of the Future Will Look Like:* "It is a truism to say that cities are for people. The urban challenge for the next few decades is to truly make them so, by doing things like turning half of every road into pedestrian-and-bicyclists-only space, or making every other street usable only by walkers and cyclists." Penalosa explains the importance of designing pedestrian pathways into cities and adapting urban environments to meet the needs of people who want to travel on foot or on bike. He explains that by doing so, future cities and urban areas will be more effective in making all citizens feel equal and included. Granted, Watkinsville is not a large urban city, but it might one day be a large urban area. As the population in rural Georgia continues to increase, it is no secret that traffic and density will grow exponentially. What is bringing people into the small and rural town of Watkinsville? Out of the 160+ people that responded to a survey, 32.26% responded that the school system was their main reason for moving to the town of Watkinsville. As schools draw more and more people into the town each year, populations continue to rise. However, greenway infrastructure increases pedestrian access and as more people move throughout the town on foot and bike, automobile traffic will decrease. Traffic has become a major problem in Watkinsville in the past ten years. There is a major flaw in Watkinsville's design that has led to the increase of traffic in the downtown area. The roads going through the town are shaped like a funnel, pushing cars from four major state routes into the two-way street that passes through downtown. This can be seen

in Figure 22, Main Street sees on average, over 16,000 cars per day. 16,000 cars a day equates to nearly 11 cars per minute for 24 hours a day, this is one car every 5 seconds, this is an extreme amount of traffic for a town that has a population of only around 3,000 people. The high amount of traffic increases pedestrian levels of stress as they walk down the sidewalks that line Main Street, increasing the need for the implementation of a side path or an alternate route to walk/bike. People are moving to this small town to escape the traffic and congestion of a denser area; the aid of greenway infrastructure can help mitigate these growth problems. On average, Watkinsville has 2 cars per household (Census.gov).

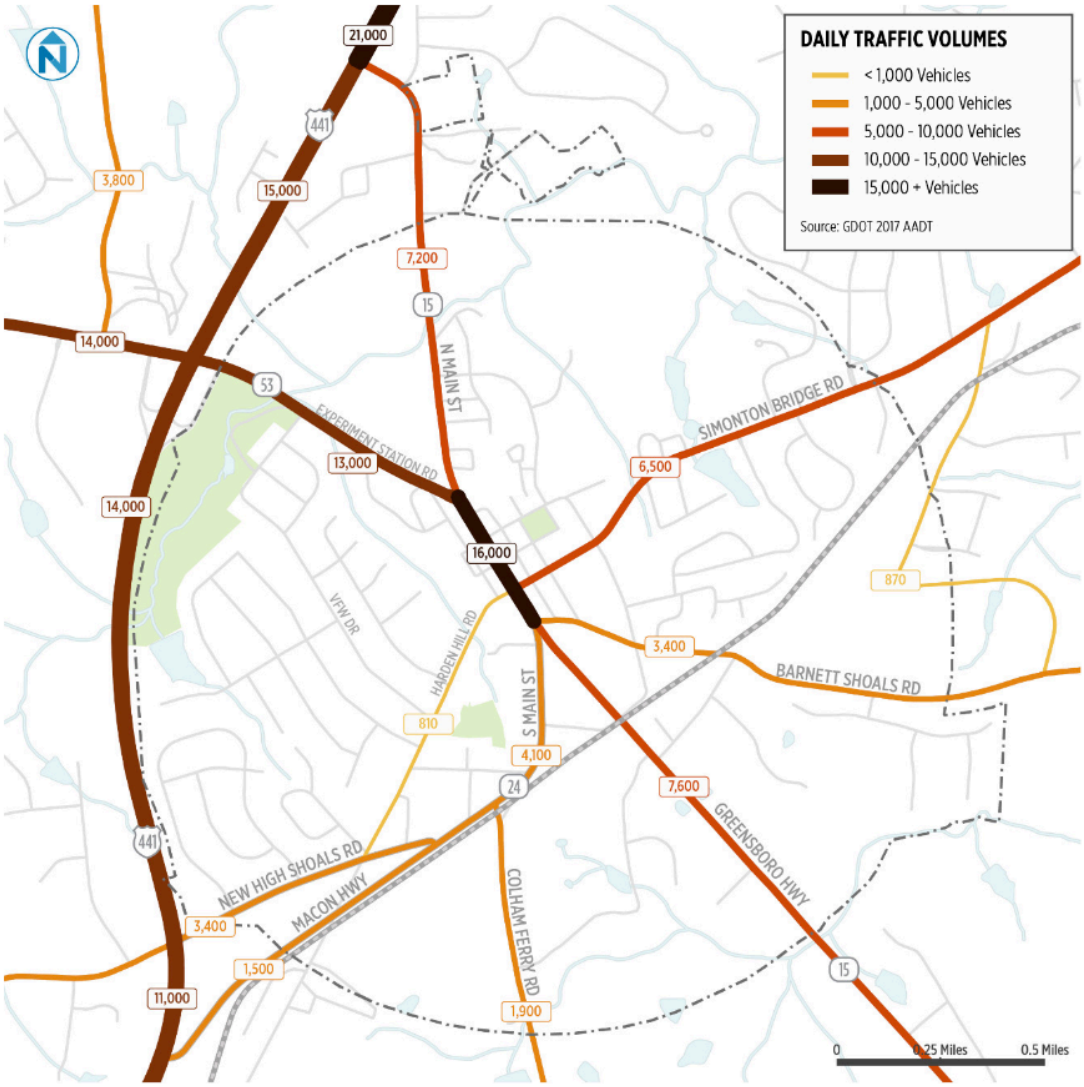

Figure 22: Watkinsville Traffic Volumes (Transportation Study, City of Watkinsville 2019)

Means of Transportation to Work:	Total Percentages:	Margin of Error:
Car, Truck or Van:	95.30%	± 2.4
Drove Alone:	84.90%	± 5.0
Carpooled:	10.40%	± 4.2
Public Transportation:	0.00%	± 2.7
Walked:	0.30%	± 0.5
Bicycle:	0.70%	± 1.1
Taxicab, Motorcycle, other means:	0.40%	± 0.6

Table 10: Means of Transportation to Work (U.S Census Bureau)

Place of Work:	Total Percentages:	Margin of Error:
Worked in State of Residence:	99.30%	± 0.7
Worked in County of Residence:	33.10%	± 5.3
Worked outside County of Residence:	66.20%	± 5.7
Worked outside State of Residence:	0.70%	± 0.7

Table 11: Place of Work (U.S Census Bureau)

As seen in Tables 10 and 11, most of Watkinsville's citizens drive to work and work outside of Oconee County and Watkinsville. Per U.S. Census Data, only about 10% of the citizens in the town carpool, contributing to the increase in traffic counts on weekday mornings and afternoons. According to the Oconee County Join Comprehension Plan, not only are Watkinsville Citizens the cause of increased traffic volumes in the area, truck traffic through the town has caused a large increase of the congestion in the area. Highway 15 is a major trucking route between a large area of southern Georgia and Athens, it also just happens to pass right through main street in Watkinsville. There are very few alternate routes for trucks passing by this way so most of them travel straight through downtown Watkinsville. This rise in truck traffic has contributed to the overall rise in traffic in the downtown corridor.

Even though around 66% of citizens work outside of Oconee County, survey findings show that nearly 38% of Watkinsville's Survey participants would consider biking to work if there was an adequate trail system located in the town.

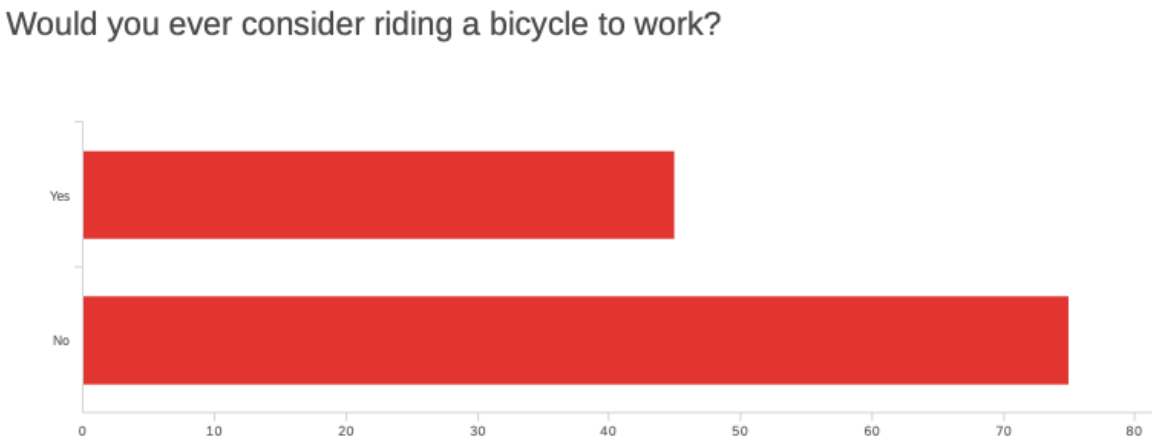

Table 12: Likeliness of Biking to Work

Table 12 shows the survey results of those who would consider biking to work, 37.5% say yes while 62.5% say no. Currently, only .70% of all Watkinsville residents bike to work (U.S Census Bureau). If this trail system was implemented and if Watkinsville saw an increase of just 30% of the population biking to work every day, this can reduce the daily local traffic by nearly 30%, a significant decrease.

5. CREATE A SENSE OF IDENTITY IN WATKINSVILLE:

It is no doubt that Watkinsville is known for its small town and homey feel, this being one of the main reasons why people are migrating to the area. In the same way, the Firefly trail in nearby Athens, Georgia has created a "tourist like" destination for runners and bikers all around, the Watkinsville greenway can do the same for this small town. Providing citizens with a

way to move about the town on foot and bike can help to bring the community closer together and help preserve that small town feel where there is the feeling that everybody knows their neighbor. One of the key elements for growing the quality of life include, increasing the amount of person-to-person outdoor interaction. The numerous neighborhoods within city limits will also benefit from this increase in foot traffic, many of which have different demographic concentrations. Connecting these neighborhoods is important to promote strength as a community, and to bring people together from all different backgrounds. Other ways greenways can help create a sense of identity to the town is by continuing to utilize and apply the towns own unique features and sense of identity design elements. Deemed the "Artland of Georgia", Watkinsville attracts many visitors year-round that come to see the work of local artists, and their studios and exhibits. The town has more artists per capita than any other town in the state (Cobb 2016). "As Donovan and Morris assert in *Winning with Rail Trails*, A successful rail trail serves as a gathering place, providing a venue for community interaction. A good way to tie a new rail trail into a community is to incorporate aspects of the local character into its design or the amenities that go with it" (Donovan and Morris 2004). The greenway plan should reflect the character of the community. Many local artists can integrate their own designs and art into the greenway design. There has already been a push for the implementation of outdoor public art in Watkinsville. In 2015, the city council voted to put $10,000 into its 2016 fiscal year budget. Since then, the art industry in Watkinsville has only grown bigger. The collaboration between artists and Watkinsville's greenway has the potential to make the greenway system an even bigger attraction. Instead of just serving as a means to go from one point to another, or to get exercise, the greenway can also serve as a way for Watkinsville to express its own one-of-a-kind

art exhibits, outdoor features and provide desirable destinations along the trail. This exact practice has already been done in the nearby college town of Athens, along the Firefly and North Oconee Greenway trail. This system features many spots where local artist's sculptures and murals have been put on display. They serve by giving the greenway its own uniqueness. By integrating these practices in Watkinsville, one can create a real sense of identity for the town.

Figure 23: Angelic woman sculpture in downtown Watkinsville, Ga (Haynes 2020)

6. INVESTMENT:

In a research book assembled by the U.S Department of the Interior National Park Service, it was found that in addition to being recognized for their environmental protection, recreation values and aesthetic appearances, these greenway corridors also have the potential to create jobs, enhance property values, expand local business, attract new or relocating businesses, increase local tax revenues, decrease government expenditures and promote a local community (United States National Park Service 1999). Many studies have revealed increases in property values in instances where the property is located near or adjacent to open spaces, the increase in property values has simultaneously resulted in an increase in property tax revenues for local governments. For construction and development perspectives, proximity to greenways, rivers or trails can increase the sales price, increase the marketability of adjacent properties and promote faster sales (United States National Park Service 1999).

As upfront costs can be high, most greenways are completed in phases that are done from year to year. Considering the payback, or return on investment, that a greenway can provide is extremely important, as well as understanding how greenways can play a significant role in helping an area grow economically. An increase in connectivity means an increase in business, especially among small businesses in downtown areas and areas connected through pedestrian transportation. By making it easier and safer for citizens to move throughout the town without the use of their cars, business in the downtown corridor will prosper because more people will be able to get out and about.

In *The Impact of Greenways and Trail on Proximate Property Values*, written by John L. Crompton and Sarah Nicholls, the researchers discovered that 47% of their surveyed audience (2,627 people from towns and cities all around America) perceived an increase in their property

values because of its proximity to a trail network. (Crompton and Nicholls 2019). *The Effects of a Recreational Bike Path on Housing Values in Muskego, Wisconsin* found that a well-maintained trail network has a positive increase on all homes in the city–not just the ones adjacent to the trail. However, homes directly adjacent to the trail were valued at a large premium (Kashian, Winden and Storts 2019). Another study done on the impact of the Catabawa Regional Trail on Property Values in Charlotte, North Carolina showed that a property's value is directly linked to its proximity to a greenway. Single-family, multifamily and commercial land sold at a premium when located along a greenway system. (Campbell and Munroe 2007). The graph below is from the study conducted in Charlotte, and shows how the changes in sales price decrease the further the property is located from a greenway in that particular part of the southeast.

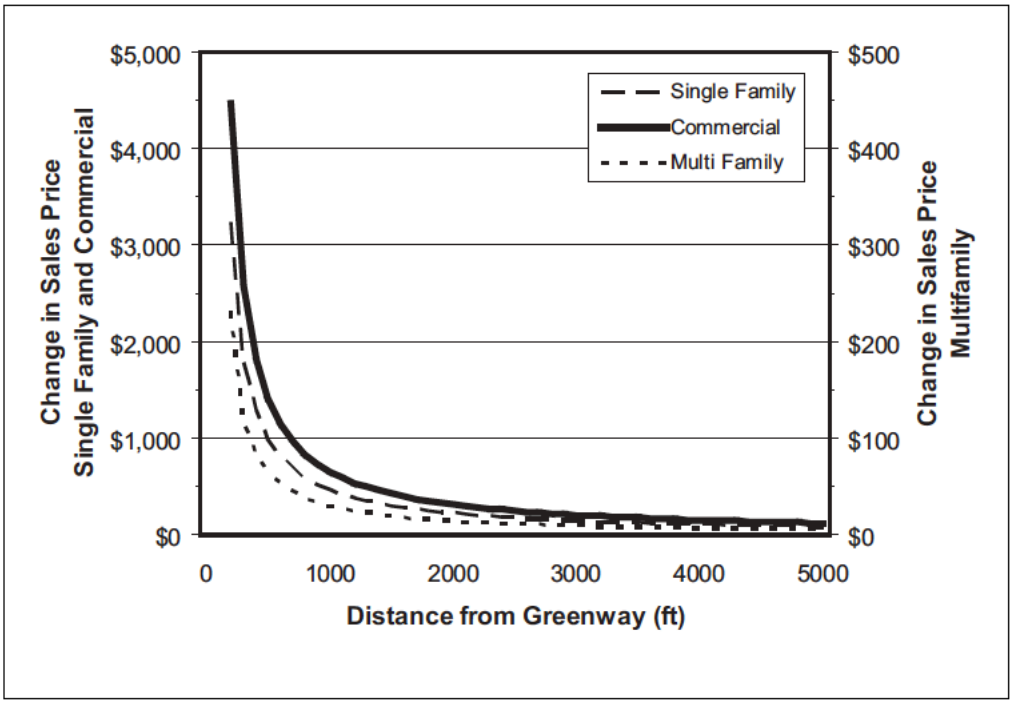

Figure 24: Sale Prices in Relation to Proximity to Greenways in Charlotte, North Carolina (Campbell and Munroe 2007)

Raising property values is just one way a greenway system can have an impact economically on a specific area. An excerpt from the report *Multi-Use Trails as Economic Engines* by Laura Brown: Several studies have documented the positive effects of trails on regional economies. When considering the regional impacts, including jobs, wages, and business output, a well-documented study from North Carolina found that a one-time investment of $26.7 million in four local greenways supported the following:

- $19.4 million in annual sales revenue from local businesses
- $684,000 in local and state tax revenue
- $25.7 million in estimated savings due to increases in physical activity, less pollution and traffic
- $48.7 million in business revenue from construction
- Every $1 spent on construction yielded $1.72 in additional impact annually

These significant impacts are very large, but it should be noted that they are specific to a state or region and given regional differences in structure and use of trails (Brown 2020).

Watkinsville is a town that offers many attractions to tourists that happen to pass through, concerts on the lawn at Ashford Manor in downtown, various historical sites, high school sporting events, art exhibitions, outdoor excursions, U-pick farms, fall festivals, local eateries and many more (City of Watkinsville 2022). Perhaps the biggest source of tourism in the small town is that from the University of Georgia, located just down the road. Every year, nearly 30,000 undergraduate students attend the university (Shearer 2020). In the fall, football game days often bring more than 100,000 people into nearby Athens. The enormous amounts of people that travel into Athens spillover into nearby towns and many game day travelers stay in Watkinsville. Often, game weekends in the fall are some of the busiest for Watkinsville. With

UGA's large student body being only 8 miles away from Watkinsville, the town sees visitor's and passersby daily. The implementation of a greenway system and rail-with-trail connecting Athens to Watkinsville can facilitate an increase in foot and bike traffic from the university through the town. Many of these visitors play a significant role in helping the local businesses flourish in the town. As people travel into the town and through the town on foot, bike or in their car, they spend money on food, drinks, transportation fees, recreation, souvenirs, apparel, equipment for their bike or anything else, accessories, etc. Boosting the local economy and helping small businesses near the greenway grow. Daily expenditures of day trip and overnight trip visitors can be seen below in Tables 13 and 14.

Day Trips	Trail Based	Bicycle Based
Food and Drink	$18.73	$14.91
Transportation	$20.97	$15.05
Recreation & Misc	$12.93	$8.61
Souvenirs	$7.62	$5.24
TOTAL	**$60.26**	**$43.81**
Overnight Trips		
Food and Drink	$32.66	$33.54
Transportation	$37.17	$31.65
Recreation & Misc	$20.47	$20.85
Souvenirs	$5.40	$17.04
Lodging	$43.91	$47.86
TOTAL	**$148.89**	**$150.93**

Table 13: Average Daily Expenditures (Outdoor Industry Association 2013)

	Trail Based	Bicycle Based
Apparel	$33.21	$31.25
Equipment	$26.12	$55.78
Accessories	$20.54	$19.98
Services	$16.25	$11.27
For Children	$23.18	$13.10
TOTAL	**$119.30**	**$131.38**

Table 14: Average Annual Expenditures (Outdoor Industry Association 2013)

A 2018 review of economic impact studies of trails across the country revealed that the average user spending ranges anywhere from 5 dollars to 67 dollars or more per user per day. Additionally, data from the Outdoor Industry Association by user type notes that out of state users spend nearly 100 dollars more than in state day users and overnight stays generate nearly double the spending of in-state overnight stays (Brown 2020). These research studies help us clearly see how much investing in a trail system can have a positive impact on the local economy of a town, generating business across all areas, greenways and multi-modal trail systems are investments that give back to society.

DISADVANTAGES OF GREENWAYS:

Many of the positives that greenways bring have been previously discussed; however, there are some negatives that a greenway system can bring to the affected area. Some of the biggest negative takeaways from greenways is an increase in taxes, gentrification/division of areas affected by them and user safety. As described earlier in this study, the implementation of greenways and trail systems can cause tax rates to increase, especially as property values increase because of their proximity to greenway infrastructure. The survey performed on residents of Watkinsville, determining their support for a greenway system, showed a high amount of support for this type of infrastructure in Watkinsville. However, it also outlined that

residents of the town showed a strong opposition to an increase in taxes. In a few of the write-in responses on question 21, which asked "If Watkinsville had a greenway system, what areas of town would you like to see connected?" one concerned resident responded "Have no problem with more greenways but do have a problem with more taxes". This is indicative of Watkinsville's population, seeing as how they have voted in past elections. Citizens are usually opposed to an increase in taxes and have once already voted down a TSPLOST tax proposed by the city.

In *Access, Equity, and Urban Greenways: An Exploratory Investigation* evidence is provided that suggests minorities and the poor have disproportionate access to trails. It is also shown that populations adjacent to the trails differ and that the populations along particular trails are segregated. Spatial differences in trail populations are associated with historic land use patterns and population movements within the city (Lindsey, Maraj and Kuan 2001). Although some greenways serve to link together neighborhoods of various demographic backgrounds and provide access between these areas to recreation activities and facilities, if not planned correctly, greenways can have adverse effects on the population. In a recent study done on the Atlanta Beltline, it was determined that majority of the users were female (60%), white (78%) and between the ages of 36 and 49 (38%). Individuals were also highly educated (86.4% held a 4-year degree or higher) and a high annual income (74% made $80,000 a year or more). Half of the sample had lived in their current neighborhood for seven or more years and over 75% owned homes. Finally, the clear majority (94%) of participants had previously used the Atlanta Beltline before (Keith 2021). The same study also researched different racial groups and their support for several Beltline items like, development support, neighborhood preservation, and social integration. Overall there was a significant difference between racial groups on each Beltline

item, it was found that White residents showed more support for each Beltline item than Black residents. However, each racial group was in support for the Beltline (Keith 2021). This study concluded that those with the highest incomes showed the most support for Beltline items whereas those with lower incomes showed less support. However, people from all levels of incomes and racial backgrounds showed an overall support for the Beltline. Perhaps these minority groups that showed the least amount of support for the Beltline, showed this because they are the groups to be most affected by environmental gentrification (Keith 2021).

"Safety is an important dimension in the perception of urban environments and one that is sometimes perceived to be at odds with enhancing the naturalness and aesthetics of urban green space" (Gobster and Westphal 2004). This might not be as big of an issue in the town of Watkinsville since the town has a relatively low rate of crime (U.S Census Bureau). However, there are concerns surrounding greenways that they might provide dangerous populations or people with an outlet to commit certain crimes. A study was conducted that focused on the urban greenway that travels through the 150-mile-long Chicago river corridor to determine how people perceived safety along the greenway. It was determined that different areas of the greenway have different safety concerns. In some sections of the greenway, people reported feeling unsafe because of the greenway was being used "as a hang-out for youth gangs engaged in criminal activity, a place for drinking and drug use, and as habitat for the homeless" (Gobster and Westphal 2004). In other areas of the greenway, people were more concerned with physical safety, things such as children falling into the river and health concerns surrounding contact with polluted water. Overall, it was outlined by the survey conducted on Watkinsville residents that they do not view greenways as unsafe environments. 94% of the sample population recorded that they view greenways as safe outlets for exercise and recreation (Appendix C).

CHAPTER 6

CONCLUSIONS

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH:

Some limitations do exist in this study. The first being that this study is a preliminary calculation of the potential impacts of the Watkinsville Transportation Study. Once the Transportation Study Plans are constructed, then a thorough and accurate study of the economic and other impacts in the community can be performed. The economic impact amounts determined by this study are based off numbers calculated from previous case studies that were calculated by economic modeling software applications.

The survey was distributed at a city council meeting and through a listserv email directly to residents of Watkinsville, which was done to ensure that the majority of responses were those from people inside the city limits. However, distribution through these methods also ensured that the survey went straight into the hands of concerned and invested citizens who are more likely to respond in support for a greenway system. For future research projects like this one, a door to door survey or distribution at a public city event would reach a wider range of citizens and would result in less bias. This way the survey could reach people that might have varying attitudes toward the greenway, this would help in identifying negative impacts that residents might be concerned of. Another limitation of the survey was that there was no question that got feedback about resident's views on a TSPLOT tax and increases in property taxes. A question such as, "Would you be willing to pay a TSPLOST tax that would go to construction of the greenway

system?" should have been included in the survey. This would have allowed for a prediction of what percent of the population would be willing and able to pay the TSPLOST tax.

CONCLUSIONS:

This research was done to collect and analyze public opinions about the implementation of a multi-modal trail network in the city of Watkinsville. Not only has this thesis has shown that the implementation of a greenway system in Watkinsville has the potential to provide numerous ecological and social functions, accelerate economic revenue, while simultaneously reliving the town of the impending pressures that rapid growth will continue to cause. It has explained that greenway systems serve as a solution to many of the problems that will increase in Watkinsville over the next few years. They provide citizens with a way to actively move throughout the town, getting people off the roads, out of their cars and providing them with healthier forms of transportation. Overall, the implementation of the greenway system in Watkinsville will take many years and a considerable amount of funding and phasing; however, given the growth rate of Watkinsville and its location in the state of Georgia, the implementation of this trail system will put Watkinsville on the path to smart sustainable growth and a higher quality of life. Case studies, economic analysis, and survey results all point to community benefits that will outweigh the upfront costs of design, construction and management, and provide a long-term excellent return on investment. Greenways will give back to the community in more ways than one, they will help the community grow to become more inclusive and will increase the quality of life of those affected. Watkinsville business owners, passersby, tourists, children, young families, citizens and anyone else who finds themselves in Watkinsville will have greater accessibility and connectivity throughout the town. Overall, by using extensive surveying on many residents of

Watkinsville, it can be concluded that opinions surrounding this multi-modal trail system display a great amount of public support for its construction. The implementation of this plan can bring enormous economic and social benefits to the town while helping it preserve its small town and rural feel; making sure that future generations can take advantage of the many opportunities Watkinsville has to offer. The future construction of the rail-with-trail, greenway system and general improvements to pedestrian infrastructure has the power to positively shape the town and provide a higher quality of life and enduring sense of community pride for current and future residents.

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APPENDICES:

APPENDIX A:

INTRODUCTION:

Appendix A consists of the survey consent letter and questionnaire that was distributed to citizens of Watkinsville via city council meeting on February 16th and via email list serve shared by the City on February 17th. This survey was available online and by hard copy. This was one of the main sources of information used to gain public opinion and input on greenway infrastructure in Watkinsville. The survey was designed and approved for distribution by the Institutional Review Board (IRB) at UGA, study number 00005276. A final report was compiled of the survey information on March 3rd when a total of 159 people completed the survey. For a full final report of the survey, please contact the author at mjh59783@uga.edu.

SURVERY QUESTIONAIRE:

UNIVERSITY OF GEORGIA CONSENT LETTER:
Multi-Modal Trail Networks in Watkinsville, Georgia

Dear Participant,

My name is Michael Hans and I am a student in the College of Environment and Design at the University of Georgia under the supervision of Brad Davis. I am inviting you to take part in a research study.

I am doing research on greenway infrastructure in Watkinsville Georgia.

I am looking for any citizens of Watkinsville to give feedback on their daily experiences in Watkinsville, especially those experiences with any outdoor recreation. There are no eligibility criteria and every individual is invited to take place.

If you agree to take part in this study, you will be asked to answer 20 multiple choice questions and one short answer. The survey session should take about 10-15 minutes. There are no additional activities other than the survey.

Participation is voluntary. You can refuse to take part or stop at any time without penalty.

If there are questions that make you uncomfortable. You can skip these questions if you do not wish to answer them.

Your responses may help us understand the potential benefits to Watkinsville that improved infrastructure might bring.

The information gathered will not be used for any future research or distributed and it will only be used in my thesis document.

If you are interested in participating or have questions about this research, please feel free to contact me at 678-206-3959, mjh59783@uga.edu.

Please keep this letter for your records.

Sincerely,

Michael Hans

Multi-Modal Trail Networks in Watkinsville, Georgia Survey

1. What is your age?
    a. 0-25
    b. 26-50
    c. 51-75
    d. 76-100

2. Gender?
    a. Male
    b. Female
    c. Other

3. Race?
    a. Caucasian
    b. African American
    c. Hispanic or Latino
    d. Asian
    e. Other: _____

4. Do you have kids?
    a. No
    b. Yes
    c. If yes, how many? _____

5. Do you live inside Watkinsville city limits?
    a. Yes
    b. No
    c. If no, how far outside city limits? _____
    d. Other: _____

6. Where do you work?
    a. Inside Watkinsville city limits
    b. Athens
    c. Atlanta or Metro-Atlanta
    d. Other: _____

7. How long is your commute to work?
    a. 15 minutes or less
    b. 15-30 minutes
    c. 30 minutes to an hour
    d. an hour or more

8. Would you ever consider riding a bicycle to work?
    a. Yes
    b. No

9. What is your favorite time of year?
    a. Spring
    b. Summer
    c. Fall
    d. Winter

10. How long have you been living in Watkinsville?
    a. 0-5 years
    b. 5 - 15 years
    c. 15 – 30 years
    d. 30 years or more

11. Where else have you lived besides Watkinsville?
    a. Atlanta
    b. Athens
    c. Other/Please list all the places you have lived for 3 months or longer:

    _____

12. What brought you to Watkinsville?
    a. Schools
    b. Community
    c. Scenery
    d. Proximity to other places, like UGA or Atlanta
    e. Other: _____

13. Do you live in a rural area or suburban area of Watkinsville?
    a. Rural
    b. In town
    c. Somewhere in between

14. How often do you go on walks or exercise outside?
    a. Daily
    b. Every other day
    c. 1-2 times a week
    d. Every other week or less

15. Are you satisfied with Watkinsville's sidewalks?
    a. Yes
    b. No

16. Would you like to see improvements to Watkinsville's pedestrian infrastructure?
    a. No
    b. Yes
    c. If yes, what would you like to see done?
    _____

17. Are you familiar with greenways?
    a. Yes, I've heard of them before
    b. No, I'm not familiar at all

18. Have you ever used a greenway before?
    a. Yes
    b. No

19. Do you think greenway systems are safe?
    a. Yes
    b. No

20. If Watkinsville had its own greenway system, would you consider using it?

a. Yes
b. No

21. If Watkinsville had a greenway system, what areas of town would you like to see connected?

_____
_____
_____

Thank you for your time!

APPENDIX B:

Institutional Review Board (IRB) Approval:

UNIVERSITY OF GEORGIA

Tucker Hall, Room 212
310 E. Campus Rd.
Athens, Georgia 30602
TEL 706-542-3199 | FAX 706-542-5638
IRB@uga.edu
http://research.uga.edu/hso/irb/

Human Research Protection Program

NOT HUMAN RESEARCH DETERMINATION

February 2, 2022

Dear Michael Hans:

On 2/2/2022, the Human Subjects Office reviewed the following submission:

Title of Study:	Multi-Modal Trail Networks in Watkinsville, Georgia
Investigator:	Michael Hans
IRB ID:	PROJECT00005276
Funding:	None

We have determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations. The project is designed to evaluate use of a specific public location, not the behavior or health of the people who will provide information as a sample of a population under study.

University of Georgia (UGA) IRB review and approval is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are research involving human subjects, please submit a new request to the IRB for a determination.

Sincerely,

Kimberly Fowler, Director
Human Subjects Office, University of Georgia

APPENDIX C:

Survey Results:

Question 1: How old are you?

A: Under 18	0.64%
B: 18-24	5.73%
C: 25-34	7.01%
D: 35-44	21.02%
E: 45-54	32.48%
F: 55-64	20.38%
G: 65+	12.74%

Question 2: What is your gender?

A: Male	68.15%
B: Female	31.85%

Question 3: What is your race?

A: White	91.72%
B: Black or African American	0.64%
C: Hispanic or Latino	1.27%
D: Asian or Pacific Islander	0.64%
E: Other	5.73%

Question 4: Do you have kids?

A: Yes	76.58%
B: No	23.42%

Question 5: Do you live inside city limits?

A: Yes	51.92%
B: No	6.41%
C: If no, how far away do you live?	41.67%

Question 6: Where do you work?

A: Inside Watkinsville city limits	16.35%
B: Athens	40.88%
C: Atlanta or Metro-Atlanta	3.77%
D: Other	32.08%
E: Unemployed	6.92%

Question 7: How long is your commute?

A: 15 min or less	35.48%
B: 15 - 30 min	27.74%
C: 30 min to an hour	4.52%
D: one hour or more	1.29%
E: NA	30.97%

Question 8: Would you ever consider riding a bike to work?

A: Yes	37.50%
B: No	62.50%

Question 9: What is your favorite time of year?

A: Spring	34.42%
B: Summer	16.23%
C: Fall	42.86%
D: Winter	6.49%

Question 10: How long have you been living in Watkinsville?

A: 0-5 years	21.79%
B: 5-15 years	32.69%
C: 15-30 years	30.77%
D: 30+ years	12.18%
E: Entire life	2.56%

Question 11: Where else have you lived besides Watkinsville?

A: Athens	35.29%
B: Atlanta	15.69%
C: Other	49.02%

Question 12: What brought you to Watkinsville?

A: Schools	32.26%
B: Community	11.61%
C: Proximity to UGA/Atlanta	14.82%
D: Family	20.00%
E: Other	21.29%

Question 13: Do you live in a rural area or suburban area of Watkinsville?

A: Rural	30.32%
B: Suburban	69.68%

Question 14: How often do you go on walks or exercise outside?

A: Daily	48.41%
B: Every Other Day	15.92%
C: 1-2 times a week	22.93%
D: Every other week or less	12.74%

Question 15: Are you satisfied with Watkinsvilles sidewalks?

A: Yes	29.03%
B: No	25.81%
C: If no, why?	45.16%

Question 16: Would you like to see improvements to Watkinsvilles pedestrian infrastructure?

A: Yes	39.61%
B: No	3.90%
C: Indifferent	10.39%
D: If yes, what changes?	46.10%

Question 17: Are you familiar with greenways?

A: Yes	89.74%
B: No	10.26%

Question 18: Have you ever used a greenway before?

A: Yes	30.13%
B: No	24.36%
D: If yes, where?	45.51%

Question 19: Do you think greenway systems are safe?

A: Yes	94.00%
B: No	6.00%

Question 20: If Watkinsville had its own greenway system, would you consider using it?

A: Yes	94.16%
B: No	5.84%