

FINAL PLAN  
OCT 2020



PREPARED FOR: THE PIEDMONT TRIAD REGIONAL COUNCIL AND NCDOT *with*  
THE WINSTON-SALEM URBAN AREA MPO, THE NORTHWEST PIEDMONT RPO,  
*and* SURROUNDING COUNTIES/MUNICIPALITIES

PREPARED BY ALTA PLANNING + DESIGN *with* WALLACE CONSULTING *and* VELO GIRL RIDES

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*NCDOT = North Carolina Department of Transportation*

*Back Cover Photo: Touring the Yadkin Valley Region by bicycle (photo: Velo Girl Rides)*



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## INTENDED AUDIENCE

The intended audience for this document includes residents, elected officials, government planners, developers, and all people interested in active transportation, recreation, health, wellness, environmental stewardship, economic development, tourism, and overall quality of life throughout the Yadkin Valley Region of North Carolina.

## ADDITIONAL INFORMATION

Please contact PTRC for additional information on this plan and the planning process:  
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# CHAPTER 1

## INTRODUCTION



*Salem Creek Greenway in Winston-Salem, NC (photo: Alta)*



# PROJECT OVERVIEW

*The purpose of this plan is to identify opportunities and constraints for bicycling in the Yadkin Valley region, and to establish recommendations for improvement. This plan includes recommendations for regional trails and bicycle routes, as well as smaller, in-town bicycling improvements that aim to enhance safety and connectivity in the short-term.*

The Piedmont Triad Regional Council (PTRC) led the planning process, with a study area that includes 24 municipalities, six counties, three divisions of NCDOT (Divisions 9, 11, 12), the Winston Salem Urban Area MPO, the Northwest Piedmont RPO, and the CRTPO RPO.

This plan was developed through an open and participatory process that garnered public input through public events, Steering Committee meetings, input maps, and comment forms. This plan also builds upon the recommendations of past planning efforts, each informed by their own public engagement processes.

## KEY FEATURES OF THE PLAN

- An analysis of current conditions and public feedback regarding bicycling in the Yadkin Valley region;
- A comprehensive recommended bikeway and greenway network;
- A strategic list of recommended top projects;
- Recommended strategies for greenway and bikeway policies, programs, design, and implementation.

## PLANNING PROCESS

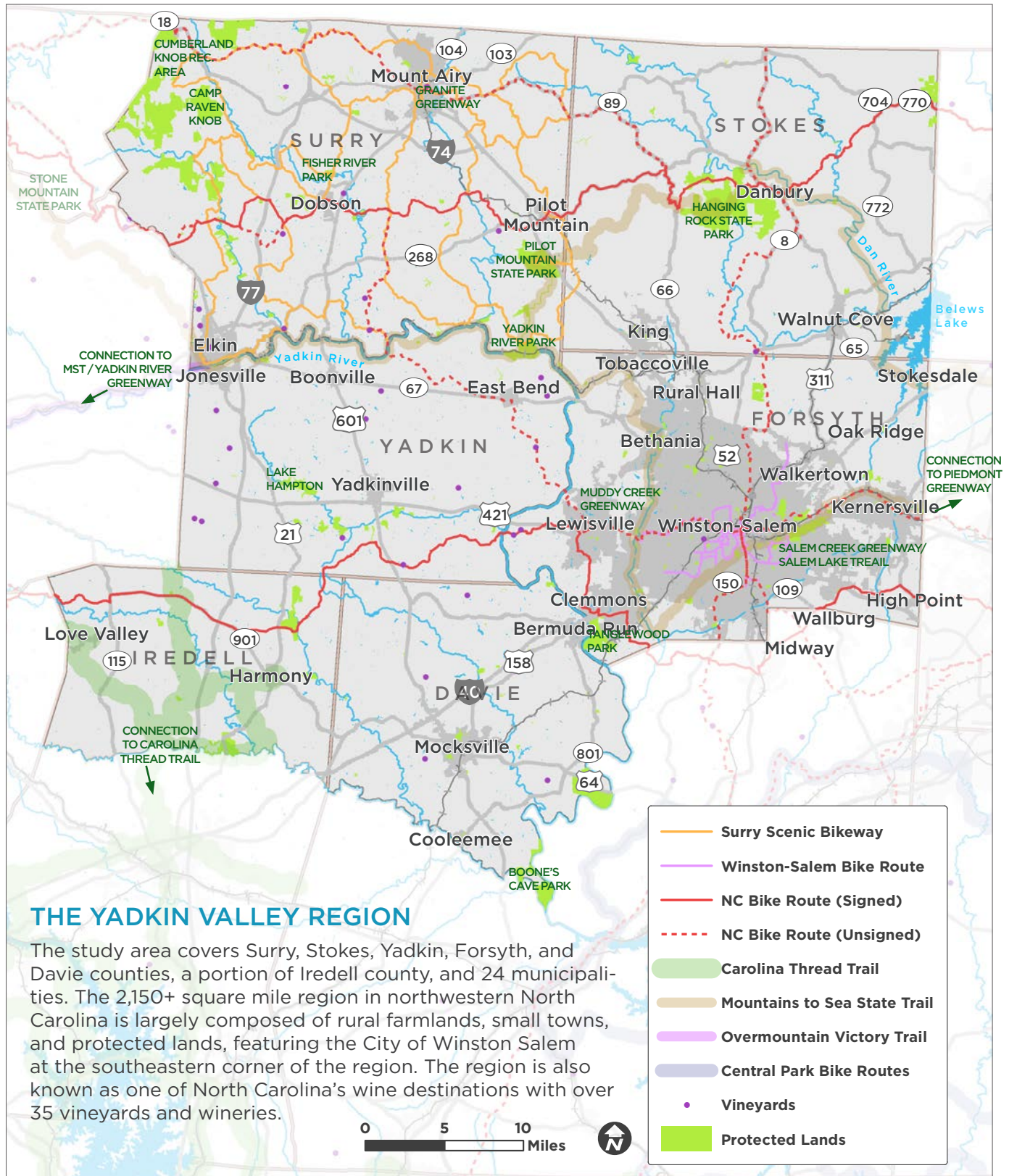
The graphic at right summarizes the outreach efforts and major milestones of the planning process. More in-depth reporting and analysis of the engagement process can be found towards the end of Chapter 2.







## MAP 1.1 - STUDY AREA



Sources: NCDOT, ESRI, USGS, NOAA.



Bicycling conditions in the region today are largely perceived as fair, with room for improvement (see survey results at the end of Chapter 2). Most people riding in the region today do so for recreation, with a desire for connecting to trails, greenways, and parks. However, people would bicycle more often if drivers were less aggressive and there were more places to ride other than on the street with cars.

There are many opportunities for new bicycle facilities in the Yadkin Valley Region that

could get people to ride more often. These include projects in adopted plans, such as the Yadkin River Greenway and the Dan River Trail. Other projects, like the potential for linking bicycle tourism with agritourism, have been discussed, but never formally recommended in past plans. There also are many new connections that could be made to the region's many historic small towns, connecting bicyclists to rural and low-volume roadways, highlighting the Yadkin Valley's scenic rolling landscapes.



*Clockwise from top left: Downtown Pilot Mountain, Cycle to Farm Bicycle Tour by Velo Girl Rides, Pilot Mountain State Park Corridor Trail, trail riding in Surry County, Downtown Danbury, bicycle lane in Winston-Salem, vineyard in Surry County, and a bicycle lane in Yadkinville.*





## PLAN VISION

*The Yadkin Valley Region will improve conditions for bicycling, making roadways safer and more comfortable for all users. This plan recommends a variety of new bicycling facilities for people of all ages and abilities, connecting within, and between, communities. Outcomes include greater health, safety, economic activity, and transportation choices for residents and visitors throughout the Region.*

## GOALS

The following goals were adapted from the Federal Highway Administration's Guidebook for Developing Pedestrian and Bicycle Performance Measures.



### **ENHANCE CONNECTIVITY**

Identify projects that can create more convenient and accessible bicycling connections for people of all ages and abilities.



### **CREATE A POSITIVE ECONOMIC IMPACT**

Create projects that support the positive economic effects of bikable communities, particularly high-impact/low-cost projects.



### **PROTECT THE ENVIRONMENT**

Promote cycling as an environmental good, prioritize linkages to natural areas, and develop programs that bring cyclists to nature.



### **PROMOTE EQUITY**

Ensure equitable distribution of investment to low-income and low car-ownership populations. Include connections to employment centers and educational institutions.



### **INCREASE AWARENESS TO IMPROVE SAFETY**

Develop bicycle-specific education programs, policies and facilities that emphasize safety for all types of bicyclists.



### **ENHANCE HEALTH**

Encourage bicycle-friendly policies that improve health and wellness by increasing access to bikeways and encouraging their use.



### **INCREASE LIVABILITY**

Encourage bicycle-friendly development, including greenways and bikeways as essential infrastructure.

## TYPES OF BICYCLISTS

This Plan was developed with the understanding that there are different types of bicyclists, with differing needs. Bicyclists can be categorized into four distinct groups based on comfort level and riding skills. Bicyclists' skill levels greatly influence expected speeds and behavior. Bicycle infrastructure should accommodate as many user types as possible. The various characteristics, attitudes, and infrastructure preferences of each type are described below.



### STRONG AND FEARLESS (~1% OF POPULATION)

Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other types of bicyclists and will typically choose roadway connections - even if shared with vehicles - over separate bicycle facilities such as shared use paths.



### ENTHUSED AND CONFIDENT (~ 5-10% OF POPULATION)

This group encompasses bicyclists who are fairly comfortable riding on all types of bikeways, but usually choose low traffic streets or multi-use paths when available (and may deviate from more direct routes to use them). This group includes commuters, recreationalists, racers and utilitarian bicyclists.



### INTERESTED BUT CONCERNED (~ 60% OF POPULATION)

The bulk of the cycling population falls into this category, representing bicyclists who typically only ride a bicycle on low traffic streets or multi-use trails in favorable weather. These bicyclists perceive significant barriers to bicycling, specifically traffic and other safety issues. They may become "Enthusied & Confident" with encouragement, education and experience.



### NO WAY, NO HOW (~ 30% OF POPULATION)

Persons in this category are not bicyclists, and perceive severe safety issues with riding in traffic. Some people in this group may eventually become bicyclists with time, education, and improved conditions for bicycling. A significant portion of these people will not ride a bicycle under any circumstances.

*Source: Four Types of Cyclists. (2009). Roger Geller, City of Portland Bureau of Transportation. Supported by data collected nationally since 2005.*





# THE VALUE OF BIKEWAYS AND GREENWAYS



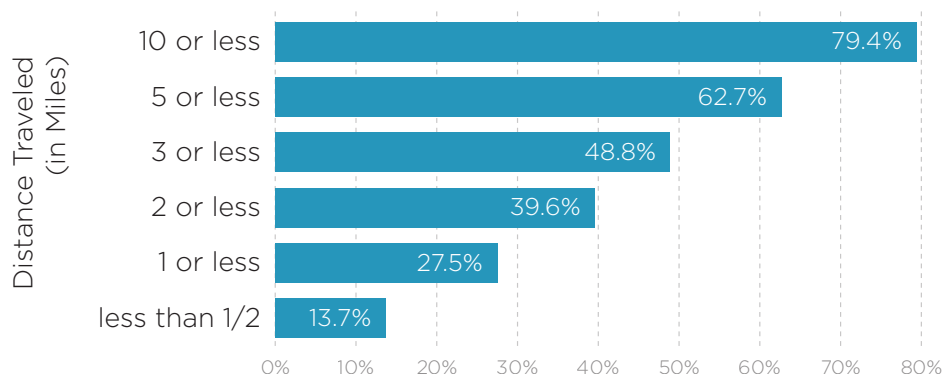
## CONNECTIVITY

The Yadkin Valley region is large, encompassing 24 municipalities, six counties, and three NCDOT divisions. These communities share many resources and amenities that could be accessed via bicycle if conditions were inviting to residents and tourists.

While some communities may choose to seize more localized connectivity issues, there are some inter-municipality trail opportunities. For example, the NC Bike Route 2 connects Lewisville, Clemmons, and High Point, and extends to the eastern and western ends of the state. Additionally, paths like Surry County Scenic Bikeway exemplify how contributions to larger networks can also greatly benefit local communities, especially as it relates to tourism and economic development.

Making shorter trips safer and more convenient for bicycling is also important. More than 60% of all driving trips made in the U.S. are shorter than five miles (see chart below). Additionally, surveys by the Federal Highway Administration show that Americans are willing to bicycle as far as five miles. This presents an opportunity for more everyday, in-town trips to be made by bicycle. The challenge is to create routes within communities that are safe, comfortable, and convenient. Although the scope of this plan has a large geographic extent, within a largely rural context, many of the recommendations will be focused on where people live, in the region's many small towns.

Distance of All Average Driving Trips Made in the U.S.



Data Source: Bicycle and Pedestrian Information Center (pedbikeinfo.org)



## ECONOMIC IMPACT

Active transportation projects are shown to deliver an array of positive economic benefits in the form of tourism, development and maintenance of facilities, increased property values, commercial activity, and infrastructure savings.

***“Trails can be associated with higher property value, especially when a trail is designed to provide neighborhood access and maintain residents’ privacy. Trails, like good schools or low crime, create an amenity that commands a higher price for nearby homes. Trails are valued by those who live nearby as places to recreate, convenient opportunities for physical activity and improving health, and safe corridors for walking or cycling to work or school.”***

- Headwaters Economics  
([www.headwaterseconomics.org/trail](http://www.headwaterseconomics.org/trail))

Bicycling has a low cost for users, a high return on investment for the taxpayer, and is increasingly of interest to employers and homebuyers. It is hard to argue against developing a regional system that creates value and generates economic activity on this scale and at this investment level (see following page for examples). More detailed information can be found in the full report, *Evaluating the Economic Contribution of Shared Use Paths in NC*, which can be accessed here: <https://itre.ncsu.edu/focus/bike-ped/sup-economic-impacts/>.



*Small towns in the region (like Mount Airy, shown here), could benefit from additional tourism associated with bicycling and trails.*



*Bicycle tourism, combined with the Yadkin Valley's agritourism for vineyards and wineries, could be a winning combination for economic development in the region.*



***A great example of successful bike tourism for vineyards is in Napa Valley, California. For more informatino, see [napavalleybiketours.com](http://napavalleybiketours.com)***





A 2018 study looking at the economic impact of four greenways in North Carolina (Brevard Greenway, Little Sugar Creek Greenway, American Tobacco Trail, and Duck Trail) found that **every \$1.00 of initial trail construction supports \$1.72 annually from sales revenue, sales tax revenue, and benefits related to health and transportation.**

*Combined Study Results: A one-time \$26.7M capital investment in the four greenways supports:*



**\$19.4M**

Estimated annual sales revenue at local businesses along the four greenways



**\$684K**

Estimated annual local and state sales tax revenue from businesses along the greenways



**\$25.7M**

Estimated annual savings due to more physical activity, less pollution and congestion, and fewer traffic injuries from use of the greenways



**\$48.7M**

Estimated business revenue from greenway construction



**790 JOBS**

Are supported annually through greenway construction



*The study included extensive trail user surveys for each of the four greenways over a period of three years.*



Source: Institute of Transportation Research and Education. (2017). *Evaluating the Economic Impact of Shared Use Paths in North Carolina.* <https://itre.ncsu.edu/focus/bike-ped/sup-economic-impacts/>





# ENVIRONMENT

Trails and greenways have the potential to link fragmented habitats and restore or create new habitat for plants and animals. Greenways also protect large swaths of natural plant habitat which are beneficial in the production of oxygen and filtering of air pollutants like ozone, sulfur dioxide, carbon monoxide, and heavy metals.

Additionally, greenways act as natural buffer zones that protect streams, rivers, and lakes by filtering agricultural and roadway pollutants and preventing soil erosion.

Bicycling and bicycle infrastructure can also be useful in emergencies like natural disasters. Most importantly, greenways and trails often utilize floodplain land, preventing development in these potentially hazardous areas. Additionally, in the immediate

aftermath of an emergency, FEMA recognizes that cargo bikes can be used to deliver people and goods in places where roads are otherwise blocked, damaged, or constricted (<https://community.fema.gov/story/disaster-relief-trials-pedal-toward-community-resilience>).

Providing the community with safe and appealing opportunities to access the outdoors can also spur interest in environmental stewardship and the appreciation of the natural assets of the Yadkin Valley region. Furthermore, being outdoors in nature is shown to increase well-being and provide health benefits, both physically and mentally ([www.nrpa.org/uploadedFiles/nrpa.org/Publications\\_and\\_Research/Research/Papers/SOPARC-Report.pdf](http://www.nrpa.org/uploadedFiles/nrpa.org/Publications_and_Research/Research/Papers/SOPARC-Report.pdf)).



**ASTHMA IS THE LEADING CHRONIC DISEASE IN CHILDREN** and the number one reason for missed school days (CDC)



A minimum of **20 MINUTES OF PHYSICAL ACTIVITY, 3X WEEK, STRENGTHENS THE LUNGS**, including those of individuals living with asthma (US National Lib of Medicine)



Exposure to **TRAFFIC EMISSIONS** is linked to exacerbation of **ASTHMA, REDUCED LUNG FUNCTION, ADVERSE BIRTH OUTCOMES** and childhood **CANCERS** (CDC)



IF **8% MORE CHILDREN LIVING WITHIN 2 MILES OF A SCHOOL WERE TO WALK OR BIKE TO SCHOOL**, the air pollution reduced from not taking a car would be **EQUIVALENT TO REMOVING 60,000 CARS FROM THE ROAD** for one year (Pedroso, 2008, SRTS)



**40% OF ALL TRIPS** in the U.S. are **TWO MILES OR LESS**, and two-thirds of them happen in cars (NHTS, 2009)



**BIKING 2 MILES**, rather than driving, **AVOIDS EMITTING 2 lbs OF POLLUTANTS**, which would take 1.5 months for one tree to sequester. (EPA, 2000 and NC State, 2001)





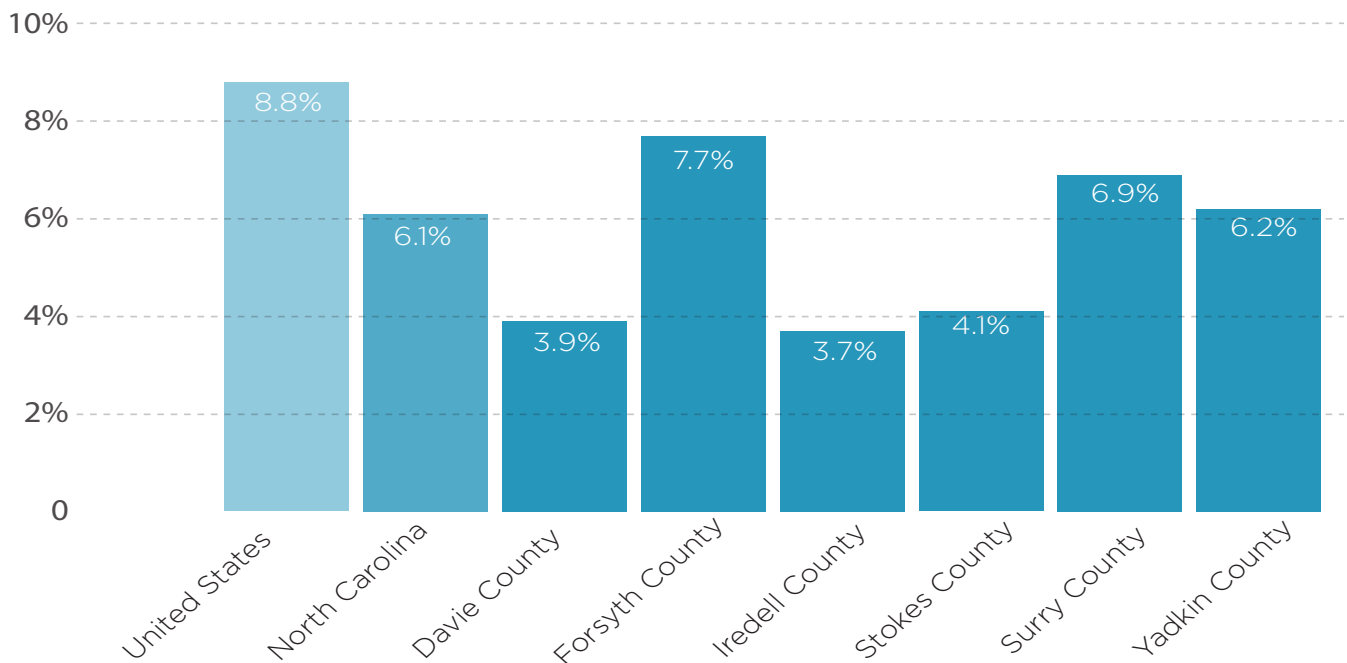
## EQUITY

The chart below illustrates the share of population in the study area without access to a motor vehicle. This population is reliant on safe access to bicycle, pedestrian, and transit facilities to not only access employment and basic services but to also be an engaged member of society.

In addition to economic challenges, auto-oriented development restricts populations under 16 and seniors who desire safe ways to access community destinations.

Costs associated with car ownership can be a barrier to mobility in car-centric environments. A study cited by the Victoria Transport Policy Institute found that households in automobile dependent communities devote 50 percent more of their income to transportation than households in communities with more accessible land use and more multi-modal transportation systems ([www.vtpi.org/tca/tca0501.pdf](http://www.vtpi.org/tca/tca0501.pdf)). Reducing this financial burden could have major impacts on a household's ability to partake in the local economy, accrue wealth, and reduce economic hardship.

### PERCENT OF HOUSEHOLDS WITH NO MOTOR VEHICLE



Data Source: US Census Bureau, American Community Survey 2017, 5-Year Estimates



## SAFETY

There are many factors that influence the safety, both perceived and actual, that bicyclists experience. The Federal Highway Administration Crash Modification Factor Clearinghouse ([www.cmfclearinghouse.org](http://www.cmfclearinghouse.org)) is a web-based database that helps engineers and planners identify the most appropriate countermeasure for safety needs. For example, before and after studies of bicycle lane installations show a crash reduction of 35 percent (CMF ID: 1719) for vehicle/bicycle collisions after bike lane installation.

Increasing bicycle safety can result from a range of actions, such as safety education programs or the development of group rides. Simply getting more people on bicycles is in itself a safety measure. Shifts from driving to active modes tend to reduce total per capita crash rates in an area, thus providing a safety benefit. Additionally, the straightforward reduction of speed limits can have a profound effect on safety and comfort for bicyclists (as seen in the graphic below).

### BICYCLE FACILITIES WITH PEDESTRIAN CRASH COUNTERMEASURES

FACILITY TYPE	PEDESTRIAN CRASH REDUCTION FACTOR
Install bicycle & pedestrian overpass/underpass	90%
Install sidewalk or side path (to avoid walking along roadway)	88%
Provide paved shoulder (of at least 4 feet)	71%
Install raised median at unsignalized intersection	46%
Install crossing refuge island	36%
Install crossing countdown signal heads	25%

*Bicycling improvements can increase safety for other roadway users too, especially pedestrians, as shown above. Source: Countermeasures and Their Potential Effectiveness for Pedestrian Crashes. [https://safety.fhwa.dot.gov/ped\\_bike/tools\\_solve/ped\\_tctpepc/](https://safety.fhwa.dot.gov/ped_bike/tools_solve/ped_tctpepc/)*

A bicyclist/pedestrian hit by a vehicle traveling at **25 MPH**



has a **89%** chance of survival

A bicyclist/pedestrian hit by a vehicle traveling at **35 MPH**



has a **68%** chance of survival

A bicyclist/pedestrian hit by a vehicle traveling at **45 MPH**



has a **35%** chance of survival

*Rosén, E., & Sander, U. (2009). Pedestrian fatality risk as a function of car impact speed. Accident Analysis & Prevention, 41(3), 536-542.*





## HEALTH

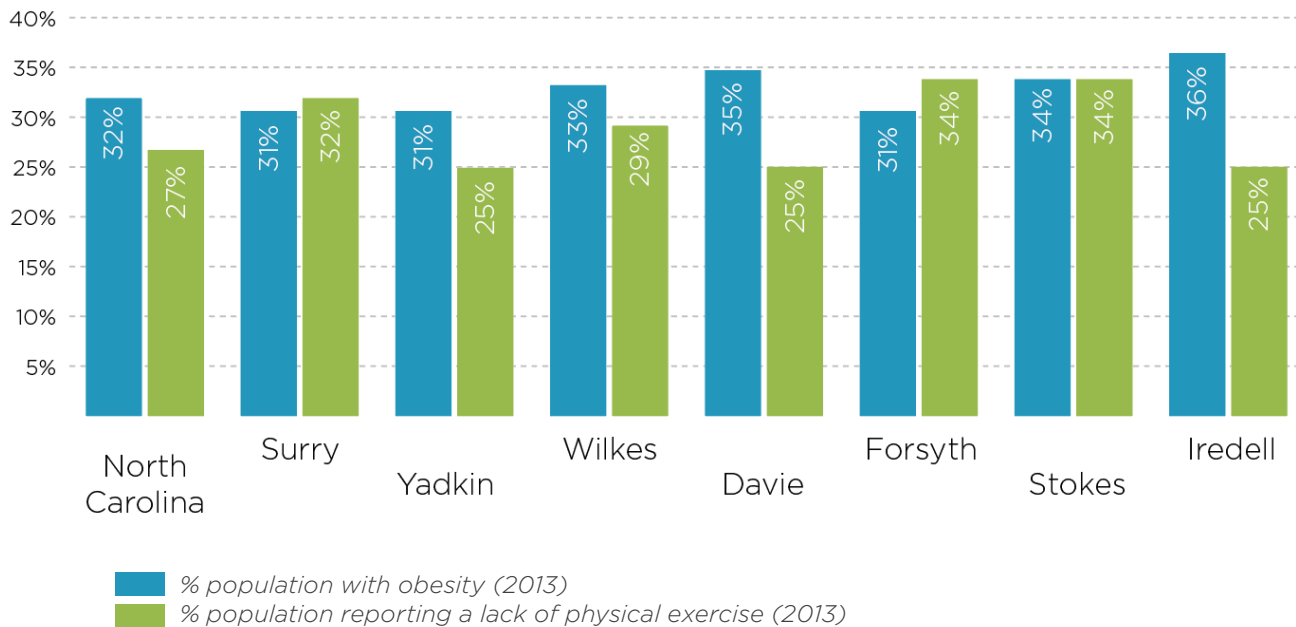
There are a growing number of studies illustrating how our environment—neighborhoods, towns, transportation systems, parks, and trails—contribute to a person’s ability to meet the recommended daily 30 minutes of moderately intense physical activity (60 minutes for youth).

According to a Federal Highway Administration report (*Evaluating the Economic Benefits of Non-Motorized Transportation*), the physical nature of riding a bike leads to decreases in mortality (rate of death) and morbidity (rate of disease) related to obesity and other health conditions.

These benefits are not only advantageous for individuals who may avoid negative health conditions, they also reduce absenteeism in the workplace and overall health care expenditures on a local, state, and national level. More information available at <https://rosap.ntl.bts.gov/view/dot/12173>

Detailed information on the economic impact of improving public health can be found in *Evaluating the Economic Contribution of Shared Use Paths in NC*: <https://itre.ncsu.edu/focus/bike-ped/sup-economic-impacts/>.

### COUNTY HEALTH STATISTICS IN THE YADKIN VALLEY REGION



## Health-Related Benefits of Active Transportation

### CURRENT U.S. HEALTH STATISTICS



**80%** of Americans **DO NOT ACHIEVE** the recommended 150 minutes per week of **MODERATE EXERCISE** (CDC)



**72%** of Americans **ARE OVERWEIGHT OR OBESE** (CDC, 2016)



**CARDIOVASCULAR DISEASES** are the **#1 CAUSE OF DEATH** in the United States (American Heart Association)



**1,660** Americans **DIE EVERY DAY FROM CANCER**, mainly that of the lung, breast and colon (American Cancer Society, 2019)



**61%** of American adults 65 years or older **HAVE AT LEAST ONE ACTIVITY-BASED LIMITATION** (CDC)



**86%** of workers in the United States **DRIVE OR RIDE IN A PRIVATE VEHICLE TO COMMUTE**, sitting on average for 26 minutes each way (American Community Survey, 2017)

### HEALTH BENEFITS



Residents of **WALKABLE COMMUNITIES** are **2.4x** as **LIKELY TO MEET PHYSICAL ACTIVITY GUIDELINES** compared to those who do not live in walkable neighborhoods (Frank, 2005)



For every **0.6 MILE WALKED** there is a **5%** **REDUCTION IN THE LIKELIHOOD OF OBESITY** (Frank, 2004)



**20 MINUTES WALKING OR BIKING** each day is associated with **21%** **LOWER RISK OF HEART FAILURE FOR MEN** and **29%** **LOWER RISK FOR WOMEN** (Rahman, 2014 and 2015)



A large study found that bike commuters **REDUCED THEIR RISK OF OVERALL DEATH BY 41%, HEART DISEASE BY 46%, AND CANCER BY 45%** (British Medical Journal, 2017)



**PHYSICAL ACTIVITY HELPS PREVENT OR DELAY ARTHRITIS, OSTEOPOROSIS AND DIABETES**, while helping maintain balance, mental cognition, and independence (NIH-National Institute on Aging)



**PEOPLE WHO BIKE BURN** an average of **540** **CALORIES PER HOUR** (De Geus, 2007)





# LIVABILITY

Bikable communities include many factors that are often associated with concepts of livability and quality of life, such as increasing safety, personal and public health, and opportunities for economic growth.

The American Association of Retired Persons (AARP) has an online tool that draws upon national databases to rank communities on a variety of livability factors, called the "Livability Index" (see table below). Transportation, as a factor of livability, is growing in importance as younger generations are showing a preference for more car-free lifestyles and older genera-

tions are looking for alternative transportation options that increase physical activity, reduce cost, improve community ties, and are more safe.

The table below shows the transportation scoring of the Livability Index comparison for three cities. It offers perspective on how the Yadkin Valley region's largest city (Winston-Salem) compares to the state capital, and to a national model for bicycling infrastructure and livability, Davis, California (<https://livabilityindex.aarp.org>).

	WINSTON-SALEM, NC	RALEIGH, NC	DAVIS, CA
<b>OVERALL LIVABILITY SCORE for TRANSPORTATION</b>	<b>50</b>	<b>43</b>	<b>68</b>
<b>Convenient transportation options</b> (frequency of local transit service)	0 buses and trains per hour	13 buses and trains per hour	27 buses and trains per hour
<b>Accessible system design</b> (ADA-accessible stations and vehicles)	97.8% of stations and vehicles are accessible	46.2% of stations and vehicles are accessible	94.3% of stations and vehicles are accessible
<b>Convenient transportation options</b> (walk trips)	0.71 trips per household per day	0.76 trips per household per day	0.87 trips per household per day
<b>Convenient transportation options</b> (congestion)	14.7 hours per person per year	23.9 hours per person per year	7.6 hours per person per year
<b>Transportation costs</b> (household transportation costs)	\$12,123 per year	\$12,323 per year	\$12,086 per year
<b>Safe streets</b> (speed limits)	31.6 miles per hour	31.4 miles per hour	30.1 miles per hour
<b>Safe streets</b> (crash rate)	9.3 fatal crashes per 100,000 people per year	7.4 fatal crashes per 100,000 people per year	4.8 fatal crashes per 100,000 people per year

● Top Third
 ● Middle Third
 ● Bottom Third

Source: <https://livabilityindex.aarp.org>









# EXISTING CONDITIONS

*This chapter summarizes the existing conditions for bicycling in the Yadkin Valley Region through existing conditions maps, recommendations from local and regional plans, stakeholder comments, and public feedback.*

## EXISTING CONDITIONS OVERVIEW

The maps on the following pages (and in Chapter 1) serve to communicate the existing conditions of the region for bicycling. Although it is a large study area, there are relatively few actual miles of bicycle facilities on the ground today. In fact, the main existing mileage is made up of signed on-road routes. (see **Map 1.1 Study Area**, page 6).

The existing facilities and routes are few and far between, but they provide a starting point from which to begin building a more complete and connected system. Much more can be done to better connect to a greater number of small towns and regional destinations in the region by bicycling. After all, the key to a successful network is connectivity; as more bicycle facilities are connected to one another, the benefits of any particular segment are greatly enhanced, with positive impacts to transportation, recreation, health, and economy.

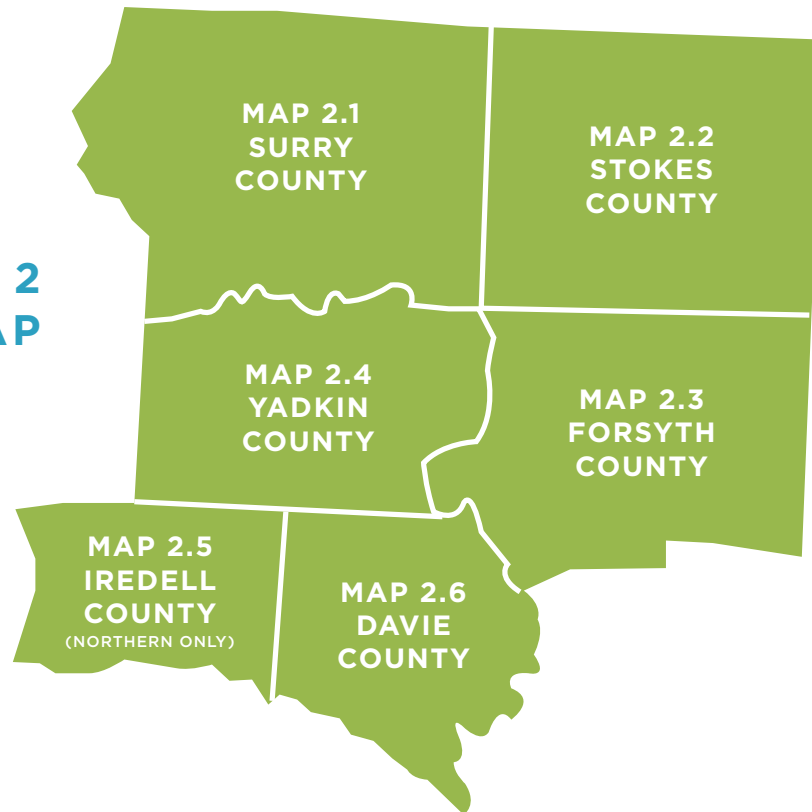
This chapter examines **existing conditions by county in Maps 2.1-2.6**, covering:

- Existing facilities
- Designated bicycle routes
- Municipalities
- River corridors
- Railroad corridors
- State parks and protected lands
- Past and current planning work that is relevant to bicycling
- Key opportunities and constraints from public, steering committee, and stakeholders
- Locations and clusters of bicycle crashes, as reported by NCDOT (2007-2018).

**The Bicycle Level of Service (BLOS) analysis is covered in Map 2.7A** (for Winston-Salem) and **Map 2.7B** (for the region). The BLOS maps show the estimated levels of service for bicycling under current conditions, based on traffic volumes, traffic speeds, roadway widths, and other factors.

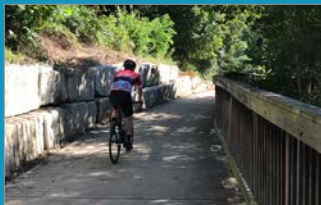
The chapter concludes with a **summary of public involvement and feedback**.

## CHAPTER 2 KEY MAP



### EXISTING FACILITIES SUMMARY

There are approximately 73 miles of existing bicycle facilities in the Yadkin Valley Region. There are also close to 452 miles of designated bicycle routes, but these are signed only, with no physical facility. The existing facilities and routes within the study area include:



#### **SHARED USE PATHS** **43 miles**

Examples include the Granite City Greenway, Elkin & Allegheny Rail Trail, and many trails and greenways in Winston-Salem, such as the Salem Creek Greenway and Muddy Creek Greenway.



#### **BICYCLE LANES** **20 miles**

Mostly located in Winston Salem



#### **SHARED LANE MARKINGS** **10 miles**

Mostly located in Winston Salem



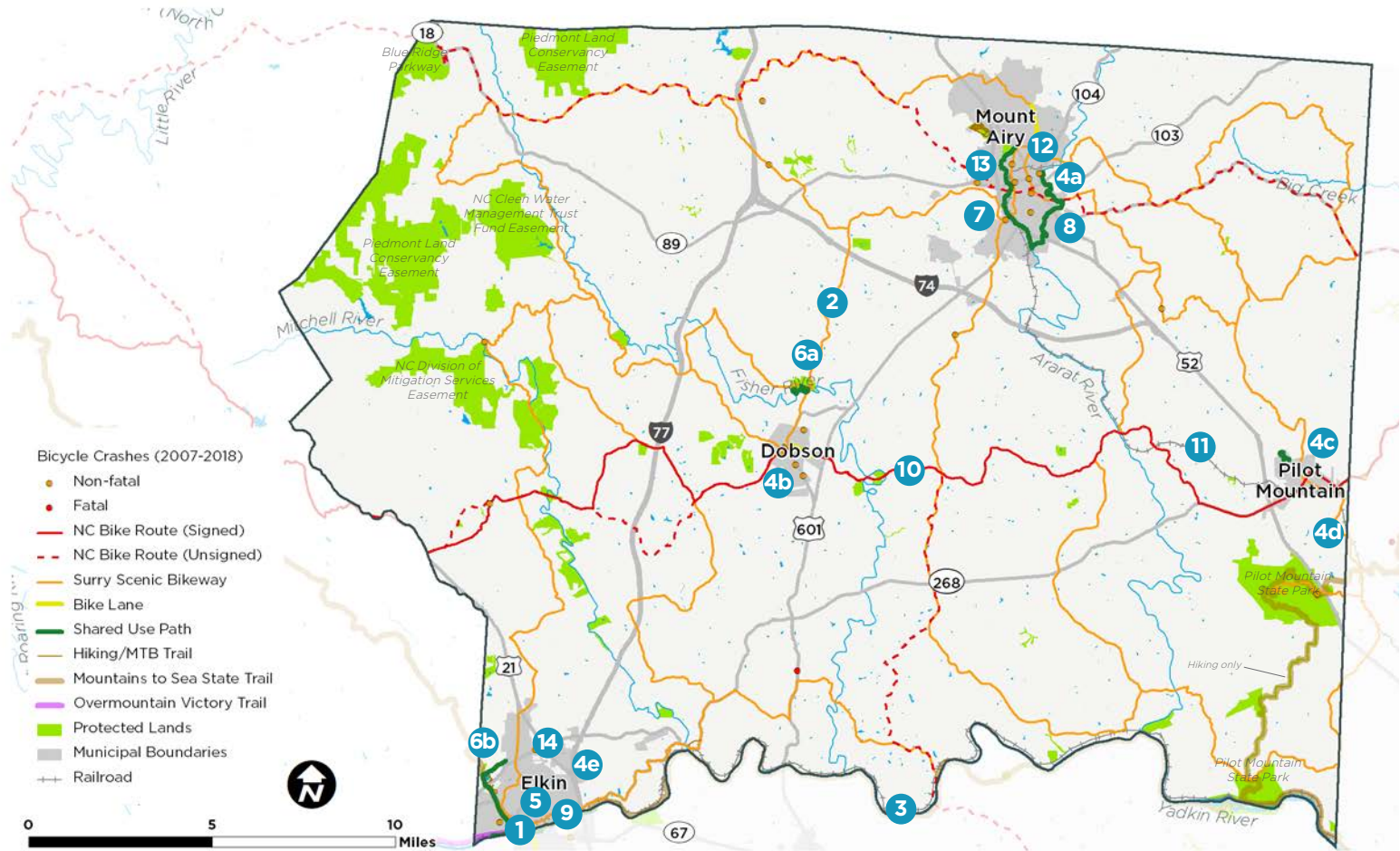
#### **SIGNED BIKE ROUTES** **452 miles**

Signed only (no designated bicycle facility). Examples: NC Bike Routes 2 and 4, Surry County Scenic Bicycle Routes, and Winston-Salem/Forsyth County Bicycle Routes.





## MAP 2.1 - EXISTING CONDITIONS: SURRY COUNTY



### EXISTING PLANS, FACILITIES, & RESOURCES

MAP ID	EXISTING PLAN/RESOURCES	KEY PROJECTS/RECOMMENDATIONS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
1	NCDOT 2018-2027 STIP Bridge Projects	<b>Multiple bridge replacement projects;</b> confirm projects will accommodate bicyclists. For example: Elkin Creek in Elkin (B-5971).
2	Surry County Scenic Bikeways	Surry has over <b>500 miles of designated bikeways</b> that provide access to each community in the County, and attractions such as parks and vineyards. The routes provide challenges for all levels of cyclists, running through the County's most scenic areas. This system could be used as a model for other counties in the Yadkin Valley Regional Bike Plan study area. This Plan can also serve as an opportunity to tweak or update the county bikeway network.
3	Surry County CTP	This 2012 CTP features a well-distributed network of both on-road improvements and multi-use paths, including a <b>greenway trail along the north side of the Yadkin River</b> . Many of the routes identified align with other initiatives, such as the Surry County Scenic Bikeways and the <b>Surry County Greenway Plan (2005)</b> .  The Regional CTP planning process (for Davie, Surry, & Yadkin counties) began in May 2019 and is expected to conclude in October 2020. The new CTP should incorporate recommendations from this Yadkin Valley Regional Bicycle Plan.
4	Local Pedestrian and Greenway Plans	These plans feature recommendations for multi-use trails that could be incorporated into this regional planning process: <b>Mount Airy Pedestrian Plan (2013) (4a)</b> , <b>Connect Dobson Greenway Master Plan (2019) (4b)</b> , the <b>Pilot Mountain Pedestrian Plan (2015) (4c)</b> , and the Pilot Mountain to State Park Greenway Feasibility Study (2020) (4d). Additionally, Elkin is in the process of developing a bicycle and pedestrian plan (4e).
5	Local Parks and Recreation Plans	Local parks plans, such as the 2014 Town of Elkin Recreation, Parks & Greenway Plan should be reviewed for bicycle facility recommendations that can connect to a regional network. For example, the <b>Big Elkin Creek Greenway and Yadkin River Greenway</b> in Elkin.

## EXISTING PLANS, FACILITIES, & RESOURCES (CONTINUED)

MAP ID	EXISTING PLAN/RESOURCES	KEY PROJECTS/RECOMMENDATIONS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
6	Existing Mountain Bike Trails	There are at least half a dozen mountain bike trails in the Yadkin Valley region. These should be considered as destinations for the future regional bicycle system, such as those at <b>Fisher River Park (6a)</b> near Dobson, and the <b>Elkin Creek &amp; Iron Falls MTB Trails (6b)</b> .
7	Emily B. Taylor Greenway (a.k.a. Granite City Greenway)	The <b>Emily B. Taylor Greenway</b> is approximately 2.5 miles in length (one way). It is a paved surface, multipurpose trail that goes from Veteran's Park on West Lebanon Street to Worth Street. The greenway is maintained by the local parks and recreation department and continues to be one of the most utilized park facilities in Mount Airy. This is part of the overall <b>Granite City Greenway</b> .
8	Ararat River Greenway (a.k.a. Granite City Greenway)	The <b>Ararat River Greenway</b> is a paved 2.2-mile greenway trail from Riverside Park to Tharrington Park. This section of the river has been restored and is great for wildlife viewing, kayaking, canoeing and trout fishing. The entire length of the trail is stocked with trout. There are multiple canoe/kayak/tube launch stations as well as areas for sitting by the river. A rest room is available halfway down the trail, on a side trail to the environmental park. This is part of the overall <b>Granite City Greenway</b> .
9	The Elkin Valley Trails Association (EVTA)	<p>This local all-volunteer non-profit's mission is to increase the quality of life in the Elkin Valley by building and promoting a network of trails and greenways. EVTA is a key stakeholder in the region for trail development. Associated trails include the following and can be viewed here: <a href="https://elkinvalleytrails.org/our-area-trails/maps/">https://elkinvalleytrails.org/our-area-trails/maps/</a></p> <ul style="list-style-type: none"> <li>• "Segment 6" of the Mountains-to-Sea Trail (MST)</li> <li>• Stone Mountain Trail; developing trail to and from Elkin (24 miles)</li> <li>• Pilot Mountain Trail; developing trail to and from Elkin (32 miles)</li> <li>• Elkin-Alleghany Rail Trail (2 miles)</li> <li>• Isaacs Trailhead to Carter Falls MST (2.5 miles)</li> <li>• Carter Falls Trail (0.5 mile)</li> <li>• Grassy Creek Vineyard Trail (0.5 mile)</li> <li>• Wells Knob Trail (2.5 miles)</li> <li>• Sawyers' Trail (2 miles)</li> <li>• Carolina Heritage Trail MST (0.5 mile)</li> <li>• Vineyard Loop: The loop will eventually connect the following wineries: Brushy Mountain, Grassy Creek, Elkin Creek, Adagio, Jones von Drehle, and McRitchie</li> </ul>
10	NC Bike Route 4: North Line Trace	Running east/west from the mountains to the coast, the ~400 mile <b>NC Bike Route 4 North Line Trace</b> runs just south of and parallel to North Carolina's border with Virginia. It travels through or near numerous small towns including Dobson and Pilot Mountain.

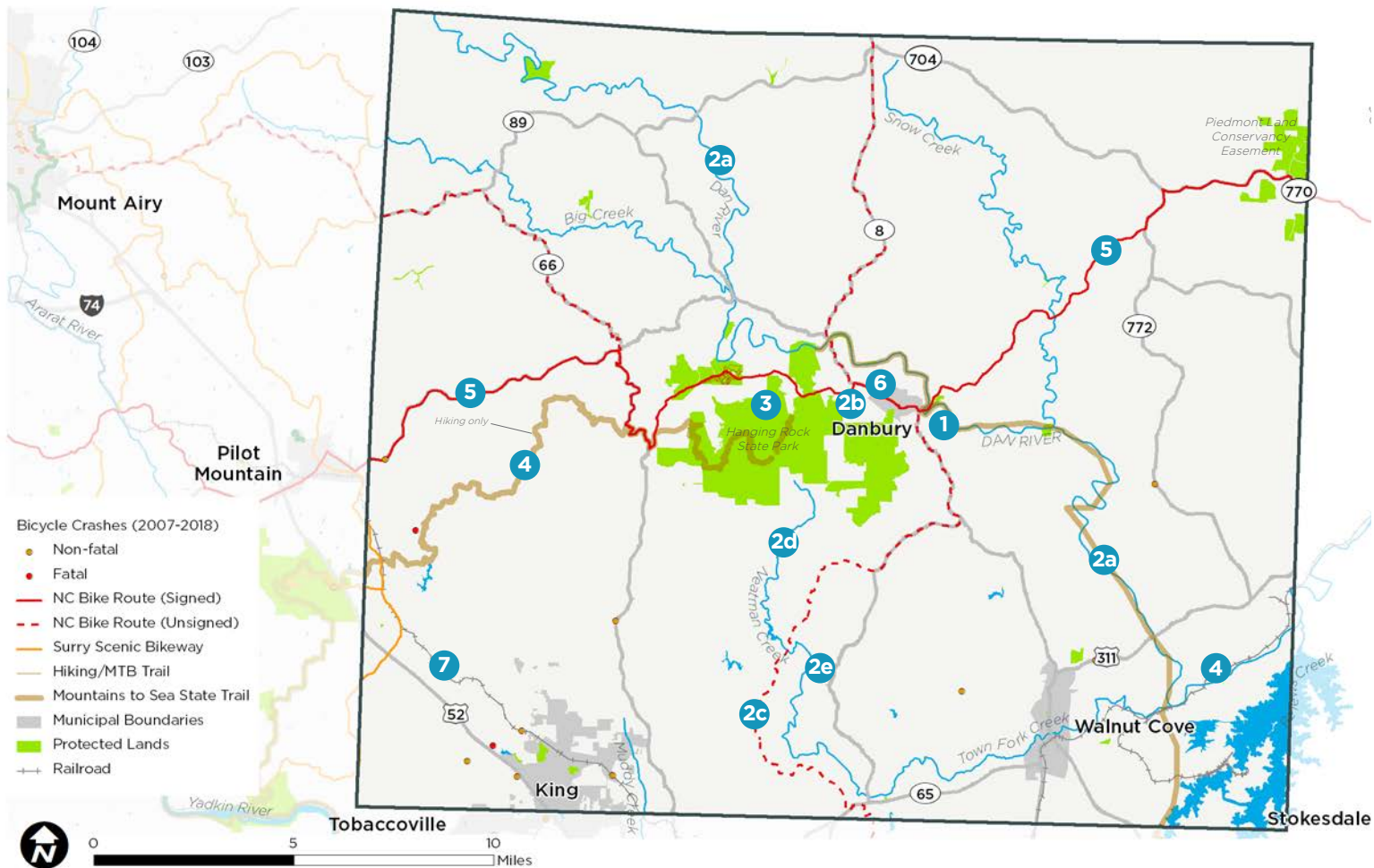
## STAKEHOLDER COMMENTS

MAP ID	COMMENT SOURCE	COMMENTS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
1	Stakeholder Meeting #2	The best option for bike/ped connectivity between Elkin and Jonesville is via a separate bike/ped bridge along US21B.
2	Kickoff Meeting	Longer-distance cyclists enjoy scenic rides out throughout the Yadkin Valley region and to local state park destinations such as Pilot Mountain State Park.
11	Stakeholder Meeting #2	The Yadkin Valley Railroad through Surry County carries a very low volume of train traffic- consider rail with trail opportunities.
12	Stakeholder Meeting #2	<b>Granite City Greenway:</b> Railroad currently not interested in converting inactive section into a rail trail connection that would complete the Mt. Airy Granite City Greenway (made up of the Emily B. Taylor Greenway and the Ararat River Greenway). A greenway extension is planned along Ararat River north to the Jones Intermediate School. Current designs for a roadway improvement project on US-601 (R-5714, set to begin construction in 2020) does not include any connections to the nearby Granite City Greenway.
13	Stakeholder Meeting #2	Need to explore on-road bike/ped connections in downtown Mt. Airy such as Oak St, Virginia St, and Lovill St.
14	Heritage & Trails Visitor Center	The <b>Yadkin Valley Tour de Vino</b> is the 3rd Saturday in May and starts in Elkin, NC. The rides are a 30, 31, 50, 71 or 100 mile scenic ride into parts of Surry, Wilkes, Yadkin and part of Alleghany counties of North Carolina: <a href="http://www.yvtdv.com">www.yvtdv.com</a>
N/A	Stakeholder Interview: Surry County Staff	The Surry County Wine Trail Map showcases 16 wineries and 5 breweries & distilleries in the heart of Yadkin Valley wine country. These are key destinations for bicycle tourism.
N/A	Stakeholder Interview: Surry County Staff	The Surry County Four Rivers map provides in-depth info about 100 miles of kayaking and canoeing waters (including put-in and take-out access points); and 36 miles of stocked trout waters. These are key destinations for bicycle tourism. The map can be found here: <a href="https://www.yadkinvalleynyc.com/guides/outdoor-recreation-map/">https://www.yadkinvalleynyc.com/guides/outdoor-recreation-map/</a>





## MAP 2.2 - EXISTING CONDITIONS: STOKES COUNTY



### EXISTING PLANS, FACILITIES, & RESOURCES

MAP ID	EXISTING PLAN/RESOURCES	KEY PROJECTS/RECOMMENDATIONS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
n/a (county-wide)	Stokes County CTP	This 2017 CTP recommends a multi-use path that runs across the County on the north side of the Dan River (2a), with smaller connecting paths to Hanging Rock State Park (2b) and Walnut Cove. A network of on-road sections that need improvement are also identified, including the entirety of <b>NC Bike Route 4</b> through the County (5).
1	NCDOT 2018-2027 STIP Bridge Projects	<b>Multiple bridge replacement projects;</b> confirm projects will accommodate bicyclists. For example: Dan River in Danbury (B-5766).
2	Piedmont Triad Regional Trail Plan and Inventory	This 2011 plan includes an inventory of existing & proposed trails, and identification of new proposed regional trail connections throughout the Piedmont Triad, including nearly the entire study area for this Yadkin Valley Regional Bike Plan, with the exception of the portion in Iredell County. The proposed regional trails from this plan that fall within Stokes County include the following (e.g., Local or Regional trails that were identified in 6 local public meetings as important regional trail connections): <ul style="list-style-type: none"> <li>• <b>Dan River Trail</b> (priority/proposed, 123.9 miles) (2a)</li> <li>• <b>Danbury Connector</b> (proposed, 3.5 miles) (2b)</li> <li>• <b>Hanging Rock Connector</b> (proposed, 16.6 miles) (2c)</li> <li>• <b>Neatman Ck Greenway</b> (proposed, 16.3 miles) (2d)</li> <li>• <b>Neatman Creek Greenway Spur</b> (proposed, 0.8 miles) (2e)</li> </ul>
3	Existing Mountain Bike Trails	There are at least half a dozen mountain bike trails in the Yadkin Valley region. These should be considered as destinations for the future regional bicycle system, such as those at <b>Hanging Rock State Park</b> (the park features over eight miles of mountain bike trails).

## EXISTING PLANS, FACILITIES, & RESOURCES (CONTINUED)

MAP ID	EXISTING PLAN/RESOURCES	KEY PROJECTS/RECOMMENDATIONS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
4	Sauratown Trail (MST)	Segment 7 of the <b>Mountains-to-Sea Trail</b> is the <b>Sauratown Mountains Trail</b> , running 36 miles from Pilot Mountain State Park to Hanging Rock State Park. The Sauratown Trail is maintained by the Sauratown Trails Association ( <a href="http://www.sauratowntrails.org">www.sauratowntrails.org</a> ), and the portion of Segment 7 within the state parks is maintained by Friends of the Sauratown Mountains ( <a href="http://www.sauratownfriends.org">www.sauratownfriends.org</a> ). The Sauratown Trail is hiking only.
5	NC Bike Route 4: North Line Trace	Running east/west from the mountains to the coast, the ~400 mile <b>NC Bike Route 4 North Line Trace</b> runs just south of and parallel to North Carolina's border with Virginia. It travels through or near numerous small towns including Pilot Mountain, Danbury, and Eden.
6	Connect Danbury	The <b>Connect Danbury Plan</b> (2017) proposes connecting Danbury with the Stokes County Government Center via sidewalks on both sides of NC 89; to Hanging Rock State Park via Sheep Rock Rd; and to Moratock Park via a sidepath (see image below).



The decorative sidewalk along the south side of Main Street would incorporate elements of the historic flagstone walkway. The rendering is part of the Connect Danbury plan approved by the Danbury Town Council.

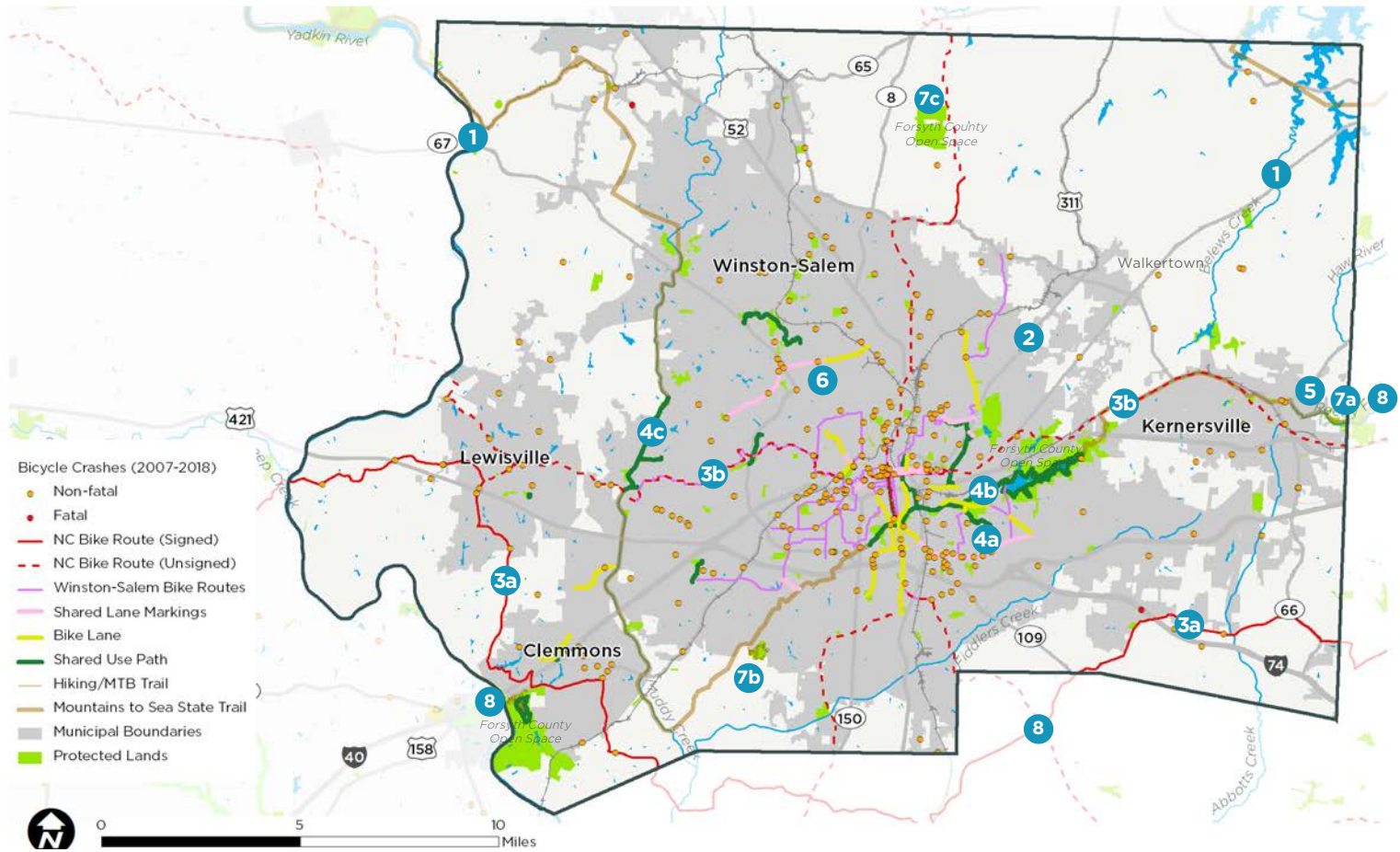
## STAKEHOLDER COMMENTS

MAP ID	COMMENT SOURCE	COMMENTS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
1	Kickoff Meeting	<b>Sheppards Mill Rd Bridge</b> is expected to be replaced within 3 years. New designs are likely to include bicycle lanes.
7	Stakeholder Meeting #2	The <b>Yadkin Valley Railroad</b> through Stokes County carries a very low volume of train traffic- consider rail with trail opportunities.
3, 5	Kickoff Meeting	Longer-distance cyclists enjoy scenic rides out throughout the Yadkin Valley region and to local state park destinations such as <b>Hanging Rock State Park</b> .





## MAP 2.3 - EXISTING CONDITIONS: FORSYTH COUNTY



### EXISTING PLANS, FACILITIES, & RESOURCES

MAP ID	EXISTING PLAN/RESOURCES	KEY PROJECTS/RECOMMENDATIONS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
n/a (city-wide)	Winston-Salem Bike Plan (2005 & 2019 update)	<p>The <b>Winston-Salem Bicycle Plan</b> (2019): The goal of the plan is to help the City determine which bicycle facilities are the most critically needed to improve safety and connectivity, as well as promote active transportation for all abilities. Priority routes are shown on page 57 of that plan, and include:</p> <ul style="list-style-type: none"> <li>• Northside Trace</li> <li>• Robinhood Road</li> <li>• Northwest Connector</li> <li>• Westside Bike Boulevard</li> <li>• Eastern Trace</li> <li>• CrossTown Connector</li> <li>• Lewisville Connector</li> <li>• Parkland South Connector</li> <li>• Southern Fiddle</li> <li>• Bethabara Brightway</li> <li>• Walkertown Quarry Connector</li> <li>• Reynolda Link</li> <li>• Long Branch</li> <li>• Forsyth Medical</li> <li>• Forsyth Tech Connector</li> <li>• Waughtown Route</li> <li>• Downtown Connector</li> </ul>
n/a (city-wide)	Winston-Salem Urban Area CTP	The <b>2012 CTP</b> identifies almost all roads that are not local or limited access as “needs improvement”. A goal of this regional plan could be to narrow down these recommendations to target specific routes for improvement. The City of Winston-Salem’s 2019 Bicycle Plan (above) should go a long way towards addressing this as well.
n/a (city-wide)	Forsyth County Bicycle Routes	This set of <b>11 bicycle route loops and connectors</b> (from the “Step up Forsyth!” map) is from 2004, but may still be relevant to examine potential regional connections.
1	NCDOT 2018-2027 STIP Bridge Projects	<b>Multiple bridge replacement projects</b> ; confirm projects will accommodate bicyclists. For example: Yadkin River near East Bend.
2	NCDOT 2018-2027 STIP Division & Regional Highway Projects	Potential opportunities to incorporate paved shoulders or bicycle lanes. For example: <b>US 158</b> , connecting Winston-Salem, Walkertown, and Stokesdale; and <b>NC 66</b> in Walkertown (U-5824; planning and design in progress).

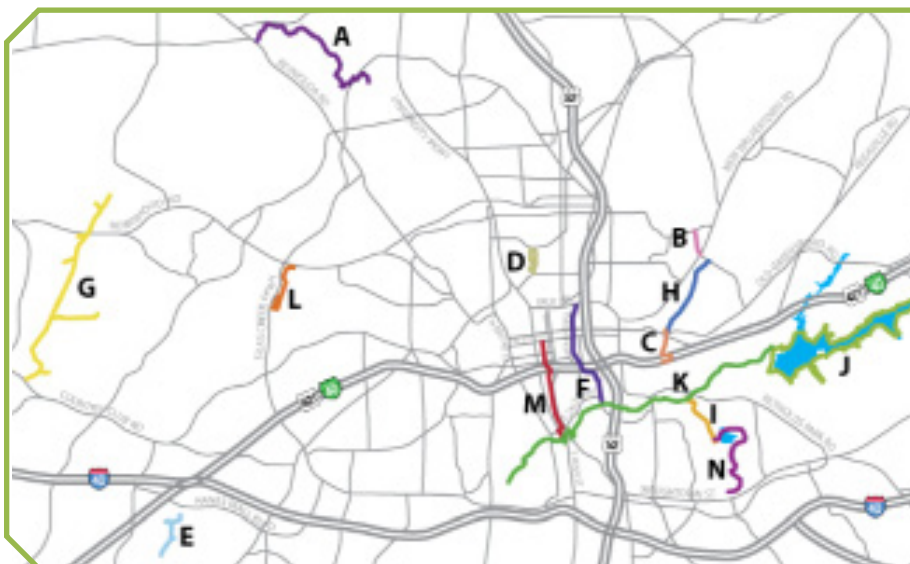


## EXISTING PLANS, FACILITIES, & RESOURCES (CONTINUED)

MAP ID	EXISTING PLAN/ RESOURCES	KEY PROJECTS/RECOMMENDATIONS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
3	NC Bike Route 2 & WalkBikeNC (NC Statewide Bicycle & Pedestrian Plan)	The 700+ mile <b>NC Bike Route 2 (3a)</b> serves as the main artery of the North Carolina bicycle route system, bisecting the state west to east. It ties the mountains in the west with the piedmont in the center and the coastal region in the east. It connects many of North Carolina's larger cities including Asheville, Winston-Salem, Greensboro, Durham, and Raleigh.  <b>New Proposed NC Business Bike Route 2 (3b):</b> This route would go through Winston-Salem, High Point, and Greensboro to complement the existing rural route through the region. Suggested route draws upon input from local bicyclists and bicycle shop owners.
4	Winston-Salem & Forsyth County Greenway Plan	The <b>Winston-Salem Greenway Plan Update</b> , adopted in 2012, continues the efforts started in the original 2002 plan by expanding the recommendations and prioritizing the greenway network. Top priorities included portions of the <b>Woughtown Connector (4a)</b> , <b>Salem Creek Greenway (4b)</b> , and <b>Muddy Creek Greenway (4c)</b> .
5	Piedmont Greenway-Triad Park Reedy Fork Section Feasibility Study	This 2016 study evaluates the three mile section of the <b>Piedmont Trail</b> that extends from downtown Kernersville to Triad Park. The proposed 3-mile alignment serves the largest number of uses along the corridor, while providing the longest distance off-road (as compared to other alternatives).
6	Wake Forest University Area Bicycle, Pedestrian & Transit Study	This 2015 study focuses on connections between the <b>Reynolda Campus</b> and the surrounding areas, including bicycle infrastructure recommendations to connect towards Downtown Winston-Salem. Additionally, the 2014 <b>Wake Forest University Bicycle &amp; Pedestrian Infrastructure Study</b> identifies a prioritized set of recommendations to improve conditions for walking and bicycling campus-wide.
7	Existing Mountain Bike Trails	There are at least half a dozen mountain bike trails in the Yadkin Valley region. These should be considered as destinations for the future regional bicycle system. For example: <b>Kernersville MTB Park (7a)</b> , <b>Hobby Park (7b)</b> , and <b>Horizons Park (7c)</b> .
8	Regional Planning Connections	Many existing plans have bicycle facility recommendations that connect to the study area. These should be reviewed to coordinate recommendations. A few examples include State Bike Route recommendations from <b>WalkBikeNC</b> , the <b>High Point Regional Bike Plan (2019)</b> , the <b>Piedmont Greenway Feasibility Study (2018)</b> , the <b>Central Park NC Regional Bike Plan (2013)</b> , the <b>Greensboro MPO BiPed Plan Update (2013)</b> , and the <b>Yadkin River Greenway Feasibility Study (2010)</b> .

## STAKEHOLDER COMMENTS

MAP ID	COMMENT SOURCE	COMMENTS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
9	Stakeholder Meeting #2	The National Cycling Center is involved in exploring material and design options for developing trails on top of existing railroad tracks versus removing the tracks.
n/a (city-wide)	Kickoff Meeting	Better connectivity is needed within and to areas beyond city limits

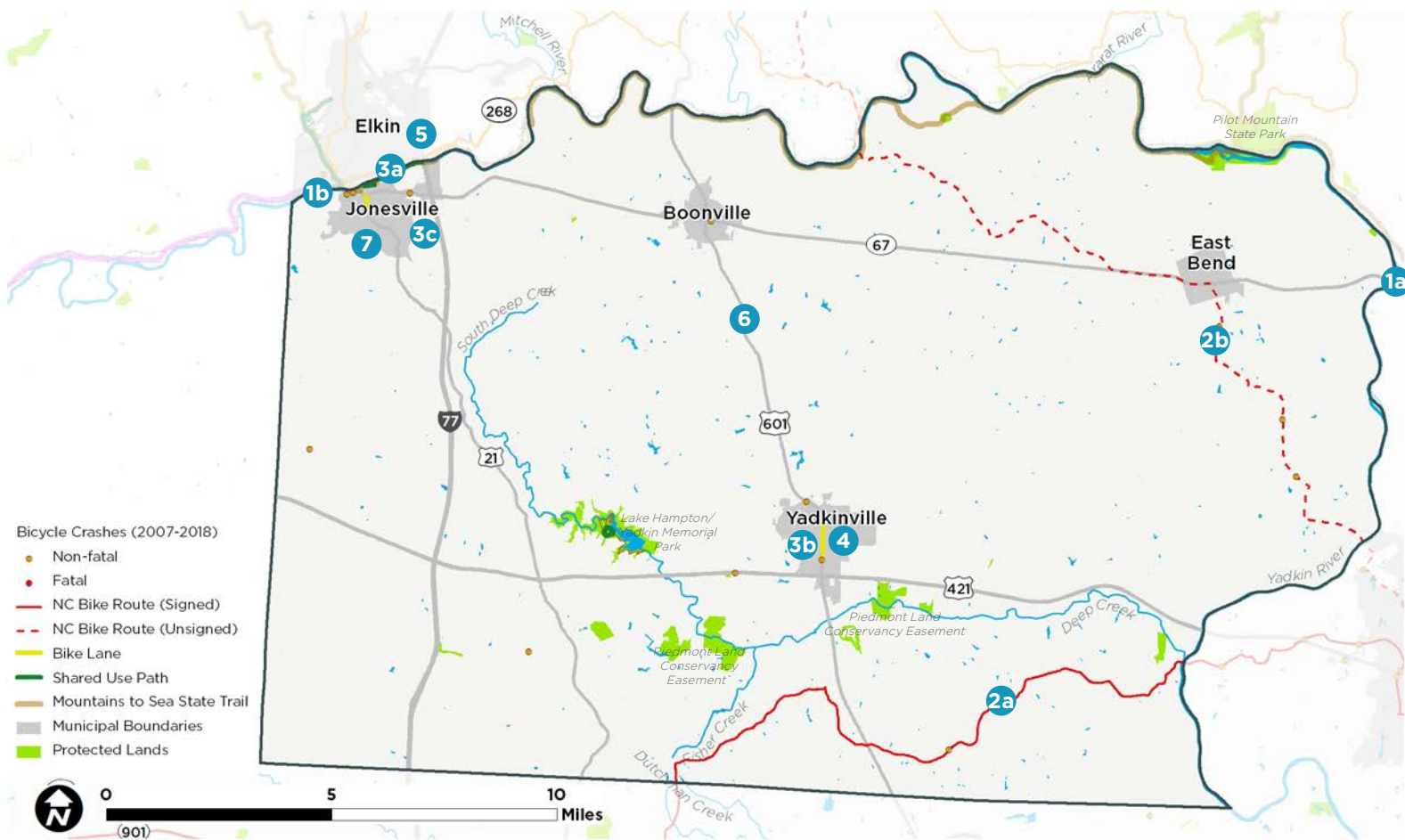


### Winston-Salem & Forsyth County Greenway Plan

- A. Bethabara Greenway
- B. Bowen Branch Greenway
- C. Brushy Fork Greenway
- D. Gateway Commons Greenway
- E. Little Creek Greenway
- F. Long Branch Trail
- G. Muddy Creek Greenway
- H. Newell/Massey Greenway
- I. Peachtree Greenway
- J. Salem Lake Trail
- K. Salem Creek Greenway
- L. Silas Creek Greenway
- M. Strollway
- N. Woughtown Connector



## MAP 2.4 - EXISTING CONDITIONS: YADKIN COUNTY



### EXISTING PLANS, FACILITIES, & RESOURCES

MAP ID	EXISTING PLAN/ RESOURCES	KEY PROJECTS/RECOMMENDATIONS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
1	NCDOT 2018-2027 STIP Bridge Projects	<b>Multiple bridge replacement projects;</b> confirm projects will accommodate bicyclists. For example: Yadkin River near East Bend (B-5825) (1a) and Elkin Creek in Elkin (B-5971) (1b).
2	NC 2 Mountains to Sea route & WalkBikeNC (NC Statewide Bicycle & Pedestrian Plan)	The 700+ mile <b>NC 2 Mountains to Sea route (2a)</b> serves as the main artery of the North Carolina bicycle route, bisecting the state west to east. It ties the mountains in the west with the piedmont in the center and the coastal region in the east. It connects many of North Carolina's larger cities including Asheville, Winston-Salem, Greensboro, Durham, and Raleigh.  <b>New Proposed NC Bike Route 12: Yadkin Valley Crossing (2b):</b> This proposed addition to the State Bike Route system is detailed in WalkBikeNC, connecting from Stone Mountain in the west to Winston-Salem in the east (via Dobson, Boonville, and Lewisville).
3	Yadkin County CTP	This 2014 CTP recommends: <ul style="list-style-type: none"><li>• <b>multi-use paths in Jonesville (3a)</b></li><li>• <b>multi-use paths in Yadkinville (3b)</b></li><li>• <b>on-road sections in need of improvement along a short loop south of Jonesville (3c)</b></li><li>• <b>on-road sections in need of improvement along NC Bike Route 2 (2a)</b></li></ul> The Regional CTP planning process (for Davie, Surry, & Yadkin counties) began in May 2019 and is expected to conclude in October 2020. The new CTP should incorporate recommendations from this Yadkin Valley Regional Bicycle Plan.

## EXISTING PLANS, FACILITIES, & RESOURCES (CONTINUED)

MAP ID	EXISTING PLAN/RESOURCES	KEY PROJECTS/RECOMMENDATIONS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
4	Yadkinville Pedestrian Plan (2010)	<p>Although pedestrian-focused, the Yadkinville Pedestrian Plan features recommendations for multi-use trails that could be incorporated into this regional bicycle plan:</p> <ul style="list-style-type: none"> <li>• <b>Upper Yadkinville Multi-Use Trail</b> along Sewer and Water Easements (Ped Plan Project ID: T); Short segment north of downtown.</li> <li>• <b>Middle Yadkinville Multi-Use Trail</b> along Sewer and Water Easements (Ped Plan Project ID: U); Long cross-town connection, running east-west south of downtown and parallel to Main St.</li> <li>• <b>Lower Yadkinville Multi-Use Trail</b> along Sewer and Water Easements (Ped Plan Project ID: V); Short segment south of 421 and east of 601.</li> </ul>
5	Jonesville Pedestrian Plan (2015)	<p>Although pedestrian-focused, the Jonesville Pedestrian Plan features recommendations for multi-use trails that should be incorporated into this regional bicycle plan. Figure 9 on page 24 of that plan shows the following <b>sidepaths on the Jonesville Comprehensive Proposed Facilities Map</b>, listed in order of priority:</p> <ul style="list-style-type: none"> <li>• NC 67, from Existing Sidewalk to Mayberry Road</li> <li>• US 21 Bridge, from Elm St to Elkin</li> <li>• NC 67, from Mayberry Road to I 77 S Exit Ramp</li> <li>• Valley Drive Greenway, from Swaim Memorial Park to Park Drive E</li> <li>• Penticostal Parcel</li> <li>• Valley Drive Greenway, from Park Drive to E NC 67</li> <li>• Elm Street, from Bridge Street to NC 67</li> </ul> <p>The plan also features a <b>proposed greenway trail running north-south along Sandyberry Creek</b>, roughly the length of town, from the Yadkin River to Center Rd.</p>

## STAKEHOLDER COMMENTS

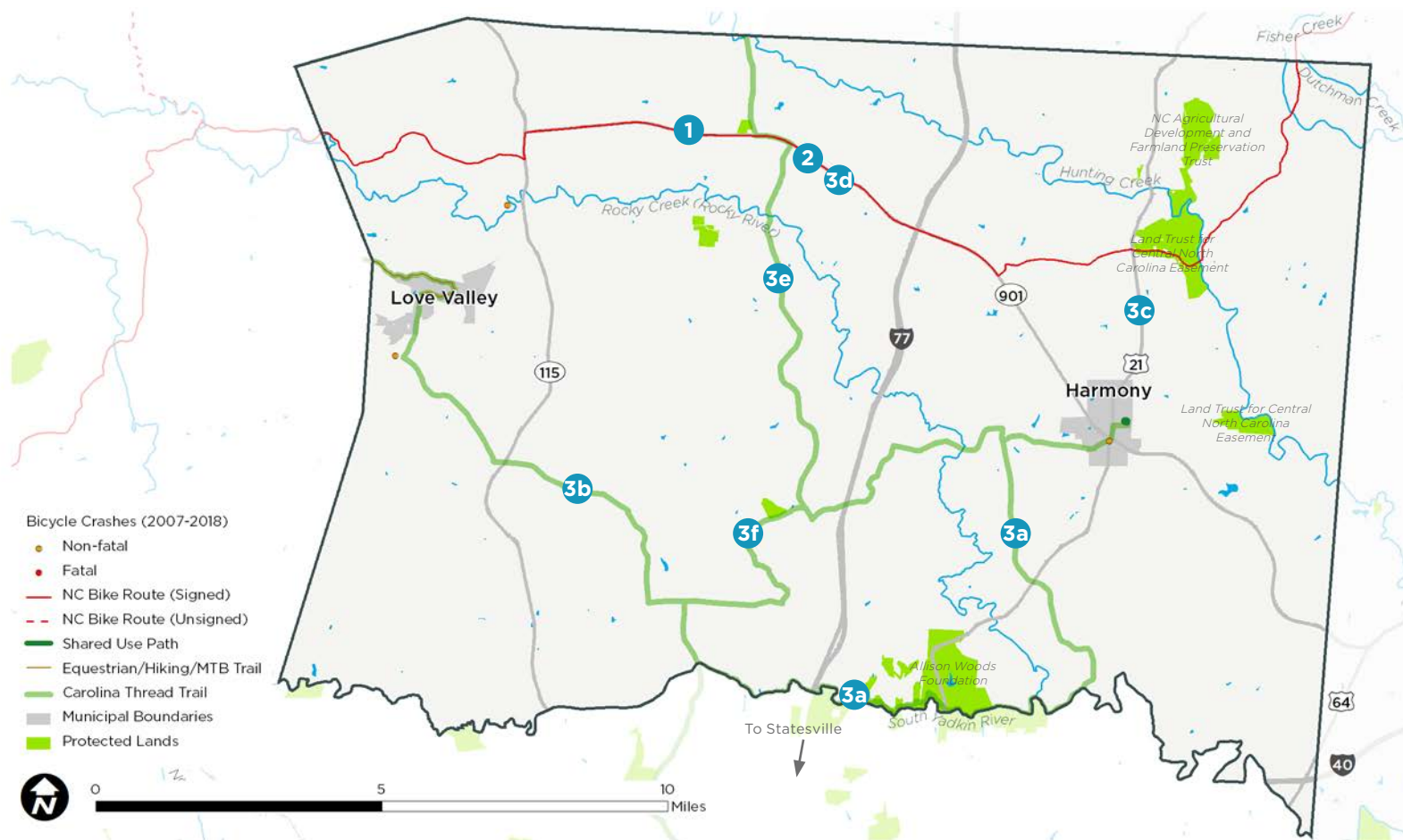
MAP ID	COMMENT SOURCE	COMMENTS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
1	Stakeholder Meeting #2	Planned commercial development near Yadkin River in uptown Jonesville. Trail-oriented development could make direct connection to MST/Jonesville Greenway/Yadkin River Greenway and between Elkin and Jonesville.
2	Stakeholder Meeting #2	Roads that are a part of the proposed NC Bike Route 12 (Yadkin Valley Crossing) may be improved in future funding cycles- opportunity to incorporate bicycle facilities into design
4	Kickoff Meeting	Large numbers of bicyclists are observed on roads such as Sugartown Road and Rockford Road who are mostly coming from the Winston-Salem area
5	Stakeholder Meeting #2	NCDOT will include piers for a future bicycle/pedestrian bridge next to I-77 during bridge replacement project
6	Stakeholder Meeting #2	Roadway modernization (STIP R-5896) will include 5-ft wide shoulders and bicycle-friendly rumble strips on US-601 from Yadkinville to Boonville with goals of continuing north into Surry County in future.
7	Kickoff Meeting	Town of Jonesville acquired 155 acres along Yadkin River which will include ~4.5 miles of river greenway to continue the ~2 miles of unpaved greenway along riverfront from Bluff Street to I-77





## MAP 2.5 - EXISTING CONDITIONS: IREDELL COUNTY

(THIS STUDY INCLUDES THE NORTHERN PORTION ONLY)



### EXISTING PLANS, FACILITIES, & RESOURCES

MAP ID	EXISTING PLAN/RESOURCES	KEY PROJECTS/RECOMMENDATIONS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
n/a (county-wide)	Bicycle Suitability Map for the CRTPO Region	The CRTPO map was developed to give recreational and commuting cyclists region-wide roadway suitability information for the greater Charlotte area. It was funded and published by the Charlotte Regional Transportation Planning Organization (CRTPO), which serves all of Mecklenburg County including Charlotte, all of Iredell County and most of Union County. The map can be viewed here: <a href="http://crtpo.org/bicycle-suitability">crtpo.org/bicycle-suitability</a>
1	NC 2 Mountains to Sea route	The 700+ mile <b>NC 2 Mountains to Sea route (2)</b> serves as the main artery of the North Carolina bicycle route system, bisecting the state west to east. It ties the mountains in the west with the piedmont in the center and the coastal region in the east. It connects many of North Carolina's larger cities including Asheville, Winston-Salem, Greensboro, Durham, and Raleigh.
2	Iredell County CTP	The 2005 CTP only identifies the existing <b>State Bike Route 2</b> on NC 901 in north Iredell County.

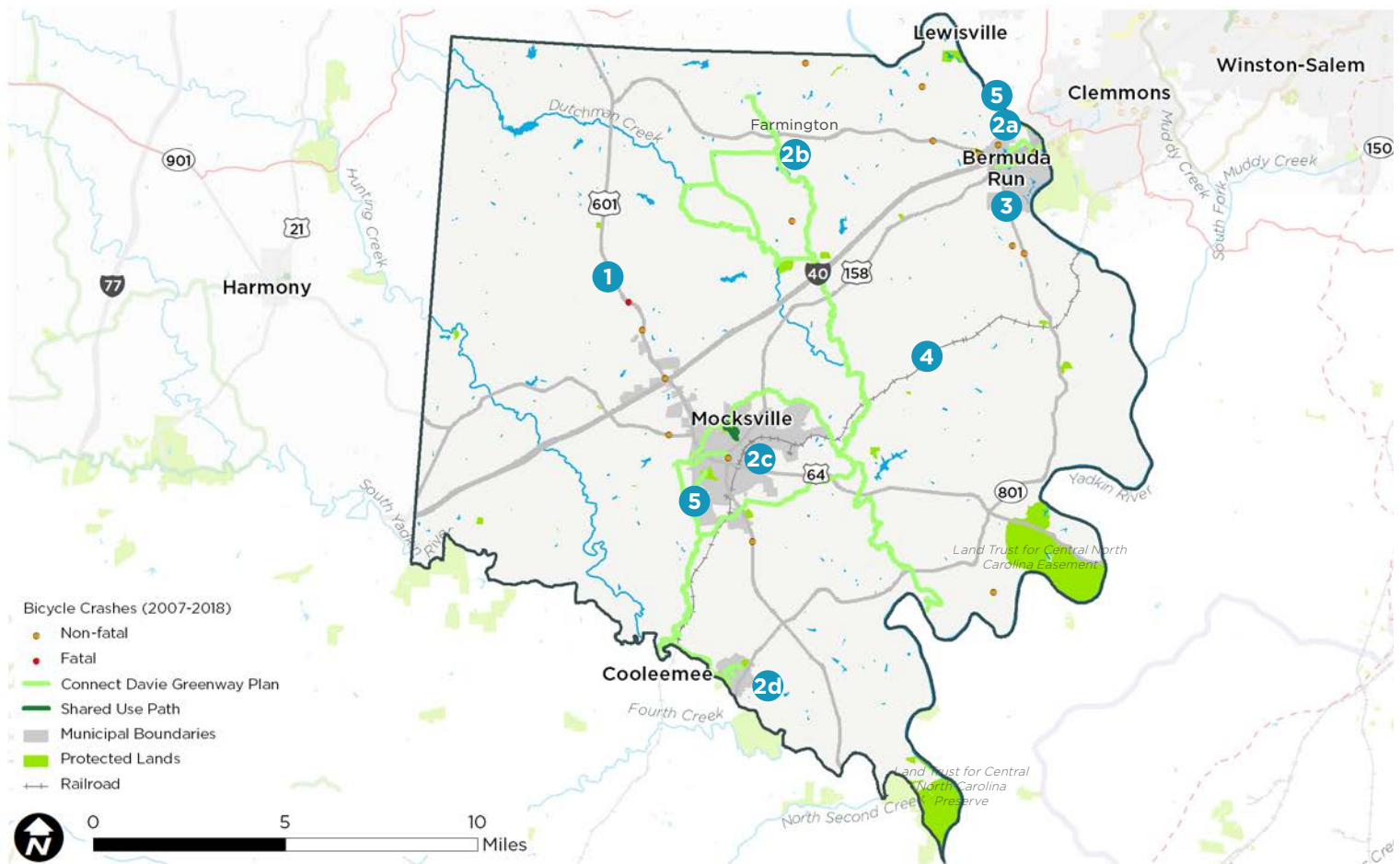


## EXISTING PLANS, FACILITIES, & RESOURCES (CONTINUED)

MAP ID	EXISTING PLAN/ RESOURCES	KEY PROJECTS/RECOMMENDATIONS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
3	Carolina Thread Trail Plan	<p>Iredell County has adopted the Carolina Thread Trail Plan and there are portions of that plan in northern Iredell County (shown in green on Map 2.5). This includes the following <b>Proposed Carolina Thread Trail (CTT) Routes</b>:</p> <ul style="list-style-type: none"> <li>• <b>South Yadkin River Corridor to Harmony (3a)</b>: Starting at S. Chipley Ford, follow South Yadkin River east then take Chief Thomas Rd. north to Tabor Rd., then follow Tomlin Rd east to US 21, then north on US 21 to Highland Point Ave., ending at the existing trail in Thomason Moore Park (CTT Plan ID: F) (17.4 miles).</li> <li>• <b>Love Valley to Statesville (3b)</b>: Starting at Fourth Creek, go north on S. Chipley Ford then west on Snow Creek Rd., then take N. Chipley Ford to Dobson Farm to Mountain View to Love Valley Rd. Connecting to existing trail and ending at Alexander County line (CTT Plan ID: G) (17.2 miles)</li> </ul> <p>The plan also includes <b>"Other Connection Opportunities"</b> in northern Iredell County:</p> <ul style="list-style-type: none"> <li>• <b>(3c)</b> From Harmony, head north on US 21, and end at the NC 2 Mountains to Sea route. (CTT Plan ID: A) (3.5 miles)</li> <li>• <b>(3d)</b> From the Alexander County line, head east on Linneys Mill Rd. to Wilkesboro Hwy—W. Memorial Hwy.—W. Houstonville Rd.—E. Houstonville Rd.—Sandy Springs Rd., and end at the Yadkin County line. (CTT Plan ID: B) (22 miles) <i>Note: This is same as the NC 2 Mountains to Sea route.</i></li> <li>• <b>(3e)</b> From the Wilkes County line, head south on Warren Bridge Rd. across NC 2 Mountains to Sea route to Jennings Rd., and end at Snow Creek Rd (CTT Plan ID: C) (8.8 miles)</li> <li>• <b>(3f)</b> From S. Chipley Ford, follow Snow Creek Rd—Friendship Rd.—Bussell Rd.—Jennings Rd.—Olin Rd.—Tatum Rd.—Tabor Rd, and end at Tabor Rd, just west of Harmony (CTT Plan ID: E) (9.3 miles)</li> </ul>



## MAP 2.6 - EXISTING CONDITIONS: DAVIE COUNTY



### EXISTING PLANS, FACILITIES, & RESOURCES

MAP ID	EXISTING PLAN/RESOURCES	KEY PROJECTS/RECOMMENDATIONS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
n/a (county-wide)	Davie County CTP	<p>This 2012 CTP recommends a small network of multi-use paths in Mocksville (including one recommended off road trail), with a larger network of on-road recommendations that surround Mocksville, identified as “needs improvement”.</p> <p>The Regional CTP planning process (for Davie, Surry, &amp; Yadkin counties) began in May 2019 and is expected to conclude in October 2020. The new CTP should incorporate recommendations from this Yadkin Valley Regional Bicycle Plan.</p>
n/a (county-wide)	Davie County Parks and Recreation Master Plan (2015)	<p>This plan asked residents to, “please list what you believe are the top six most needed recreational facilities in Davie County”. The #1 response was Trails/Greenways/Walking/Biking (from a list of 20 recreational activities; page 31 of the plan).</p> <p>Key recommendation from the plan: “The county should commission a countywide Greenway/Bikeway Master Plan study....According to needs guidelines, the county should have a minimum of (12) twelve miles of greenways/trails by the year 2027.” (page 5 of the plan)</p>
1	NCDOT 2018-2027 STIP Division & Regional Highway Projects	<p>Potential opportunities to incorporate paved shoulders or bicycle lanes. For example: <b>US 601</b> in north Mocksville (R-5736; planning and design in progress).</p>



## EXISTING PLANS, FACILITIES, & RESOURCES (CONTINUED)

2	ConnectDavie Greenway Master Plan	<p><b>ConnectDavie</b> is an initiative of the Davie County Health Department to improve active living opportunities through the creation of a county-wide system of multi-use greenways. This plan aims to provide meaningful connections to Davie County's towns, neighborhoods, schools, recreation facilities, historical and cultural resources, and other areas deemed worthy by local citizens. The ConnectDavie plan is critical for not only determining priority areas for implementation, but also for communicating to grant agencies that can help fund construction.</p> <p>The plan features several key recommended greenways (text adapted from ConnectDavie):</p> <ul style="list-style-type: none"> <li>• <b>Bermuda Run (2a):</b> Conceptual renderings were developed to show the I-40 greenway crossings. On the north side of I-40, the Lakeside Greenway will transport bicyclists, joggers, and other trail users along a paved path that will link to the BB&amp;T Soccer Complex and Kinderton. A separate study was conducted for the Lakeside Greenway; a specific trail alignment was determined based on a topographic survey and views of the lake.</li> <li>• <b>Farmington (2b):</b> The proposed Farmington trail system utilizes floodplain areas associated with Dutchman Creek, Bryant Creek, and Cedar Creek. Because of Farmington's rich equestrian-centered landscape, this trail network should provide for a separate equestrian trail parallel to the multi-use greenway.</li> <li>• <b>Mocksville (2c):</b> The proposed GREENRING provides for a complete loop around Mocksville and incorporates floodplain areas associated with five different streams, including Nelson Creek, Elisha Creek, Dutchman Creek, Leonard Creek, and Bear Creek. The first phase includes connecting Rick Park to Campbell Road along Nelson Creek; trail easements currently exist along this 1.5-mile "shovel ready" corridor. The second phase extends further along Nelson Creek finding the confluence of Elisha Creek before reaching Highway 158. The third phase extends from Highway 158 to Milling Road. Although there are some dedicated trail easements within the phase two and three corridors a significant landowner outreach effort is necessary to secure legal trail easements.</li> <li>• <b>Cooleemee (2d):</b> The proposed multi-use greenway network will connect River Park, the Mill Village Museum, Cooleemee Park, and Cooleemee Elementary School. The proposed "Town Greenway" bisects the community and directly links all of the aforementioned community assets. The "Northern Loop Greenway" is proposed along the northern periphery of Town and directly connects River Park to Cooleemee Elementary School.</li> </ul>
3	Davie County Transportation Alternatives Feasibility Study (2016)	<p>The Davie County Transportation Alternatives Feasibility Study blends the needs of motorists, bicyclists, pedestrians and emergency service providers into a plan for residents and businesses in eastern Davie County and the Town of Bermuda Run. The study graphically depicts alternatives for potential improvements within the study area, including:</p> <ul style="list-style-type: none"> <li>• A proposed roundabout at NC 801 and US 158</li> <li>• A proposed roundabout for the I-40 interchange at Farmington Road</li> <li>• A new signal or roundabout at US 158 at Baltimore Road</li> </ul> <p>Page 4-1 of the study says that, <b><i>"Throughout the planning process, stakeholders and residents noted the need for improved bicycle and pedestrian amenities, particularly along the NC 801 corridor."</i></b> Future improvements related to this study should accommodate bicyclists.</p>
4	Rail-Trail Opportunities	Rail-Trail opportunities should be explored along the limited amount of rail in the study area. This includes the Norfolk-Southern connections in Davie County.
5	Yadkin River Greenway Feasibility Study (2010)	The key recommendation for Davie County/Bermuda Run from this 2010 study is a proposed multi-use trail on the south/west side of the Yadkin River, from Clayton Foster Lane to US 158 (Sections 3 & 4 of the study)

## STAKEHOLDER COMMENTS

MAP ID	COMMENT SOURCE	COMMENTS RELATED TO THE YADKIN VALLEY REGIONAL BICYCLE PLAN
5	Stakeholder Meeting #2	Davie County Community Park is set to open in Spring 2020. Opportunity to connect sidewalk south of South Davie Middle School to the new Community Park and Davie County Community College.







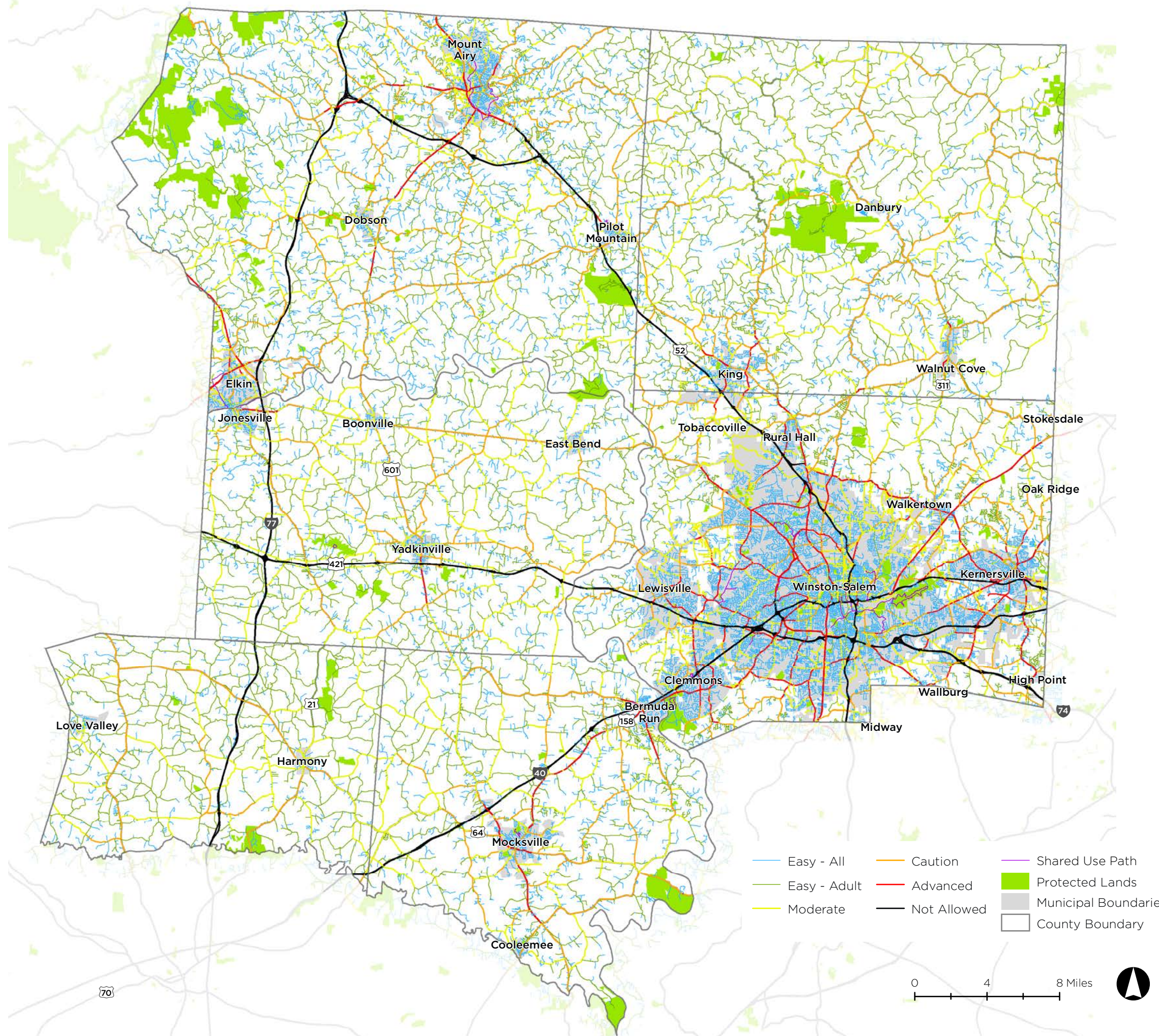
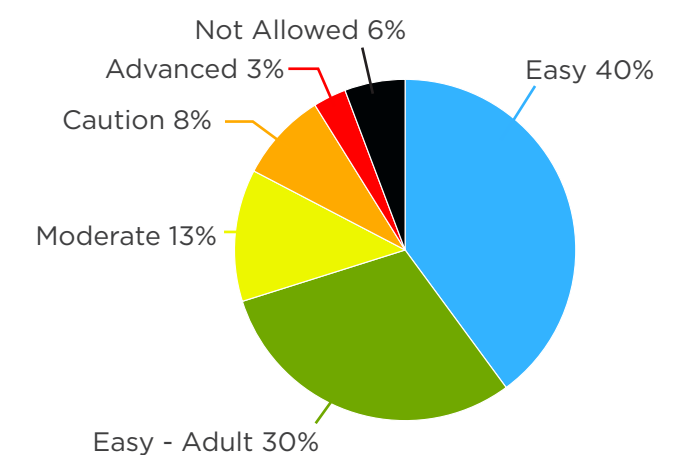
## MAP 2.7B REGIONAL BICYCLE LEVEL OF SERVICE

The project team used a rating system to evaluate existing conditions on roads across the Yadkin Valley region. The data available to classify these roadways includes traffic volumes, speed limits, presence of 4' or wider paved shoulder or bike lane, and designated truck routes. The result is a "bicycle level of service" (BLOS) rating, based on a comfort level for moderately experienced cyclists. Input from the public can be used to verify the findings of this analysis and make adjustments as needed.

According to the analysis, much of the region is covered by easy routes (blue and green), generally with low traffic volumes and low speeds on rural roads found throughout the study area. The majority of the roadways that provide lower comfort levels (moderate, caution, and advanced) are found along major highways connecting towns throughout the study area, and in more populated and developed areas, like Winston-Salem.

This overall analysis of existing regional roadway characteristics was used to help inform the plan recommendations for the regional bicycle network in Chapter 3.

### YADKIN VALLEY ROADS BY BLOS CATEGORY







## PUBLIC OUTREACH SUMMARY: *WHAT WE HEARD*

This planning effort included a project website ([www.bikeyadkinvalley.com](http://www.bikeyadkinvalley.com)) where people could take the project survey, contact project planners, view project materials, and find information about events for public outreach. The process also included four meetings with a project Steering Committee (see acknowledgements page), stakeholder interviews, and plan presentations. Below are some highlights from what we heard.



**85%** say  
it's very important to  
create more bikeways  
and greenways in  
their community.



**84%**  
bicycle for exercise,  
compared to just 22%  
for transportation.

**63%**



are uncomfortable bicycling in the street with cars.

**70-85%**



would be  
very likely  
to bike more  
often if there  
were more  
greenways,  
separated  
bicycle lanes,  
and shared-  
use paths.



## THE TOP

**3** most important destinations to connect with bikeways according to the survey:

1. Trails or greenways
2. Parks within cities and towns
3. State parks and natural areas



**71%** Have ridden a bike in the last 30 days, and **20%** have ridden more than 10 times in the last 30 days.



**29%** Have not ridden a bike in the last 30 days

**80% Live**

in the Yadkin Valley Region

**51% Work**

in the Yadkin Valley Region

**40% Visit**

the Yadkin Valley Region for shopping, fun, or recreation

**196**

total surveys

**6** events for public outreach

**4** committee meetings



## EXAMPLE COMMENTS COLLECTED THROUGH THE 2019 PUBLIC COMMENT FORM:

"I have ridden hundreds of miles in Yadkin, Surry, Stokes, Davie & Iredell counties. For the most part the further out you go the better/more courteous motorists are. But as you get closer to Winston-Salem, people get more aggressive and/or are texting while driving. Dedicated bike/multiuse paths completely separated from traffic closer to Winston-Salem, would be ideal...."

*What change would you most like to see related to bicycling in your community?:*

**"More education for both bike riders as well as drivers using the same roads, bike lanes, and more bike trails and greenways."**

*Where would you like to bike if it were safe and comfortable to do so?:*

**"Long distance greenways around the region similar to the Neuse River Trail in Wake and Johnston counties."**

*What change would you most like to see related to bicycling in your community?:*

**"More understanding and commitment from local elected officials and city/county staff and greater support and collaboration with local organizations that are willing to push for progress."**

*Where do you currently bike that needs improvement?:* **"Everywhere! There are only a few greenways and they aren't long or connective. Some roads near my house have bike lanes but I prefer protected bike lanes, multi-use side paths, and greenways. I think there needs to be increased facilities in metropolitan areas and longer greenways connections across towns. Specifically, schools need better bike/ped infrastructure."**





## PUBLIC PREFERENCE FOR BICYCLE FACILITY TYPES

What is the likelihood that the following types of bicycling facilities would influence you to bike more often? (% responding “very likely” shown below)



Greenways



Separated bike lanes (physically separated from traffic)



Shared-use side paths



Buffered bike lanes



Safer intersections for bicyclists



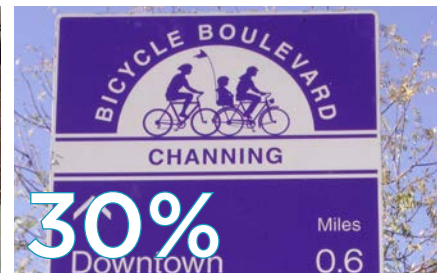
Bike lanes



Paved shoulders



Bike parking



Wayfinding signs for bicyclists



## PUBLIC OUTREACH AT LOCAL EVENTS

The first round of public outreach included tabling with project information at events and festivals in the Yadkin valley region. Each table included project information cards, project surveys, and a public input map where people were encouraged to provide site-specific comments.

The input received is summarized in the survey results on the previous pages. The second round of outreach used a public presentation format, focused on the main recommendations of the draft plan.



The photos above show outreach sessions at local events in the Yadkin Valley Region. Events included:

- Tuesday, July 23, 2019: Clemmons Farmer's Market (Clemmons, NC); *Rained out; project cards passed out at Town Hall and Tanglewood Park instead.*
- Saturday, July 27, 2019: Surry County Farmers' Market (Elkin, NC)
- Saturday, September 14, 2019: Stokes Stomp (Danbury, NC)
- Saturday, September 28, 2019: Carolina Jubilee (Harmony, NC)
- Saturday, October 12, 2019: The Oaks Festival (Mocksville, NC)
- Saturday, October 19, 2019: Yadkin Valley Grape Festival (Yadkinville)





*Granite City Greenway, Mount Airy, NC (photo: Alta)*





## REGIONAL NETWORK OVERVIEW

This chapter details the recommended Yadkin Valley Regional Bicycle Network. The complete network is made up of priority projects linking communities and nearby destinations, plus a comprehensive, long-term network focused on longer-distance regional connectivity.

### THE HUBS AND SPOKES MODEL FOR CONNECTIVITY

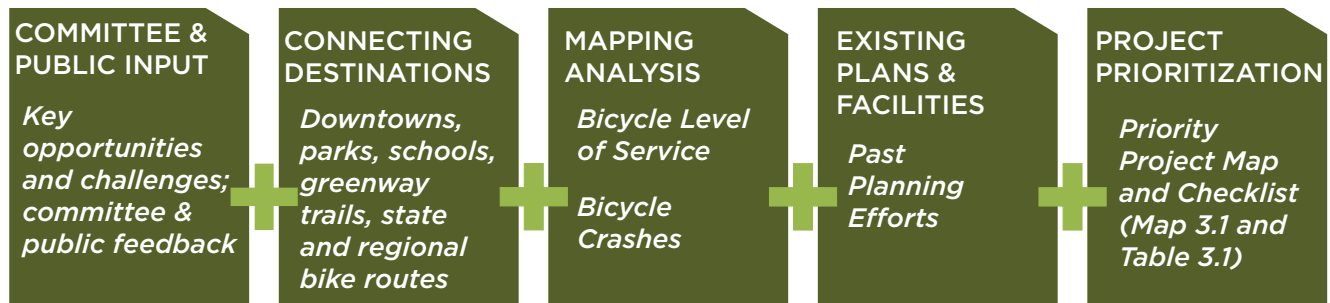
Conceptually, the recommended bikeways and the destinations they connect can be seen as a network of ‘hubs’ and ‘spokes’. Downtowns, parks, and other places people like to bike are the ‘hubs’ of the network, whereas the various bicycle facilities that connect them are the ‘spokes’.

*This plan aims to connect people and places in the Yadkin Valley Region using different types of bikeways and greenways.*



## BASIS OF RECOMMENDATIONS

The proposed Regional Bicycle Network is a result of a collaborative planning process that involved public engagement, data collection, and technical analysis, mostly outlined in Chapter 2:



## CHAPTER 3 MAPS & CUTSHEETS

Recommendations are organized into the following maps and cutsheets.



### MAPS 3.1 REGIONAL NETWORK & PRIORITY PROJECTS:

1

These two maps focus on the priority projects. The priority projects were the most consistently mentioned in committee meetings, stakeholder discussions, and public outreach. They fulfill a variety of prioritization criteria that will help them score high in future funding applications, and they provide for a range of project types and users while being geographically distributed across the region.

2

### PRIORITY PROJECT CUTSHEETS:

This series of project summaries can be used when applying for future funding, or when communicating the priority project details to potential partners during implementation.

3

### MAPS 3.2-3.7 REGIONAL NETWORK COUNTY MAPS

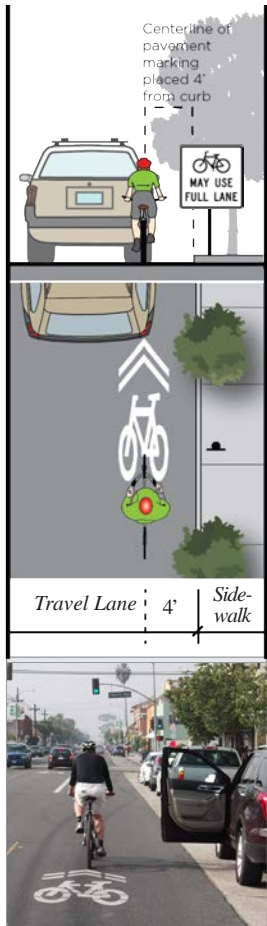
As priority projects are completed, this plan should be updated to include new priorities, drawing upon the larger regional network of recommendations. These routes and recommendations are shown on the county-level and strategically build upon the project cutsheets referred to above. These longer-term recommended bikeway and greenway projects may also be incorporated into future roadway resurfacing, construction, and development projects.



## BICYCLE FACILITY TYPES

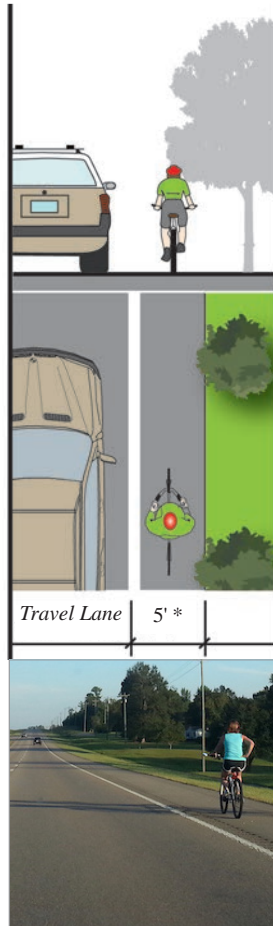
These are the primary facility types recommended in this plan. See the maps (and legends) in Chapter 3 to see where these facilities are recommended. For more information on facility design, please see the list of design resources in Appendix A.

### SHARED LANE



Shared Lane Markings (SLMs), or “sharrows,” are road markings used to indicate a shared lane environment for bicycles and automobiles. Among other benefits, shared lane markings reinforce the legitimacy of bicycle traffic on the street, recommend proper bicyclist positioning, and may be configured to offer directional and wayfinding guidance. Shared lane markings are only recommended in areas where there are constraints.

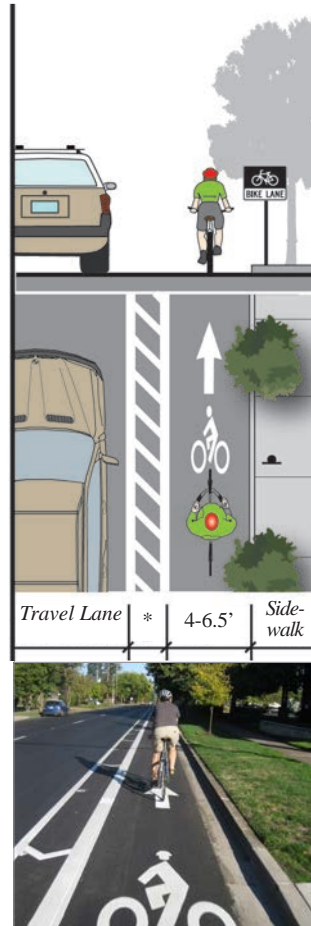
### PAVED SHOULDER



Paved shoulders on the edge of roadways can be enhanced to serve as a functional space for bicyclists and pedestrians to travel in the absence of other facilities with more separation. Paved shoulders can reduce “bicyclist struck from behind” crashes, which represent a significant portion of rural road crashes. For preferred rumble strip placement see FHWA’s Achieving Multimodal Networks (2016).

\*Recommended 5 ft minimum width; up to 8 ft for higher speeds and volumes.

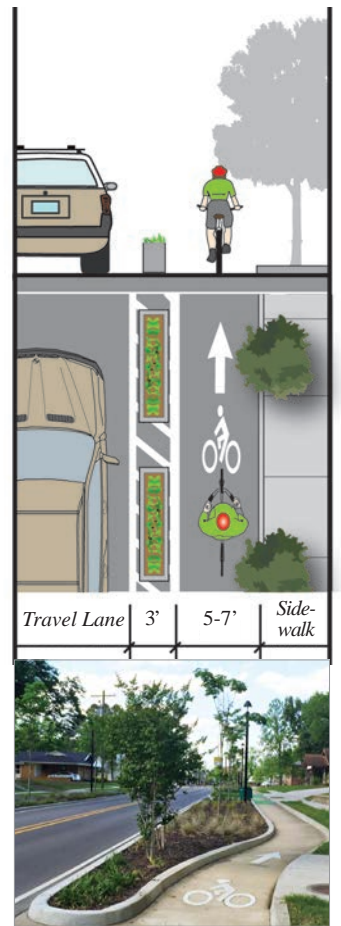
### BICYCLE LANE



Bike lanes designate an exclusive space for bicyclists, directly adjacent to motor vehicle travel lanes. The preferred minimum width is 6.5 ft to allow bicyclists to ride side-by-side or pass each other without leaving the bike lane. Absolute minimum bike lane width is 4 ft when no curb and gutter is present or 5 ft when adjacent to a curbface, guardrail, other vertical surface or on-street parking stalls (AASHTO Bike Guide 2012).

\*The optional buffer is 1.5-4 ft, or wider. If 4 ft or wider, mark with diagonal or chevron hatching.

### SEPARATED BIKE LANE\*

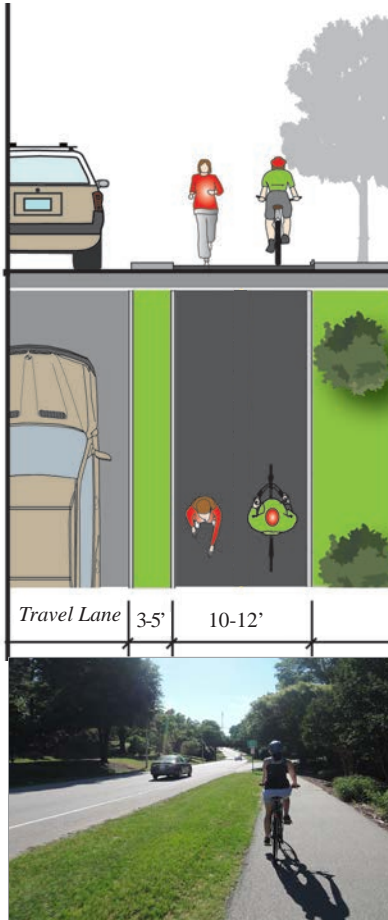


A separated bike lane is a facility for exclusive use by bicyclists that is located within or directly adjacent to the roadway and is physically separated from motor vehicle traffic with a vertical element. Preferred minimum width of a one-way separated bike lane is 7 ft (2.1 m). This width allows for side-by-side riding or passing. Separated bike lanes should be considered as an option in the design process for the bicycle lanes recommended in this plan, especially for inclusion on projects with new roadway construction.

*\*This facility can also be design for two-way bicycle travel, also known as a two-way cycle track.*

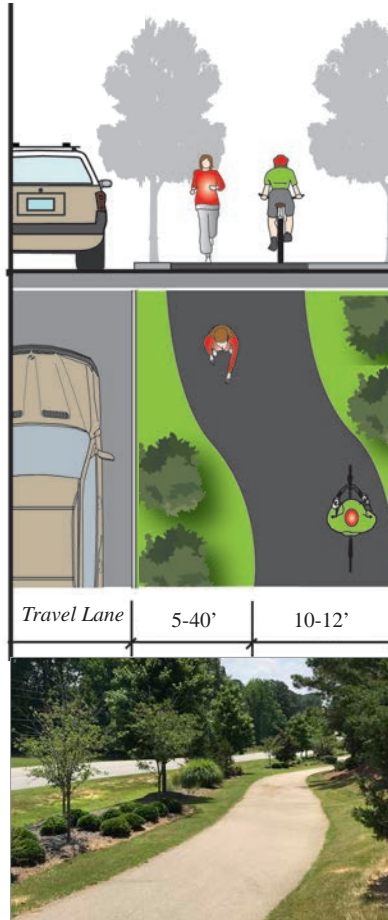
## BICYCLE FACILITY TYPES (CONTINUED)

### SHARED USE PATH: SIDE PATH



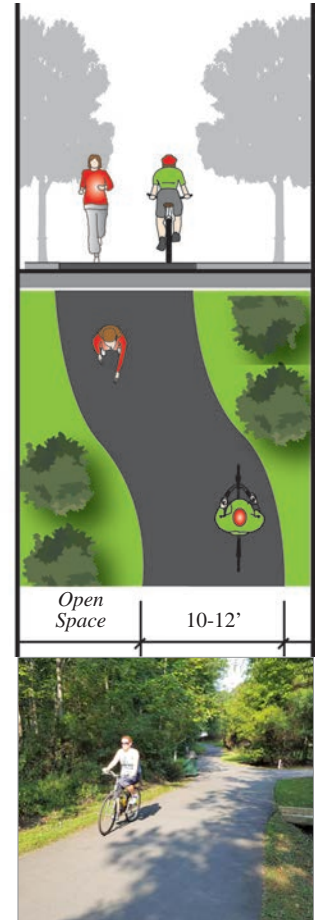
A side path is a bidirectional shared use path located immediately adjacent and parallel to a roadway. Side paths can offer a high-quality experience for users of all ages and abilities as compared to on-roadway facilities in heavy traffic environments, allow for reduced roadway crossing distances, and maintain rural and small town community character. Widths and design details of side path elements may vary. Minimum recommended pathway width is 10 ft. In low-volume situations and constrained conditions, the absolute minimum side path width is 8 ft.

### SHARED USE PATH: STREET-SIDE GREENWAY



'Street-side greenway' is a term used in some communities in North Carolina (in the towns of Cary and Apex, for example) for side paths with a greater landscaped buffer between the roadway and trail, allowing the trail to meander slightly for increased user comfort and a more rural aesthetic. These street-side trails typically do not fit within the roadway right-of-way, but can usually be constructed with a town greenway easement of 20-30'. The easements can overlay streetscape buffers while not affecting setbacks or buffer widths, so long as required planting density can still be achieved. This design should be considered for the more rural side paths that are recommended in this plan.

### SHARED USE PATH: GREENWAY



Greenways offer connectivity opportunities beyond that of the roadway network. These facilities are often located in parks, along rivers, and in utility corridors where there are few conflicts with motorized vehicles. They can provide a low-stress experience for a variety of users, including bicyclists, pedestrians, skaters, wheelchair users, joggers, and other users. Faster-moving bicyclists often prefer to use roadways, due to conflicts with other, slower-moving greenway trail users.





# TABLE 3.1 PRIORITY CHECKLIST

		Facility Types*	Connects to a Park, Rec Center, School, or University	Connects to a Municipal Building, Employment Center, or Commercial Center	Connects to a Designated Bike Route or Trail	Connects to an Existing Bike Facility	Supported by an Adopted Plan	Reported Bike or Ped Crash Along Route (2007-2015, within 500')	Uses Mostly Existing Public Land or Street ROW	Supported in Stakeholder & Public Feedback
<b>SURRY COUNTY: NCDOT DIVISION 11 / NORTHWEST PIEDMONT RPO</b>										
<b>A</b>	<b>MT AIRY DOWNTOWN SPINE</b> (Grace St to the Granite City Greenway)	SBL	✓	✓	✓	✓	✓	✓	✓	✓
<b>B</b>	<b>GRANITE CITY GREENWAY TO DOWNTOWN CONNECTOR</b> (Granite City Greenway to Riverside Park)	SUP, SBL, SL	✓	✓	✓	✓	✓	✓	✓	✓
<b>C</b>	<b>MT AIRY SOUTH STREET</b> (Maple St to Granite City Greenway)	SBL, SUP		✓	✓	✓	✓	✓	✓	✓
<b>D</b>	<b>PILOT MOUNTAIN - TOWN TO STATE PARK TRAIL</b> (East Surry High School to Pilot Mtn. State Park)	SBL, SUP	✓	✓	✓	✓	✓	✓		✓
<b>E</b>	<b>DOBSON - DOWNTOWN TO FISHER RIVER PARK</b> (Downtown to Fisher River Park)	SBL, SUP	✓	✓	✓	✓	✓	✓		✓
<b>F</b>	<b>ELKIN &amp; JONESVILLE YADKIN RIVER GREENWAY (MST)</b> (Elkin/Jonesville MST to I-77)	SUP	✓	✓	✓	✓	✓	✓		✓
<b>G</b>	<b>DOWNTOWN ELKIN CIRCULATION</b> (Elkin Middle & High School to Downtown)	SUP, SBL, BL, SL	✓	✓	✓	✓	✓	✓	✓	✓
<b>STOKES COUNTY: NCDOT DIVISION 9 / NORTHWEST PIEDMONT RPO</b>										
<b>H</b>	<b>DANBURY CIRCULATION</b> (Moratock Park to Stokes Co. Gov. Center and Hanging Rock State Park)	SUP, SL	✓	✓	✓	✓	✓			✓
<b>FORSYTH COUNTY: NCDOT DIVISION 9 / WINSTON-SALEM FORYSTH MPO</b>										
<i>For Winston-Salem's high priority project list, please refer to the 2019 Winston-Salem Bicycle Master Plan, summarized at the end of this chapter.</i>										
<b>I</b>	<b>LEWISVILLE CIRCULATION</b> (Great Wagon Road to Styers Ferry Road)	SUP, SBL, BL	✓	✓	✓	✓	✓	✓	✓	✓
<b>YADKIN COUNTY: NCDOT DIVISION 11 / NORTHWEST PIEDMONT RPO</b>										
<i>For Jonesville, also see Project F above.</i>										
<b>J</b>	<b>DOWNTOWN JONESVILLE TRAIL</b> (Yadkin River to Bridge St Bike Lanes)	SUP, SBL		✓	✓	✓	✓	✓	✓	✓
<b>K</b>	<b>JONESVILLE CIRCULATION</b> (N Bridge St to N Bridge St)	SUP, BL	✓	✓	✓	✓	✓	✓	✓	✓
<b>L</b>	<b>DOWNTOWN YADKINVILLE CONNECTORS</b> (Hinshaw Gardens to Unifi Industrial Rd)	SUP, SBL	✓	✓		✓	✓	✓		✓
<b>IREDELL COUNTY (NORTHERN ONLY): NCDOT DIVISION 12 / CRTPO RPO</b>										
<b>M</b>	<b>CAROLINA THREAD TRAIL IN HARMONY</b> (Town Hall and Library to Tomlinson-Moore Family Park)	SUP	✓	✓	✓	✓	✓		✓	✓
<b>DAVIE COUNTY: NCDOT DIVISION 9 / NORTHWEST PIEDMONT RPO</b>										
<b>N</b>	<b>MOCKSVILLE NORTH/SOUTH SPINE</b> (Milling Road to South Davie Middle School)	SBL, SL	✓	✓		✓	✓	✓	✓	✓
<b>O</b>	<b>MOCKSVILLE GREENWAY</b> (Rich Park and South Davie Middle School)	SUP, SL	✓	✓		✓	✓		✓	✓
<b>P</b>	<b>MOCKSVILLE - DAVIE CO. COMMUNITY PARK LINK</b> (S. Davie Middle School to Davie Community Park)	SUP, SBL	✓	✓			✓	✓	✓	✓
<b>Q</b>	<b>BERMUDA RUN CIRCULATION</b> (I-40 bike/ped crossings to Davie Medical Center)	SUP, SL	✓	✓		✓	✓	✓	✓	✓
<b>R</b>	<b>BERMUDA RUN TO CLEMMONS</b> (Blue Heron Trail to Tanglewood Park)	SBL	✓	✓	✓	✓	✓	✓	✓	✓

\*SUP = Shared Use Path; SBL = Separated Bike Lane; BL = Bike Lane; SL = Shared Lane



## MAP 3.1 REGIONAL NETWORK AND PRIORITY PROJECTS

This plan includes long-term visionary projects that will positively impact multiple communities in the region, as well as locally-focused projects that aim to improve safety and connectivity in the short-term.

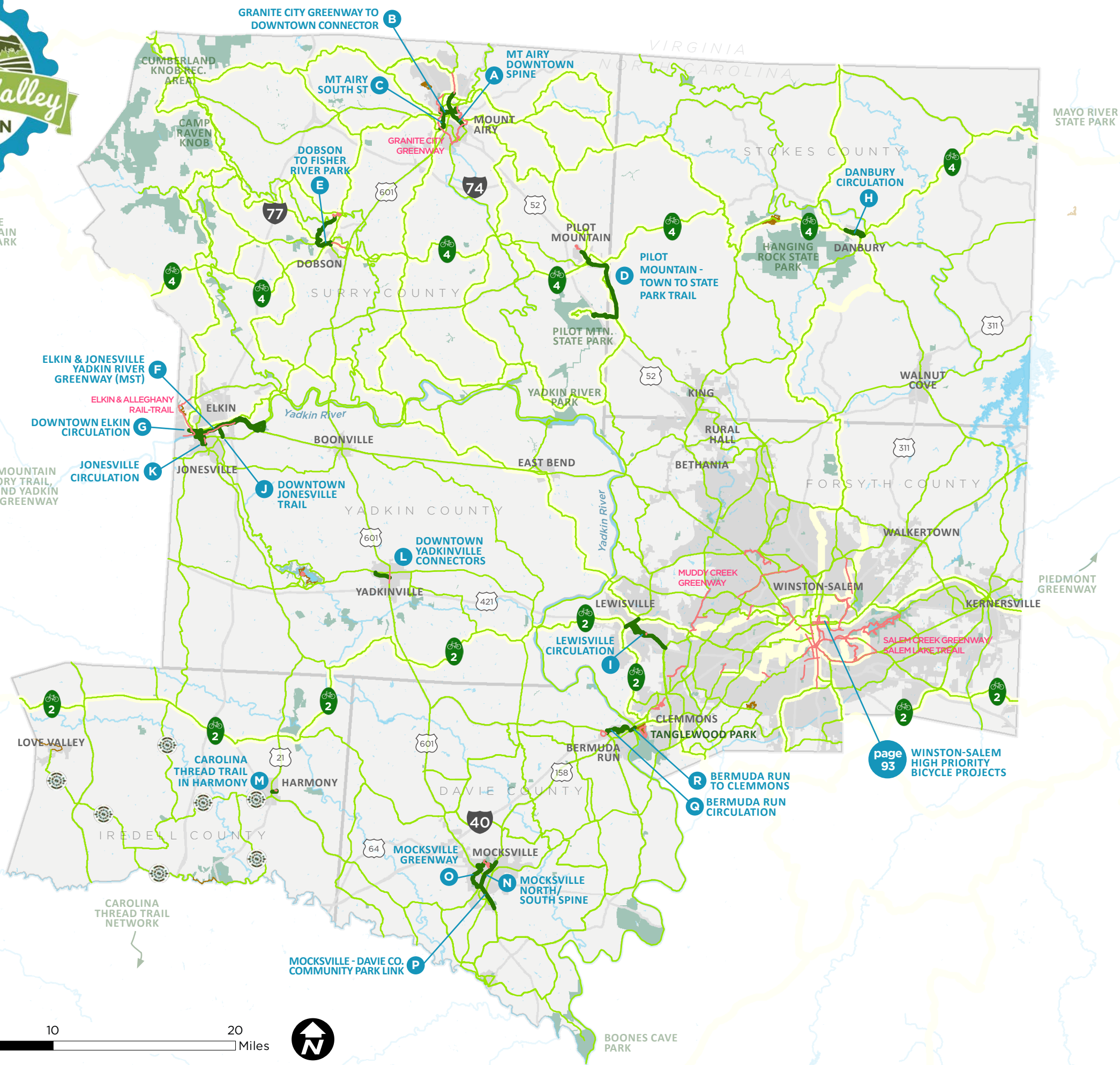
All 18 priority projects are listed in the plan as projects A-R, each with their own detailed project map and recommendations. They are grouped by county, rather than being listed in a specific priority order. The actual order in which projects are constructed depends on many factors, such as the availability of funding and the opportunity to build facilities in conjunction with other roadway projects.

These top projects meet a variety of important prioritization criteria that are commonly used to rank potential bicycle and greenway projects across the state by NCDOT and other funding agencies. The checklist in Table 3.1 on the previous page outlines key factors related to connectivity and prioritization for each project, as may be applicable to potential future funding.

Additional maps and project descriptions are included at the end of this chapter, featuring a more comprehensive network of all recommended bicycle facilities in the region, building upon these top projects.

### LEGEND

- Regional Network
- Priority Project
- Existing Shared Use Paths, Greenways, Sidepaths, Bicycle Lanes, and Sharrows
- Existing/Designated State and Local Bike Routes
- Existing Hiking/Mt Biking Trail
- Waterways
- County Boundary
- Protected Lands
- Municipal Boundaries
- Study Area
- NC Bike Route 2: Mountains to Sea
- NC Bike Route 4: North Line Trace
- Carolina Thread Trail (proposed on adopted plan)



0 10 20 Miles





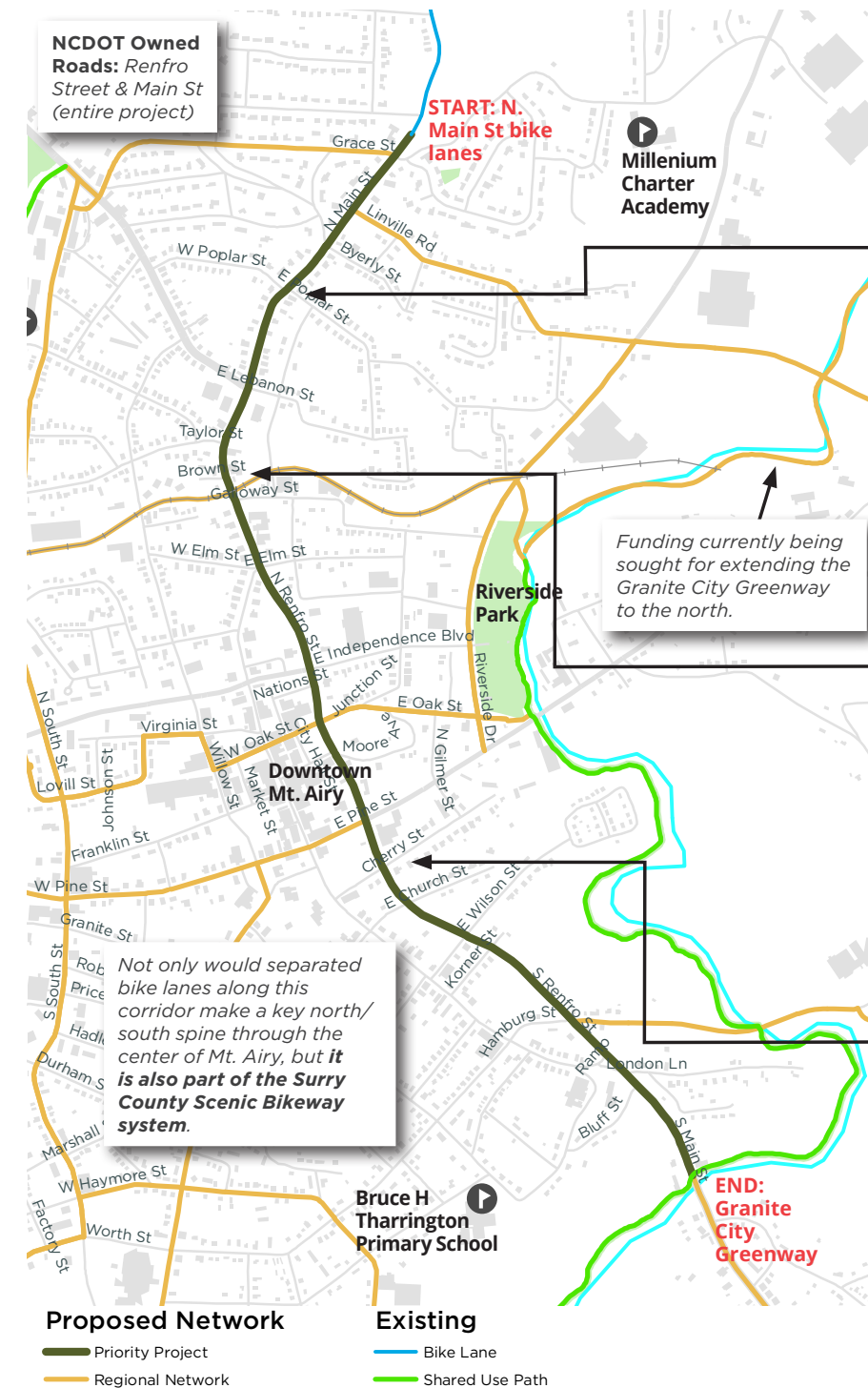


# A MT AIRY DOWNTOWN SPINE - SEPARATED BIKE LANES

**FROM:**  
Grace Street

**TO:**  
Granite City Greenway

**LENGTH:**  
2.1 Miles



N. Main St, from the existing bike lanes just north of **Grace St to Lebanon St**, is a two lane road with extra pavement width (36'-44'). Narrow the travel lanes to 12', allowing space to create bike lanes. This leaves 6' for the bike lanes at the narrowest sections, and additional space for buffers and/or physical separation in wider sections; consider narrower travel lanes for greater separation.<sup>1</sup> The bike lanes will also significantly enhance the value of the existing sidewalks that currently have little to no buffer with automobile traffic (same note for the section below).

N. Main St carries low traffic volumes for a four/five lane road (48'-55' pavement width) at 9,100 AADT from **Lebanon St to Elm St**. Convert this four/five lane section to three lanes (12' for travel lanes, 6.5' for the bike lane/buffer space (at the narrowest sections), allowing space to create **buffered bike lanes**<sup>1</sup>).

Renfro St carries low traffic volumes for a four lane road (50' width) at 6,900 - 8,100 AADT from **Elm St to the Granite City Greenway south of Hamburg St**. Convert this section of Renfro St from four lanes to three (12' for travel lanes, 7.5' for each bike lane/buffer space), allowing space to create **buffered bike lanes**<sup>1</sup>.

Speed limit of N. Main St/Renfro St is 35 mph. The average risk of death for a pedestrian reaches 10% at an impact speed of 23 mph, 25% at 32 mph, 50% at 42 mph. Consider speed limit reduction.<sup>2</sup>

<sup>1</sup><http://ruraldesignguide.com/physically-separated/separated-bike-lane>  
<sup>2</sup><https://aaaafoundation.org/impact-speed-pedestrians-risk-severe-injury-death/>

# A MT AIRY DOWNTOWN SPINE - SEPARATED BIKE LANES (CONTINUED)

## TRIP GENERATORS:

- Granite City Greenway
- Downtown Mt Airy
- Riverside Park
- Surry County Scenic Bikeway
- Businesses along the corridor
- Residential areas adjacent to the corridor

## SUPPORT IN OTHER PLANS:

- Surry County Comprehensive Transportation Plan (2012)

## POTENTIAL ROW NEEDS:

- None

## JURISDICTIONS:

- City of Mt Airy

## POTENTIAL PARTNERSHIPS:

- City of Mt Airy
- Surry County
- Piedmont Triad Regional Council
- NCDOT
- Businesses along the corridor

## ESTIMATED CONSTRUCTION COSTS:

- Est. base project cost: \$360,000
- Est. additional cost option 1: flexible posts in bicycle lane buffer: \$55,770
- Est. additional cost option 2: concrete median in bicycle lane buffer: \$459,030

## DESIGN OPTIONS AND CONSIDERATIONS:

Right: Existing 4-lane section of N Renfro St, facing south.

Below: Photo visualization showing physically separated bicycle lanes on N Renfro St.





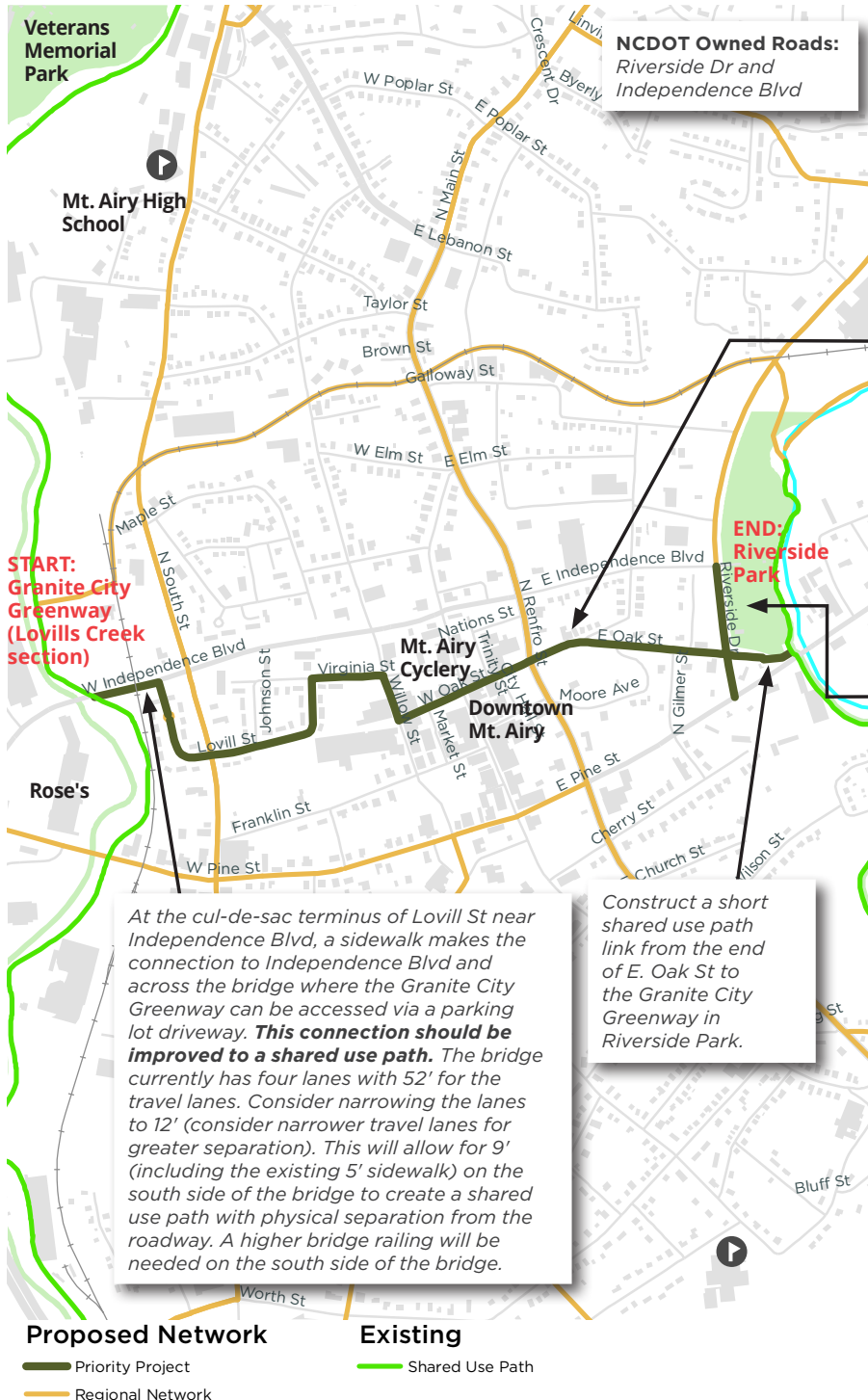


## B GRANITE CITY GREENWAY TO DOWNTOWN CONNECTOR

**FROM:**  
Granite City Greenway

**TO:**  
Riverside Park

**LENGTH:**  
1.1 Miles



Develop a direct east/west connection between downtown Mt. Airy and the Granite City Greenway, by utilizing neighborhood streets and shared use path links.

Add **signs and shared lane markings** to **Lovill St, Virginia St, Willow St, and Oak St** to highlight lower traffic volume neighborhood/downtown streets, linking the east/west sides of the Granite City Greenway (Lovill's Creek section) to the Ararat River section) via downtown Mt. Airy.

**Riverside Dr** carries very low traffic volumes for a five-lane road at 6,600 AADT **from Pine St to Independence Blvd**. Convert this section of Riverside Dr from five lanes to three, allowing space to create physically **separated bike lanes**, and allowing for a safer crossing of Riverside Dr at Oak St (and Independence Blvd) to Riverside Park.

# B

## GRANITE CITY GREENWAY TO DOWNTOWN CONNECTOR (CONTINUED)

### TRIP GENERATORS:

- Granite City Greenway
- Downtown Mt Airy
- Riverside Park
- Mt Airy Cyclery
- Surry County Scenic Bikeway
- Rose's Discount Store Shopping Center
- Businesses along the corridor
- Residential areas adjacent to the corridor

### JURISDICTIONS:

- City of Mt Airy

### POTENTIAL PARTNERSHIPS:

- City of Mt Airy
- Piedmont Triad Regional Council
- NCDOT
- Businesses along the corridor

### POTENTIAL ROW NEEDS:

- Short sections of ROW may be needed at the end of E. Oak St as well as the short connection from the Independence Blvd bridge to access the greenway access behind Rose's shopping center.

### ESTIMATED CONSTRUCTION COSTS:

- Est. base project cost: \$710,000
- Est. additional cost option 1: flexible posts in bicycle lane buffer: \$5,720
- Est. additional cost option 2: concrete median in bicycle lane buffer: \$40,040

### DESIGN OPTIONS AND CONSIDERATIONS:



*Existing residential section of Lovill St, heading south to the Granite City Greenway..*



*Example of a similar street with shared lane markings that would help bicyclists navigate their way east-west between the sections of existing greenway (source: [reconnectrochester.org](http://reconnectrochester.org)).*





# C MT AIRY SOUTH STREET - SEPARATED BIKE LANES

**FROM:**  
Maple Street

**TO:**  
Granite City Greenway

**LENGTH:**  
1.4 Miles

North of the train tracks, South St narrows - a future phase should continue the separated bike lanes north to Lebanon St/Grace St. The section north of the train tracks to Orchard St is narrow and will require new construction outside of the existing roadway pavement width.

The inactive railroad line from South St to the east toward Riverside Park would be an ideal east/west trail link for the Granite City greenway if a partnership with the railroad owner can be created. The railroad ROW is 100' and could accommodate both a trail and active railroad line if desired.

Not only would separated bike lanes along this corridor make a key north/south spine through the west side of Mt. Airy, but **it is also part of the Surry County Scenic Bikeway system.**

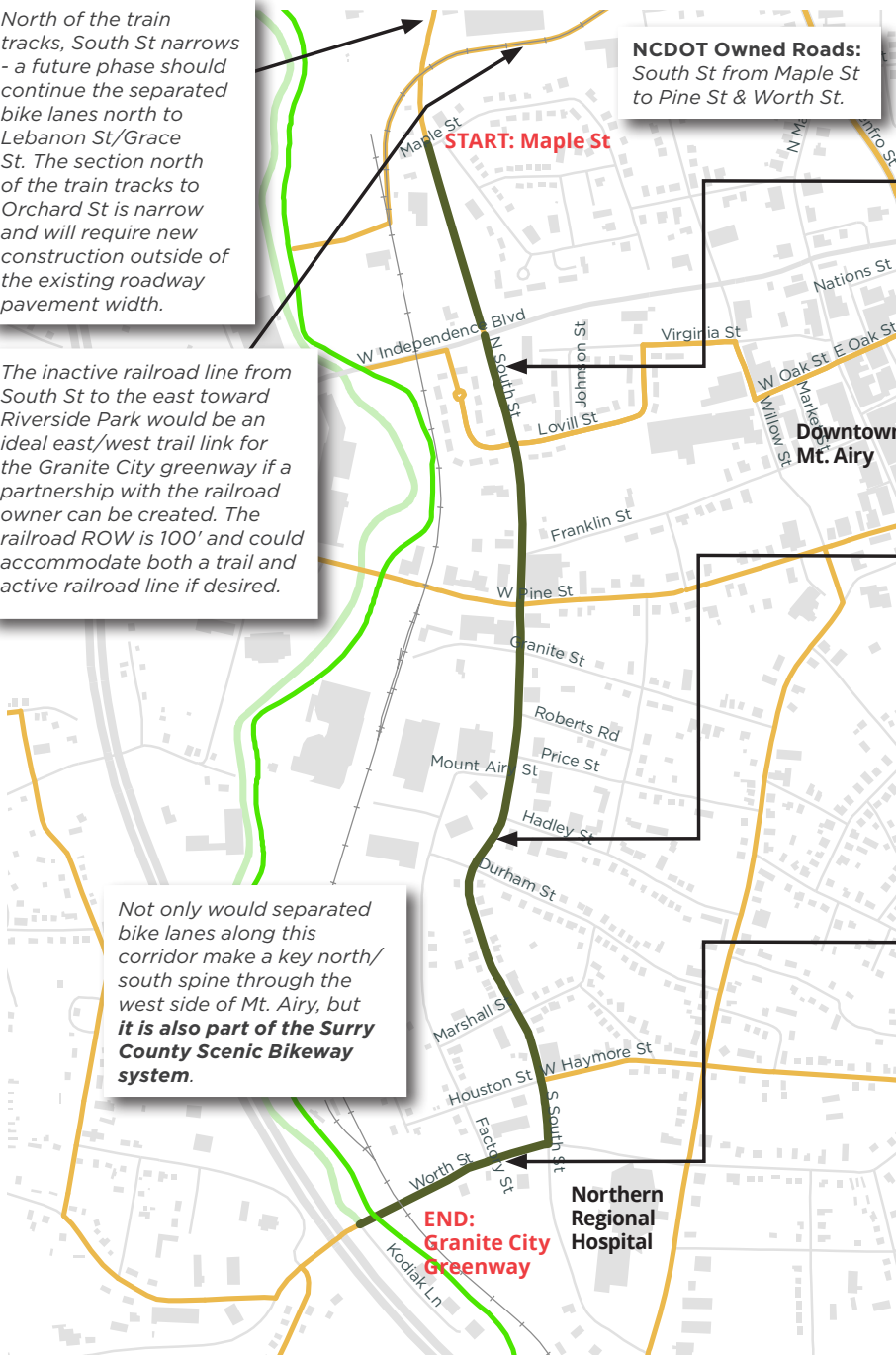
**NCDOT Owned Roads:**  
South St from Maple St to Pine St & Worth St.

South St carries very low traffic volumes for a four-lane road (52' width) at 4,400 - 6,600 AADT from **Maple St to Pine St**. Convert this section of South St from four lanes to three (11' for travel lanes, 9.5' for each bike lane/buffer space), allowing space to create physically **separated bike lanes**<sup>1</sup>.

South St, from **Pine St to Houston St** is a two-lane road with extra pavement width (34'). Narrow the travel lanes to 10', allowing space to create physically **separated bike lanes** (7' for bike lane/buffer space)<sup>1</sup>. The bike lanes will also significantly enhance the value of the existing sidewalks that currently have no buffer with automobile traffic.

**South St from Houston St to Worth St and Worth St from South St to the Granite City Greenway** are narrow two lane roads. A **sidepath** should be constructed along this section to complete the link to the Granite City Greenway. Consider adding this element to the design of the STI Project EB-5845 that includes sidewalk construction along this section.

For the section north of Pine St, the speed limit should be lowered from 35 mph to 25 mph, matching the speed limit of South St south of Pine St.



<sup>1</sup><http://ruralsdesignguide.com/physically-separated/separated-bike-lane>

## C MT AIRY SOUTH STREET - SEPARATED BIKE LANES (CONTINUED)

### TRIP GENERATORS:

- Granite City Greenway
- Downtown Mt Airy
- Northern Regional Hospital
- Surry County Scenic Bikeway
- Businesses along the corridor
- Residential areas adjacent to the corridor

### SUPPORT IN OTHER PLANS:

- Surry County Comprehensive Transportation Plan (2012)

### POTENTIAL ROW NEEDS:

- ROW may be needed for the Worth St section depending on design

### JURISDICTIONS:

- City of Mt Airy

### POTENTIAL PARTNERSHIPS:

- City of Mt Airy
- Piedmont Triad Regional Council
- NCDOT
- Businesses along the corridor
- Northern Regional Hospital

### ESTIMATED CONSTRUCTION COSTS:

- Est. base project cost: \$1,500,000
- Est. additional cost option 1: flexible posts in bicycle lane buffer: \$30,030
- Est. additional cost option 2: concrete median in bicycle lane buffer: \$293,150

### DESIGN OPTIONS AND CONSIDERATIONS:



*Existing residential section of South St, heading south to the Granite City Greenway.*



*Example of a similar street with physically separated bicycle lanes (source: Alta Planning + Design). Note that the South St recommended separated bike lanes could be implemented within the existing pavement width, and would be a narrower buffer than pictured to the left.*



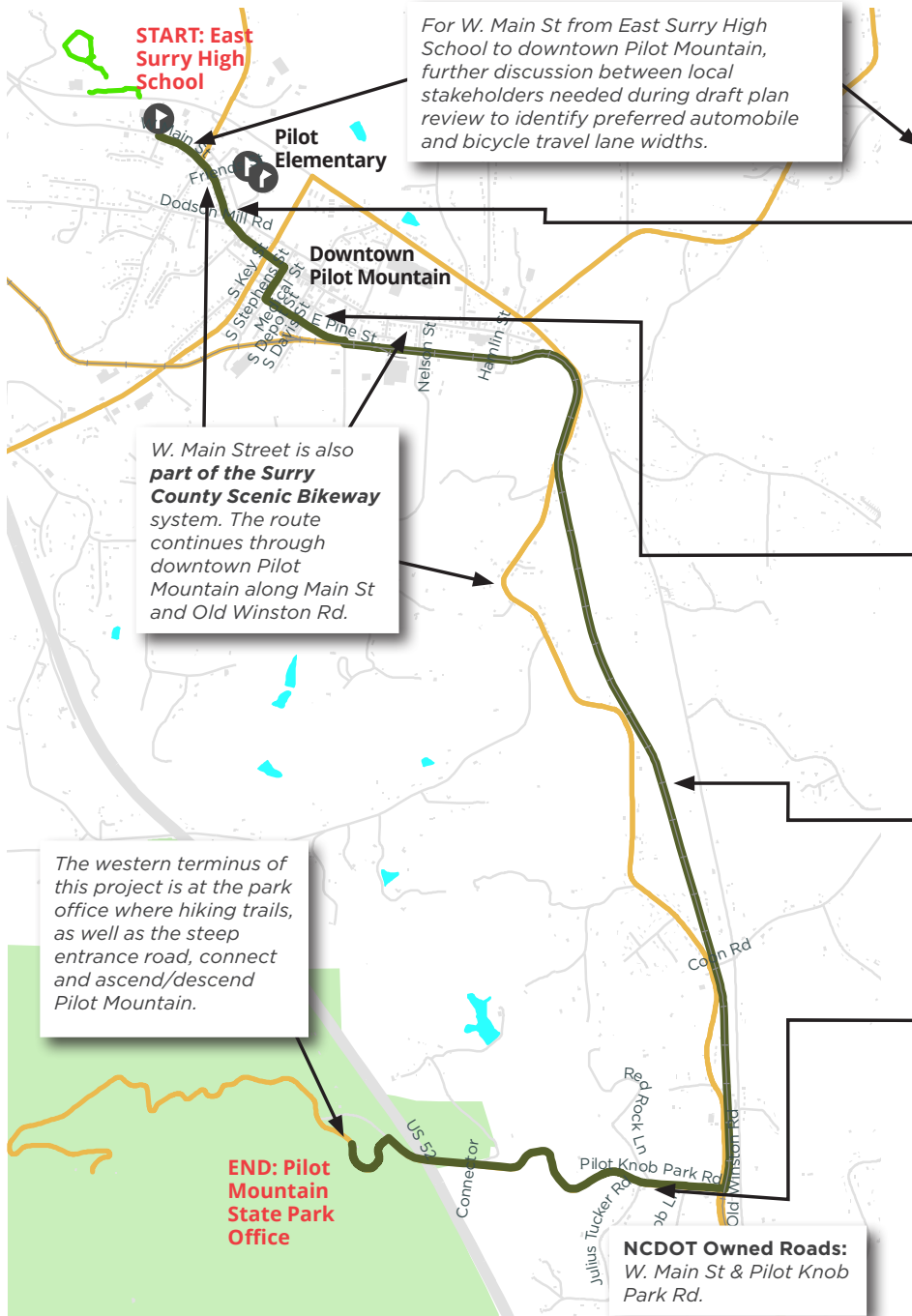


# D PILOT MOUNTAIN - TOWN TO STATE PARK TRAIL

**FROM:**  
East Surry High School

**TO:**  
Pilot Mountain State Park

**LENGTH:**  
6.3 Miles



**W Main St, from East Surry High School to Stephens St,** is a two lane road with extra pavement width (36'), traffic volumes of 3,200 - 6,200 AADT, and a 35 mph speed limit. Narrow the travel lanes to 11', allowing space to create physically **separated bike lanes**<sup>1</sup> (7' for bike lane/buffer space). The bike lanes will also significantly enhance the value of the existing sidewalks that currently have no buffer with automobile traffic.

Add **shared lane markings and wayfinding signage** along **Stephens St and Pine St** to make the connection between the W. Main St bike lanes and the proposed rail-with-trail (below).

If an agreement can be negotiated with the railroad owner and operator, construct a **rail-with-trail**<sup>2</sup> along the existing railroad corridor from the **Pine St/Academy Rd intersection to Pilot Knob Park Rd.**

Construct a **sidepath** along **Pilot Knob Park Rd** from the proposed rail-with-trail into Pilot Mountain State Park.

<sup>1</sup><http://ruralsdesignguide.com/physically-separated/separated-bike-lane>  
<sup>2</sup><https://railroads.dot.gov/eLibrary/rails-trails-best-practices-and-lessons-learned>

*\*Note - Some of this project is posted at 35 mph. The average risk of death for a pedestrian reaches 10% at an impact speed of 23 mph, 25% at 32 mph, 50% at 42 mph. Consider speed limit reduction\*. Add source somewhere on the page: <sup>\*</sup><https://aaaafoundation.org/impact-speed-pedestrians-risk-severe-injury-death/>*

**Proposed Network**

- Priority Project
- Regional Network

**Existing**

- Shared Use Path

0 0.25 0.5 Miles



# D

## PILOT MOUNTAIN - TOWN TO STATE PARK TRAIL (CONTINUED)

### TRIP GENERATORS:

- East Surry High School
- Pilot Elementary
- Downtown Pilot Mountain
- Pilot Mountain State Park
- Surry County Scenic Bikeway

### SUPPORT IN OTHER PLANS:

- Surry County Comprehensive Transportation Plan (2012)
- Pilot Mountain to State Park Greenway Feasibility Study (2020)

### POTENTIAL ROW NEEDS:

- Any rail-with-trail development will need to utilize railroad ROW and require an agreement with the railroad owner. There are potential ROW needs for the Pilot Knob Rd section, depending on design.

### DESIGN OPTIONS AND CONSIDERATIONS:

*Separated bike lanes could be added to W. Main St within the existing pavement, at relatively low cost. Below is a photo simulation along W. Main St. Not only do they provide a safer space for bicyclists, but they also provide a buffer between the sidewalk and automobile traffic.*

### JURISDICTIONS:

- Town of Pilot Mountain
- Surry County
- Stokes County

### POTENTIAL PARTNERSHIPS:

- Town of Pilot Mountain
- Surry County
- Stokes County
- Piedmont Triad Regional Council
- NC State Parks
- Norfolk Southern
- Yadkin Valley Railroad
- NCDOT
- Businesses along the corridor

### ESTIMATED CONSTRUCTION COSTS:

- Est. base project cost: \$7,000,000
- Est. additional cost option 1: flexible posts in bicycle lane buffer: \$18,590
- Est. additional cost option 2: concrete median in bicycle lane buffer: \$182,100





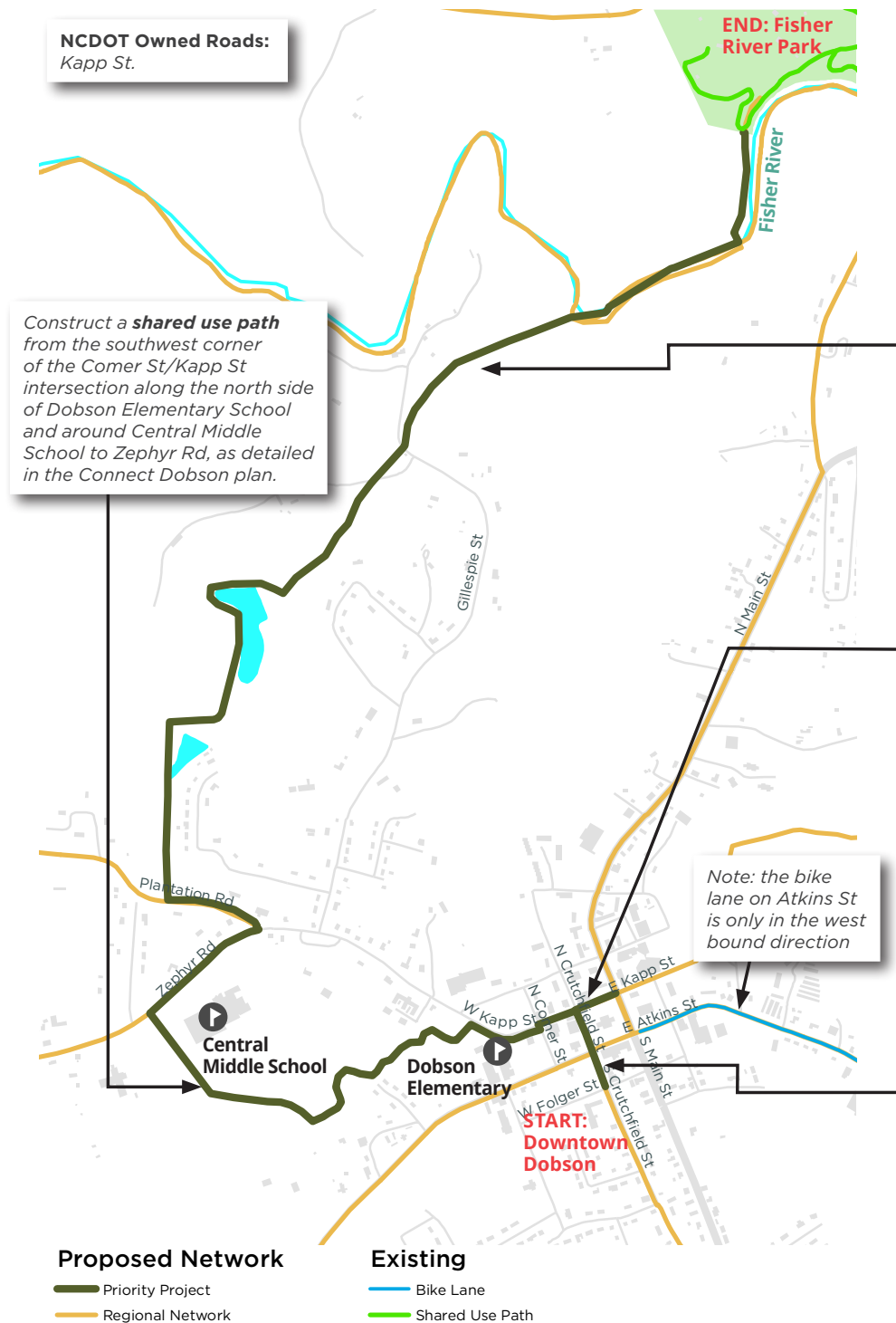


# E DOBSON - DOWNTOWN TO CENTRAL MIDDLE SCHOOL

**FROM:**  
Downtown Dobson

**TO:**  
Fisher River Park

**LENGTH:**  
3.4 Miles



This project was identified as a priority in the Town of Dobson's Connect Dobson Greenway Master Plan. This includes several specific recommendations from the plan that are detailed and expanded upon below:

Construct a greenway from Central Middle School to Fisher River Park as identified in Connect Dobson. Agreements with local landowners and further study will be needed.

From downtown, construct a **two-way separated bikeway** within the existing curb, along Kapp St from Main St to Comer St. The Connect Dobson plan details this configuration within a 52' ROW that includes two 11' travel lanes, 8' for parking on each side, and 14' along the south side of Kapp St for a two-way separated bikeway (10') and a buffer (4'), that is adjacent to the existing sidewalk.

Construct a **two-way separated bikeway** within the existing curb, along **Crutchfield St from Kapp St to Folger St**. Page 56 of Connect Dobson details this configuration within a 55' ROW that includes two 11' travel lanes, 8' for parking on each side of the travel lanes, and 17' along the west side of Crutchfield St for a two-way separated bikeway (10') and a buffer (7'), that is adjacent to the existing sidewalk.

# E

## DOBSON - DOWNTOWN TO CENTRAL MIDDLE SCHOOL (CONTINUED)

### TRIP GENERATORS:

- Dobson Elementary School
- Central Middle School
- Dobson Square Park
- Downtown Dobson
- Surry County Scenic Bikeway
- Fisher River Park

### SUPPORT IN OTHER PLANS:

- Connect Dobson Greenway Master Plan (2019)

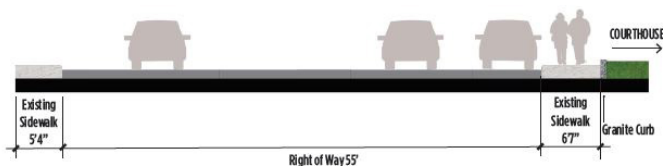
### POTENTIAL ROW NEEDS:

- ROW would need to be negotiated with property owner between the elementary and middle school as well as the section continuing to Fisher River Park.

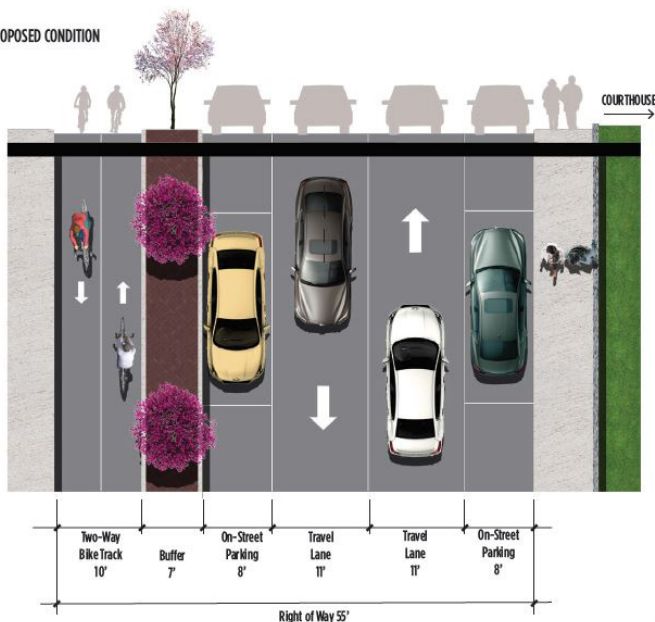
### DESIGN OPTIONS AND CONSIDERATIONS:

Below are graphics from pages 56-57 of the Connect Dobson Greenway Master Plan, showing the recommended configuration for Crutchfield St (left) and Kapp St (right).

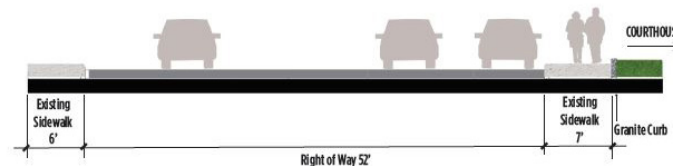
EXISTING CONDITION



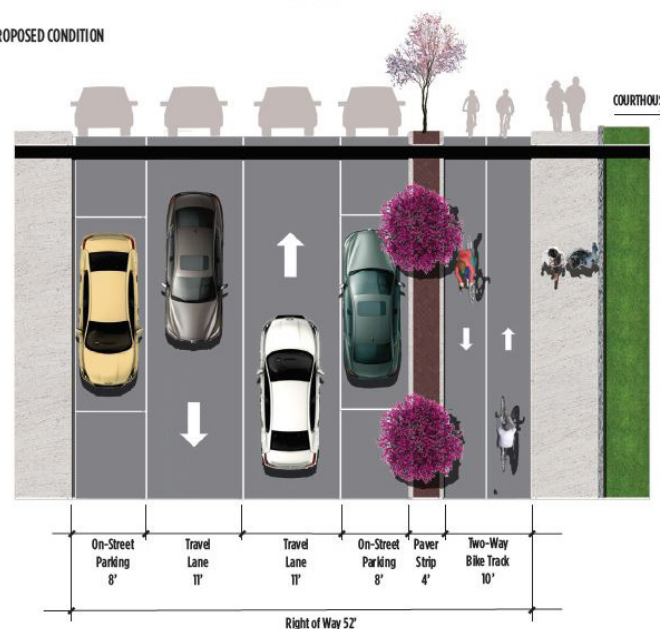
PROPOSED CONDITION



EXISTING CONDITION



PROPOSED CONDITION



### JURISDICTIONS:

- Town of Dobson
- Surry County

### POTENTIAL PARTNERSHIPS:

- Town of Dobson
- Surry County
- Piedmont Triad Regional Council
- NCDOT
- Downtown businesses

**Estimated Construction Costs** (for section from Downtown to Central Middle School, 1.2 miles):

- Est. base project cost: \$1,300,000
- Est. additional cost option 1: flexible posts in bicycle lane buffer: \$5,720
- Est. additional cost option 2: concrete median in bicycle lane buffer: \$211,400





# F ELKIN & JONESVILLE YADKIN RIVER GREENWAY (MST)

## FROM:

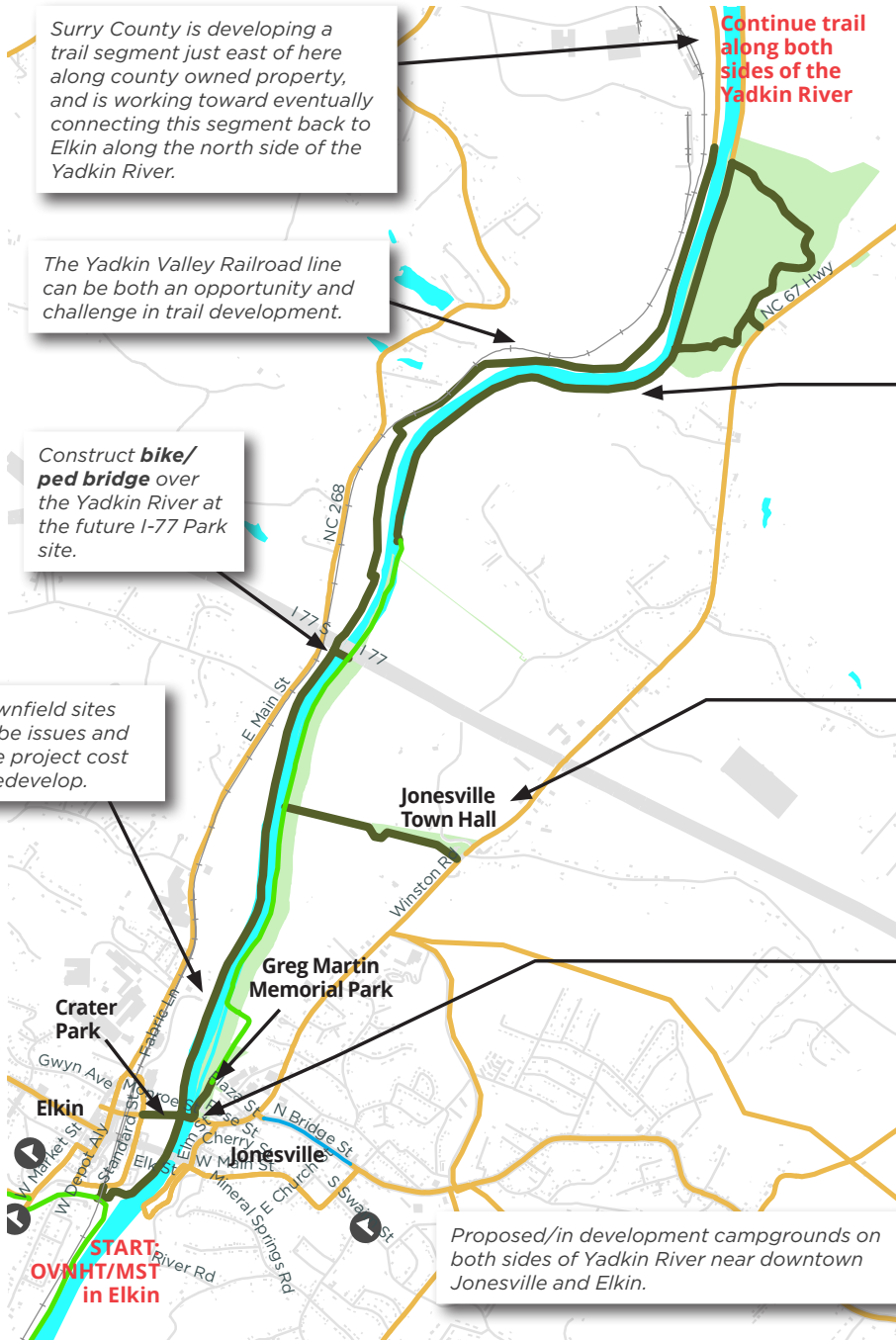
Elkin/Jonesville MST

## TO:

Yadkin River Surry/Yadkin Counties

## LENGTH:

8.3 Miles



Continue the Mountains to Sea Trail from the existing section in Elkin, along the Yadkin River. Ideally, this would be developed on both sides of the Yadkin River, forming an MST loop along the Jonesville and Elkin sides and continuing downstream the length of each county.

The Town of Jonesville has acquired access to continue the Jonesville Greenway for a total of 4.5 miles along the south side of the Yadkin River.

Construct **shared use path** connection to the Jonesville Town Hall.

A key element for developing the MST loop will be the construction of a **bike/ped bridge at the former Hugh Chatham Bridge site** across the Yadkin River, providing a connection between downtown Elkin and Jonesville. Fundraising efforts are currently underway for this project.

## Proposed Network

- Priority Project
- Regional Network

## Existing

- Bike Lane
- Shared Use Path

0 0.25 0.5 Miles



# F

## ELKIN & JONESVILLE YADKIN RIVER GREENWAY (MST) (CONTINUED)

### TRIP GENERATORS:

- Overmountain Victory Trail
- Jonesville Greenway/MST
- Elkin Municipal Park
- Crater Park
- Downtown Elkin
- Downtown Jonesville
- Jonesville Town Hall

### SUPPORT IN OTHER PLANS:

- Mountains to Sea State Trail Sub Section Plan: Stone Mountain to Pilot Mountain State Park (2014)
- Elkin 2030 Comprehensive Town-Wide Master Plan (2019)
- Jonesville Pedestrian Plan (2015)
- Yadkin County Comprehensive Transportation Plan (2014)
- Surry County Comprehensive Transportation Plan (2012)

### POTENTIAL ROW NEEDS:

- ROW needed for much of the proposed trail section in Elkin

### DESIGN OPTIONS AND CONSIDERATIONS:

*Below is a graphic from page 71 of the Mountains to Sea State Trail Sub Section Plan: Stone Mountain to Pilot Mountain State Park, showing the MST loop along both sides of the Yadkin River between Elkin and Jonesville.*

### JURISDICTIONS:

- Town of Elkin
- Town of Jonesville
- Surry County
- Yadkin County

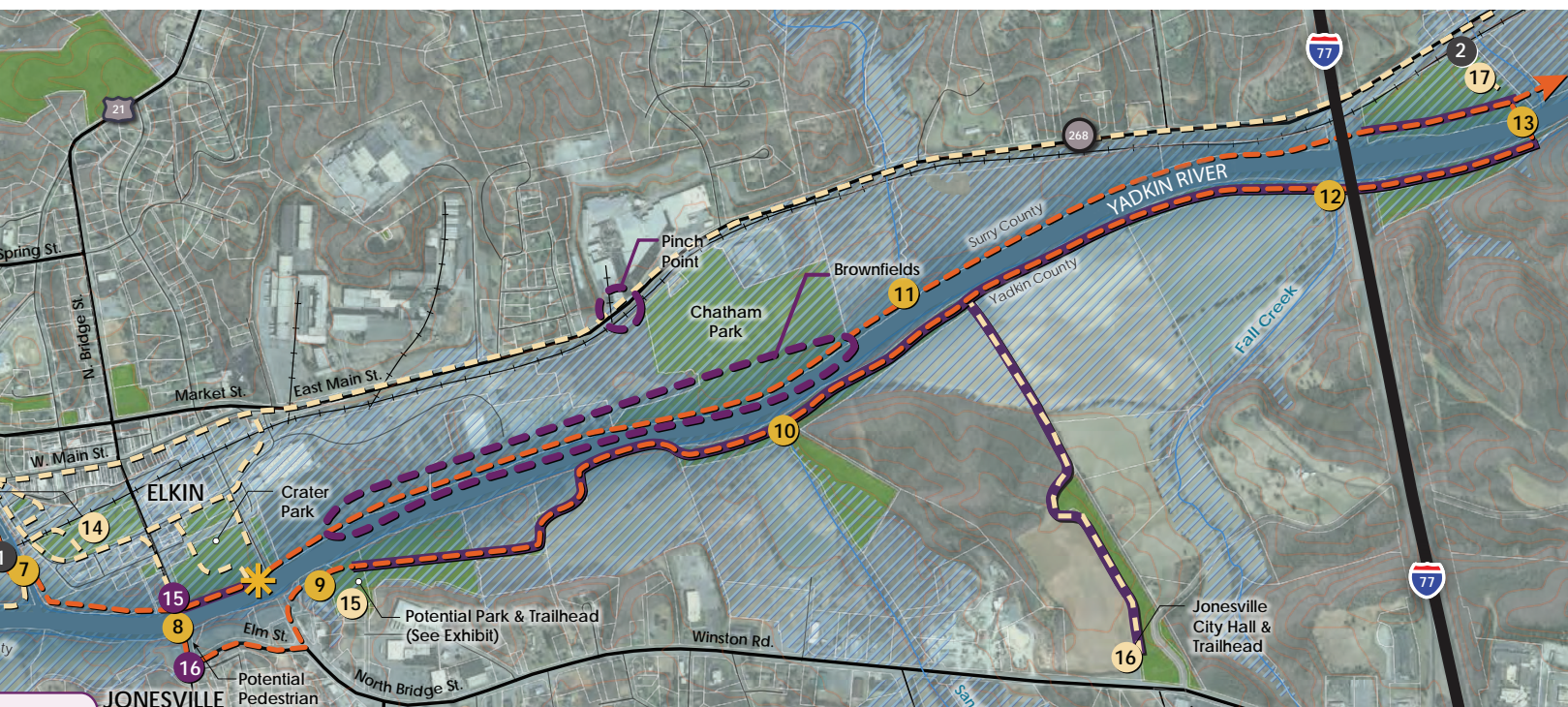
### POTENTIAL PARTNERSHIPS:

- Town of Elkin
- Town of Jonesville
- Surry County
- Yadkin County
- Piedmont Triad Regional Council
- Elkin Valley Trails Association
- Friends of the Greenway - Jonesville
- Friends of the Mountains to Sea Trail
- NCDOT
- Downtown businesses
- NC State Parks

### ESTIMATED CONSTRUCTION COSTS:

For section along Yadkin River, Front St to I-77 (excluding bridge over the river); Jonesville Greenway to Jonesville Town Hall; and sidepath along Main St/US 21B, Commerce St to Elm St (3.7 miles total):

- Est. base project cost: \$4,500,000





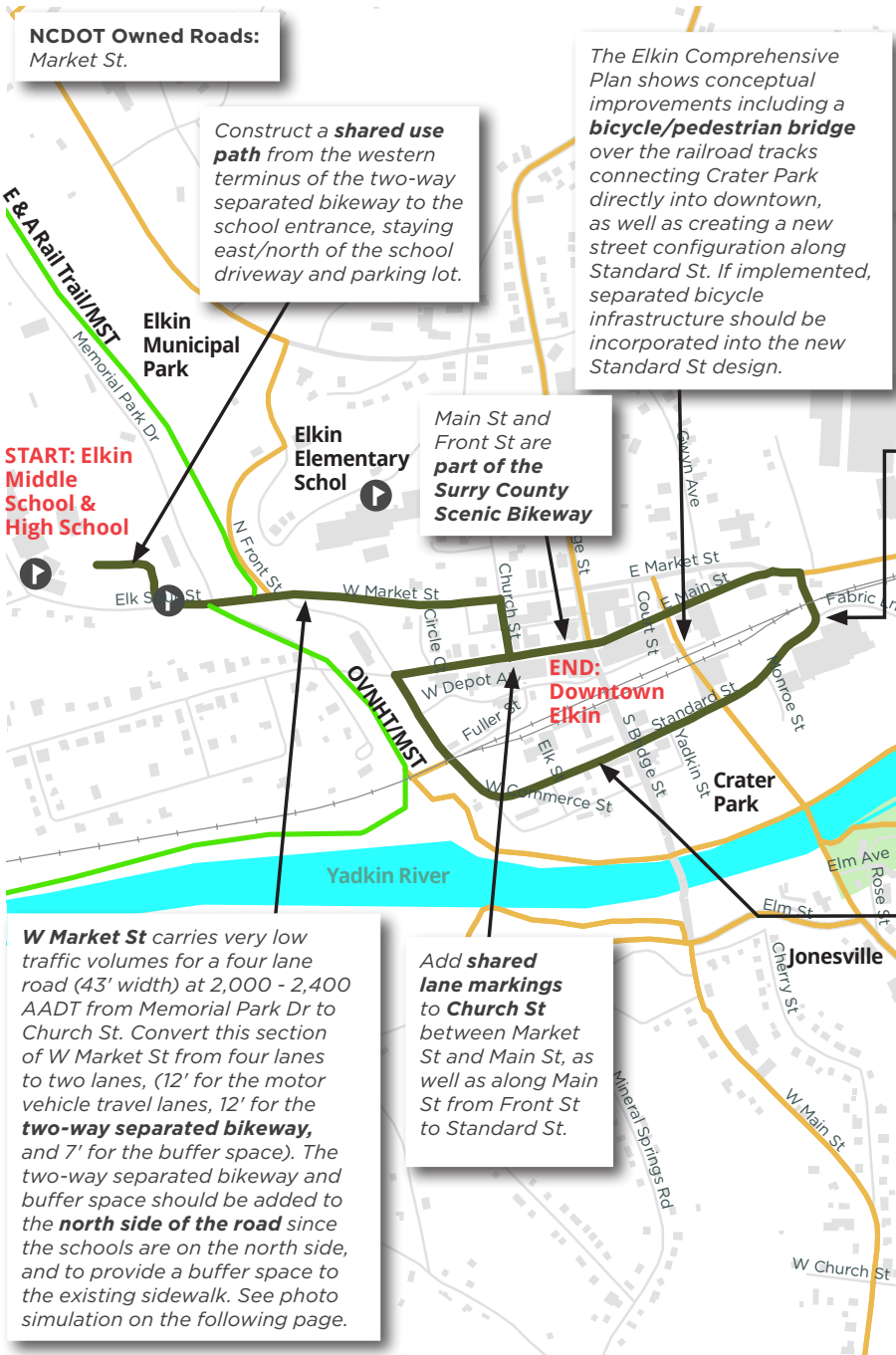


# G DOWNTOWN ELKIN CIRCULATION

**FROM:**  
Elkin Middle & High School

**TO:**  
Downtown Elkin

**LENGTH:**  
1.4 Miles



As the Mountains to Sea Trail is developed and extended in both directions of the existing greenway in Elkin, circulation through downtown Elkin should be considered concurrently. Several options are recommended below, and could be used as elements for the Elkin Bicycle & Pedestrian planning process that is underway:

**Standard St from the east driveway of Crater Park to Main St** narrows to 31'. Stripe the travel lanes to 10' and stripe 5.5' **bike lanes** on each side of the road. During future resurfacing, add pavement to each side of the road, such that the total pavement is 36', allowing for the creation of buffer space.

**Front St and Standard St from Main St to the eastern driveway of Crater Park** are two lane roads that are 20 mph, have no sidewalks, and have extra pavement width (including a narrow 4' bike lane striped along the west side of Front St between Main St and Standard St). Their respective widths range from 36' - 45'. The travel lanes should be striped to 10'. The remaining 16'+ could be utilized as a **12' shared use path with a 4' buffer** (or alternatively a 8' separated bike lanes/buffer space on each side').

## Proposed Network

- Priority Project
- Regional Network

## Existing

- Shared Use Path

0 0.25 0.5 Miles



<sup>1</sup><http://ruraldesignguide.com/>  
physically-separated/separated-bike-lane

# G

## DOWNTOWN ELKIN CIRCULATION (CONTINUED)

### TRIP GENERATORS:

- Elkin Middle School
- Elkin High School
- Elkin Elementary School
- Overmountain Victory Trail
- Mountains to Sea Trail
- E & A Rail Trail
- Elkin Municipal Park
- Crater Park
- Downtown Elkin
- Jonesville

### SUPPORT IN OTHER PLANS:

- Mountains to Sea State Trail Sub Section Plan: Stone Mountain to Pilot Mountain State Park (2014)
- Elkin 2030 Comprehensive Town-Wide Master Plan (2019)

### DESIGN OPTIONS AND CONSIDERATIONS:

*Below is a photo simulation of the W. Market St section that is proposed to be converted from four lanes to two lanes. This allows for a two-way separated bikeway with a large buffer on the north side of the existing street.*

### POTENTIAL ROW NEEDS:

- ROW needed on school property for shared use path connection to Elkin High School

### JURISDICTIONS:

- Town of Elkin

### POTENTIAL PARTNERSHIPS:

- Town of Elkin
- Surry County
- Downtown businesses
- Elkin Valley Trails Association
- NCDOT
- Piedmont Triad Regional Council

### ESTIMATED CONSTRUCTION COSTS:

- Est. base project cost: \$440,000
- Est. additional cost option 1: flexible posts in bicycle lane buffer: \$18,590
- Est. additional cost option 2: concrete median in bicycle lane buffer: \$183,400







# H DANBURY CIRCULATION

## FROM:

Moratock Park

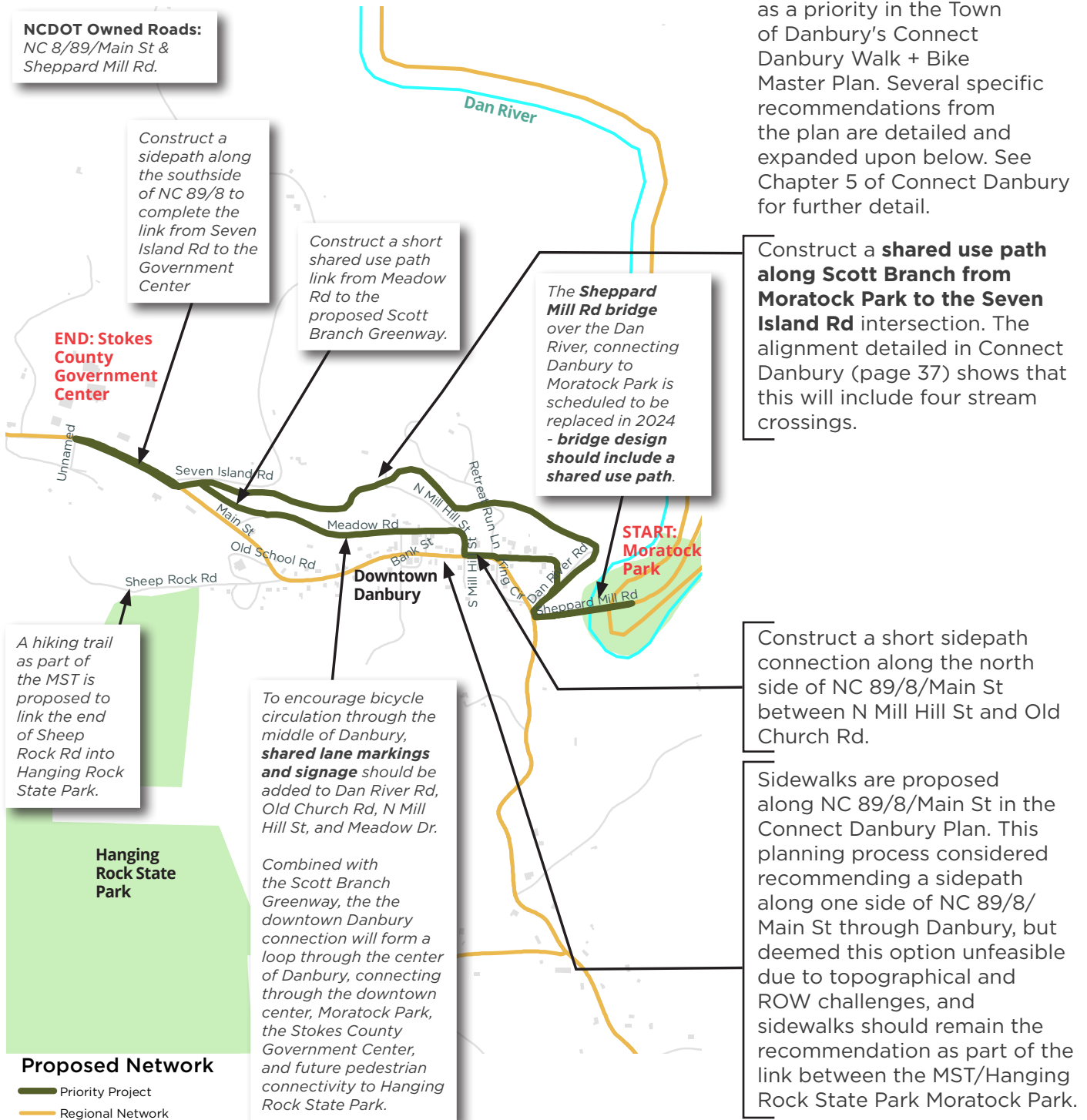
## TO:

Stokes County Government Center and Hanging Rock State Park

## LENGTH:

1.7 Miles

This project was identified as a priority in the Town of Danbury's Connect Danbury Walk + Bike Master Plan. Several specific recommendations from the plan are detailed and expanded upon below. See Chapter 5 of Connect Danbury for further detail.



0 0.25 0.5 Miles



# H DANBURY CIRCULATION (CONTINUED)

## TRIP GENERATORS:

- Moratock Park
- Downtown Danbury
- Hanging Rock State Park
- Stokes County Government Center
- River Rock Commercial Area
- Mountains to Sea Trail
- NC Bike Route 4: North Line Trace

## SUPPORT IN OTHER PLANS:

- Connect Danbury Walking + Bike Master Plan (2017)
- Stokes County 2035 Vision Plan (2015)

## JURISDICTIONS:

- Town of Danbury
- Stokes County

## POTENTIAL PARTNERSHIPS:

- Town of Danbury
- Stokes County
- NCDOT
- Friends of the Mountains to Sea Trail
- NC State Parks
- Danbury businesses and residents

## ESTIMATED CONSTRUCTION COSTS:

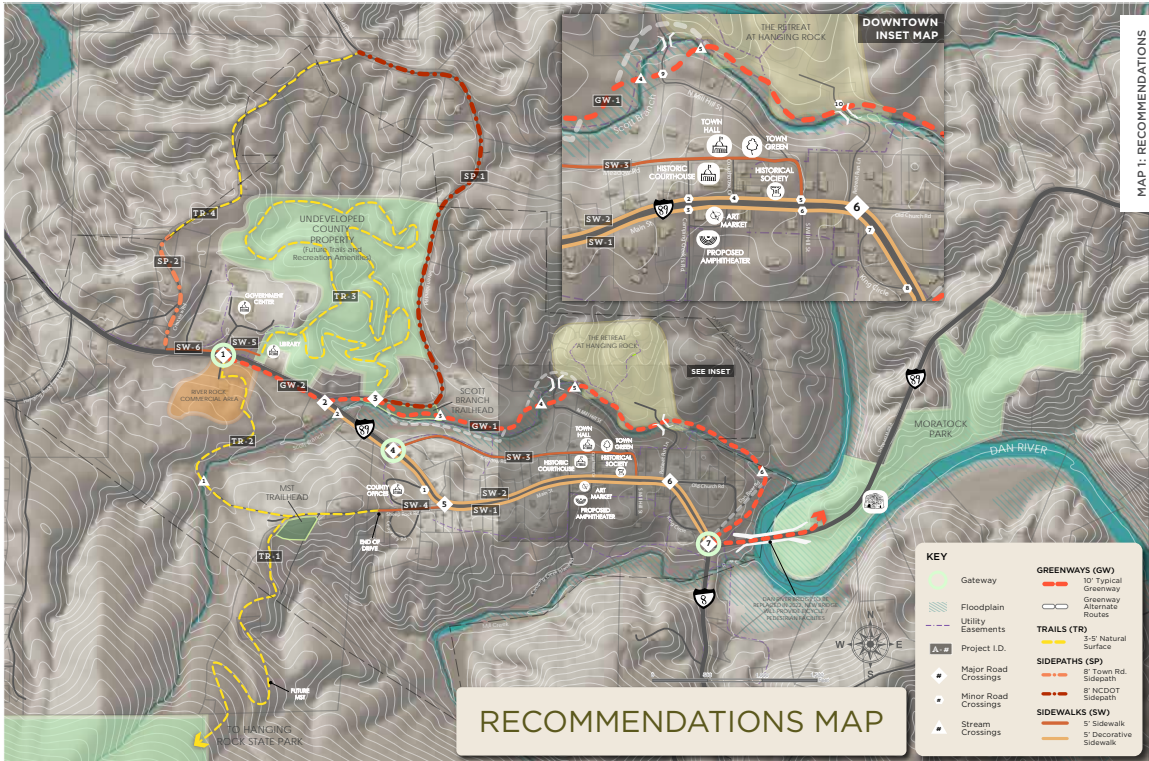
- Est. base project cost: \$4,000,000

## POTENTIAL ROW NEEDS:

- Scott Branch Greenway
- Connector between Meadow Rd and proposed Scott Branch Greenway
- Short Main St/NC 89/NC 8 sidepath between Old Church Rd & North Mill Hill St depending on alignment, as well as section between Government Center and Seven Island Rd

## DESIGN OPTIONS AND CONSIDERATIONS:

Recommendations map from Connect Danbury showing comprehensive walking and biking recommendations throughout Danbury (page 37 of Connect Danbury).





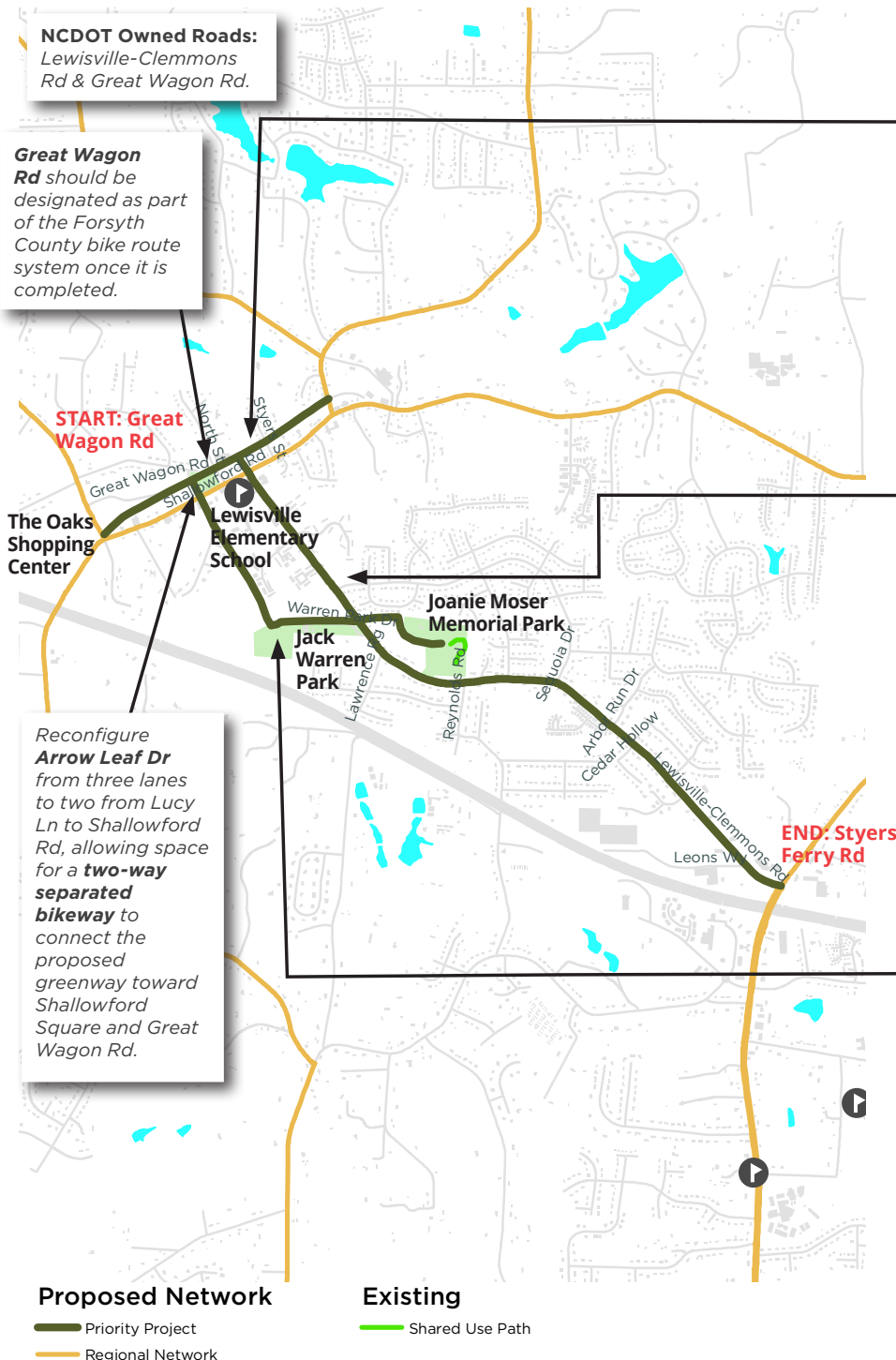


# LEWISVILLE CIRCULATION

**FROM:**  
Great Wagon Road

**TO:**  
Styers Ferry Road

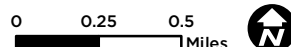
**LENGTH:**  
4.4 Miles



The construction of the new road (**Great Wagon Rd**) as part of STIP U-5536 from The Oaks shopping center on Shallowford Rd to Lewisville Vienna Rd will include **bicycle lanes** as part of the project. It will create a southwest/northeast connection through Lewisville.

**Bike lanes** are also proposed to be incorporated into the **Lewisville Clemmons Rd** widening project (**from Shallowford Rd to Styers Ferry Rd**) that is scheduled for construction in 2027 (STIP: U-6189), although design has not been completed to-date. As part of this project, **separated bike lanes and sidewalk or a sidepath** should be included during the design phase<sup>1</sup>. This road currently carries high traffic volumes (8,800 - 11,000 AADT) and speeds (45 mph). The speed limit should be reduced, especially near the parks.

The **Lewisville Elementary School** property, lies a short distance to the northwest corner of **Jack Warren Park**. Construct a **greenway** to connect these two destinations, and continue the greenway east across Lewisville Clemmons Rd to also connect **Joanie Moser Memorial Park** (and multiple neighborhoods). Complete the connection north to the future Great Wagon Rd, creating a loop in the heart of Lewisville.



<sup>1</sup><http://ruralsdesignguide.com/physically-separated>

# I

## LEWISVILLE CIRCULATION (CONTINUED)

### TRIP GENERATORS:

- Lewisville Elementary School
- Joanie Moser Memorial Park
- Jack Warren Park
- Downtown Lewisville
- The Oaks Shopping Center
- Residential areas adjacent to the corridor

### SUPPORT IN OTHER PLANS:

- Lewisville Pedestrian Plan (2011)
- Winston-Salem Urban Area Comprehensive Transportation Plan (2012)

### POTENTIAL ROW NEEDS:

- Greenway section between Lewisville Elementary School and Jack Warren Park

### JURISDICTIONS:

- Town of Lewisville

### POTENTIAL PARTNERSHIPS:

- Town of Lewisville
- Forsyth County
- NCDOT
- Piedmont Triad Regional Council
- Businesses along the corridor

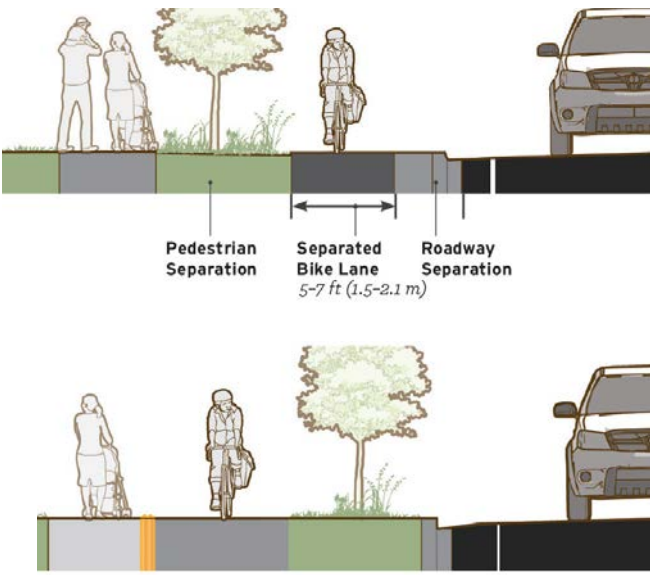
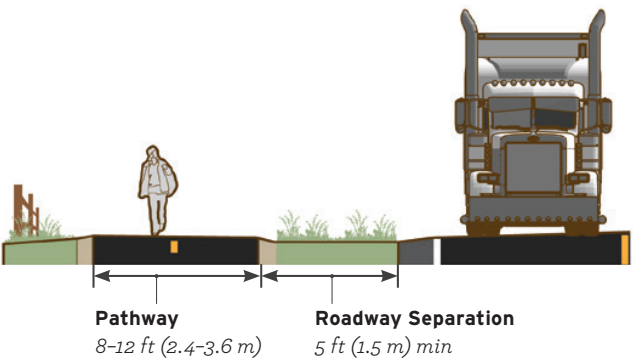
### ESTIMATED CONSTRUCTION COSTS

For section along Arrow Leaf Dr, Lucy Ln to Shallowford Rd; and shared use path from Arrow Leaf Dr to Joanie Moser Memorial Park (1.1 miles total):

- Est. base project cost: \$1,300,000
- Est. additional cost option 1: flexible posts in bicycle lane buffer: \$1,430
- Est. additional cost option 2: concrete median in bicycle lane buffer: \$20,200

### DESIGN OPTIONS AND CONSIDERATIONS:

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics below and to the right from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruralsdesignguide.com/physically-separated>.





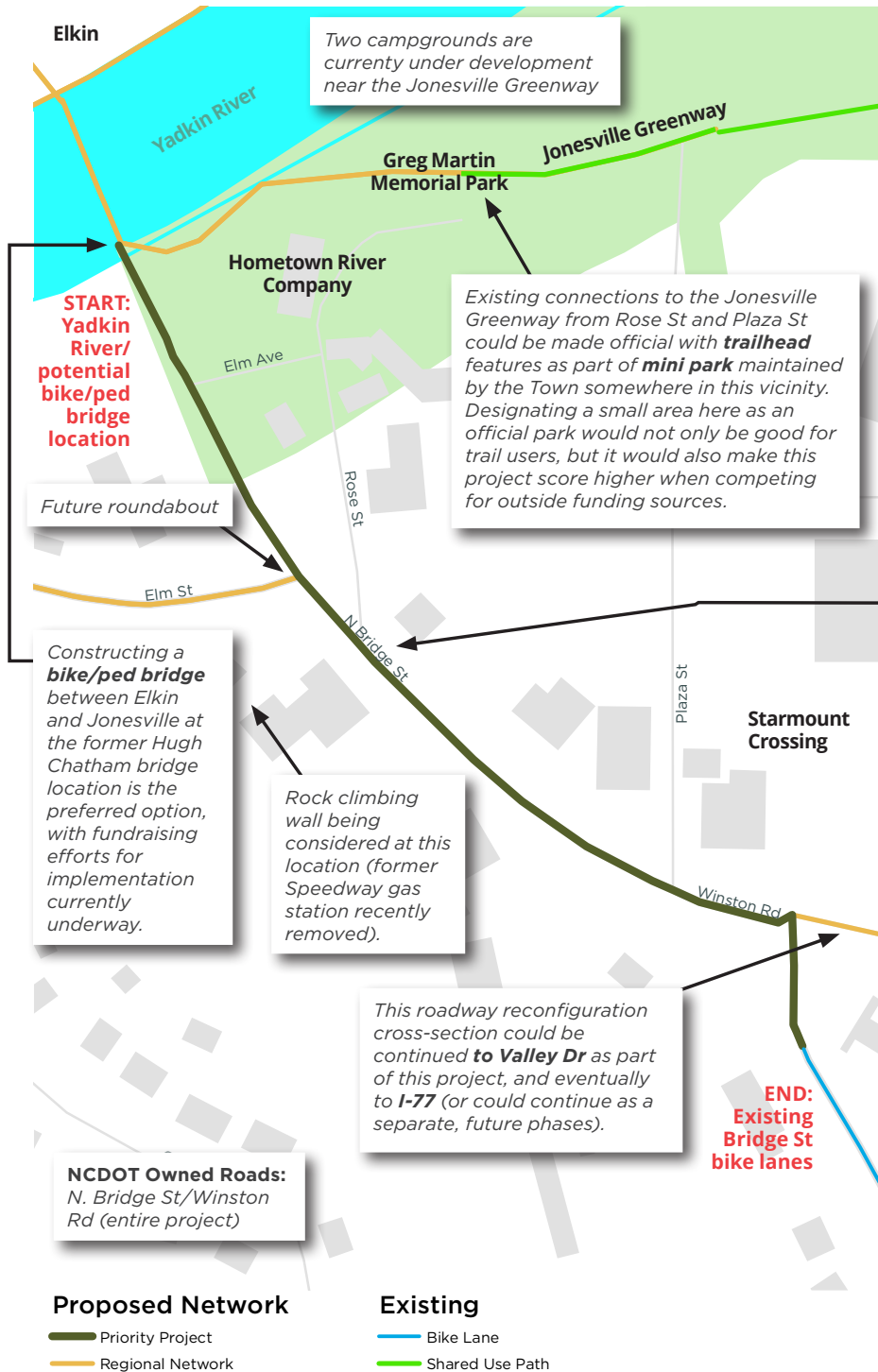


# J DOWNTOWN JONESVILLE TRAIL

**FROM:**  
Yadkin River

**TO:**  
Bridge Street Bike Lanes

**LENGTH:**  
0.2 Miles



With the development of the Jonesville Greenway as part of the Mountains to Sea Trail, Jonesville has an opportunity to thoroughly incorporate bicycling (and walking) infrastructure into the future of it's downtown core.

This section of Bridge St has low traffic volumes for a five-lane street (7,900 AADT). A **complete street corridor improvement project** is recommended along **N Bridge St/Winston Rd**, from the northern terminus of Bridge St at the Yadkin River to the existing bike lanes along Bridge St to the south. The project should reconfigure the roadway to two or three lanes, with access management improvements, sidewalks, and physically **separated bicycle facilities**<sup>1</sup>, providing multimodal access to businesses along the corridor. The project should be thought of as an extension of the Jonesville Greenway.

The rendering on the following page shows an example of how these elements could be incorporated into future corridor design.

<sup>1</sup><http://ruraldesignguide.com/physically-separated/separated-bike-lane>

# J

## DOWNTOWN JONESVILLE TRAIL (CONTINUED)

### TRIP GENERATORS:

- Jonesville Greenway/MST
- Downtown Jonesville businesses
- Residential areas adjacent to the corridor

### SUPPORT IN OTHER PLANS:

- Jonesville Pedestrian Plan (2015)
- Yadkin County Comprehensive Transportation Plan (2014)
- Mountains to Sea State Trail Sub Section Plan: Stone Mountain to Pilot Mountain State Park (2014)

### POTENTIAL ROW NEEDS:

- None

### JURISDICTIONS:

- Town of Jonesville

### POTENTIAL PARTNERSHIPS:

- Town of Jonesville
- Downtown businesses
- Friends of the Greenway - Jonesville
- NCDOT
- Piedmont Triad Regional Council
- Dogwood Health Trust

### ESTIMATED CONSTRUCTION COSTS:

- Est. base project cost: \$510,000
- Est. additional cost option 2: mill and overlay: \$240,400

### DESIGN OPTIONS AND CONSIDERATIONS:

The photo simulation below shows examples of recommended elements - bicycle and pedestrian facilities that are physically separated from the roadway, access management, and other streetscape elements.





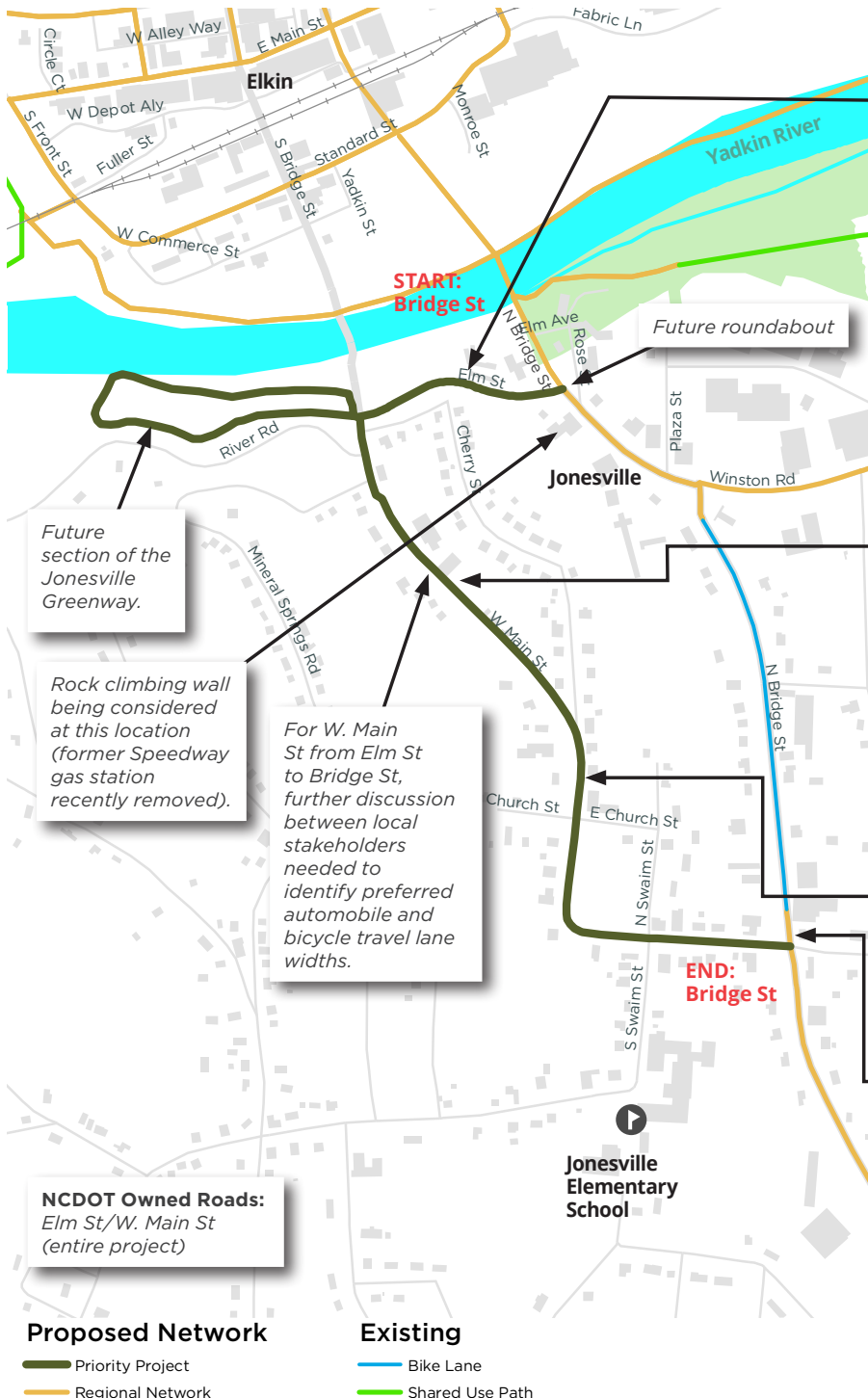


# K JONESVILLE CIRCULATION

**FROM:**  
Bridge Street

**TO:**  
Bridge Street

**LENGTH:**  
1.3 Miles



Design of the future STI project along **Elm St** (R-5913) should include a **sidepath**, connecting Bridge St to W Main St in Jonesville. This is a key connector for residents living along or near W Main St on the west side of Jonesville and can be a part of the western extension of the Jonesville Greenway.

**W Main St, from Elm St to Bridge St** to the south, has the same pavement width as the section of Bridge St that currently has bike lanes (32'). Consider striping the travel lanes to 10' since this is a residential area, leaving space for 6' **bike lanes** on each side of the road<sup>1</sup>. This will also add value to the existing sidewalks that currently have little to no buffer between the edge of sidewalk and automobile traffic. Furthermore, lower the speed limit to 20 mph.

South of Cherry St, the pavement width narrows to 30'. The bike lanes will need to be 5' along this section<sup>1</sup>.

The **Bridge St** bike lanes end just north of the Main St intersection. **Complete the bike lane to the intersection** by removing the center turn lane (AADT 1,900 here).

0 0.25 0.5 Miles



<sup>1</sup><http://ruralsdesignguide.com/visually-separated/bike-lane>

# K

## JONESVILLE CIRCULATION (CONTINUED)

### TRIP GENERATORS:

- Jonesville Greenway/MST
- Downtown Jonesville
- Jonesville Elementary
- Residential areas adjacent to the corridor

### SUPPORT IN OTHER PLANS:

- Jonesville Pedestrian Plan (2015)
- Yadkin County Comprehensive Transportation Plan (2014)

### POTENTIAL ROW NEEDS:

- None

### JURISDICTIONS:

- Town of Jonesville

### POTENTIAL PARTNERSHIPS:

- Town of Jonesville
- Downtown businesses
- Friends of the Greenway - Jonesville
- NCDOT
- Piedmont Triad Regional Council
- Dogwood Health Trust

### ESTIMATED CONSTRUCTION COSTS

For section along W Main St, from Elm Street to Bridge Street; and N Bridge St, from existing bike lanes to Main St (0.6 miles total):

- Est. base project cost: \$60,000

### DESIGN OPTIONS AND CONSIDERATIONS:



*Existing conditions along US 21 Business*



*Example of a similar street with bicycle lanes (US 15 Business)*



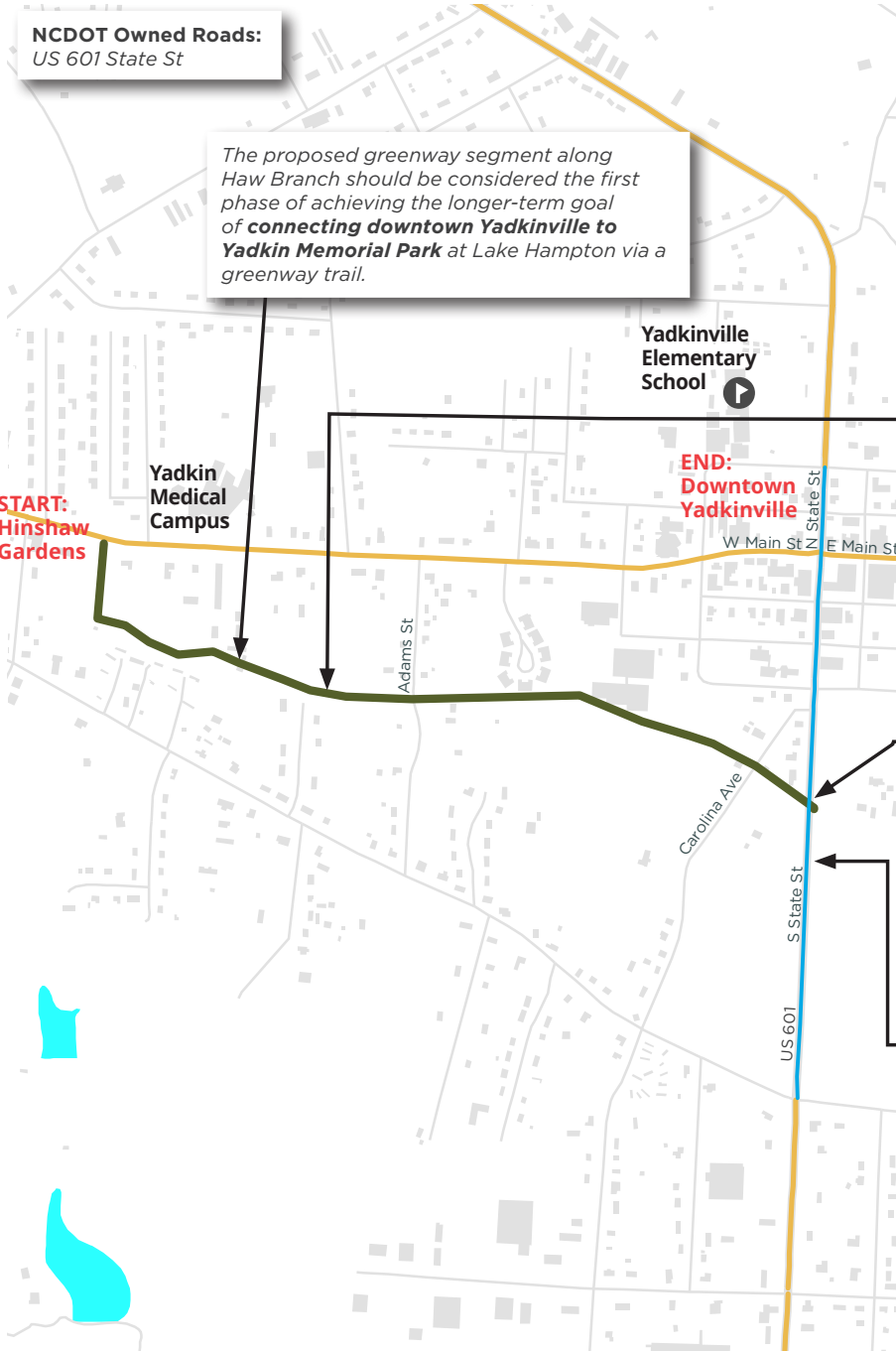


# DOWNTOWN YADKINVILLE CONNECTORS

**FROM:**  
Hinshaw Gardens

**TO:**  
Unifi Industrial Rd

**LENGTH:**  
0.9 Miles



The existing bike lanes along US 601 could provide a significant north/south link in the center of Yadkinville, but are reportedly under-used. The lack of buffer space or physical separation from automobile traffic likely contributes to current low usage (see comment form results about preferred facility types).

Construct a **shared use path along Haw Branch from Hinshaw Gardens to US 601** following the existing water/sewer easements. This project, a recommendation from the Yadkinville Pedestrian Plan, was submitted in P5.0, but was not funded.

Construct a **mid-block crosswalk** at the intersection of the proposed greenway and **US 601**. A median safety island should be constructed in the center turn lane space since it is unused at this location.

The **US 601 bike lanes** currently have 8' from the travel lane to the curb face (including a 2' gutter pan). During future resurfacing or roadway improvements, consider reducing the center turn lane width to allow more rideable space for bicyclists and the creation of a buffer.

<sup>1</sup><http://ruralsdesignguide.com/physically-separated>

# L

## DOWNTOWN YADKINVILLE CONNECTORS (CONTINUED)

### TRIP GENERATORS:

- Downtown Yadkinville
- Hinshaw Gardens
- Yadkin Medical Campus
- Residential areas adjacent to the corridor

### SUPPORT IN OTHER PLANS:

- Yadkinville Pedestrian Plan (2010)
- Yadkin County Comprehensive Transportation Plan (2014)

### POTENTIAL ROW NEEDS:

- ROW would be needed along the length of the Haw Branch greenway section.

### JURISDICTIONS:

- Town of Yadkinville

### POTENTIAL PARTNERSHIPS:

- Town of Yadkinville
- NCDOT
- Piedmont Triad Regional Council
- Adjacent property owners
- Businesses along the corridor
- Dogwood Health Trust

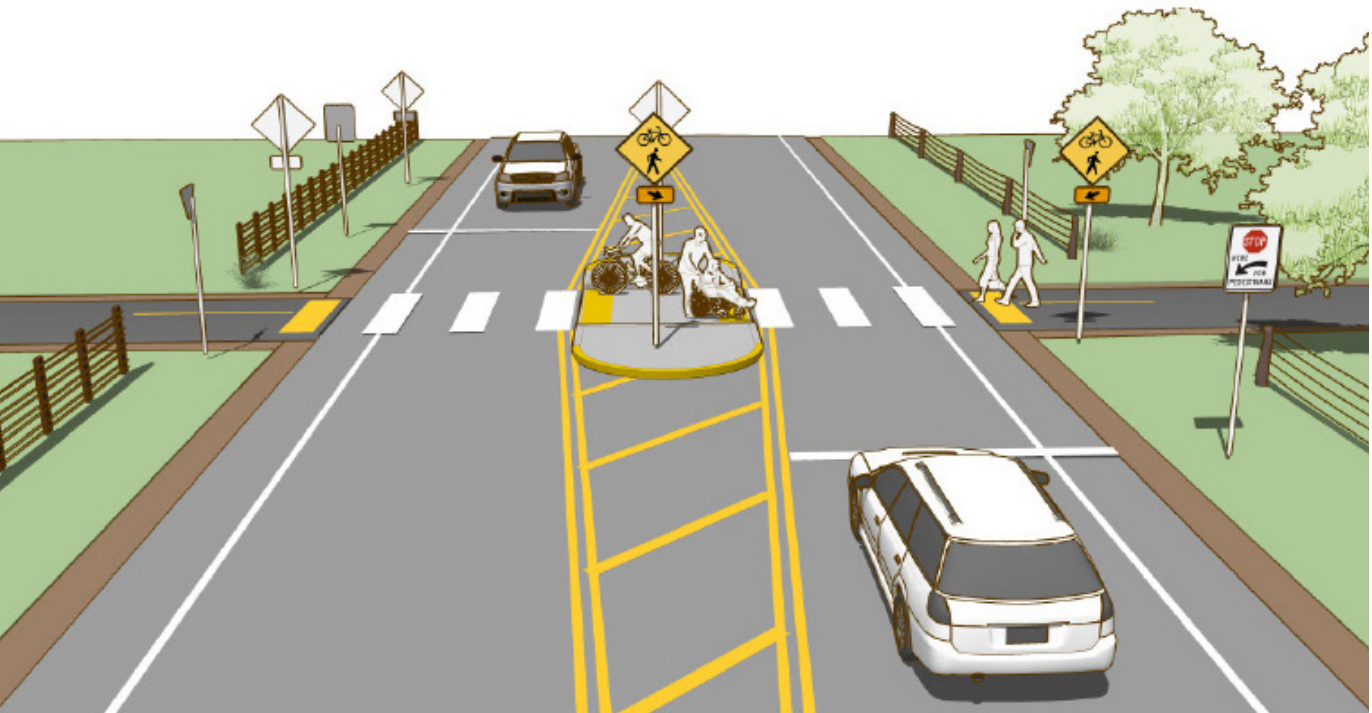
### ESTIMATED CONSTRUCTION COSTS:

For shared use path, from Old U.S. 421 to South State St:

- Est. base project cost: \$1,200,000

### DESIGN OPTIONS AND CONSIDERATIONS:

Median safety islands on each end of the greenway should allow path users to cross one lane of traffic at a time. The bicycle waiting area should be at least 8 ft deep to allow for a variety of bicycle types. To promote yielding to bicyclists the median safety island should be designed to require horizontal deflection of the motor vehicle travel lanes.



<https://ruralsdesignguide.com/physically-separated/shared-use-path>



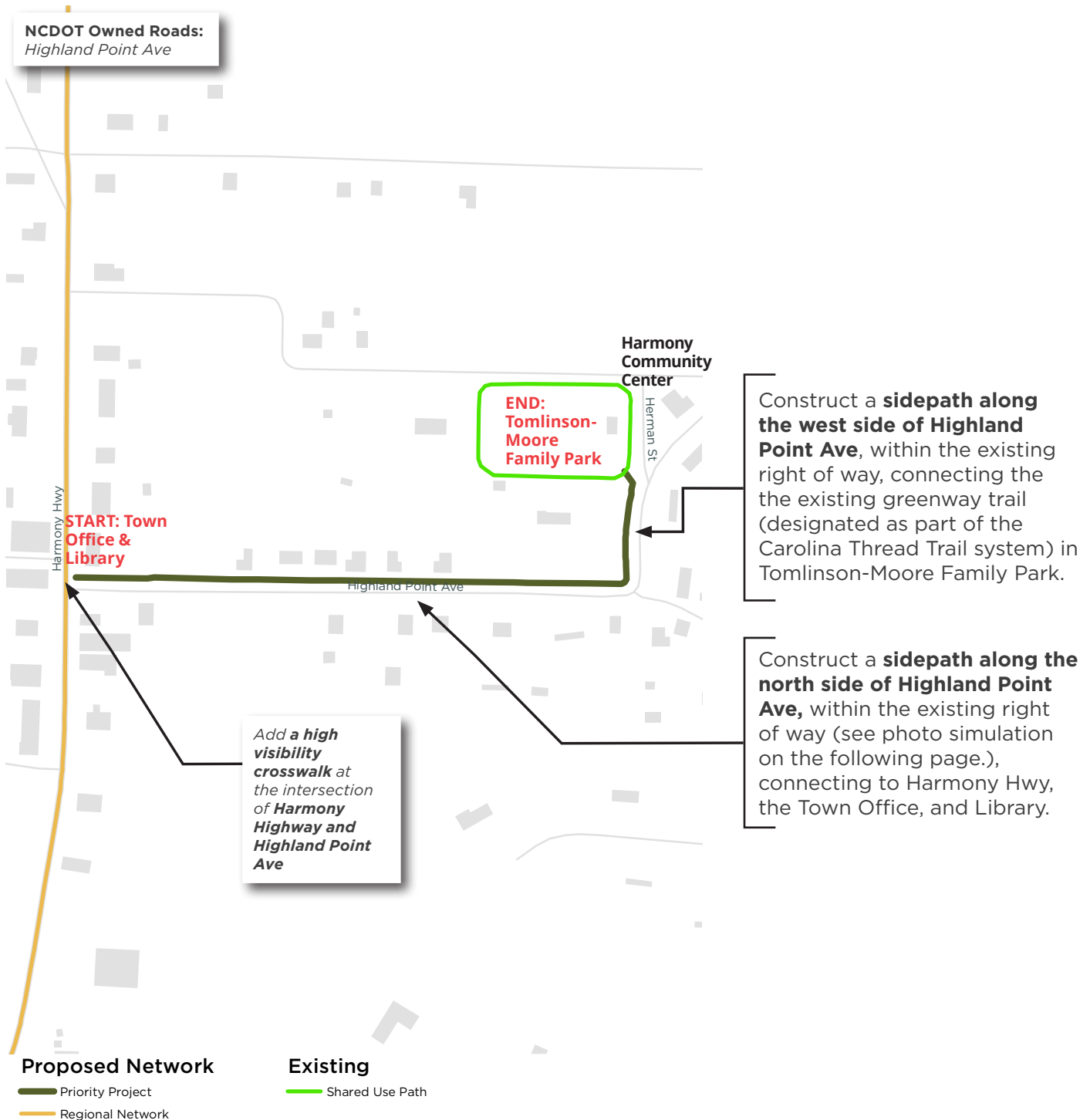


# M CAROLINA THREAD TRAIL IN HARMONY

**FROM:**  
Town Office and Library

**TO:**  
Tomlinson-Moore Family Park

**LENGTH:**  
0.3 Miles



# M IREDELL COUNTY CAROLINA THREAD TRAIL DEVELOPMENT (CONTINUED)

## TRIP GENERATORS:

- Harmony Elementary
- Harmony Branch Library
- Tomlinson-Moore Family Park
- Harmony Community Center
- Harmony Town Office

## SUPPORT IN OTHER PLANS:

- Iredell County Carolina Thread Trail Master Plan

## POTENTIAL ROW NEEDS:

- There appears to be ample roadway ROW for a side path

## JURISDICTIONS:

- Town of Harmony

## POTENTIAL PARTNERSHIPS:

- Town of Harmony
- Carolina Thread Trail
- NCDOT

## ESTIMATED CONSTRUCTION COSTS:

- Est. base project cost: \$300,000

## DESIGN OPTIONS AND CONSIDERATIONS:

*Right: Existing conditions on Highland Point Ave facing Harmony Highway.*

*Below: Photo visualization showing a side path along the north side of Highland Point Ave, connecting the park and community center to Town Hall and the Library.*



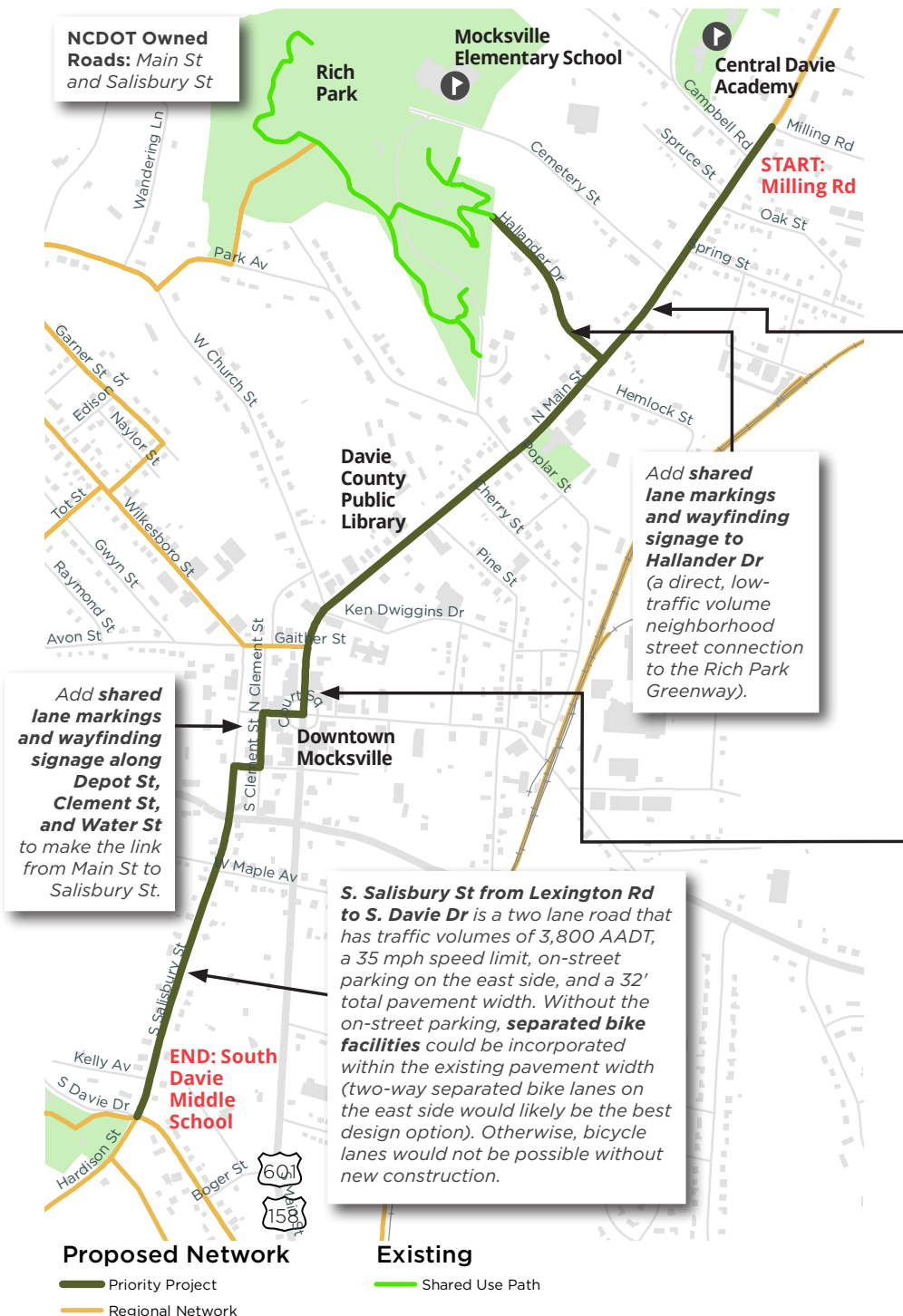


# N MOCKSVILLE NORTH/SOUTH SPINE

**FROM:**  
Milling Road

**TO:**  
South Davie Middle School

**LENGTH:**  
2.1 Miles



**N Main St/US 158, from Milling Rd to Gaither St** is a two-lane road with an approximate pavement width of 35-36', 6,900 - 10,000 AADT, and a 20-35 mph speed limit. Narrow the travel lanes to 11', allowing space to create **buffered bike lanes**<sup>1</sup> (6-7' for bike lane/buffer space - this includes paving the existing gutter pan), and extend the 20 MPH downtown speed limit, north to at least Hallander Dr. The bike lanes will also significantly enhance the value of the existing sidewalks that currently have a very small buffer between the sidewalk and automobile traffic.

**Separated bike lanes** should be extended through downtown along **Main St from Gaither St to Depot St**. With the approximately 62-64' of pavement width along this section, this would include delineating 24' for travel lanes (two 12' lanes), 16' for parallel parking (8' on each side; changing angled parking to parallel parking), and 22-24' for bike lanes and buffer space (11-12' on each side, between parking and the existing sidewalk).

Separated bike lanes will not fit in the cross-section without changing the angled parking to parallel parking (angled parking requires an additional 8' of space on each side); in this case, **shared lane markings** would be recommended instead.

<sup>1</sup><http://ruralsdesignguide.com/physically-separated/separated-bike-lane>



# N

## MOCKSVILLE NORTH/SOUTH SPINE (CONTINUED)

### TRIP GENERATORS:

- Downtown Mocksville
- Rich Park
- Mocksville Elementary School
- Davie County Library
- South Davie Middle School
- Residential areas adjacent to the corridor

### SUPPORT IN OTHER PLANS:

- Connect Davie: Davie County Greenway Master Plan (2015)
- Davie County Comprehensive Transportation Plan (2012)

### POTENTIAL ROW NEEDS:

- None

### JURISDICTIONS:

- Town of Mocksville

### POTENTIAL PARTNERSHIPS:

- Town of Mocksville
- NCDOT
- Piedmont Triad Regional Council
- Businesses along the corridor

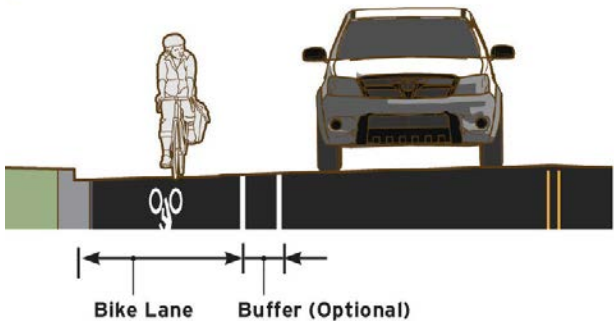
### ESTIMATED CONSTRUCTION COSTS:

- Est. base project cost: \$220,000
- Est. additional cost option 1: flexible posts in bicycle lane buffer: \$40,000
- Est. additional cost option 2: concrete median in bicycle lane buffer: \$460,000

### DESIGN OPTIONS AND CONSIDERATIONS:

Left: Existing conditions on N Main St/US 158, facing south towards Downtown Mocksville.

Right: Examples of visually separated bicycle lanes, using a painted buffer.



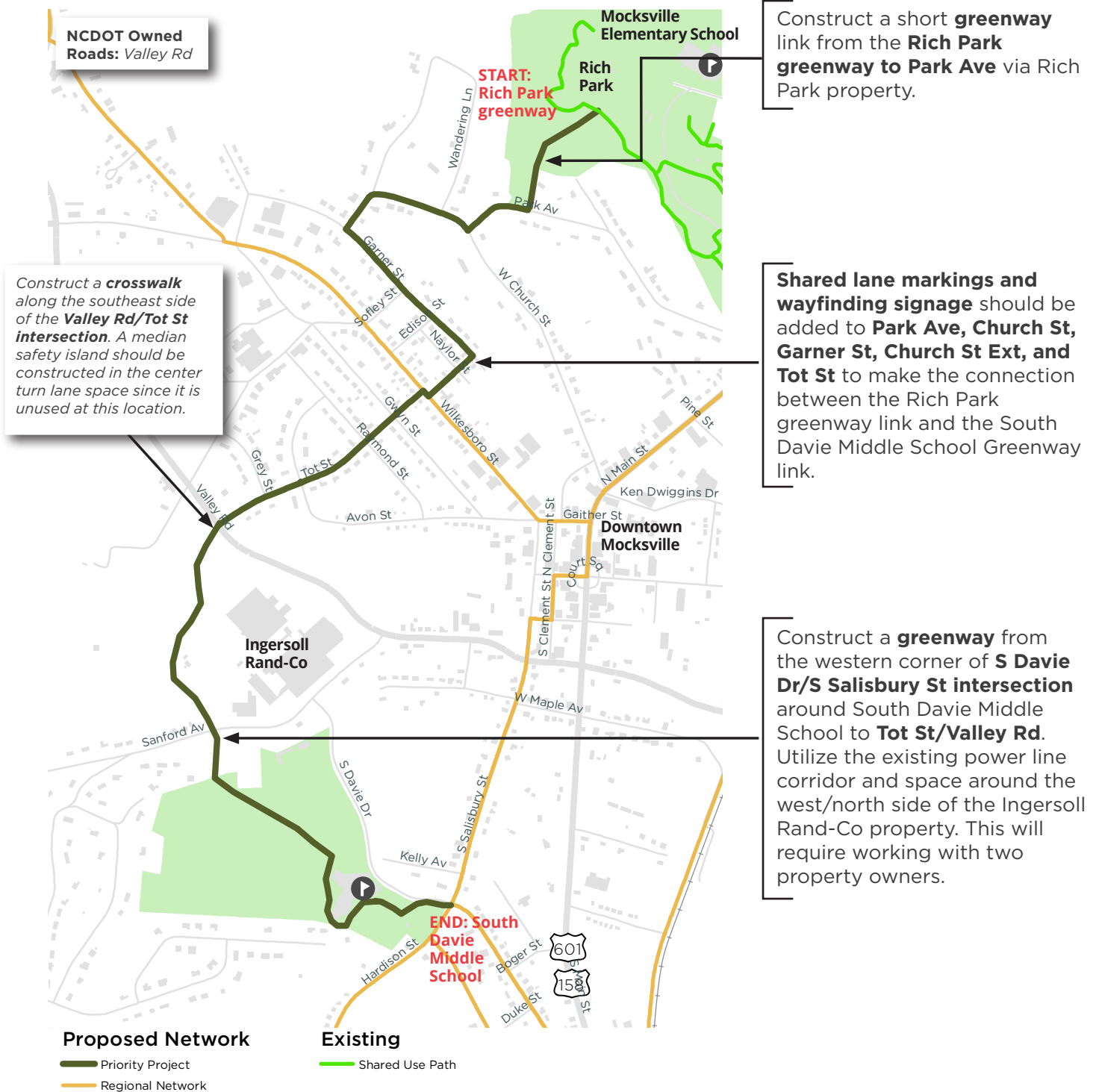


# MOCKSVILLE GREENWAY

**FROM:**  
Rich Park

**TO:**  
South Davie Middle School

**LENGTH:**  
2.4 Miles





## MOCKSVILLE GREENWAY (CONTINUED)

### TRIP GENERATORS:

- Rich Park
- Mocksville Elementary School
- South Davie Middle School
- Residential areas adjacent to the corridor

### SUPPORT IN OTHER PLANS:

- Connect Davie: Davie County Greenway Master Plan (2015)
- Davie County Comprehensive Transportation Plan (2012)

### POTENTIAL ROW NEEDS:

- ROW is needed for the greenway section between Valley Rd and South Davie Middle School

### JURISDICTIONS:

- Town of Mocksville

### POTENTIAL PARTNERSHIPS:

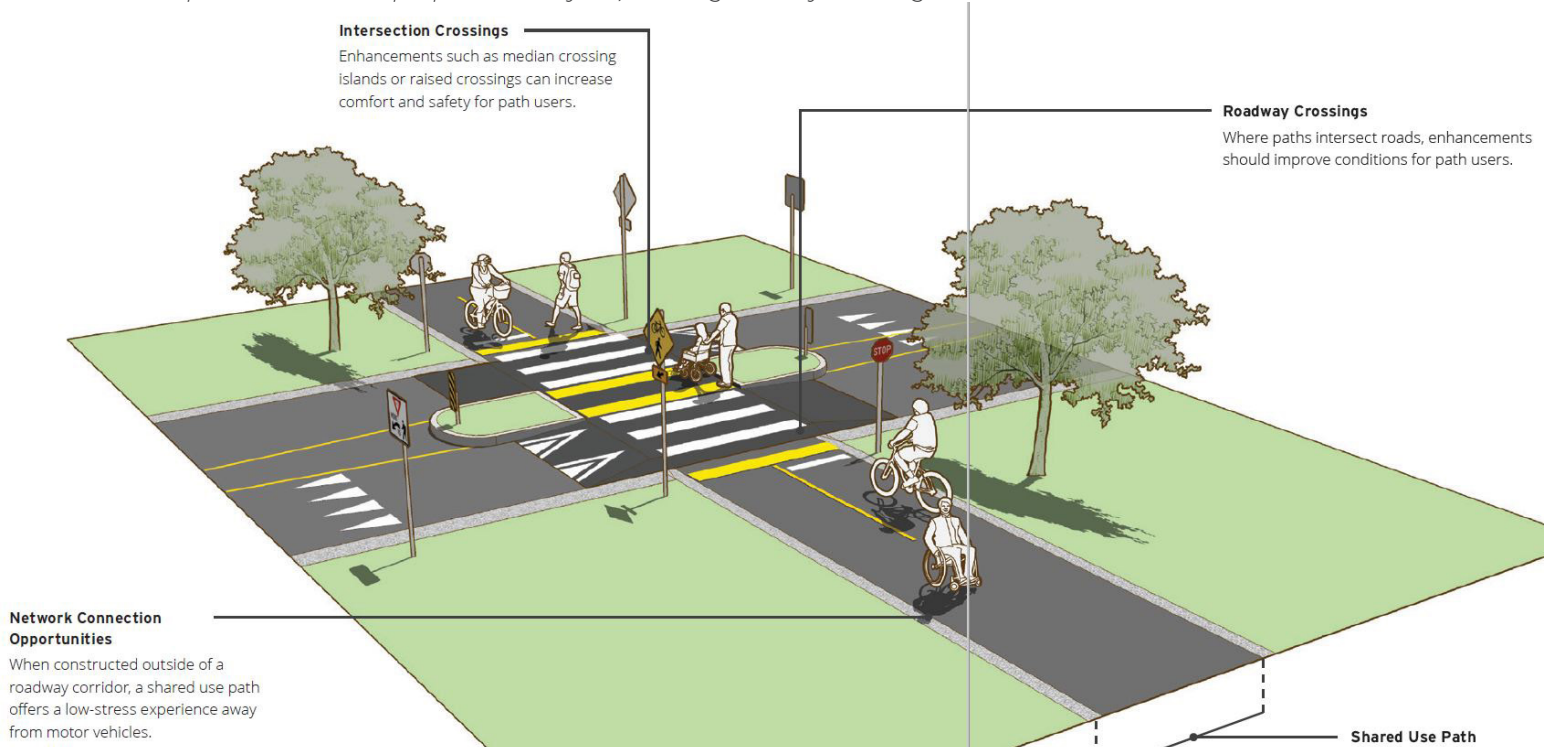
- Town of Mocksville
- NCDOT
- Piedmont Triad Regional Council

### ESTIMATED CONSTRUCTION COSTS:

- Est. base project cost: \$1,600,000

### DESIGN OPTIONS AND CONSIDERATIONS:

Roadway intersections are particularly important for the comfort of a bicyclists using a shared use path. See the graphic below from the Small Town and Rural Multimodal Network Design Guide for design elements that could be implemented at the proposed Valley Rd/Tot St greenway crossing in Mocksville.







# P MOCKSVILLE - DAVIE COUNTY COMMUNITY PARK LINK

## FROM:

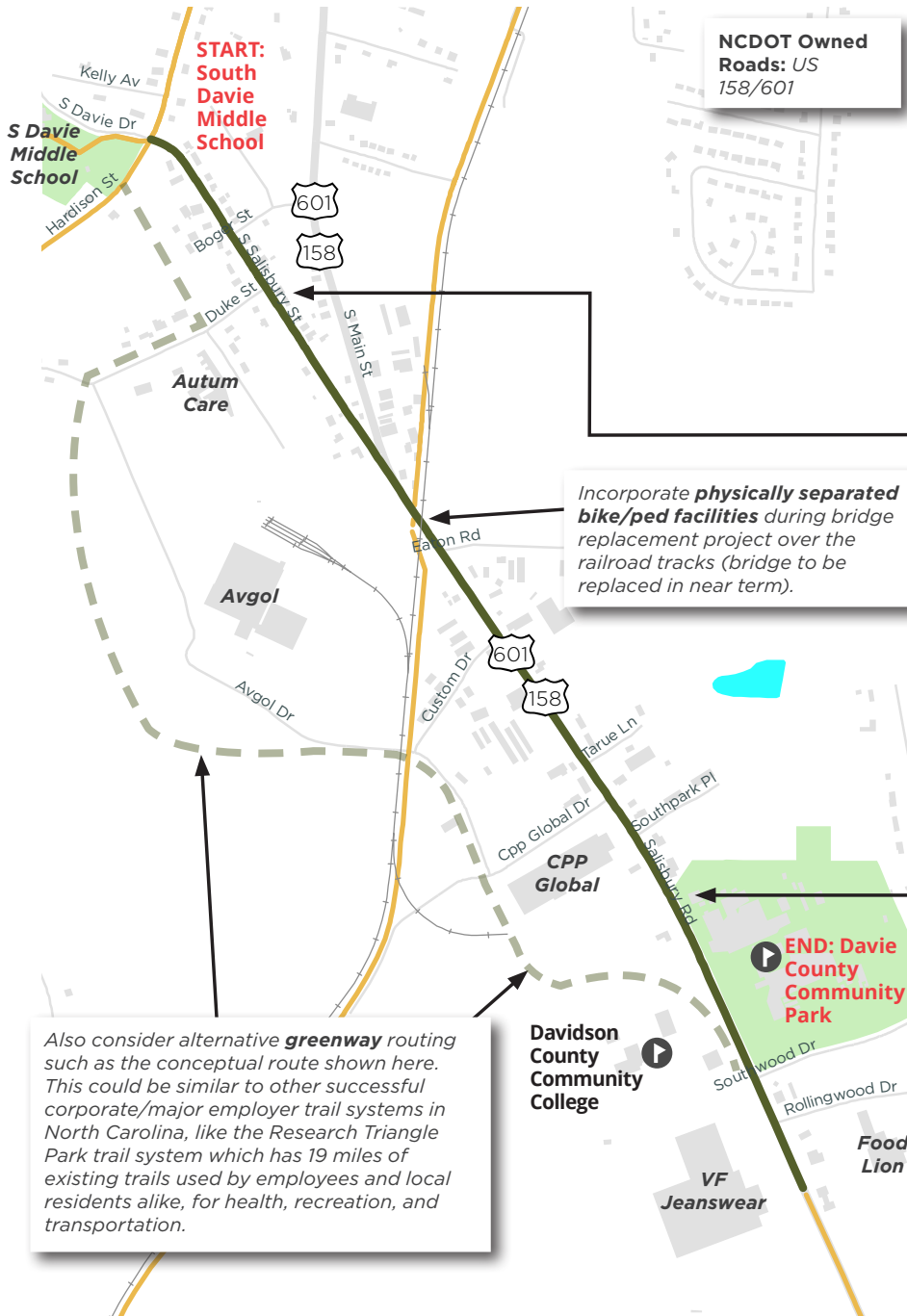
South Davie Middle School

## TO:

Davie Community Park

## LENGTH:

1.7 Miles



NCDOT Owned  
Roads: US  
158/601

Conduct a **feasibility study** for bicycle and pedestrian connectivity between South Davie Middle School and Davie County Community Park. Currently, the only existing bike/ped feature includes a sidewalk along the east side of Salisbury St from S. Davie Dr to US 158. Several considerations include, but are not limited to:

For the section of **S Salisbury north of US 158**, examine options for constructing a **sidepath or some combination of separated bike lanes/sidewalks**<sup>1</sup>. This will likely require additional ROW and moving utilities. There is no existing curb and gutter on the west side of the street.

The **US 158 section** carries traffic volumes of 15,000 AADT, a 45 mph speed limit, auto-oriented (and industrial) adjacent land use, three travel lanes (includes center-turn lane), and a 60' ROW. Significant investment will be needed to add physically separated walking and biking facilities along this corridor. Design should include a **sidepath or some combination of separated bike lanes/sidewalks**.

Also consider alternative **greenway** routing such as the conceptual route shown here. This could be similar to other successful corporate/major employer trail systems in North Carolina, like the Research Triangle Park trail system which has 19 miles of existing trails used by employees and local residents alike, for health, recreation, and transportation.

## Proposed Network

- Priority Project
- Regional Network

0 0.25 0.5 Miles



<sup>1</sup><http://ruralsdesignguide.com/physically-separated>

P

## DAVIE COUNTY COMMUNITY PARK LINK (CONTINUED)

### TRIP GENERATORS:

- South Davie Middle School
- Davidson County Community College
- Davie County Community Park
- Businesses along the corridor
- Residential areas adjacent to the corridor

### SUPPORT IN OTHER PLANS:

- Connect Davie: Davie County Greenway Master Plan (2015)
- Davie County Comprehensive Transportation Plan (2012)

### POTENTIAL ROW NEEDS:

- ROW likely needed for much of the corridor, depending on routing and design

### JURISDICTIONS:

- Town of Mocksville
- Davie County

### POTENTIAL PARTNERSHIPS:

- Town of Mocksville
- Davie County
- NCDOT
- Piedmont Triad Regional Council
- Businesses along the corridor
- A State Planning and Research (SPR) Grant application was submitted for this project in 2019

### ESTIMATED CONSTRUCTION COSTS:

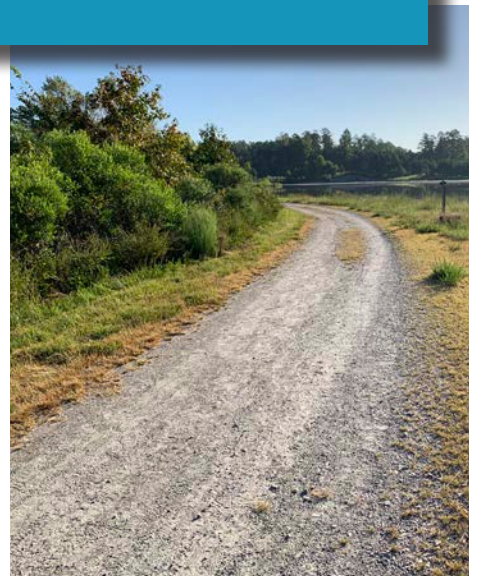
- Est. base project cost: \$2,100,000

### DESIGN OPTIONS AND CONSIDERATIONS:

*If a greenway trail alternative is pursued, the benefits to large employers along US 158 could be similar in nature to those seen for trail systems connecting business parks like the Research Triangle Park. That system uses mostly paved paths with safe roadway crossings, including some unpaved sections, as shown below.*

***“Building our network of trails is an essential investment that enables the Research Triangle Park to remain globally competitive by allowing us to attract the type of workers that companies want with amenities professional workers demand.”***

**- Liz Rooks, Former Executive Vice President of the Research Triangle Foundation**



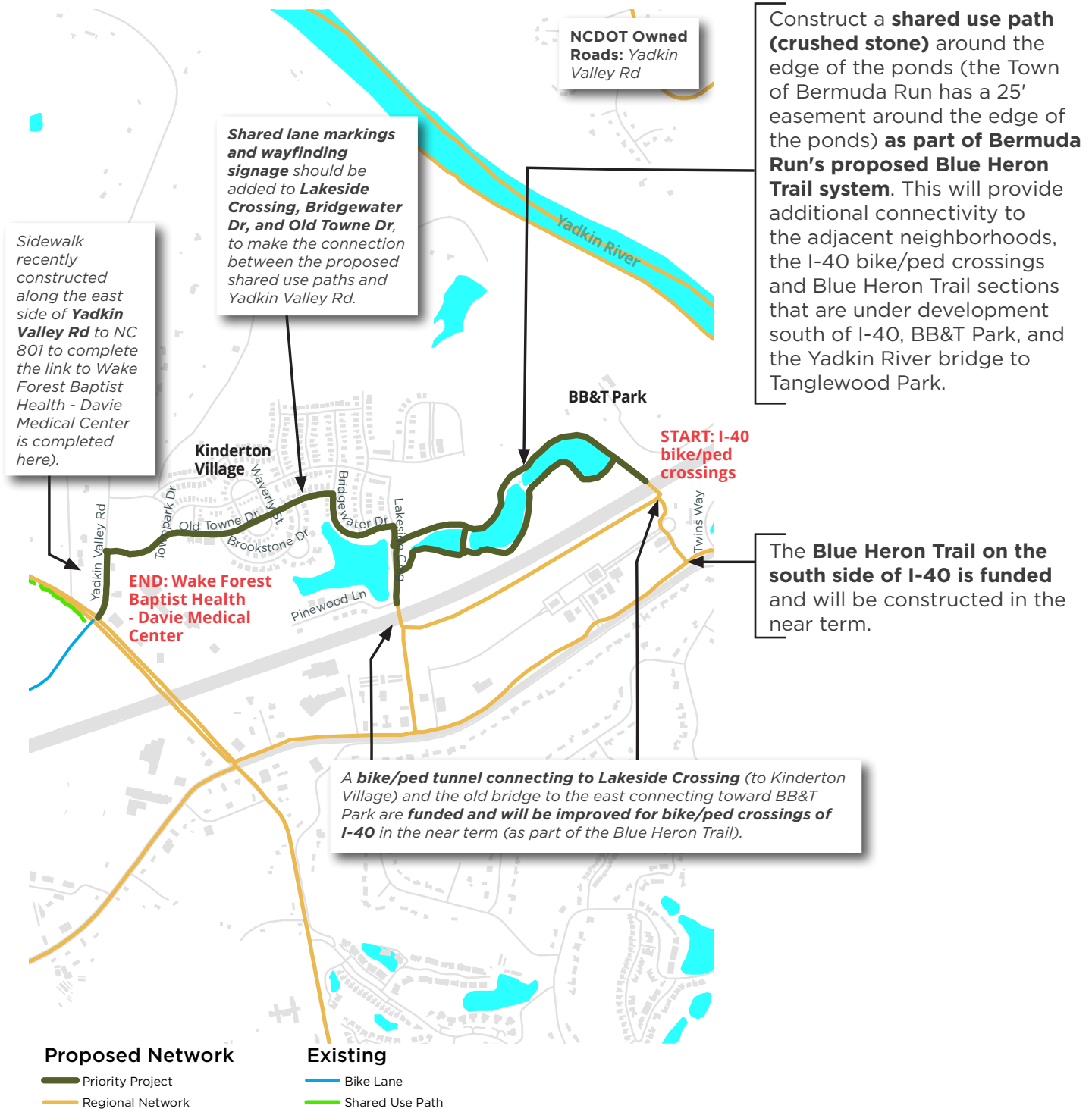


# Q BERMUDA RUN CIRCULATION

**FROM:**  
I-40 bike/ped crossings

**TO:**  
Davie Medical Center

**LENGTH:**  
2.4 Miles



0 0.25 0.5 Miles







# BERMUDA RUN CIRCULATION (CONTINUED)

## TRIP GENERATORS:

- Wake Forest Baptist Health - Davie Medical Center
- Businesses on both sides of I-40 as well as NC 801 and US 158
- Bermuda Run Ponds
- Residential areas adjacent to the corridor

## SUPPORT IN OTHER PLANS:

- Connect Davie: Davie County Greenway Master Plan (2015)
- Town of Bermuda Run Trail System Master Plan (2017)
- Comprehensive Plan - Town of Bermuda Run (2017)

## JURISDICTIONS:

- Town of Bermuda Run
- Davie County

## POTENTIAL PARTNERSHIPS:

- Town of Bermuda Run
- Davie County
- Wake Forest Baptist Health - Davie Medical Center
- NCDOT
- Piedmont Triad Regional Council
- Businesses along the trail system

## ESTIMATED CONSTRUCTION COSTS:

- Est. base project cost: \$2,000,000

## POTENTIAL ROW NEEDS:

- None

## DESIGN OPTIONS AND CONSIDERATIONS:

The image below is from the Town of Bermuda Run Trail System Master Plan. It identifies the proposed Blue Heron Trail, much of which is currently under development.





# R BERMUDA RUN TO CLEMMONS

## FROM:

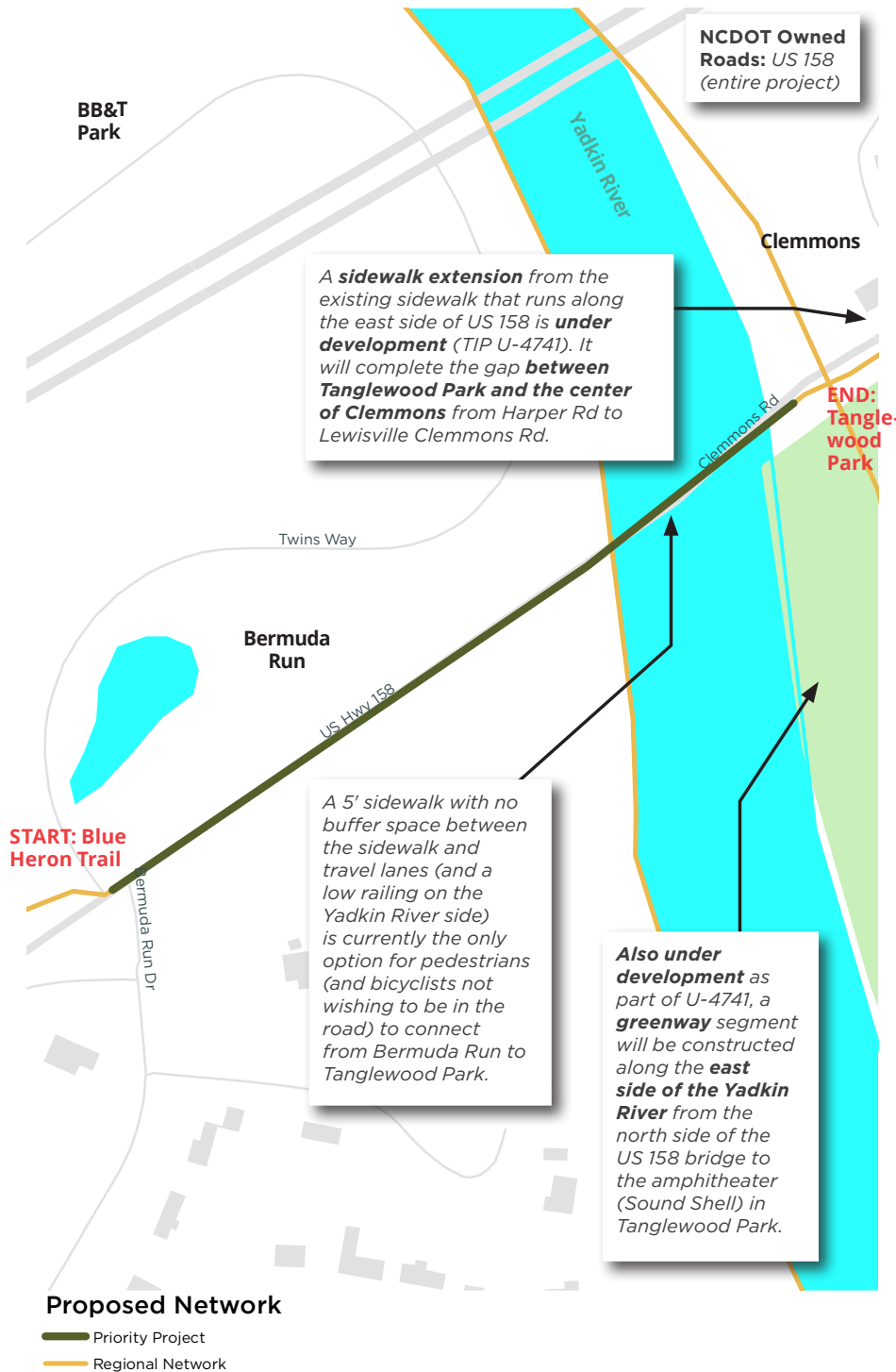
Blue Heron Trail

## TO:

Tanglewood Park

## LENGTH:

0.4 Miles



With a greenway segment under development from the northeast side of the US 158 bridge to the amphitheater in Tanglewood Park (along the Yadkin River), as well as the Blue Heron Trail that is under development in Bermuda Run just southwest of the bridge, **reconfiguring the US 158 bridge to safely accommodate bicyclists and pedestrians will fill a key gap between Bermuda Run and Tanglewood Park/Clemmons.**

From Bermuda Run heading northeast, US 158 is a two lane road that transitions to a four lane cross-section upon entering the bridge over the Yadkin River. With a total bridge width of 66'. The travel lanes and the median striping cover 61' of pavement. Traffic volumes along the bridge are 16,000 AADT. To safely accommodate bicyclists (and pedestrians), consider two reconfiguration options:

**Option 1 (Ideal option):** Remove one of the north bound travel lanes. This would allow space for a **12' two-way separated bikeway** (adjacent to the 5' sidewalk), 11' buffer space, and 38' for the three travel lanes (two lanes in the south bound direction, one in the north bound direction).

**Option 2:** Narrow the four travel lanes to 11' each, allowing space for an **8' two-way separated bikeway** (adjacent to the 5' sidewalk), and a 9' buffer space.

# R

## BERMUDA RUN TO CLEMMONS & TANGLEWOOD PARK (CONTINUED)

### TRIP GENERATORS:

- Tanglewood Park
- Bermuda Run developing trail system
- BB&T Park
- Yadkin River
- Residential areas adjacent to the corridor

### SUPPORT IN OTHER PLANS:

- Connect Davie: Davie County Greenway Master Plan (2015)
- Winston-Salem Urban Area Comprehensive Transportation Plan (2012)

### POTENTIAL ROW NEEDS:

- None

### JURISDICTIONS:

- Town of Bermuda Run
- Davie County
- Village of Clemmons
- Forsyth County

### POTENTIAL PARTNERSHIPS:

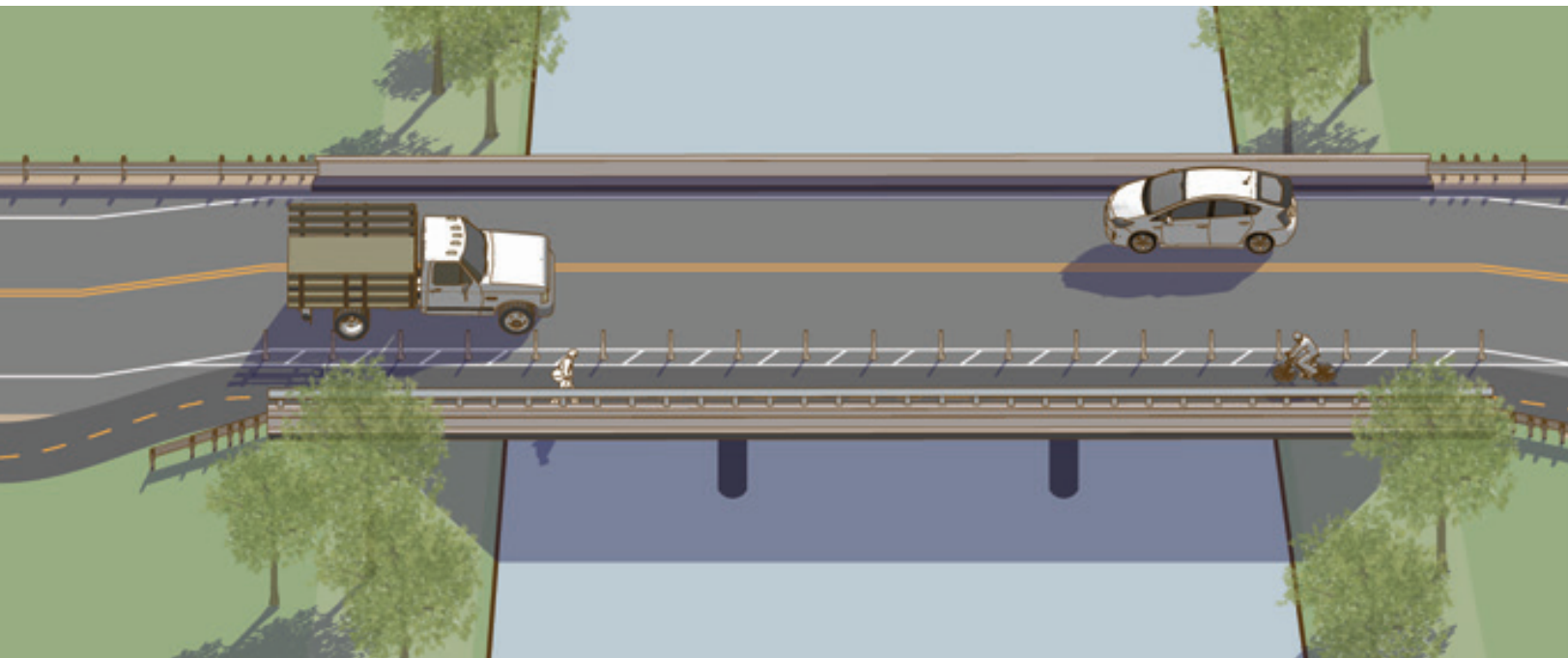
- Town of Bermuda Run
- Davie County
- Village of Clemmons
- Forsyth County
- NCDOT
- Piedmont Triad Regional Council

### ESTIMATED CONSTRUCTION COSTS:

- Est. base project cost: \$320,000

### DESIGN OPTIONS AND CONSIDERATIONS:

*Bridges - On Deck Sidepath: The Blue Heron Trail in Bermuda Run could be connected to Tanglewood Park via a sidepath on the deck of the US 158 bridge. The image below, from the Small Town & Rural Multimodal Networks design guide shows a bridge reconfiguration that creates space for a physically separated sidepath (see pages 5-19 to 5-26 of the Small Town and Rural Multimodal Networks design guide for further information on bicycle facilities on bridges. Image below is from page 5-22)*



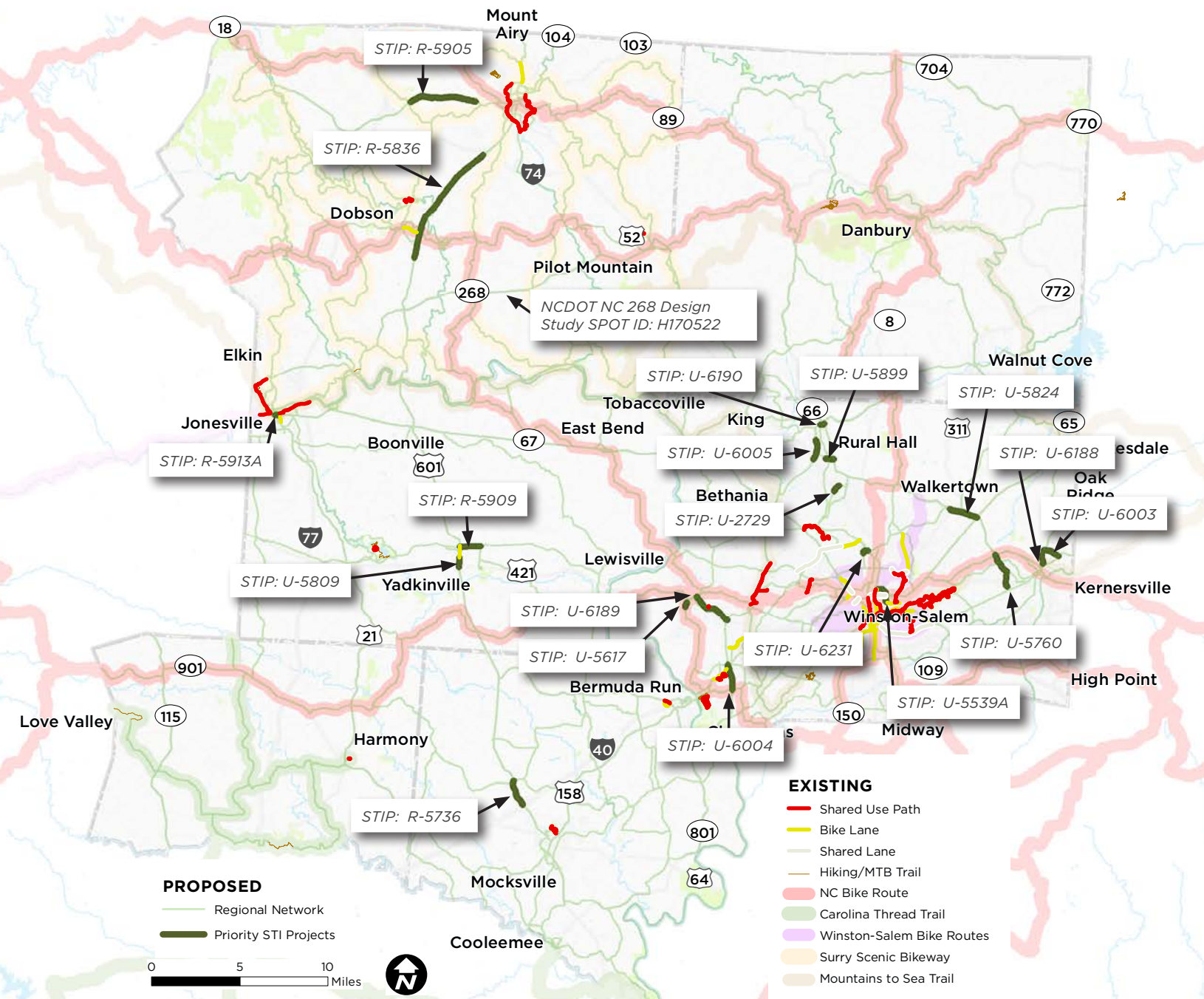




# COMPLETE STREET STI PROJECTS

As the region continues to expand, multiple roadway corridors are scheduled to be constructed or widened in the coming years. It is critical to incorporate bicycle (and pedestrian) facilities that are physically separated from the roadway, as these are all higher traffic volume/higher speed thoroughfares, as part of the design of these projects.

The corridors highlighted in dark green are committed projects included in the 2020-2029 STIP.



## COMPLETE STREET STI PROJECTS (CONTINUED)

### TRIP GENERATORS:

- Mount Airy
- Dobson
- Boonville
- East Bend
- Yadkinville
- Lewisville
- Mocksville
- Clemmons
- Rural Hall
- Walkertown
- Kernersville

### SUPPORT IN OTHER PLANS:

- Winston-Salem Urban Area CTP (2012)
- Walk/Bike NC (2013)

### POTENTIAL ROW NEEDS:

- ROW will need to be acquired for most roadway widening projects

### JURISDICTIONS:

- Municipal & County Partners

### POTENTIAL PARTNERSHIPS:

- Municipal & County partners
- NCDOT

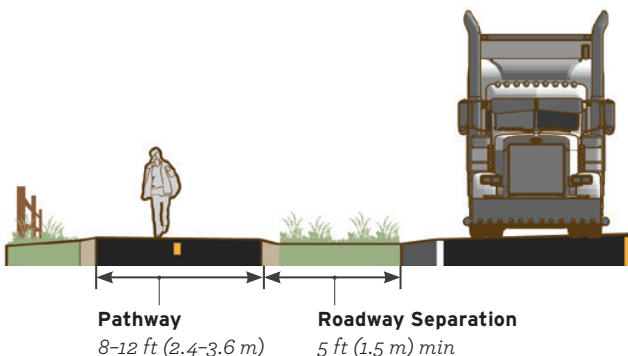
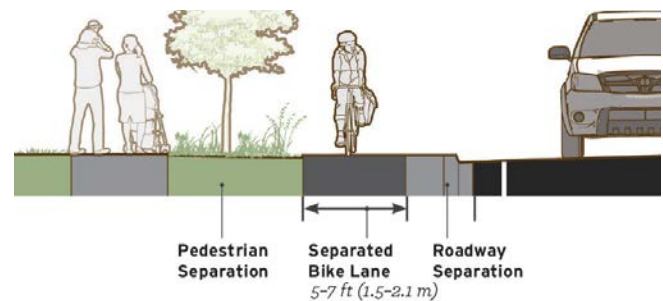
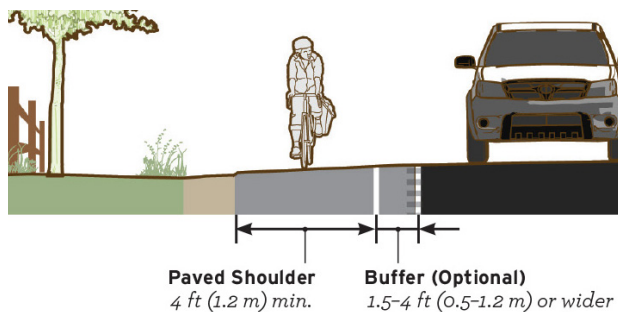
### ESTIMATED CONSTRUCTION COSTS:

- Projects to be completed with roadway construction/reconstruction

## DESIGN OPTIONS AND CONSIDERATIONS:

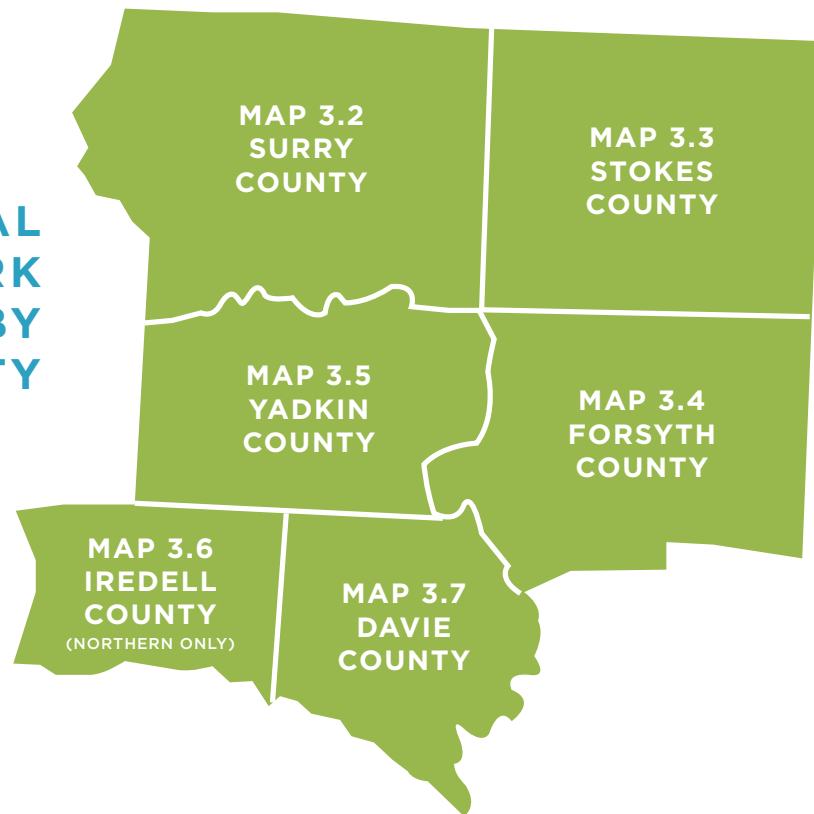
Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics below from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruralsdesignguide.com/physically-separated>.

While less ideal, construction of paved shoulder can be a significant improvement for bicycle and motorist safety and comfort. Sometimes geographical and/or financial constraints can limit design options. Further detail regarding options for paved shoulder enhancements such as buffer space and bicycle friendly rumble strips can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruralsdesignguide.com/visually-separated/paved-shoulder>.





## REGIONAL NETWORK MAPS BY COUNTY



### MAPS 3.2-3.7 REGIONAL NETWORK COUNTY MAPS

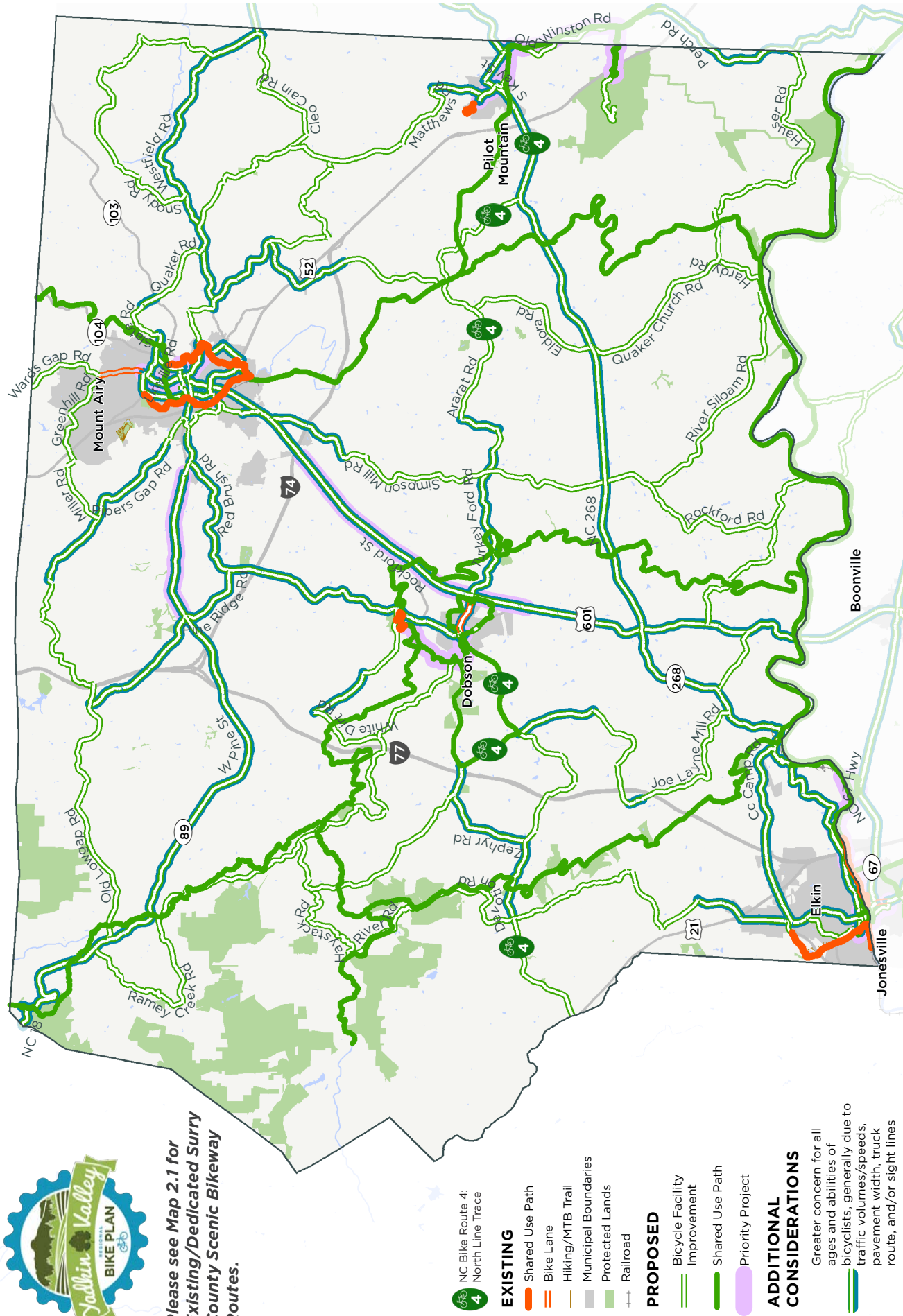
As priority projects are completed, this plan should be updated to include new priorities, drawing upon the larger regional network of recommendations. These routes and recommendations are shown on the county-level and strategically build upon the project cutsheets. These longer-term recommended bikeway and greenway projects may also be incorporated into future roadway resurfacing, construction, and development projects.



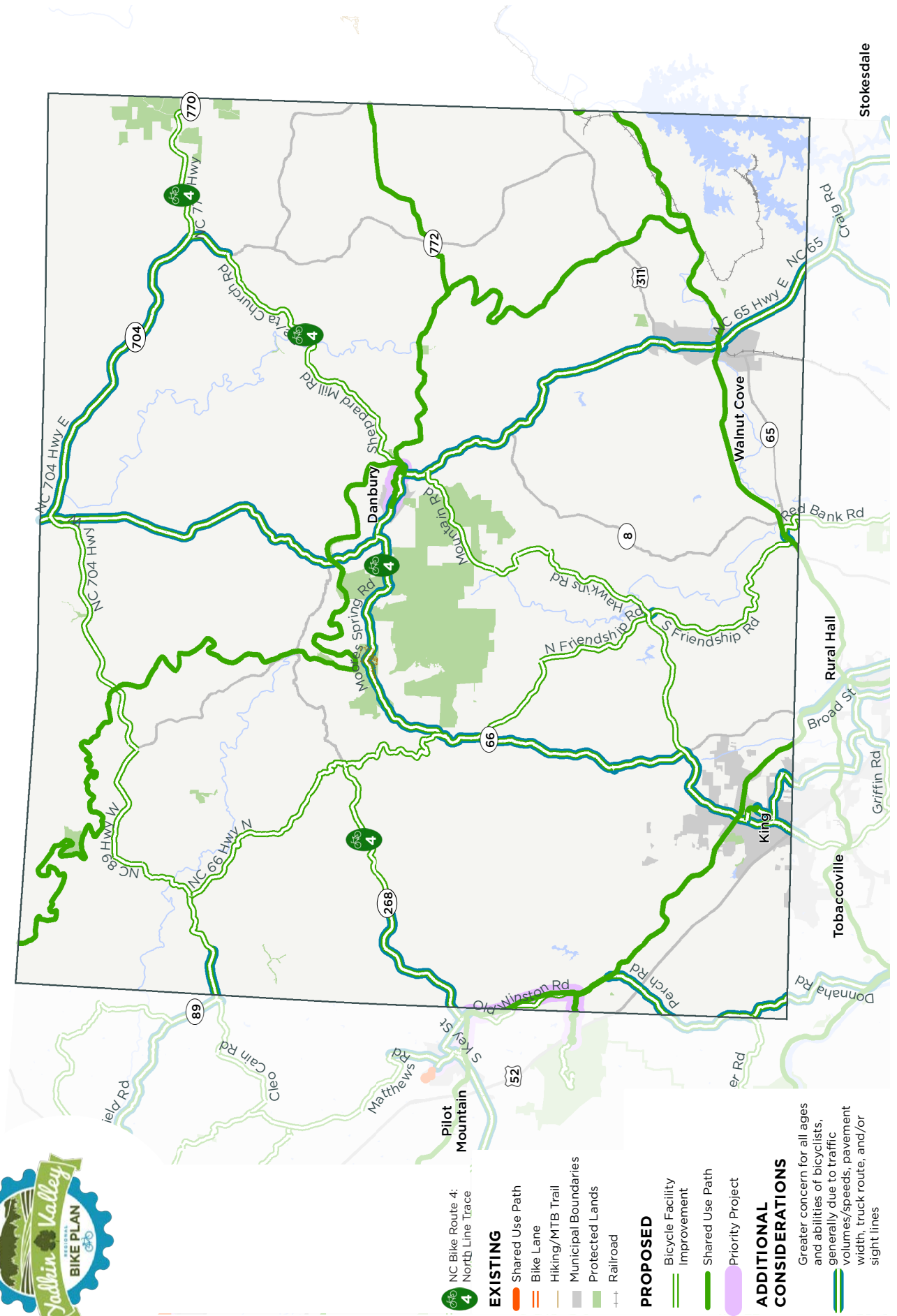
# MAP 3.2 - REGIONAL NETWORK BY COUNTY: SURRY COUNTY



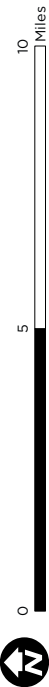
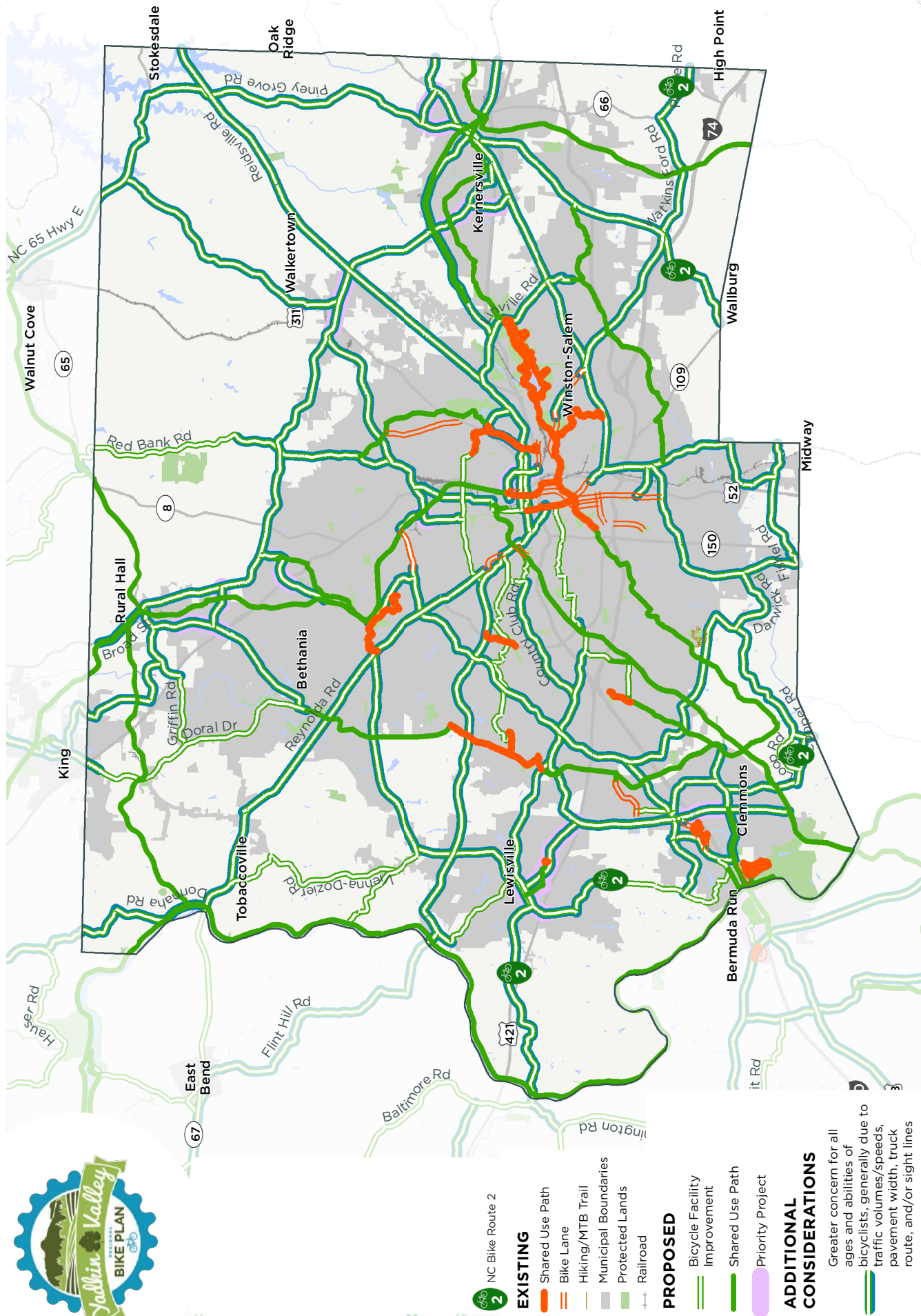
Please see Map 2.1 for Existing/Dedicated Surry County Scenic Bikeway Routes.



# MAP 3.3 - REGIONAL NETWORK BY COUNTY: STOKES COUNTY

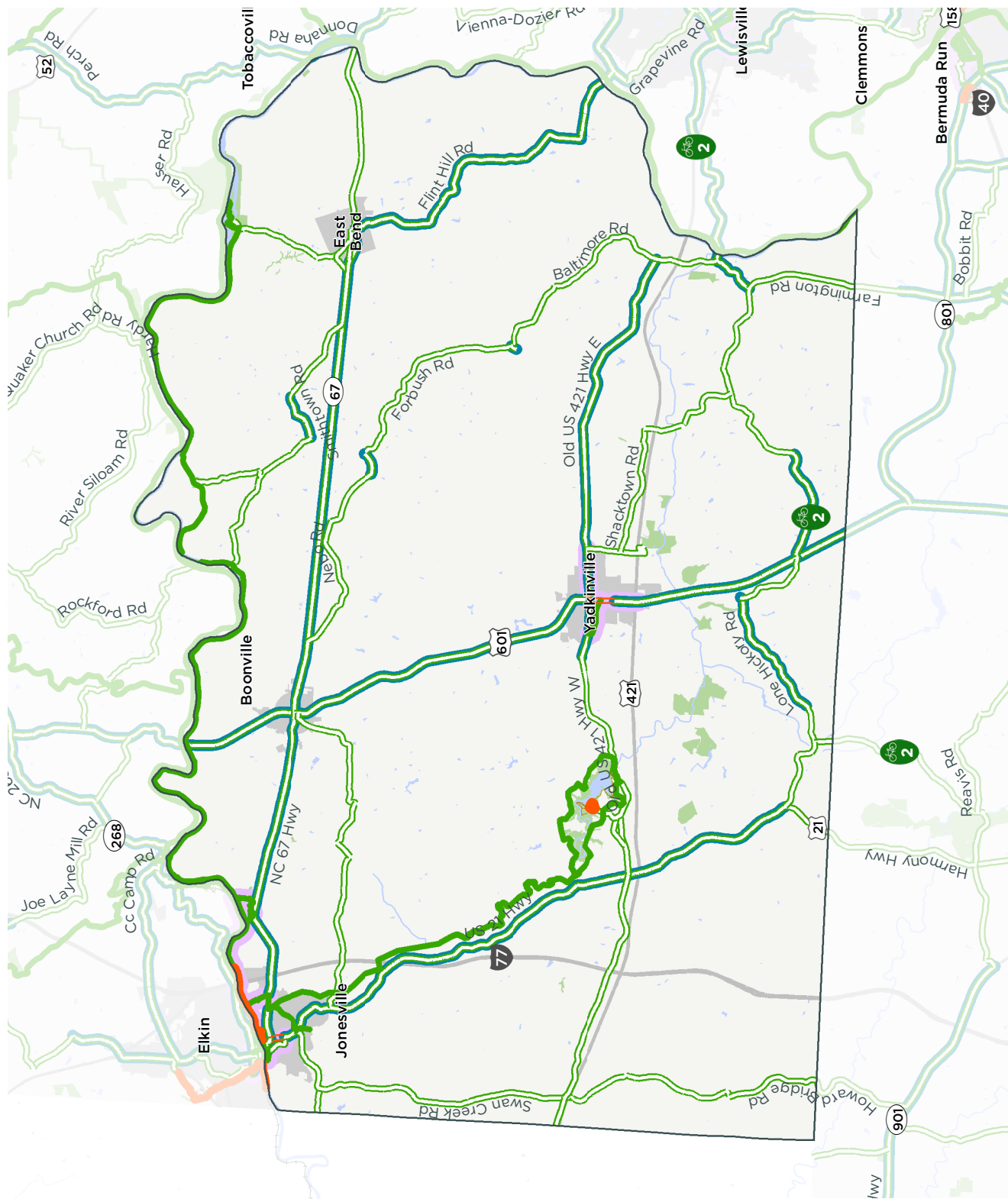


MAP 3.4 - REGIONAL NETWORK BY COUNTY: FORSYTH COUNTY





# MAP 3.5 - REGIONAL NETWORK BY COUNTY: YADKIN COUNTY



NC Bike Route 2

## EXISTING

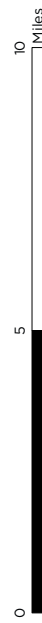
- Shared Use Path
- Bike Lane
- Hiking/MTB Trail
- Municipal Boundaries
- Protected Lands
- Railroad

## PROPOSED

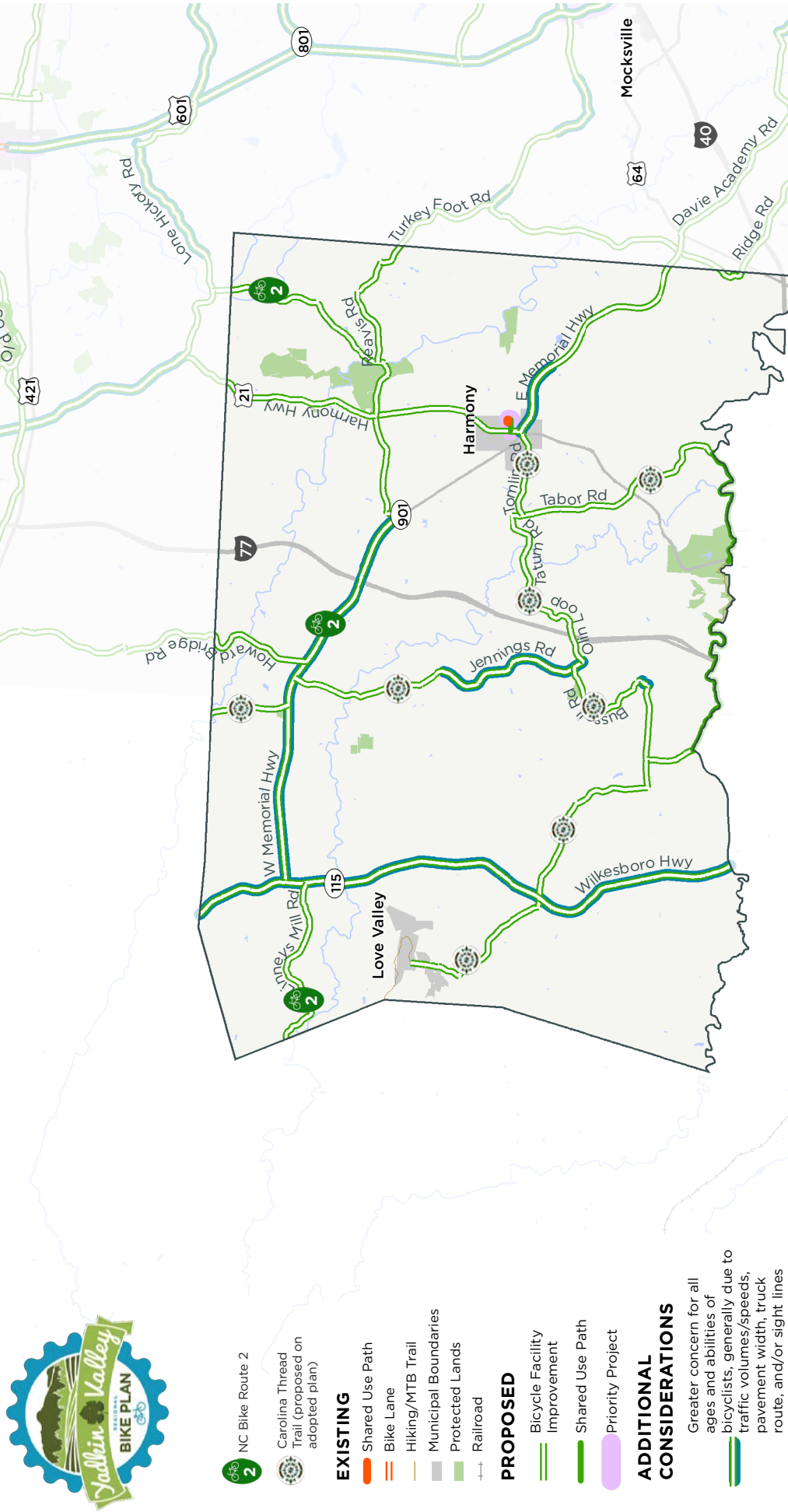
- Bicycle Facility Improvement
- Shared Use Path
- Priority Project

## ADDITIONAL CONSIDERATIONS

Greater concern for all ages and abilities of bicyclists, generally due to traffic volumes/speeds, pavement width, truck route, and/or sight lines



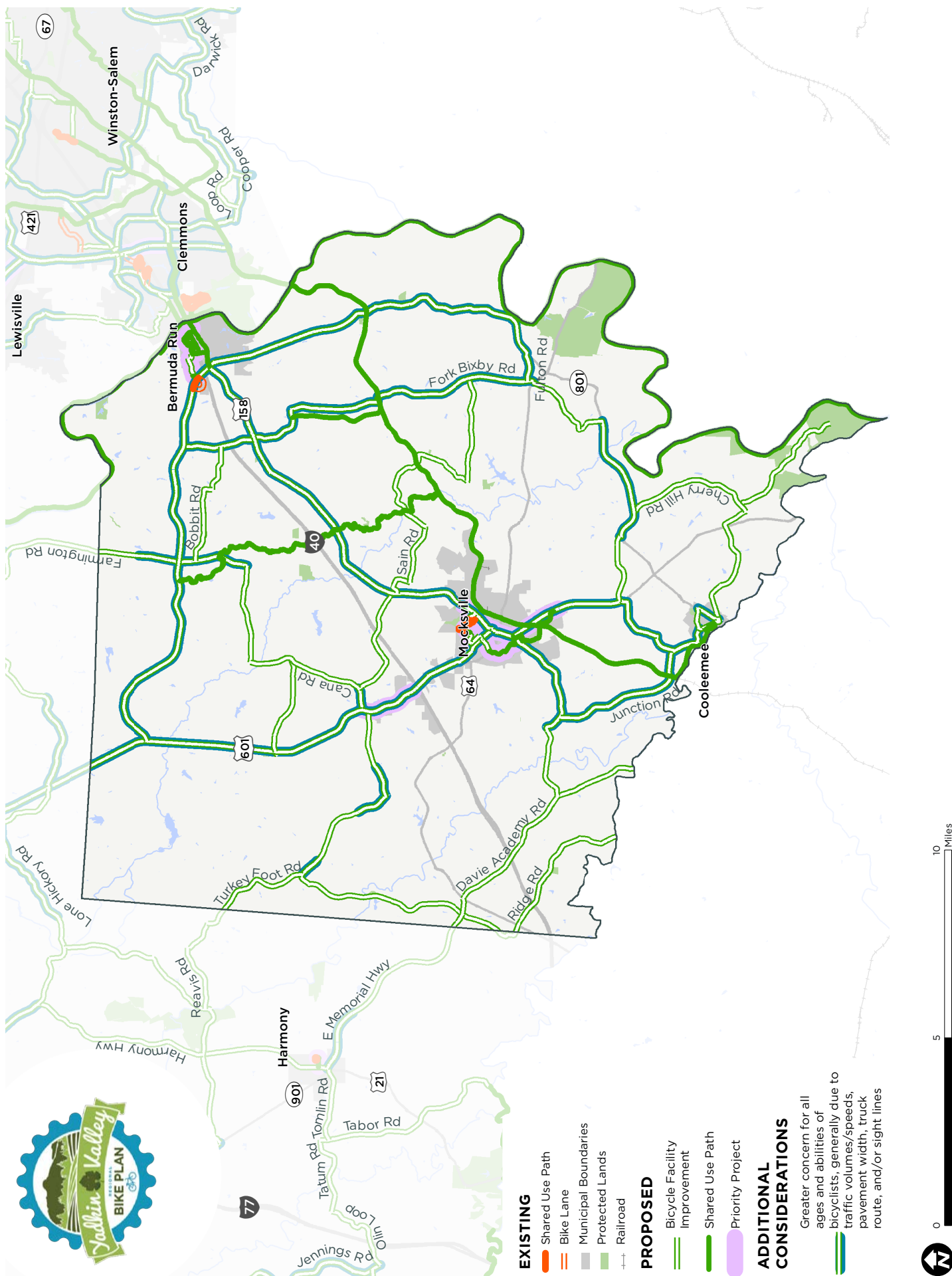
MAP 3.6 - REGIONAL NETWORK BY COUNTY: IREDELL COUNTY



**ADDITIONAL CONSIDERATIONS**

Greater concern for all ages and abilities of bicyclists, generally due to traffic volumes/speeds, pavement width, truck route, and/or sight lines

### MAP 3.7 - REGIONAL NETWORK BY COUNTY: DAVIE COUNTY





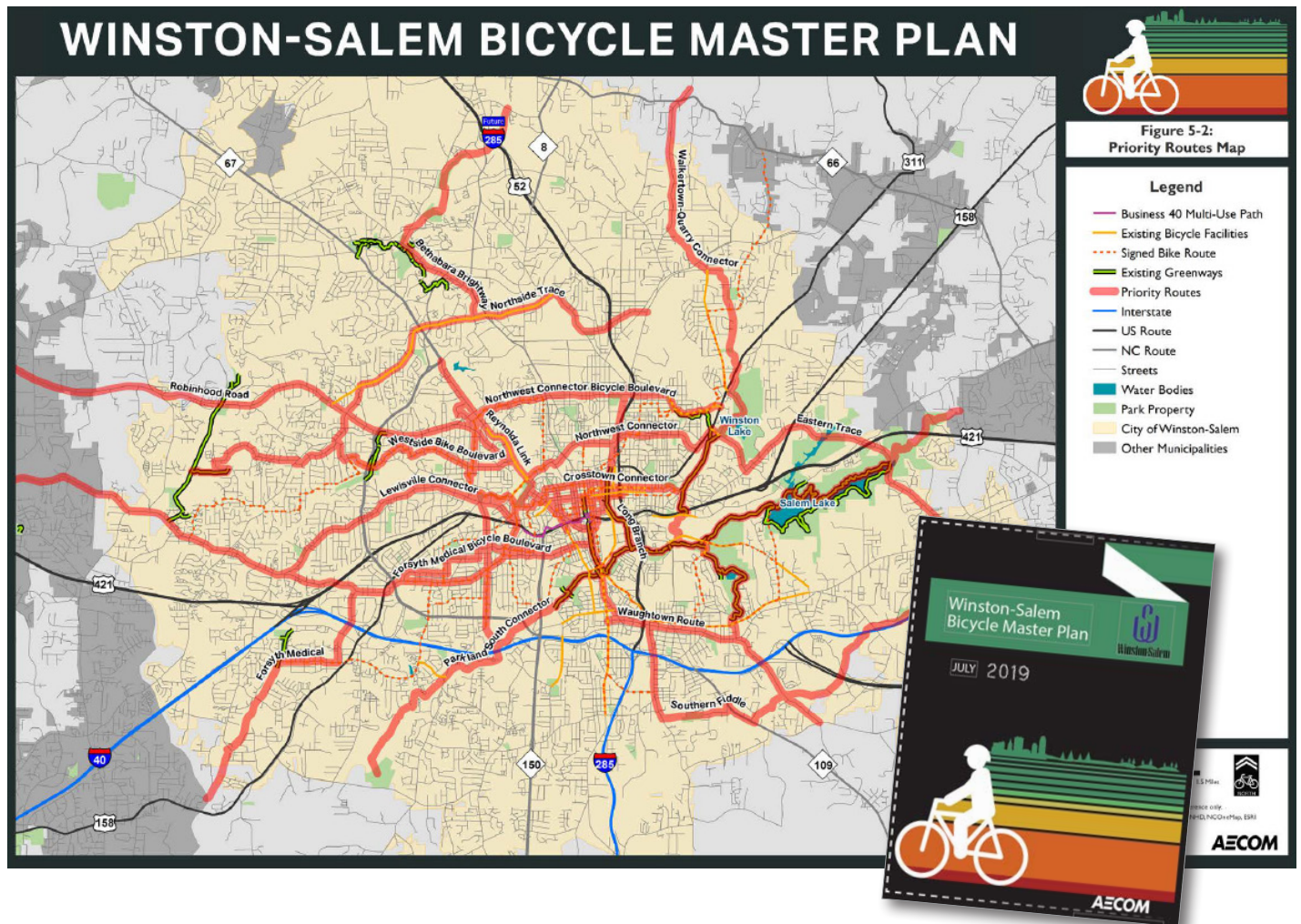
## HIGH PRIORITY PROJECTS IN WINSTON-SALEM

In 2019, 17 high priority bicycle projects were identified in the Winston-Salem Bicycle Master Plan. The prioritization process for these projects included input from public meetings, surveys, gap analysis, social equity considerations, and results from a demand model. The priority routes are listed below in the order of north to south and west to east:

1. Northside Trace
2. Robinhood Road
3. Northwest Connector
4. Westside Bike Boulevard
5. Eastern Trace

6. CrossTown Connector
7. Lewisville Connector
8. Parkland South Connector
9. Southern Fiddle
10. Bethabara Brightway
11. Walkertown Quarry Connector
12. Reynolda Link
13. Long Branch
14. Forsyth Medical
15. Forsyth Tech Connector
16. Waughtown Route
17. Downtown Connector

These routes are shown on Figure 5-2 of the Winston-Salem Bicycle Master Plan, available at: <http://www.ci.winston-salem.nc.us/departments/transportation/biking/bike-plan>

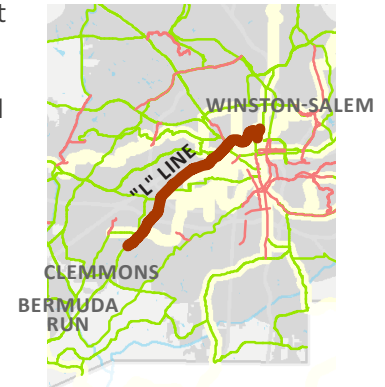




# "L"-LINE RAIL TRAIL (OR RAIL WITH TRAIL) POTENTIAL IN WINSTON-SALEM

The Norfolk Southern railroad line ("L" Line) that runs from the northern part of downtown Winston-Salem (Winston Junction) to Clemmons is currently inactive. This section has been inactive for approximately 20 years, and will likely remain inactive in the near term. Major capital improvements to the rail corridor would be needed to reactivate rail service.

In this section of southwest Winston-Salem where bicycling (and walking) opportunities are limited by automobile-oriented development including high traffic volume/high speed roadways such as Stratford Rd/US 158, US 421, NC 67, and I-40, utilizing this corridor for a walking/biking trail would provide immense value to the network by separating trail users from roadway traffic and utilizing the relatively flat grade of the rail corridor. Regionally, this can be a key connection opportunity between downtown Winston-Salem and Clemmons. If implemented, this trail would become a key component of the local transportation network while also serving as a local and regional destination.



Above: The inactive section of the "L" Line in Winston-Salem

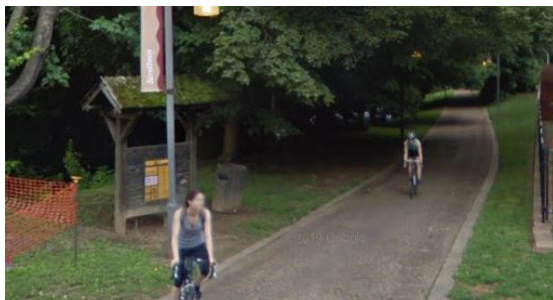
When examining trail development along this corridor, two-options should be considered and would require an agreement with Norfolk Southern, the owner of the rail line.

## RAIL TRAIL:

If rail service is not reactivated, a rail trail conversion would involve the removal of the existing railroad tracks and constructing a paved shared use path on the center of the existing rail bed, similar to the Strollway and Long Branch Trail in Winston-Salem.

## RAIL WITH TRAIL:

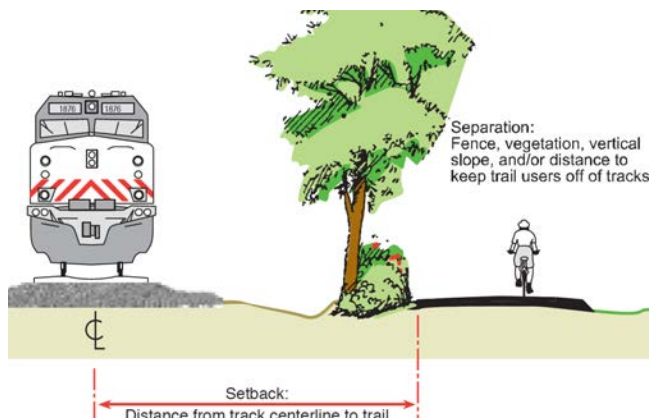
If rail service were to be reactivated (or the possibility preserved), this option would entail developing a trail within the railroad ROW but separated and parallel to the existing railroad tracks. This could be accomplished whether or not rail service is activated in the future.



Above: Rail Trail example in Winston-Salem (The Strollway), Google Street View



Left: Rail with Trail example in Charlotte, NC (Charlotte Rail Trail), Google Street View



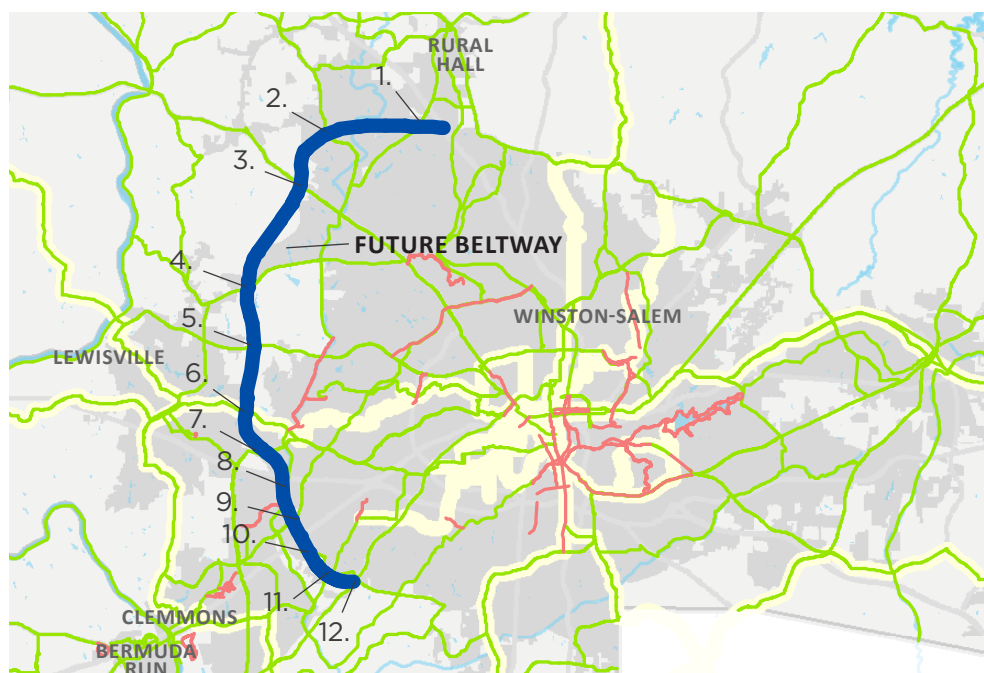
Left: From page 47 of the USDOT "Rails with Trails: Best Practices and Lessons Learned" (2020) report. Setback is the distance between the edge of a rail-with-trail and the centerline of the closest active railroad track. The range of setback on existing rails-with-trails varies considerably, from seven to 200 feet, with an average of approximately 32 feet (based on a sample size of 78). A comparison of rail-with-trail setback with both train speed and frequency reveals little correlation, with some trails reporting a narrow setback existing along high speed and frequently traveled rail lines.

# WINSTON-SALEM BELTWAY COORDINATION

The future segments of the Winston-Salem Northern Beltway to be constructed will take place over the next decade from the northern side of Winston-Salem to the west and southwest sides of Winston-Salem. As it is constructed, it is important to consider bicycle accommodations at crossing points from this regional network (and the recently completed Winston-Salem Bicycle Plan). This includes ensuring space for sidepaths or bike lanes/sidewalk combinations under bridges that are constructed over roadways, or ensuring space for greenways at future bridge locations over locations where greenways are proposed.

Locations where the recommended regional network from this plan intersects with the future Beltway project are listed below and on the map at the bottom of the page:

1. Bethania-Rural Hall Rd
2. Bethania-Tobaccoville Rd
3. Reynolda Rd/NC 67
4. Yadkinville Rd
5. Robinhood Rd
6. Shallowford Rd
7. Phillips Bridge Rd
8. Proposed Muddy Creek Greenway (between Phillips Bridge Rd & Springfield Farm Rd)
9. S Peace Haven Rd
10. McGregor Rd
11. Proposed greenway between Jonestown Rd and Stratford Rd
12. Proposed greenway along inactive L-Line railroad corridor







Public outreach for the Yadkin Valley Regional Bike Plan in Elkin, NC (photo: Alta)





# PROGRAM STRATEGIES

*The program recommendations in this chapter focus on attracting new cyclists from within the Yadkin Valley region as well as tourists from outside the region while creating a safer environment for all.*

## OVERVIEW

Bicycle infrastructure—bike lanes, trails, bike routes and other physical enhancements—certainly attract more cyclists and help create a safer environment. Just as important for promoting bicycling, however, are **education, encouragement, enforcement and engineering**. Both cyclists and motorists need to understand how to interact safely on roadways so everyone benefits. Regular evaluation of how the plan is working aids fine-tuning and improvements as the plan is implemented. Fortunately, these program elements require much less investment and can be started right away.

## EDUCATION

### EDUCATION STRATEGY ONE

**Purpose:** To educate cyclists of all ages as well as motorists on rules of the road and how to ride and interact safely. Develop on-going programs to educate cyclists at different age and ability levels

**Audience:** Cyclists of all ages; motorists

**Partners:** Schools, recreation departments, bicycle clubs, civic organizations, youth-oriented groups

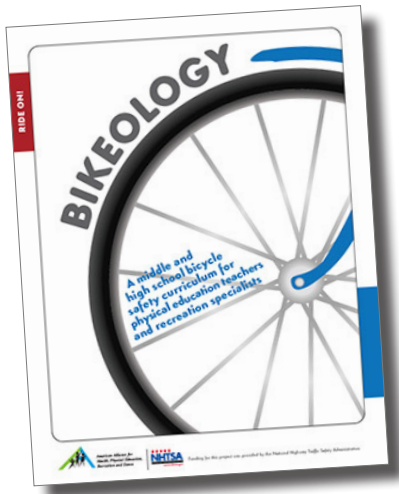
#### **For Young Children:**

Bike rodeos can introduce children to riding skills, but children need more practice for the skills to become automatic. Teaching children proper bicycling skills when they're young and learning to ride establishes a sound foundation for their enjoyment and safety. It also

prepares them for eventually learning to drive a motor vehicle because most of the laws are the same. Bicycling not only develops their physical skills but also trains their brains in spatial reasoning and how to constantly monitor and adjust to their surroundings. The Netherlands requires all students at about 10 years of age to learn how to bicycle safely. As a result, the country has a high percentage of the population that bikes while maintaining a low rate of bicycle-motor vehicle crashes.

North Carolina has its own special curriculum for students in kindergarten through fifth grade: **Let's Go NC! A Pedestrian and Bicycle Safety Skills Program for Healthy, Active Children**. The curriculum is separated into three teaching levels: K-1, grades 2-3 and grades 4-5. Endorsed by the North Carolina Division of Public Instruction, these lessons are frequently taught as part of physical education classes or after-school programs. Lessons can also be offered through Scout troops or other youth-oriented organizations. The entire curriculum—including lesson plans, handouts, videos and parent tip sheets—is available online at no charge: <https://connect.ncdot.gov/projects/BikePed/Pages/LetsGoNC.aspx> (Please note: Link asks for user name & password, but clicking on "Cancel" opens the website.) For teachers whose schedules don't allow for five lessons per grade, condensed lessons are available.

Putting the students on bicycles for practice is essential, although one teacher uses scooters. **The National Cycling Center** in Winston-Salem has trailers with bikes and helmets that can travel from school to school so that students have good bicycles to use in class.



### For Older Children

A different curriculum was developed at the national level for older students by the National Highway Traffic Safety Administration (NHTSA) and the Society for Health and Physical Education (SHAPE). **Bikeology**, designed for middle and high school students, covers the basics taught through Let's Go NC!, but broadens the lessons to include bicycle mechanics and maintenance. This curriculum can also be offered in physical education classes or through other organizations serving older children. The curriculum is free and also includes parent information:

- Bikeology curriculum part 1 and part 2 (This is called "Unit 4" on the website.) (SHAPE America)
  - <http://www.shapeamerica.org/publications/resources/teachingtools/qualitytype/upload/bikeology-curriculum-part1-v2.pdf>
  - <http://www.shapeamerica.org/publications/resources/teachingtools/qualitytype/upload/bikeology-curriculum-part2.pdf>
- Bikeology guide for parents (SHAPE America): <http://www.shapeamerica.org/publications/resources/teachingtools/qualitytype/upload/bikeology-parent-guide.pdf>

### For Adults:

Because adults are more dispersed and therefore more difficult to reach, several different approaches are needed to educate cyclist and adult motorists about bicyclists' rights and responsibilities as well as how motorists should safely interact with cyclists. Here are three suggestions:

1. **Print materials about cycling:** Brochures about cycling safely and interacting with motorists can inform citizens and improve safety. These brochures should be made available on city/county/regional websites with printed versions available, such as this one from Winston-Salem: <https://nc-winston-salem.civicplus.com/DocumentCenter/View/2238/Bike-Safety-Brochure-PDF>
2. **Courses for adult cyclists:** The League of American Bicyclists provides a list of trained and certified instructors in North Carolina who can offer different levels of bicycling workshops for adults in the area. These courses could be offered through local parks and recreation centers or at area schools. <https://www.bikeleague.org/bfa/search/map/NorthCarolina?bfaq=North%20Carolina>
3. **Print materials for motorists:** The League of American Bicyclists also offers print materials about motorist safety when interacting with cyclists. There is a charge for these materials. <https://www.bikeleague.org/bfa/search/map/NorthCarolina?bfaq=North%20Carolina>
4. **Courses for motorists:** The League of American Bicyclists offers Bicycle Friendly Driver training, the newest addition to the League's Smart Cycling program. Created by the City of Fort Collins, the training aims to educate motorized vehicle drivers about how and why bicyclists travel the roadways in the ways they do with the objective of developing a shared understanding for all users.

The Connect Locally Map provides names and contact information for League Certified Instructors in North Carolina: Select North Carolina from the list then scroll down to the list of League Certified Instructors in North Carolina: <https://www.bikeleague.org/bfa/search/map/NorthCarolina?bfaq=North%20Carolina>



## EDUCATION: STRATEGY TWO

**Purpose:** A regional website to provide information to residents in and visitors to the Yadkin Valley region

**Audience:** General Public

**Partners:** Component communities and relevant agencies

This website, like the one created for developing this bicycle plan should be the one-stop source of information regarding bicycling, trails, walking/hiking within the region. Information on the website should include the following;

- An interactive map of trails and bike facilities that should also denote parking, restrooms, and location of bike parking, including bike racks and lockers
- Availability of downloadable maps of trails and routes
- Descriptions of nearby attractions or points of interest
- List of campgrounds, parks, picnic areas and accommodations
- A region-wide calendar of events throughout the region that can be easily updated on a regular basis or a link to a similar website with information for the region
- Safety information that can be downloaded/printed from the website
- How to report any issues or problems or make suggestions about improvements.

## EDUCATION: STRATEGY THREE

**Purpose:** The Watch-for-Me NC Program provides information to law enforcement departments

**Audience:** General Public

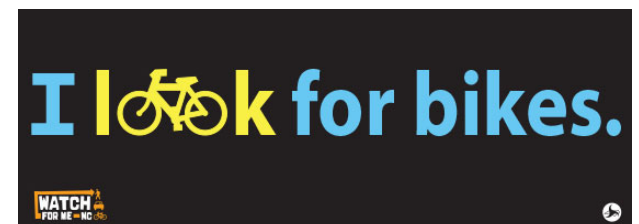
**Partners:** Component communities and relevant agencies

The Watch for Me NC program aims to reduce pedestrian and bicycle injuries and deaths through a comprehensive, targeted approach of public education, community engagement, and high visibility law enforce-

ment. On this site you can learn more about how to be a safer driver, bicyclist, and pedestrian, and ultimately, reduce the number of people hit or killed by vehicles on North Carolina streets.

The Watch for Me NC program, which started with a pilot program in Wake, Durham, and Orange counties in 2012, each year invites communities across North Carolina to apply to become partner communities. As part of that effort, partner communities receive additional support and training from NCDOT. All North Carolina communities are encouraged to use Watch for Me NC materials to improve pedestrian and bicyclist safety.

<https://www.watchformenc.org/about/>



"Watch for Me NC" materials can be placed in strategic places, including at gas stations, where drivers will see them (above).



## ENCOURAGEMENT

### ENCOURAGEMENT: STRATEGY ONE: ENHANCE AND PROMOTE BICYCLE TOURISM IN THE YADKIN VALLEY REGION (APPENDIX D)

This important encouragement strategy is covered in detail in Appendix D. The appendix provides a high-level review of the potential for cycling tourism in the Yadkin Valley Region with the identification of existing assets, as well as recognizing specific opportunities and providing recommendations for future action.

See Appendix D for details, and the online map here: <https://velogirlrides.com/yadkin-valley-regional-bicycle-tourism-map/>

### ENCOURAGEMENT: STRATEGY TWO

**Purpose:** To encourage residents to experience the fun of bicycling and be physically active through Open Street events in different locations within the region.

**Audience:** Bicyclists and general public

**Partners:** Local governments—especially, recreation and parks, civic organizations, bike clubs, health and environmental organizations

The term “open streets” means closing streets to motor vehicle traffic so that the streets are open to bicyclists, pedestrians, skaters and others so that they can experience the area without having to worry about motorized traffic. Organizers can invite community organizations to set up displays and host games and other activities that will attract families. Bike shop owners will sometimes be on hand to check out bikes and pump up tires or set up a display to allow people to try different types of bikes. Vendors offering food and beverages—restaurants or food trucks—are helpful. Depending on the time of year, it can be helpful to set up shady areas for people to rest and be out of the sun.



### Benefits of Open Streets Events

- **Health:** Most children and adults do not achieve the regular physical activity recommended to maintain health. For children it's 60 minutes a day. In North Carolina, most elementary children have physical education only once a week. Adults are advised to get at least 150 minutes of vigorous activity per week. Providing a fun way for people to be physically active can make communities healthier.
- **Environment:** Removing motor vehicles from the area, even for a short time, can reduce particulates and unhealthy gases from the air.
- **Economy:** A well-publicized open streets event can attract participants from outside the host community in addition to local residents. These people will patronize food vendors and restaurants and, depending on the event location, shop at local stores.
- **Community:** Bringing people together from different parts of the town/region can create positive connections that benefit the region.

### Suggested Activities

- Food and beverage vendors such as food trucks
- Water outlet for refilling water bottles, especially if the weather is hot.
- Activities and displays from community health organizations, the local health department, educational organizations, libraries, bike shops, fire department, rescue organizations, local museums
- Bike parade for young children
- Activities and information from scouting organizations

- Bike valet parking for people who bike to the event
- Display of transit bus with bike rack on the front
- Music or entertainment—one very popular group in Winston-Salem is the unicycle team from a local elementary school that demonstrates their skills
- Bike rodeos
- Helmet fitting—Safe Kids of North Carolina can sometimes provide helmets

### ENCOURAGEMENT: STRATEGY THREE

**Purpose:** To increase the number of North Carolinians who meet the physical activity recommendations by the Centers for Disease Control and Prevention by using Safe Routes to School to encourage more elementary and middle school students to bike or walk to school or participate in after-school bike clubs

**Audience:** Parents and students as well as school personnel

**Partners:** School system leaders, principals, teachers, parents, civic organizations and community volunteers

Healthy students are better learners with improved academic achievement. Schools are an ideal setting to teach and provide students with opportunities to improve their dietary and physical activity behaviors and manage their chronic health conditions (asthma, diabetes, epilepsy, food allergies, and poor oral health). When policies and practices are put in place to support healthy school environments, healthy students can grow to be healthy and successful adults. Yet in North Carolina about 25% of students are overweight or obese, a predictor for obesity in adulthood. In addition, most students do not achieve the recommended 60 minutes of physical activity per day. Most physical education classes are not offered daily in elementary schools, leaving children to find activities after school.

Encouraging children to bike or walk to and from school is an easy and inexpensive solution. Following are suggestions on **approaches to cycling for students:**

1. If children live close enough and have a safe route, they can ride their bikes to school—riding with parents, friends or others in their neighborhood. Of course, the school needs to provide bike racks for students to safely lock their bikes while they are in class.
2. Another option is a bike train, led by parents or school staff. Students can gather with their bikes at a designated location and ride in a “train” with a parent or other trusted adult leading the group to school in the morning and home again in the afternoon.
3. For students who live too far away, a drop-off location within cycling distance of the school can be used as the meeting location. Churches are often willing to host these meet-ups. The students would then ride together, preferably with an adult, to and from the school.

Parents who regularly ride with their children have found that bicycling can be a good motivator for children to get ready for school without dawdling.

After-school clubs offer students another avenue for learning more about biking and how to ride safely. A dedicated teacher, parent or trusted adult volunteer can build on the skills learned in Let’s Go Biking! by taking students on local rides and teaching them basic bike repairs.

### PHYSICALLY ACTIVE KIDS HAVE MORE ACTIVE BRAINS

Brain Scans of Students Taking A Test:

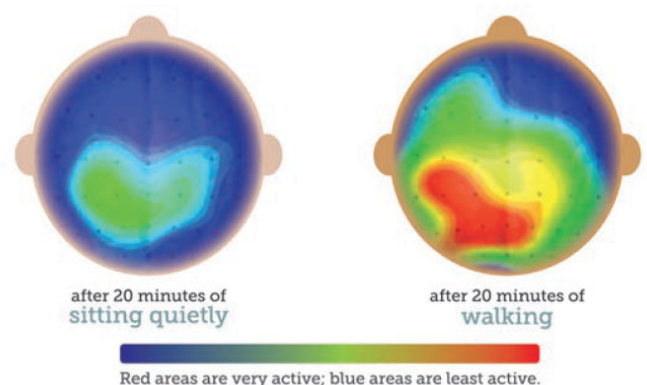


Image courtesy of Charles Hillman, University of Illinois at Urbana-Champaign. Source: *Active education: Growing evidence on physical activity and academic performance.* (2015). San Diego, CA: Active Living Research.





#### **ENCOURAGEMENT: STRATEGY FOUR**

**Purpose:** Enable lower-income residents to obtain a bicycle through a Build a Bike Program and encourage them to use the bike for transportation

**Audience:** Potential cyclists of all ages but particularly those in lower-income neighborhoods, many of whom rely on transit

**Partners:** Local bike shops and bike clubs, major retailers who sell bikes, nonprofit agencies

The **Piedmont Flyers Bike Club** in Winston-Salem annually collects money to donate bikes for kids, which is great. However, teaching older children and adults how to build and maintain a bike gets them personally invested in the bike while teaching them valuable skills for the future. The **National Cycling Center in Winston-Salem** has plans in the future to start a **Build-a-Bike Program**. Lower income residents could also benefit from this type of program, especially when the residents learn how and help repair the bikes. In return for a certain time commitment and effort repairing bikes, a resident could be eligible to receive a bike, which could help with transportation to a job.

#### **ENCOURAGEMENT: STRATEGY FIVE**

**Purpose:** Creating awareness of safe places to ride through special bicycling events when new facilities are inaugurated

**Audience:** All cyclists as well as pedestrians

**Partners:** Local governments, bike clubs, schools

Ribbon-cuttings are traditional for opening new facilities and would also work for trails and bike routes. The opening event can also be expanded to include nature talks, historical background of the area, a tour of nearby neighborhoods of interest. The mayor or other local official could lead an inaugural bike ride. Publicity through local newspapers and other media outlets can draw people from throughout the region.

#### **ENCOURAGEMENT: STRATEGY SIX**

**Purpose:** Involve middle and high school students in mountain biking and competing with other North Carolina teams

**Audience:** Students in grades 6-12

**Partners:** PE teachers, parents, schools, local mountain bike racers, local bike shops

A **North Carolina Interscholastic Cycling League** team has been established so that middle and high school students can learn to compete through races against other teams across North Carolina. Some teams are affiliated with schools but teams may also be independent. Provisions allow home-schooled and charter school students to participate in teams, too. Information is also available on Facebook.

#### **ENCOURAGEMENT: STRATEGY SEVEN**

**Purpose:** Celebrating Bike Month in May/ Bike to Work Week to call attention to cycling and encourage people of all ages to bike

**Audience:** All cyclists/local businesses

**Partners:** Local governments, bike clubs, schools, local businesses

Established in 1956 by the League of American Bicyclists, National Bike Month provides an opportunity to showcase the many benefits of bicycling — and encourage more folks to give biking a try. Cities and organizations across the country organize a variety of events to celebrate and encourage cycling for residents of all ages. Following are some suggested events.

- **National Bike to School Day:** In partnerships with the League, the National Center for Safe Routes to School now organizes an annual Bike to School Day during the first week of Bike Month. Encourage parents and school officials to organize a bike-pool or bike train for parents at local schools and engage the next generation of bicyclists! Learn more and get tips at [www.walkbiketoschool.org](http://www.walkbiketoschool.org).
- **Car vs. Bus vs. Bike Commuter Race:** The city of Dallas, Texas has played host to several Car vs. Bus vs. Bike Commuter Races. Motorist, bus driver and cyclist all start and end the morning rush hour at the same spots, but may take distinctly different routes. The bicyclist always wins! This is a sure-fire media event to run on Bike-to-Work Day to encourage folks to give bicycle commuting a try.
- **Bike Commuting Incentives:** Work with local vendors to provide prizes for Bike-to-Work Day participants. Possible prizes include: bikes, accessories, lights, racks, bags, airline tickets, and gift certificates to various local businesses. If sponsorship permits, have T-shirts or reflective commuter vests produced promoting the sponsors.
- **Ride with the Mayor (or other official):** Getting local elected officials involved shows important support for Bike Month. Use this opportunity to highlight good bike facilities in your area, tour the local trail system, and show the elected official how important it is to maintain them!
- **Smart Cycling Classes:** League Cycling Instructors offer a wide variety of classes for any audience, including Commuters, Group Rides, Traffic Skills and more. Recreational clubs can sponsor group-riding clinics and advocacy organizations can sponsor classes for public officials. <https://bikeleague.org/ridesmart>
- **Bike Rodeos:** Both entertaining and educational, bike rodeos teach kids bicycle handling and safety skills, while also sharing the rules of the road in a safe environment. A great idea for Bike to School Day!
- **Proclamation of May as National Bike Month:** Mayors, City Councils or County Commissioners could officially proclaim

May as National Bike Month while publicizing the events, trails and routes available across the region. This publicity not only recognizes cycling but reminds motorists that they should share the road safely with bicyclists.

### ENCOURAGEMENT: STRATEGY EIGHT

**Purpose:** To create safe routes for citizens to bike to local parks through Safe Routes to Parks: <https://www.saferoutespartnership.org/healthy-communities/saferoutestoparks>

**Audience:** Residents

**Partners:** Neighborhood and business associations, local government

The **Safe Routes to Parks Activating Communities** program provides tailored technical assistance for seven communities to develop Safe Routes to Parks action plans and awards \$12,500 to each community to begin implementation of those plans. The Safe Routes to Parks action plans will be based upon the Safe Routes to Parks Action Framework, developed in 2017 through the collaborative efforts of the Safe Routes to School National Partnership and the National Recreation and Parks Association. The framework provides a structured process by which communities can increase safe and equitable access to their parks and green spaces.





## ENFORCEMENT

### ENFORCEMENT: STRATEGY ONE

**Purpose:** To encourage everyone to keep bike lanes clear to improve safety for bicyclists and motorists

**Audience:** Residents, businesses and property owners

**Partners:** Neighborhood and business associations, local government

Enforcement involves more than enforcing speed limits and traffic laws. Once bicycle facilities are in place, an enforcement program is necessary to ensure that these facilities are cleared of debris regularly, that property owners/residents do not place trash and other containers in that space and that the facilities are not used for parking. Citizen volunteers can help by reporting problems on routes they ride. Printed cards such as those shown here can be distributed in print or on the website.

The initial phase of this type of enforcement should be educational in nature to increase awareness of the purpose of the facilities and how all citizens can work to keep these facilities clear for bicyclists. If problems persist, then citations are warranted when residents/businesses continue to block bike lanes.

### ENFORCEMENT: STRATEGY TWO

**Purpose:** To encourage motorists and bicyclists to operate safely and obey rules of the road

**Audience:** Motorists and bicyclists who ride on the road

**Partners:** Businesses, schools and civic organizations

Even the best education program cannot reach everyone so enforcement will be needed. Given the limited resources of most law enforcement agencies, the best approach involves targeting problem areas or those where crashes have occurred involving both bicyclists and motorists—but for a designated time period, usually three-four weeks, with a

three-step process. During the first week or two, officers stop the offender and provide an educational card reminding the person of the rights and responsibilities of bicyclists. The second step is to issue a formal warning. If the person continues to violate the law, then the officer issues a citation.

A refresher course for police officers/sheriffs on North Carolina laws pertaining to bicycle operation on the road would be beneficial since their initial training has limited time to discuss laws relevant to bicyclists.



### ENFORCEMENT: STRATEGY THREE

**Purpose:** To ensure that bicyclists riding at night or in dim light have proper lighting on their bikes

**Audience:** Any cyclist riding without lights when visibility is poor

**Partners:** Bicycle shops, bicycle clubs and civic organizations, law enforcement

The easiest way to make sure bicyclists can be seen when riding at night or in poor visibility conditions is to install bike lights for them. The City of Winston-Salem Bike Patrol has prevented untold crashes by putting small but bright front and rear lights (similar to those illustrated) on the bicycles of cyclists stopped for this violation. These inexpensive lights (\$2.95 each in bulk) can quickly be installed without tools by looping the cord around the handlebars and connecting the loop to the light. Installing the lights takes less time than writing a citation, saves administrative costs, and provides immediate safety for the cyclist.



## ENGINEERING

### ENGINEERING STRATEGY

**Purpose:** To make traffic signals more responsive to bicycles through Signal Detection and Actuation

**Audience:** Cyclists riding on the road

**Partners:** Planners, traffic engineers, bike clubs, bike shops

Traffic signals that do not change when only cyclists are present in the lane presents a major frustration and can encourage cyclists to ignore the signal. As bicycle routes are designated as part of this plan, planners and engineers should identify locations where bicycle detection should be amplified or changed. Bicyclists familiar with the routes in the region can be helpful in pointing out problem intersections.

Bicycle detection is used at actuated signals to alert the signal controller of bicycle crossing demand on a particular approach. Bicycle detection occurs either through the use of push-buttons or by automated means (e.g., in-pavement loops, video, microwave). Inductive loop vehicle detection at many signalized intersections is calibrated to the size or metallic mass of a vehicle. For bicycles to be detected, the loop must be adjusted for bicycle metallic mass. Otherwise, undetected bicyclists must either wait for a vehicle to arrive, dismount and push the pedestrian button (if available), or cross illegally.

Proper bicycle detection meets two primary criteria: 1) accurately detects bicyclists; and 2) provides clear guidance to bicyclists on how to actuate detection (e.g., what button to push, where to stand). See the NACTO Urban Bikeway Design Guide for more on these four primary types of bicycle signal detection:

- **Loop:** Induction loop embedded in the pavement
- **Video:** Video detection aimed at bicyclist approaches and calibrated to detect bicyclists
- **Push-button:** User-activated button mounted on a pole facing the street
- **Microwave:** Miniature microwave radar that picks up non-background targets





## EVALUATION

### **EVALUATION: STRATEGY ONE**

**Purpose:** To provide an easy way for the public to report problems along bike routes, greenways, trails, and other places in the community

**Audience:** General public but especially bicyclists

**Partners:** Media, bicycle clubs, bicycle shops

As the network of bicycle facilities grows, it will become more difficult and expensive to check the condition of the routes not to mention the signals and signs along each one. The City of Winston-Salem encourages people to use CityLink via email or by calling 311 within the city to report problems. The information is then conveyed to the appropriate person/department. Ideally a region-wide system could be established to serve bicyclists throughout the region.

### **EVALUATION: STRATEGY TWO**

**Purpose:** To elicit feedback through a formal survey from bicyclists about bicycle routes and any other issues or concerns

**Audience:** Adult bicyclists

**Partners:** Media, bicycle clubs, bicycle shops

Every few years a formal survey can be used to gather more specific information about citizens' usage and thoughts about bicycle routes and programs in the region. Using Survey Monkey or other online survey tool, the survey form should be placed on the website with links distributed through the media, newsletters, bike shops and other opportune outlets. In addition, it is wise to have some printed hard copies to distribute through government offices, libraries, schools, bike shops and other appropriate locations. Of course, this means that a staff member or two needs to be available to tabulate the hard copy surveys.

The survey, in addition to garnering feedback about the plan, should also include demographic information including the zip code of the respondent. This information will allow the oversight committee to ascertain how wide an area the responses represent as well as fine tune the plan's strategies.

For more on the topic of evaluation, please see the end of Chapter 6, which focuses on evaluation for plan implementation.





*Bicyclists in Tobaccoville, NC (photo: Alta)*





# POLICY OVERVIEW

*The policy objectives and associated strategies presented in this chapter aim to highlight the land use and transportation conditions that can improve and promote bicycling in the Yadkin Valley region. These are presented as options for consideration by local governments and regional partners to adopt and incorporate into their own policies and regulations, as appropriate for each community.*

Meeting the goals of this plan requires not only infrastructure improvements, but also land use patterns that put a variety of destinations and services in closer proximity to neighborhoods and downtown areas. Through the statewide adoption of Complete Street policies and design guidelines, the North Carolina Department of Transportation is a willing partner to those communities desiring a multi-modal transportation system that reinforces community character for economic development, community health, and livability. With this in mind, the following strategies aim to improve the underlying land use and transportation conditions that promote bicycle use at the regional and local level:



*Yadkin Valley Regional Bicycle Plan Steering Committee Members sharing information about upcoming local projects.*

1

**Recognize the interrelationship between land use decisions (planning and development) and transportation decisions.**



2

**Reinforce basic urban, suburban, and rural design principles that result in development of sustainable and attractive districts, neighborhoods, and corridors supportive of bicycling and walking and other modes of travel.**



3

**Protect and improve the balance of rural areas and vibrant downtown environments that make the Yadkin Valley region special.**



4

**Provide separation for bicyclists, when possible, even in constrained areas.**

## PRIORITY POLICY RECOMMENDATIONS

These recommendations support the vision of this Plan:

*"The Yadkin Valley Region will improve conditions for bicycling, making roadways safer and more comfortable for all users. This plan recommends a variety of new bicycling facilities for people of all ages and abilities, connecting within, and between, communities. Outcomes include greater health, safety, economic activity, and transportation choices for residents and visitors throughout the Region."*

### PRIORITY POLICY *and* REGULATORY RECOMMENDATIONS:

1. Develop and adopt local Complete Street Policies for each regional community. Update development regulations and engineering standards to include and reflect best practices for Complete Streets and bikeway design.
2. Include requirements to include bikeways in new development.
3. Require construction, dedication or reservation of adopted greenway alignments in new developments and along major roadways, as appropriate to regional connectivity, adopted plans, and roadway context. Consider application of corridor overlay districts or other regulatory tools that would preserve right-of-way or require dedication or construction of planned greenway alignments and promote other trail-oriented-development.
4. Adopt and/or reference in local codes and design guidance the state and national complete street design policies and guidelines including the **NCDOT Complete Streets Policy (2019)**, the NACTO Urban Bikeway Design Guide, the FHWA Separated Bike Lane Guide, and the FHWA Small Town and Rural Multimodal Networks Guide.
5. Adopt bicycle parking requirements and standards in local zoning codes and engineering standards.
6. Assign greenway construction and maintenance to appropriate municipal and county departments, including park and recreation or public works departments.
7. Provide paved shoulders in rural areas where possible and bicycle "pull-outs" or respites along bicycle routes, especially where paved shoulder cannot be provided due to topographical or other constraints.
8. When rumble strips are to be applied on roadways where bicycles are legally allowed to operate, work with the local NCDOT Division Engineers to implement bicycle-friendly rumble strips, adhering to the NCDOT R-44 Standard Practice Memo (link to memo below). Additional references to state and national best practices for bicycle-friendly rumble strip application are included below, and should be considered on roads that:
  - NCDOT R-44 Standard Practice Memo: <https://connect.ncdot.gov/resources/safety/TEPPL/TEPPL%20All%20Documents%20Library/R-44%20Rumble%20Strip%20Practice%20FINAL.pdf>
  - League of American Bicyclists "Bicycling and Rumble Strips": <https://www.aarp.org/content/dam/aarp/livable-communities/old-learn/transportation/bicycling-and-rumble-strips-problems-for-cyclists-aarp.pdf>
  - Small Town and Rural Multimodal Networks Design Guide: <https://ruraldesignguide.com/visually-separated/paved-shoulder>
9. Develop a practice to have NCDOT and local and regional agencies review the recommendations of this plan during roadway project planning and design to ensure that NCDOT projects include the recommended bikeways and treatments.



## NC MUNICIPALITIES *with* MODEL REGULATORY POLICIES

The following NC communities have model development policies that support bicycling and the development of bikeways and greenway trails (some sections of these documents are also referenced in the tables on the following pages):

- City of Wilson, North Carolina, Unified Development Ordinance
- Town of Wake Forest, North Carolina, Unified Development Ordinance
- Town of Davidson, North Carolina, Planning Ordinance

## STATE POLICIES *and* GUIDELINES

These policies describe how bicycles and pedestrian improvement are to be developed in North Carolina. For full policies, visit: <https://connect.ncdot.gov/projects/BikePed/Pages/Policies-Guidelines.aspx>

- Complete Streets: N.C. Department of Transportation policy on when and how planners and designers should design streets and roads to accommodate all users, including accommodations for bicyclists and pedestrians, in transportation projects. See the full policy (adopted in 2019) at the end of Appendix B, which says:

***"Bicycle and pedestrian and public transportation facilities that appear in a state, regional or locally adopted transportation plan will be included as part of the proposed roadway project. NCDOT will fully fund the cost of designing, acquiring right of way, and constructing the identified facilities."***

- Bicycle Policy & Guidelines: N.C. Department of Transportation policy and guidelines for planning, designing, building, maintaining and operating bicycle facilities and accommodations.
- Greenway Accommodations Memo: Approved in 2015, N.C. Department of Transportation guidelines, approaches and cost-sharing recommendations for proposed greenways under bridges.
- Greenway Accommodations Guidelines: Approved in 2015, N.C. Department of Transportation guidelines, approaches and cost-sharing recommendations for proposed greenways under bridges.
- Administrative Action to Include Greenway Plans: N.C. Department of Transportation administrative guidelines for considering greenways and greenway crossings during the highway planning process to ensure that critical corridors for future greenways are not severed by highway construction.
- Pedestrian Policy & Guidelines: N.C. Department of Transportation policy and guidelines for planning, designing, building, maintaining and operating pedestrian facilities and accommodations.
- Bridge Policy: N.C. Department of Transportation policy establishing design elements for new and reconstructed bridges on the state's road system, including requirements for sidewalks and bicycle facilities on bridges.
- Traffic Engineering Policies, Practices and Legal Authority: N.C. Department of Transportation policies and federal design guidelines for specific pedestrian and bicycle safety accommodations.



The section below is adapted from the NACTO Guidelines for Regulating Shared Micromobility, Version 2: September 2019.

## NACTO GUIDELINES FOR REGULATING SHARED MICROMOBILITY

### What is Shared Active Transportation?

NACTO's Guidelines for Regulating Shared Micromobility outlines best practices for cities and public entities regulating and managing shared micromobility services on their streets. Its recommendations were developed to reflect the wide variety of experiences that North American cities have had in regulating and managing shared micromobility.



### THE GUIDELINES COVER:

- **Options for regulation**, including permits, pilots, and demonstrations;
- **General provisions that should be included in all agreements with providers**, such as insurance requirements, and when an operator is to be considered in breach of its agreement with a city;
- **Infrastructure investments**, including device parking options such as on-street corrals and docking points (pdf), and guidance on providing safe places to ride (pdf);
- **Suggestions on operational requirements**, including fleet size, device relocation, rebalancing and fleet distribution, equipment and vehicle maintenance, customer service, and staffing;
- **Safety provisions**, including vehicle speed, battery practices, and parking options that preserve the public-right-of-way;
- **Practices for equity**, including increased access to underserved communities;
- **Fee structures** that enable cities to recoup their costs for managing dockless mobility in their cities, as well as provide public benefits;
- **Public engagement** (pdf), including outreach materials, as well as pricing and discount programs;
- **Data management** (pdf), including how cities can ensure access to accurate, high-quality data while maintaining individual privacy;
- **Technology recommendations**, including the best uses for geofencing technology along with its limitations.



*Dockless bike share in Fayetteville, NC, and scooters in Raleigh, NC.*

**FULL REPORT:** <https://nacto.org/sharedmicromobilityguidelines/>



## POLICY CONSIDERATIONS FOR RIDING BICYCLES ON SIDEWALKS

The following text is from the Bike Law website's **Ride Guide for North Carolina Bicycle Laws** ([www.bikelaw.com](http://www.bikelaw.com)):

*"Sidewalks can be confusing and another area of great debate. Usually it is safer to ride on the road. But there are times where it would be perfectly reasonable to ride your bicycle on a sidewalk. A sidewalk may provide a convenient or essential route to a multi-use path or bike rack, for example. A sidewalk makes it easy to backtrack a short distance on a one-way street. Some people simply feel more comfortable on a sidewalk if the speed and volume of traffic are heavy.*

*Sometimes riding on the sidewalk is legal and sometimes it's not. And you won't find the answer in a state statute or DMV driver's manual. You have to look at the municipal code for the city where you're riding. Many cities outlaw riding on sidewalks in center city areas.*

*North Carolina law does anticipate that there will be bicycles on sidewalks because it provides a small measure of protection for them by requiring drivers leaving drive-ways and parking lots to look for bicyclists (and pedestrians) before crossing a sidewalk. Reference: N.C. Gen. Stat. § 20-173 (c) The driver of a vehicle emerging from or entering an alley, building entrance, private road, or driveway shall yield the right-of-way to any pedestrian, or person riding a bicycle, approaching on any sidewalk or walkway extending across such alley, building entrance, road, or driveway.*

*Bicycles on sidewalks also mean bicycles in crosswalks. No law in this state requires bicyclists to dismount their bicycles or stop before entering a crosswalk (unless of course there is a stop sign or light for the path or sidewalk). What is not prohibited is by definition legal. That said, if you choose the sidewalk, do not count on drivers knowing or obeying this law. Ride slowly or slow down and look before crossing drive-ways and entrances with limited visibility or when entering crosswalks. If you must ride against traffic on the sidewalk, take even more care."*

The **Winston-Salem Code of Ordinances** (Sec. 42-286 Right-of-Way of Pedestrians; Riding on Sidewalk) outlines the City's policy on this topic:

*(a)Whenever any person is riding a bicycle upon a sidewalk, such person shall yield the right-of-way to any pedestrian and shall give audible signal before overtaking and passing such pedestrian.*

*(b)With the exception of officers assigned to the police department downtown bike patrol while engaged in*

*the performance of their duties, it shall be unlawful for any person to ride a bicycle upon a sidewalk in the following locations or on the following streets*

*(1)Central business district (defined broadly by 8th Street, Broad Street, Business 40, and HWY 52)*

*(2)Sunset Drive from First Street to Glade Street.*

*(3)Liberty Street from 14th Street to 17th Street.*

In addition to the direction provided above, additional guidelines could help to improve safety and comfort of both bicyclists and pedestrians while sharing sidewalk space. This includes the following **Top 5 Rules for Riding on the Sidewalk**, from [www.bikeshophub.com/blog/2008/07/09/top-5-rules-for-riding-on-the-sidewalk](http://www.bikeshophub.com/blog/2008/07/09/top-5-rules-for-riding-on-the-sidewalk):

1. “Ride slowly - This is the most important rule for riding on the sidewalk. Bicyclists on the sidewalk should never ride faster than a relaxed jog.
2. Yield to pedestrians - If you come up behind people walking, be very polite and wait for a good time to ask them to let you pass. Never come up behind them yelling, ringing a bell or anything else that could startle or scare them. You are trespassing on their terrain so be courteous.
3. Check every cross street and driveway - This is the dangerous part! Drivers are used to pulling all the way up to the road before coming to a stop and turning onto the street you’re following. Make sure when coming up to a driveway or cross street that you slow down and check to make sure a car is not coming. They aren’t looking for fast moving vehicles to be coming off the sidewalk, so you have to be watching for them.
4. Only cross the street at crosswalks - A good way to get hit by a car is to come darting off the sidewalk into the street randomly. Again, remember that drivers aren’t looking for people to jump off the sidewalks into traffic randomly. If you need to cross the street, wait until you get to a cross walk and do it there.
5. Be willing to walk your bike - If you regularly ride on the sidewalk, there are going to be lots of times where the best decision is to get off your bike and walk for a bit. This is usually due to congestion. When there are just too many people around that you risk hitting one of them, it’s time to walk.”

#### **Other considerations for sidewalk riding:**

- Setting a speed limit (10 MPH, for example), and encouraging bicyclists to slow to pedestrian speeds when passing them.
- An education campaign may be a helpful, communicating guidelines similar to those above.
- Signage in key areas, such as in downtown areas (e.g, “walk your bike”) may be more effective than depending on enforcement.
- Sidewalks and side paths should be designed and constructed according to national best practices to maximize visibility and safety of bicyclists and pedestrians, especially at driveways and intersections (see design guide resources listed in Appendix A).



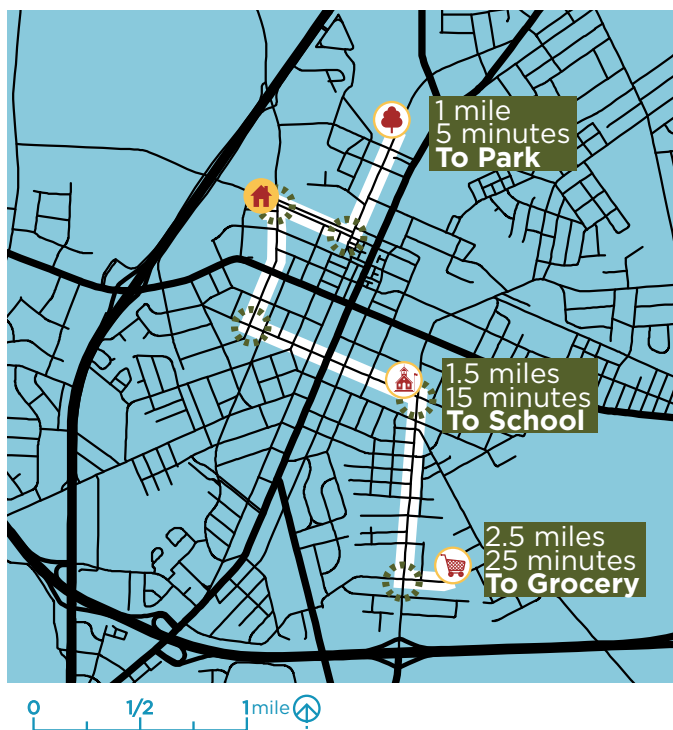


## HOW DEVELOPMENT PATTERNS INFLUENCE TRAVEL DECISIONS

The graphics below illustrate how land use and development patterns can dictate travel distances and influence behaviors. The image to the left shows a matured traditional neighborhood development pattern that was created over a long period of time in tandem with commercial growth along the main street and the freeway. The grid pattern, based on a clear street hierarchy, allows for a connected system of routing benefitting different modes. The more direct routes allow for easier navigation, customization, and less decision-making and crossings.

Conversely, the more modern development pattern shown on the right, often called suburban sprawl, consists of a labyrinthine network of homogenous neighborhoods that lack connectivity. This results in much greater trip distances, confusing routing and navigation, lack of choice, and more crossings and turn points.

### TRADITIONAL NEIGHBORHOOD DEVELOPMENT



#### BENEFITS

- Direct & simple routes
- Route customization
- Street hierarchy and facility planning
- More interesting environment for user

#### CHALLENGES

- Requires more strict land use policy & regional cooperation
- Housing preferences may differ
- Without growth boundary may be hard to compete with suburbs outside of municipality

### SUBURBAN SPRAWL DEVELOPMENT



#### BENEFITS

- Large amount of neighborhood streets that can be conducive to bicycling
- Greenfield development could allow for bicycle facilities
- Retro-fitting opportunity via trail connections

#### CHALLENGES

- Much greater trip distances
- Confusing navigation and limited route options
- Homogenous development that lacks engagement
- Neighborhood streets often feed to larger arterials without parallel alternatives

The graphics below demonstrate how the land use policies described in this chapter will improve communities on a foundational way that benefits people-first movement.

The traditional neighborhood development pattern creates many opportunities to access commercial activity along an activated main street. The grid creates more sensible density that allows for preservation of farm land in relative proximity to town. A grid is more conducive to a street hierarchy that collects travelers from the highway and distributes them along a connected network.

The suburban development pattern has auto-oriented commercial hubs that are distributed over large areas. This pattern often leads to trips that include multiple stops in disconnected areas, leading to circuitous routing that would be difficult to achieve on foot or by bicycle.

### TRADITIONAL NEIGHBORHOOD DEVELOPMENT



#### BENEFITS

- Directs travel to central commercial area that houses a diversity of uses
- Relative density compared to sprawl pattern preserves active farmland and true open space
- Improves economic development downtown
- More diverse neighborhood styles

#### CHALLENGES

- Requires enhanced design on main commercial street to accommodate modern travel demands
- Comprehensive strategy including land use, economic development, community development, and transportation

### SUBURBAN SPRAWL DEVELOPMENT



#### BENEFITS

- Maintains large amounts of open space (even if disconnected and degraded)
- Spurs rapid development

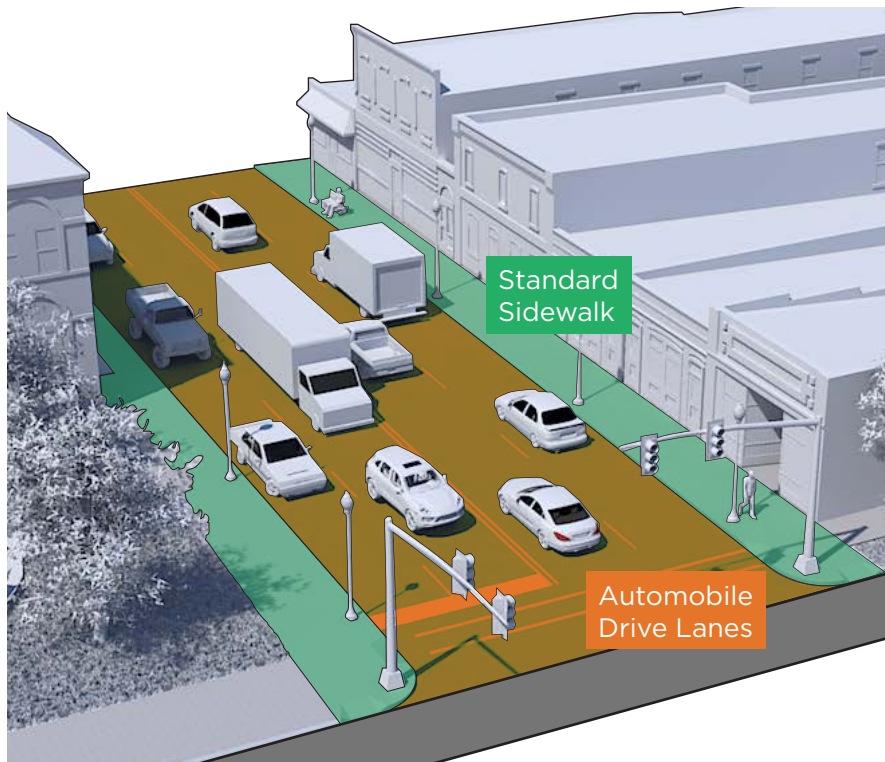
#### CHALLENGES

- Commercial activity is concentrated but designed based on automobile access
- Lack of small businesses
- Massive footprint of developments result in limited space for active farmland or connected open space preservation



## COMPLETE STREETS IN RURAL SMALL TOWN CONTEXT

### TYPICAL SMALL TOWN MAIN STREET



In many communities across the US, small town main streets that were once lively hubs of the community have transitioned into desolate strips over the last couple of decades. Main streets shifted away from people-centric places to auto-oriented spaces. This pattern often doesn't make for an interesting, safe, or inviting area for pedestrians, bicyclists, or transit users.

#### MODE PRIORITY

Pedestrian/Placemaking



Bicycle



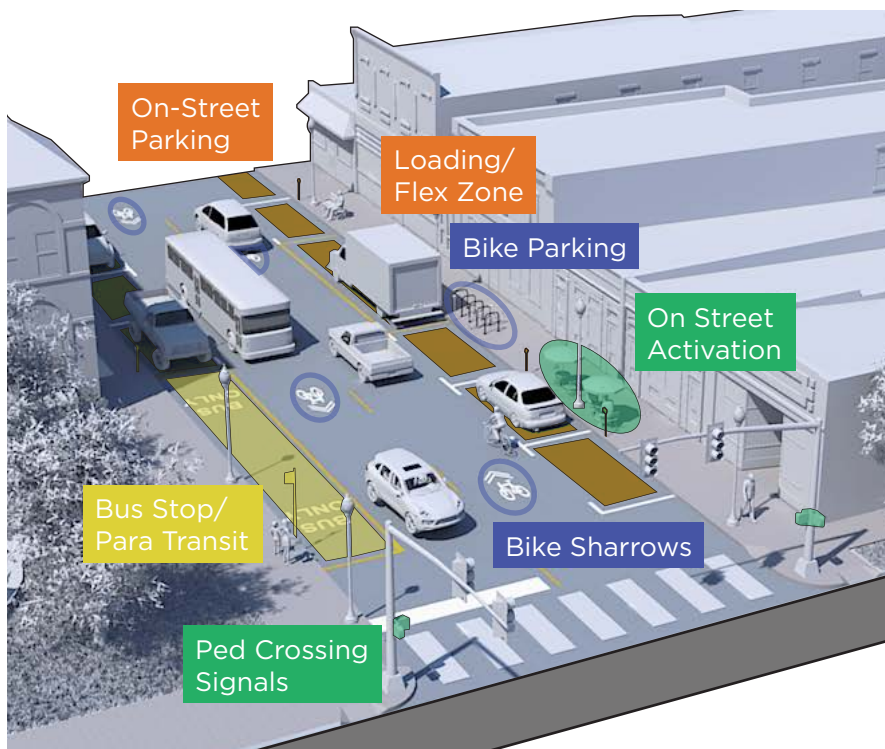
Transit



Automobile



### LOW COST IMPROVEMENTS



Impactful changes can result from simple means like paint and policy. Converting drive lanes to on-street parking will slow down traffic and create a buffer that makes walking and biking more comfortable and safe. Adding transit amenities to main streets will bring people closer to their destinations and encourage more use. Combining street furniture with safety improvements for bicyclists and pedestrians will shift the feeling of ownership in these spaces.

#### MODE PRIORITY

Pedestrian/Placemaking



Bicycle



Transit

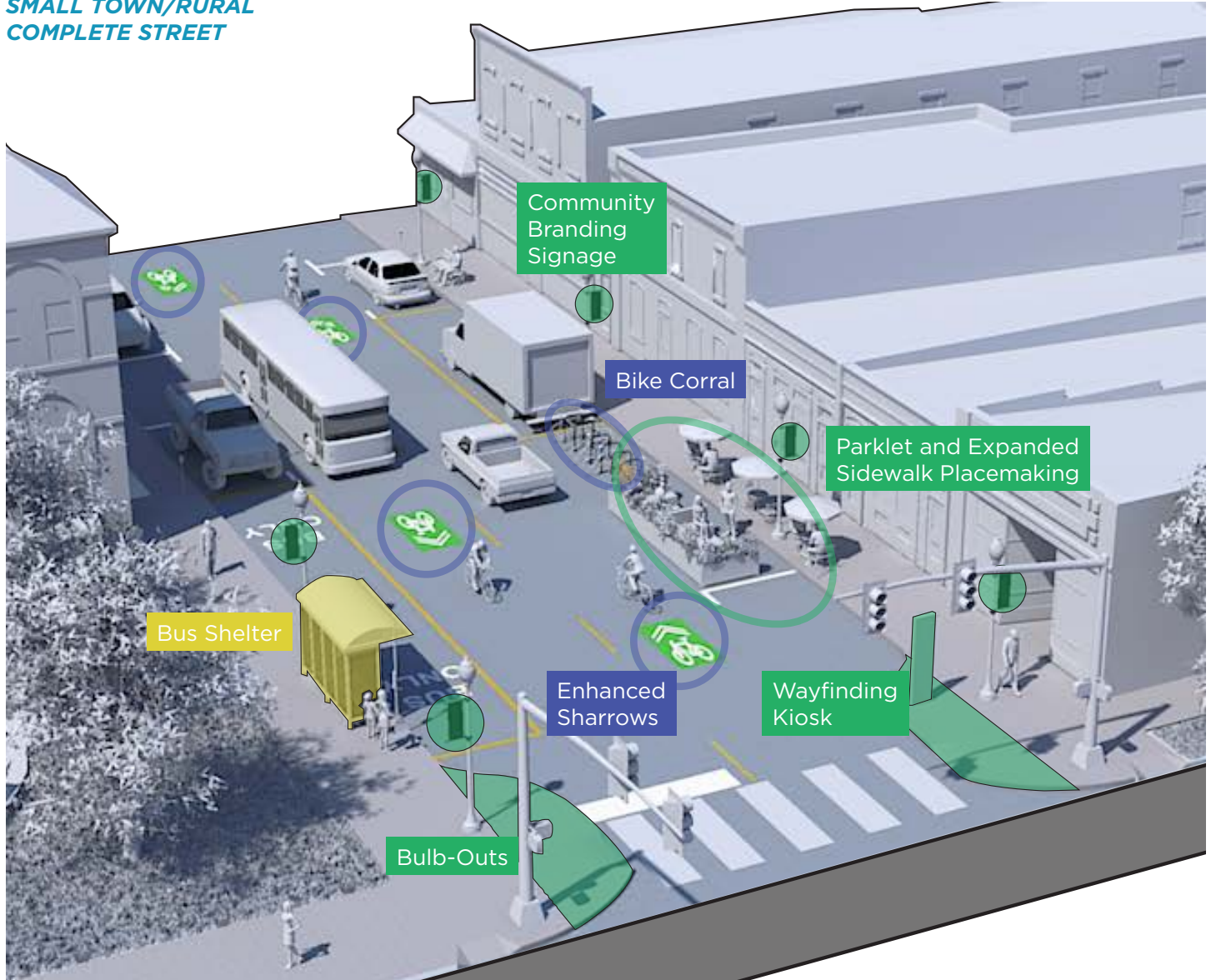


Automobile





## SMALL TOWN/RURAL COMPLETE STREET



### MODE PRIORITY

Pedestrian/Placemaking



Bicycle



Transit



Automobile



The complete street shown above creates an exciting, safe, and welcoming atmosphere for all users. It encourages people to come downtown and to get there via modes that fit their goals and lifestyle, not the design of the street. The placemaking features on-street activity, street markings, and bulb-outs working as traffic calming elements to slow vehicle travel and encourage walking and biking. Although there are not dedicated bicycle facilities, the calmed and active street, with enhanced sharrows, will allow most bicyclists to feel comfortable.\* A flagship bus shelter can act to protect users from the elements, contain wayfinding information, act as a community bulletin, and can be expanded to include micromobility systems like e-scooters and bike share as the community grows. Many of these features will come about independently and a town could find creative ways of getting the community involved in their development.

\*<https://nacto.org/publication/urban-bikeway-design-guide/bikeway-signing-marking/colored-bike-facilities/>  
<https://nacto.org/wp-content/uploads/2010/08/Second-Street-Sharrows-and-Green-Lane-in-the-City-of-Long-Beach.pdf>  
<https://nacto.org/wp-content/uploads/2010/08/More-Than-Sharrows-Lane-Within-A-Lane-Bicycle-Priority-Treatments-in-Three-US-Cities.pdf>



## PRIORITY POLICIES BY TOPIC AREA

The following policy review tables are organized into these overall categories: 1) Complete Streets and Greenways, 2) Bicycle-oriented Design Elements, 3) Connectivity, and 4) Policy Considerations by Settlement Type. These categories are interrelated, but based on the existing conditions analysis and the goals of this plan, the following key recommendations should be implemented first.

**TABLE 5.1 COMPLETE STREETS & GREENWAYS**

TOPICS/STRATEGIES	GENERAL RECOMMENDATIONS
<b>1.1 Implement Complete Streets Policy</b>  A Complete Streets policy allows cities and towns to work towards creating a street network that encourages pedestrian and bicycle travel and provides safe and comfortable roadways for all users.	In addition to the design guide resources provided in Appendix A, Smart Growth America provides great guidelines for designing streets that cater to all users: <a href="https://smartgrowthamerica.org/complete-streets-best-practices/">https://smartgrowthamerica.org/complete-streets-best-practices/</a> .
<b>1.2 Develop Complete Street Design Guidelines for a variety of contexts and all street/roadway user groups</b>  The topics below include recommendations for bicycle-related elements of Complete Streets. Designated bikeways and trails and end-of trip facilities such as bicycle parking are some of the most fundamental elements of Complete Streets for bicycle users. Access management, multi-modal level of service assessments, and traffic calming are also critical for developing complete street networks through the development review and capital project implementation process.  The design guidelines that accompany this plan (Appendix A) also include detailed recommendations on complete street design elements for bicycle users.	<p>Communities could adopt and endorse the design guide resources provided in Appendix A, including the NACTO Urban Street Design Guide: <a href="http://nacto.org/publication/urban-street-design-guide/">http://nacto.org/publication/urban-street-design-guide/</a> and the FHWA Small Town and Rural Multimodal Network Guide: <a href="http://ruraldesignguide.com/">http://ruraldesignguide.com/</a>.</p> <p>The design guidelines would then need to be integrated into development standards for new development, as was done with the Raleigh Street Design Manual (<a href="http://www.raleighnc.gov/content/extra/Books/PlanDev/StreetDesignManual/#1">http://www.raleighnc.gov/content/extra/Books/PlanDev/StreetDesignManual/#1</a>) and;</p> <p>The Charlotte Urban Street Design Guidelines: <a href="http://charlottenc.gov/Transportation/PlansProjects/Documents/USDG%20Full%20Document.pdf">http://charlottenc.gov/Transportation/PlansProjects/Documents/USDG%20Full%20Document.pdf</a></p> <p>See also the excellent Major &amp; Collector Street Plan: Implementing Complete Streets for Nashville/Davidson County, TN. <a href="https://www.nashville.gov/Portals/0/SiteContent/Planning/docs/NashvilleNext/PlanVolumes/next-volume5-MCSP.pdf">https://www.nashville.gov/Portals/0/SiteContent/Planning/docs/NashvilleNext/PlanVolumes/next-volume5-MCSP.pdf</a></p>
<b>1.3. Require bike accommodations by roadway type</b>	<p>The design guide resources (Appendix A) recommended as part of the Yadkin Valley Regional Bicycle Plan should be considered for incorporation or inclusion by reference in the regional communities' engineering and design standards and subdivision regulations.</p> <p>The NACTO Urban Bikeway Design Guide provides additional design details for various on-street bikeway treatments and could be adopted by reference in regional ordinances and/or engineering standards. Many cities have taken this approach.</p> <p><b>Resources:</b></p> <ul style="list-style-type: none"> <li>• FHWA Small Town and Rural Multimodal Network Guide: <a href="http://ruraldesign-guide.com/">http://ruraldesign-guide.com/</a></li> <li>• NACTO Urban Bikeway Design Guide <a href="http://nacto.org/cities-for-cycling/design-guide/">http://nacto.org/cities-for-cycling/design-guide/</a></li> <li>• FHWA Separated Bikelane Planning and Design Guide: <a href="https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page00.cfm">https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page00.cfm</a></li> </ul>

**TABLE 5.1 COMPLETE STREETS & GREENWAYS (CONTINUED)**

TOPICS/STRATEGIES	GENERAL RECOMMENDATIONS
<b>1.4. Require designated bikeways (bike lanes, shoulders, greenways, etc) during new development or redevelopment</b>	<p>Multi-lane roads are typically more dangerous for all users because of the increased traffic volume, the potential for higher speeds, and the additional number of conflict locations due to turning vehicles. Generally, as traffic volumes exceed 3,000 vehicles per day and traffic speeds exceed 25mph, facilities to separate bicycle and motor vehicle traffic are recommended. See the design guide resources provided in Appendix A for guidance.</p> <p>Also, see:</p> <ul style="list-style-type: none"> <li>• Chapters 6 of Wake Forest, NC UDO for recommendations for bikeways and greenways, esp. sections 6.8.2, 6.9, 6.10. <a href="http://www.wakeforestnc.gov/udo.aspx">http://www.wakeforestnc.gov/udo.aspx</a></li> <li>• Chapter 7 of the Wilson, NC UDO regarding greenways. <a href="http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-7-Parks-Open-Space.pdf">http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-7-Parks-Open-Space.pdf</a></li> </ul>
<b>1.5. Require dedication, reservation or development of greenways</b>	<p>Consider expanding requirements for greenway reservation, dedication, or provision in new developments where a greenway or trail is shown on an adopted plan or where a property connects to an existing or proposed greenway. Where greenway construction cannot politically be required, consider offering incentives in the form of reduced fees, cost sharing, density bonuses, or reduction in other open space requirements when adopted greenway alignments are constructed through private development. See the incentives offered by the City of Asheville to promote public policy goals. For example: <a href="http://www.ashevillenc.gov/departments/sustainability/resources.htm">http://www.ashevillenc.gov/departments/sustainability/resources.htm</a></p> <p>For additional examples of incentives, see also: <a href="https://www.law.ufl.edu/pdf/academics/centers-clinics/clinics/conservation/resources/incentive_strategies.pdf">https://www.law.ufl.edu/pdf/academics/centers-clinics/clinics/conservation/resources/incentive_strategies.pdf</a></p> <p>Ideally, development regulations should require the construction and maintenance of greenways to local standards unless a maintenance agreement is established with a local government.</p> <p>See requirements in Wake Forest, NC UDO, Section 6.8.2 Greenways: “When required by Wake Forest Open Space &amp; Greenways Plan or the Wake Forest Transportation Plan, greenways and multi-use paths shall be provided according to the provisions [that follow in the section cited above].” <a href="http://www.wakeforestnc.gov/udo.aspx">http://www.wakeforestnc.gov/udo.aspx</a></p> <p>Good model: (New Hanover County Zoning Ordinance): The Riverfront Mixed Use District includes the following provision: “Riverfront facilities shall provide multi-modal transportation opportunities, including public boating, walking, bicycling, and public bus or water taxi uses and the facilities necessary for such uses.”</p>
<b>1.6. Require new bike lanes, greenways, etc., to connect to existing facilities</b>	<p>Connectivity of facilities is critical for walking and biking conditions. New development should be required to connect to or extend existing bicycle and pedestrian facilities.</p> <p>See:</p> <p>Chapters 6 of Wake Forest, NC UDO for recommendations for bikeways and greenways, esp. sections 6.5.3, 6.8.2, 6.9, 6.10. <a href="http://www.wakeforestnc.gov/udo.aspx">http://www.wakeforestnc.gov/udo.aspx</a></p> <p>Chapter 7 of the Wilson, NC UDO regarding greenways. <a href="http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-7-Parks-Open-Space.pdf">http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-7-Parks-Open-Space.pdf</a></p> <p>Good model: (New Hanover County Zoning Ordinance): The EDZD Zoning District provides points for new developments that connect to the existing bikeway network and key destinations and provides a good definition of the bikeway network. (Section 54.1-14 and following.)</p>





**TABLE 5.1 COMPLETE STREETS & GREENWAYS** *(CONTINUED)*

TOPICS/STRATEGIES	GENERAL RECOMMENDATIONS	
<b>1.7. Consider bicycle concerns and Level of Service (LOS) in Traffic Impact Analyses and other engineering studies</b>	<p>Communities should consider adopting multi-modal Level of service standards. Consideration of bicycle and pedestrian levels of service assure adequate facilities for bicyclists and pedestrians in new development and capital improvements. This also helps promote walking and bicycling as a legitimate means of transportation.</p> <p>The City of Raleigh uses a multimodal level of service approach in determining road improvements and traffic mitigation: <a href="http://www.raleighnc.gov/content/extra/Books/PlanDev/StreetDesignManual/#71">http://www.raleighnc.gov/content/extra/Books/PlanDev/StreetDesignManual/#71</a></p> <p>Charlotte, NC uses Pedestrian LOS and Bicycle LOS Methodologies for intersection improvements in their Urban Street Design Guidelines: <a href="http://charmack.org/city/charlotte/transportation/plansprojects/pages/urban%20street%20design%20guidelines.aspx">http://charmack.org/city/charlotte/transportation/plansprojects/pages/urban%20street%20design%20guidelines.aspx</a></p>	
<b>1.8. Adopt traffic calming programs, policies, and standards</b>	<p>Traffic calming tools are especially important where bike routes or bike boulevards are proposed on local residential or sub-collector streets.</p> <p>The National Complete Streets Coalition provides good guidelines for traffic calming through their best practices manual: (<a href="https://smartgrowthamerica.org/resources/">https://smartgrowthamerica.org/resources/</a>).</p> <p>See also the NACTO Urban Bikeway Design Guide section on Bicycle Boulevards and the FHWA Traffic Calming Primer: <a href="https://safety.fhwa.dot.gov/speedmgt/traffic_calming.cfm">https://safety.fhwa.dot.gov/speedmgt/traffic_calming.cfm</a></p> <p>Consider requiring other traffic calming measures that improve the pedestrian and biking environment such as street trees, narrow street width standards, and T intersections.</p>	
<b>1.9. Develop an access management program or policy</b>	<p>Limiting turning movements on major roadways and requiring cross-access between adjacent parcels of land, including commercial developments, is a great tool for reducing the amount of traffic and turning movements on major roads while increasing safety and connectivity for pedestrians, bicycles, and cars.</p>	<p>Reduce the density of driveways and the incidence of less predictable driveway movements through access management. For example, combine driveways of adjacent properties, reduce driveway width to the minimum needed to accommodate ingress and egress volumes, and prevent left turns into driveways by allowing only right-in, right-out movements. However, if the access management instead serves to concentrate the traffic at a single driveway or intersection, then the conflicts may be displaced from the old location to the new location. (see page 5-44 of American Association of State Highway and Transportation Officials (AASHTO): Guide for the Development of Bicycle Facilities))</p>
<b>1.10. Provide bicycle pull-outs along bicycle routes.</b>	<p>Providing bicycle pull-outs or respites where possible, increases safety and comfort for bicyclists, especially in areas where paved shoulder cannot be provided due to topographic constraints.</p>	

## TABLE 5.2 BICYCLE-ORIENTED DESIGN ELEMENTS

TOPICS/STRATEGIES	GENERAL RECOMMENDATIONS
<b>2.1. Adopt bicycle parking requirements</b>	<p>Bicycles should receive equal consideration when calculating parking needs with specific calculations provided for determining the amount of bicycle parking provided by district type or land use type. Design and location standards for bicycle parking should be clearly stated to provide for safe and convenient access to destinations. Different standards of bicycle parking are needed for short-term visitors and customers and for longer term users like employees, residents, and students.</p> <p>See City of Wilson UDO, Chapter 9: Parking &amp; Driveways, Section 9.4 and 9.6: <a href="http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-9-Parking-Driveways-.pdf">http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-9-Parking-Driveways-.pdf</a></p> <p>Good standards for bicycle parking design can be found through the Association of Pedestrian and Bicycle Professionals' Bicycle Parking Guidelines. (<a href="http://www.apbp.org">www.apbp.org</a>)</p> <p>Bicycle Parking Model Ordinance, Change Lab Solutions: <a href="http://changelabsolutions.org/publications/bike-parking">http://changelabsolutions.org/publications/bike-parking</a></p> <p>City of San Francisco Zoning Administrator Bulletin for designs/layout/etc. The bulletin is in itself a great document that includes limits on hanging racks, how to park family bikes, and various configurations: <a href="http://sf-planning.org/sites/default/files/ZAB_BicycleParking_9-7-13.pdf">http://sf-planning.org/sites/default/files/ZAB_BicycleParking_9-7-13.pdf</a></p>

## TABLE 5.3 CONNECTIVITY

TOPICS/STRATEGIES	GENERAL RECOMMENDATIONS
<b>3.1. Revise block size requirements</b>	<p>Development density should determine the length of a block, with shorter blocks being more appropriate in areas of higher density. Maximum block length in any situation should rarely exceed 800-1000 feet for good connectivity. In areas with highest development density (urbanized, mixed use centers and high density neighborhoods), block lengths can be as little as 200 feet. In areas with blocks as long as 800 feet or greater, a pedestrian and/or bicycle path of 6-8 feet in width should be required, with an easement of 15-20 feet wide.</p> <p>Consider allowing larger blocks – up to a maximum, such as 800 feet – where development densities are expected be lower (&gt; 4 du/a). See City of Charlotte Subdivision Ordinance, Section 20-23 for example of connectivity requirements and block standards: <a href="http://charlottenc.gov/planning/Subdivision/Pages/Home.aspx">http://charlottenc.gov/planning/Subdivision/Pages/Home.aspx</a></p>



**TABLE 5.3 CONNECTIVITY** *(CONTINUED)*

TOPICS/STRATEGIES	GENERAL RECOMMENDATIONS
<b>3.2. Require connectivity/cross-access between adjacent land parcels</b>	<p>Requiring connectivity or cross-access between adjacent developments is a great tool for reducing the amount of traffic on major roads while increasing connectivity for pedestrians, bicycles, service vehicles, and neighborhood access.</p> <p>For good model language, see City of Wilson, NC UDO, Section 6.4: Connectivity: <a href="http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-6-Infrastructure-Standards.pdf">http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-6-Infrastructure-Standards.pdf</a></p> <p>Or City of Wake Forest, NC UDO, Section 6.5, Connectivity: <a href="http://www.wakeforestnc.gov/udo.aspx">http://www.wakeforestnc.gov/udo.aspx</a></p> <p>Both codes above also provide requirements for when bicycle/pedestrian connections between parcels, public open space, and between cul-de-sacs is required.</p> <p>See also the excellent Major &amp; Collector Street Plan: Implementing Complete Streets for Nashville/Davidson County, TN: <a href="http://www.nashville.gov/Portals/0/SiteContent/Planning/docs/NashvilleNext/PlanVolumes/next-volume5-MCSP.pdf">http://www.nashville.gov/Portals/0/SiteContent/Planning/docs/NashvilleNext/PlanVolumes/next-volume5-MCSP.pdf</a></p>
<b>3.3. Limit dead end streets or cul-de-sacs</b>  Dead end streets or Cul-de-sacs, while good at limiting motor vehicular traffic in an area, are a severe hindrance to pedestrian and bicycle connectivity and overall neighborhood accessibility, including for emergency access and other services.	<p>Make the maximum length for Cul-de-sacs 250-300 feet to limit the distance that a person would have to travel along a cul-de-sac.</p> <p>For good model language, see City of Wilson, NC UDO, Section 6.4: Connectivity: <a href="http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-6-Infrastructure-Standards.pdf">http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-6-Infrastructure-Standards.pdf</a></p> <p>Or City of Wake Forest, NC UDO, Section 6.5, Connectivity: <a href="https://www.wakeforestnc.gov/udo.aspx">https://www.wakeforestnc.gov/udo.aspx</a></p>
The documents to the right were referenced for this policy and regulatory review.	<p><b>REFERENCED DOCUMENTS AND RESOURCES:</b></p> <ol style="list-style-type: none"> <li>1. NCDOT Traditional Neighborhood Development (TND) Guidelines: <a href="https://connect.ncdot.gov/projects/Roadway/RoadwayDesignAdministrativeDocuments/Traditional%20Neighborhood%20Development%20Manual.pdf">https://connect.ncdot.gov/projects/Roadway/RoadwayDesignAdministrativeDocuments/Traditional Neighborhood Development Manual.pdf</a></li> <li>2. City of Wilson, NC UDO: <a href="https://www.wilsonnc.org/development-services/unified-development-ordinance/">https://www.wilsonnc.org/development-services/unified-development-ordinance/</a></li> <li>3. Town of Wendell, NC UDO: <a href="http://www.townofwendell.com/departments/planning/development/zoning/udo-unified-development-ordinance">http://www.townofwendell.com/departments/planning/development/zoning/udo-unified-development-ordinance</a></li> <li>4. City of Wake Forest, NC UDO: <a href="http://www.wakeforestnc.gov/udo.aspx">http://www.wakeforestnc.gov/udo.aspx</a></li> <li>5. See Town of Davidson, NC Planning Ordinance, <a href="https://www.ci.davidson.nc.us/1006/Planning-Ordinance">https://www.ci.davidson.nc.us/1006/Planning-Ordinance</a></li> <li>6. Association of Pedestrian and Bicycle Professionals' Bicycle Parking Guidelines. (<a href="http://www.apbp.org">www.apbp.org</a>)</li> <li>7. Making Neighborhoods More Walkable and Bikeable, ChangeLab Solutions: <a href="http://changelabsolutions.org/sites/default/files/MoveThisWay_FINAL-20130905.pdf">http://changelabsolutions.org/sites/default/files/MoveThisWay_FINAL-20130905.pdf</a></li> <li>8. Getting the Wheels Rolling: A Guide to Using Policy to Create Bicycle Friendly Communities, ChangeLab Solutions <a href="http://changelabsolutions.org/bike-policies">http://changelabsolutions.org/bike-policies</a></li> </ol> <p>And other documents noted in this column in the preceding tables.</p>



## TABLE 5.4 POLICY CONSIDERATIONS BY SETTLEMENT TYPES

Table 5.4 presents a general set of policy considerations that are organized in tabular form and calibrated to the region's range of settlement types, so that they may be considered and applied in different communities throughout the region.



Natural



Farmland



Hamlet



Village



Town



City

### TRANSPORTATION NETWORK

**Objective:** Accommodate bicyclists through the ongoing development of a context-sensitive regional and local transportation infrastructure network.

Ensure that the region's thoroughfare system is compatible with adjacent land uses and natural/built character.	●	●	●	●	●	●
Promote positive health, recreation, transportation, economic, and environmental benefits of bicycle investments.	●	●	●	●	●	●
Coordinate with NCDOT Context Sensitive Solutions and the Complete Streets Policy along and across state roadways.	●	●	●	●	●	●
Require new development to minimize driveway accesses in order to reduce conflict points.				●	●	●
Partner with State and local entities to explore alternative funding sources that support transportation options throughout the region, including integrating bicycle and pedestrian facilities.	●	●	●	●	●	●
Encourage local jurisdictions to require development to fund proportional share of transportation infrastructure costs.			●	●	●	●
Work with all jurisdictions to reduce motor vehicle speeds by implementing proven traffic-calming measures.				●	●	●
Supplement subdivision regulations with context-appropriate block size and street connectivity standards.			●	●	●	●



**TABLE 5.4 POLICY CONSIDERATIONS BY SETTLEMENT TYPES** (CONTINUED)



Natural



Farmland



Hamlet



Village



Town



City

## BIKEWAY INFRASTRUCTURE

*Objective: Accommodate bicyclists through the ongoing development of context-appropriate bikeways, bicycle parking, and bikeway signing and wayfinding.*

Ensure that the maintenance/expansion of the regional thoroughfare system serves bicyclists and pedestrians.	●		●		●		●		●		●	
Coordinate planning, design, and implementation of context-sensitive bicycle improvements with the Facility Continuum (Ch 3).	●		●		●		●		●		●	
Use this Regional Bicycle Plan to guide future planning, design, and implementation of bicycle infrastructure in conjunction with other local and regional planning and development projects.	●		●		●		●		●		●	
Encourage county/municipal parking requirements to include bicycle parking at areas of regional and local significance, such as schools, government offices, churches etc.					●		●		●		●	
Encourage county/municipal parking requirements to follow the Association for Pedestrian and Bicycle Professional's (APBP) bicycle parking design and location guidelines, including provisions for short- and long-term parking.					●		●		●		●	
Work with state, county, and local entities to enhance the safety and visibility of the regional bicycle network by implementing appropriate safety and wayfinding signage improvements.	●		●		●		●		●		●	



**Mapping Exercise**

Please help us identify:

- Accuracy of draft base map
- Key destinations
- Additional existing facilities
- Missing facilities (development planned, in design, or under construction)
- Upcoming roadway projects with opportunity to add facilities
- Target areas and corridors for recommended improvements

*Steering Committee Meeting for the Yadkin Valley Regional Bike Plan (photo: Alta)*





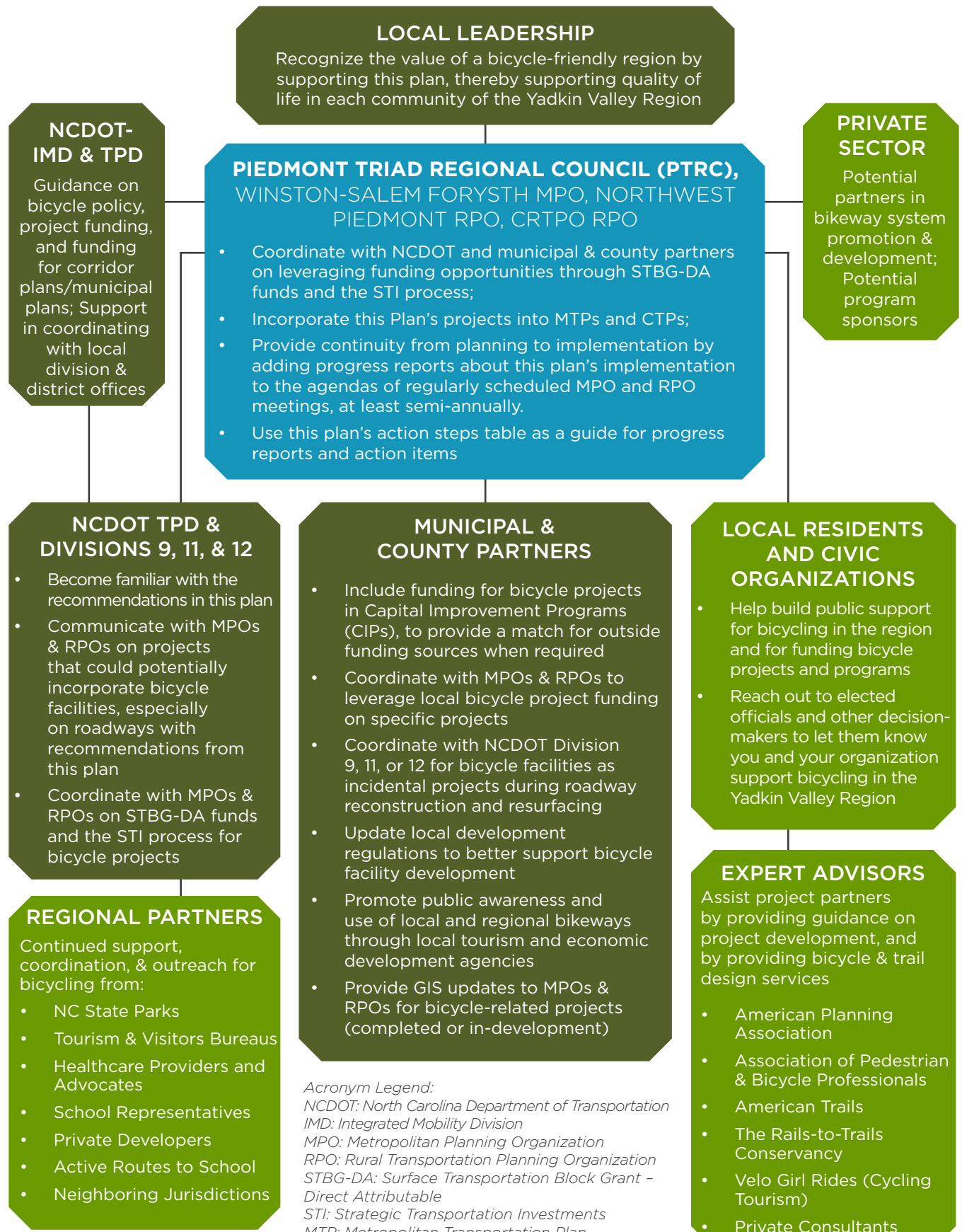
# OVERVIEW

*Implementation of the Yadkin Valley Regional Bicycle Plan will require dedication and involvement from a wide range of community partners. This chapter outlines how these partners could work together towards implementation, and features resources and action steps to help move projects forward.*

## STAKEHOLDER COORDINATION FOR IMPLEMENTATION

- As the overall regional champion of this plan, the **PIEDMONT TRIAD REGIONAL COUNCIL (PTRC)** serves as the main point of contact for information about the plan's recommendations, cost estimates, mapping data, presentation materials, and other resources. The Winston-Salem Forsyth MPO, Northwest Piedmont RPO, and CRTPO RPO should also play lead roles in implementation in their respective parts of the study area.
- **MUNICIPAL & COUNTY PARTNERS** that will implement the plan on the local level, include staff from municipal and county planning, transportation, recreation, and public works departments, among others. This includes town and county managers and administrators, especially in small communities that do not have departmental staff. **NCDOT TPD & DIVISIONS 9, 11, and 12** are also key partners, and are critical to implementation on state roadways and rights-of-way, where many of this plan's recommendations would be physically located. See the acknowledgements section of this plan for specific NCDOT division-level contacts.
- Other groups could also support the implementation of this plan, particularly for this plan's program recommendations, listed in Chapter 4. These include **REGIONAL PARTNERS, LOCAL RESIDENTS, AND CIVIC ORGANIZATIONS**, including those related to health, wellness, recreation, tourism, military, public education, and other related areas.
- PTRC and its implementation partners should reach out for technical assistance when needed. **EXPERT ADVISORS** include staff from the **NCDOT INTEGRATED MOBILITY DIVISION (IMD)**, private consultants, the American Planning Association (APA), the Association of Pedestrian and Bicycle Professionals (APBP), American Trails, and the Rails-to-Trails Conservancy.
- Successful implementation is rarely possible without the support of **LOCAL LEADERSHIP**. This includes mayors, council members, city and town managers, county boards, and in cases of large-scale project investments, state representatives. PTRC and its key partners should be well-versed in the vision, goals, and benefits of this plan (covered in Chapter 1), and well-equipped with presentation materials, so that they are able to successfully communicate the need for this plan to local leaders and the **PRIVATE SECTOR**. This is important for multiple settings, including public presentations, budgeting meetings, and staff retreats, where decisions are often made about funding needs and priorities.

## ORGANIZATIONAL FRAMEWORK FOR IMPLEMENTATION



### Acronym Legend:

NCDOT: North Carolina Department of Transportation

IMD: Integrated Mobility Division

MPO: Metropolitan Planning Organization

RPO: Rural Transportation Planning Organization

STBG-DA: Surface Transportation Block Grant – Direct Attributable

STI: Strategic Transportation Investments

MTP: Metropolitan Transportation Plan

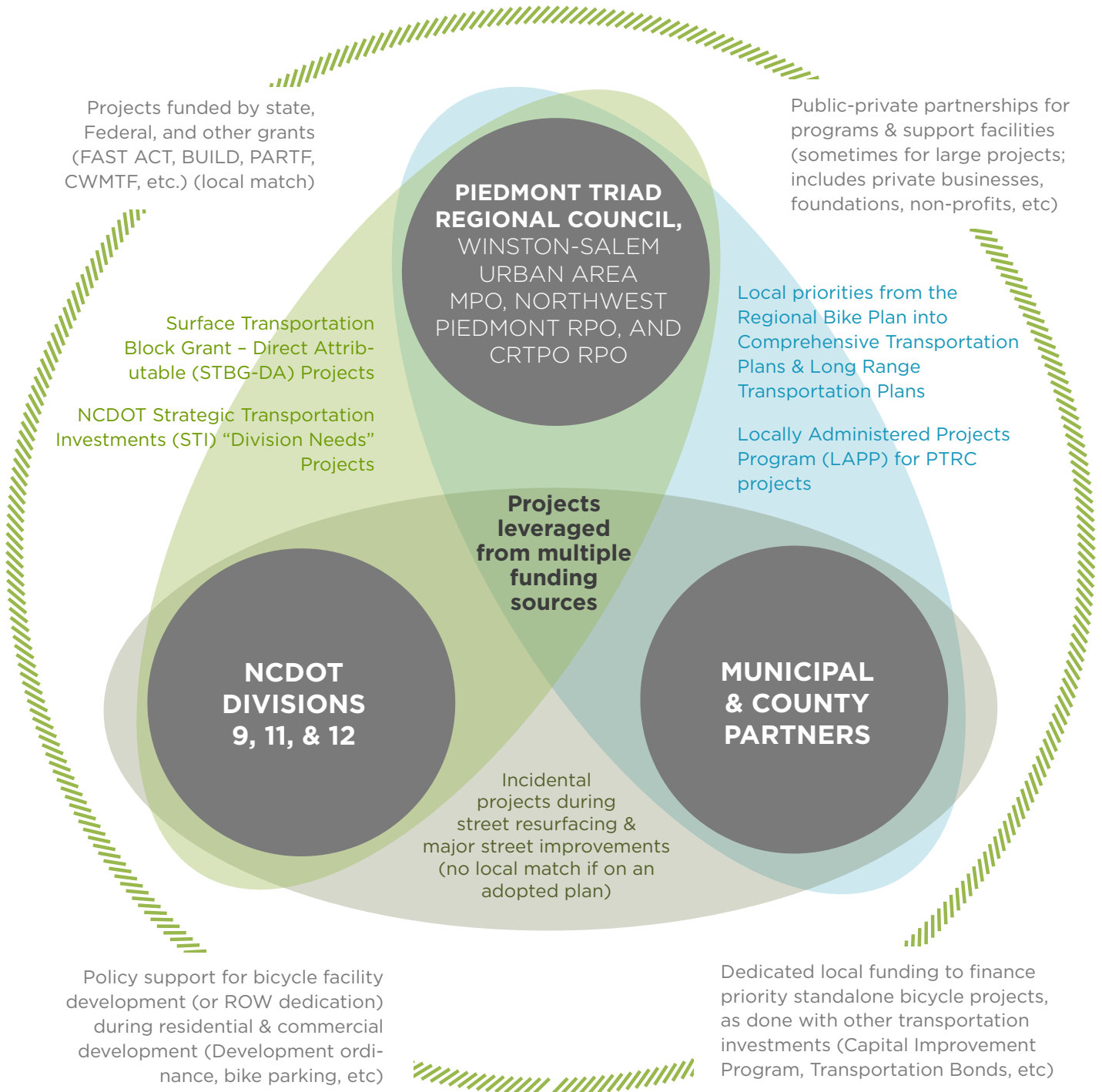
CTP: Comprehensive Transportation Plan

GIS: Geographic Information Systems



## PROJECT DEVELOPMENT OPPORTUNITIES for the REGIONAL BICYCLE PLAN RECOMMENDATIONS

Some of the project development opportunities shown below may require involvement from all three of the major groups listed (MPO/RPO, municipal/county partners, and NCDOT), but are placed in rough proximity of the groups that might lead such efforts.







## PROJECT DEVELOPMENT TIMELINES

These action steps draw from the opportunities shown on the previous page. These should be the guiding steps for the MPOs, RPOs, and local governments to begin on top projects.

# 1

### YEARS 1-5: PILOT PROJECTS & STRATEGIC PREPARATION FOR PROJECT DEVELOPMENT

1. Adopt this plan. Adoption signals intent to complete projects over time, but does not commit local communities to funding. Having an adopted plan is helpful in securing funding from federal, state, and private agencies, and in some cases is a prerequisite to eliminating local match requirements from NCDOT (see the Complete Streets Policy discussion in the previous chapter). See example adoption resolution at the end of this chapter.
2. Update Comprehensive Transportation Plans (CTPs) & Metropolitan Transportation Plans (MTPs) with recommendations from this Regional Bicycle Plan.
3. Local governments should update their development regulations to better support bicycling, and to ensure dedication of right-of-way (ROW) for bicycle facilities on adopted plans (see previous chapter). This is a key step to the long-term development of recommended trail corridors.
4. Local governments should submit projects for funding through the RPO and MPO, coordinating with NCDOT on STBG-DA funding and STI Division Needs projects.
5. Local governments and MPOs/RPOs should identify 1-3 pilot projects or programs from this plan that can be pursued in partnership with one another.
6. Local governments should consider dedication of regularly recurring local funding for top projects and for incidental projects. A local match may be required for state/federal funding; this can be met through local Capital Improvement Programs (CIPs), local bonds, or similar (see Appendix B).
7. Local governments and MPOs/RPOs should explore program or project funding through public-private partnerships (see section on ‘Engaging Private Funding’ in this chapter).
8. Prepare “shovel-ready”, high-impact projects for potential future U.S. DOT grant funding such as BUILD grants (or similar), by securing project corridor ROW & initiating design.
9. Research & prepare grant applications for bicycle & trail projects (see Appendix B).

# 2

### YEARS 6-10: CONTINUED PROJECT DEVELOPMENT

By this phase, if many steps above are complete, some of this plan’s projects will be at various stages of funding, design, and development, and others will be complete. In 2025, reassess system-wide goals and reevaluate the approach to implementation. Years 6-10 will mainly be about completing the projects initiated in years 1-5, and initiating new ones. Based on similar planning and implementation efforts in North Carolina and nationally, this plan would be a success if many of the top projects were completed by year 10 (see cutsheets), along with key policy and program recommendations. See Performance Measures listed at the end of this chapter for other ways to measure success.

# 3

### YEAR 10: FULL PLAN UPDATE

In 2030, complete a full plan update. Evaluate what has worked and what has not. Reconfirm priorities and long-term projects; update recommendations accordingly.



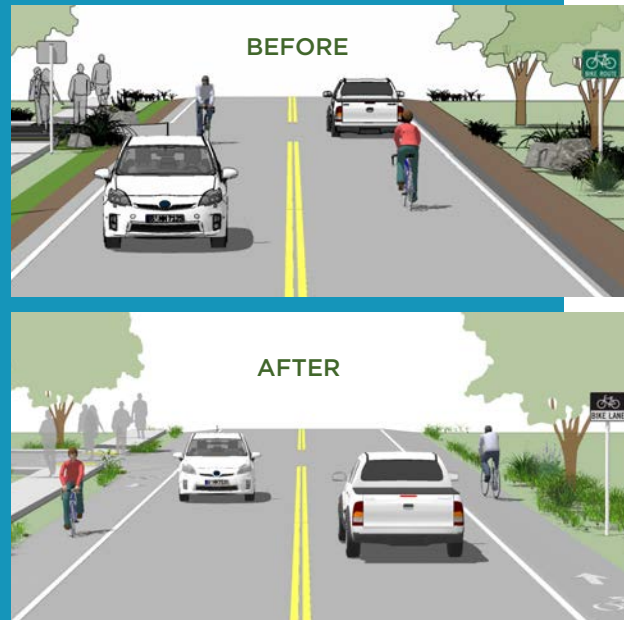
## EXAMPLE TYPES OF PROJECT DEVELOPMENT ON EXISTING ROADWAYS

Three common types of bicycle facility implementation for existing roadways are described below and on the following pages: Roadway widening, lane narrowing, and lane reconfiguration.

### ROADWAY WIDENING

Bike lanes can be accommodated on streets with excess right-of-way through shoulder widening. Although roadway widening incurs higher expenses compared with re-striping projects, bike lanes can be added to streets currently lacking curbs, gutters and sidewalks without the high costs of major infrastructure reconstruction (they can be added by expanding roads with curb and gutter as well, but at a greater cost).

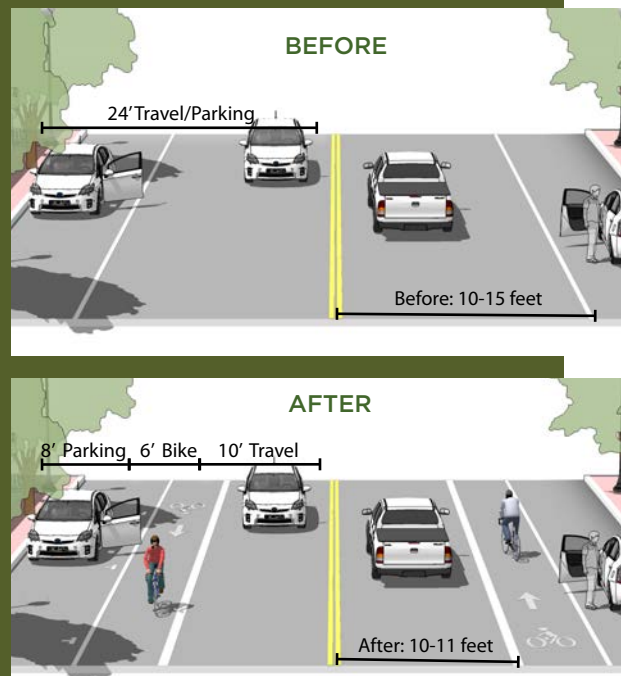
Typical application is on roads lacking curbs, gutters and sidewalks. There should be a four-foot minimum width for the bicycle lane when no curb and gutter is present, with a six-foot width preferred. If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. Overall guidance on bicycle lanes and paved shoulders applies to this treatment; for more information, see Appendix A for a list of Design Guide Resources.



### LANE NARROWING

Lane narrowing utilizes roadway space that exceeds minimum standards to provide the needed space for bike lanes. Many roadways have existing travel lanes that are wider than those prescribed in local and national roadway design standards, or which are not marked. Typical application includes:

- On roadways with wide lane widths. Most standards allow for the use of 11 foot and sometimes 10 foot wide travel lanes to create space for bike lanes.
- Special consideration should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. Center turn lanes can also be narrowed in some situations to free up pavement space for bike lanes.



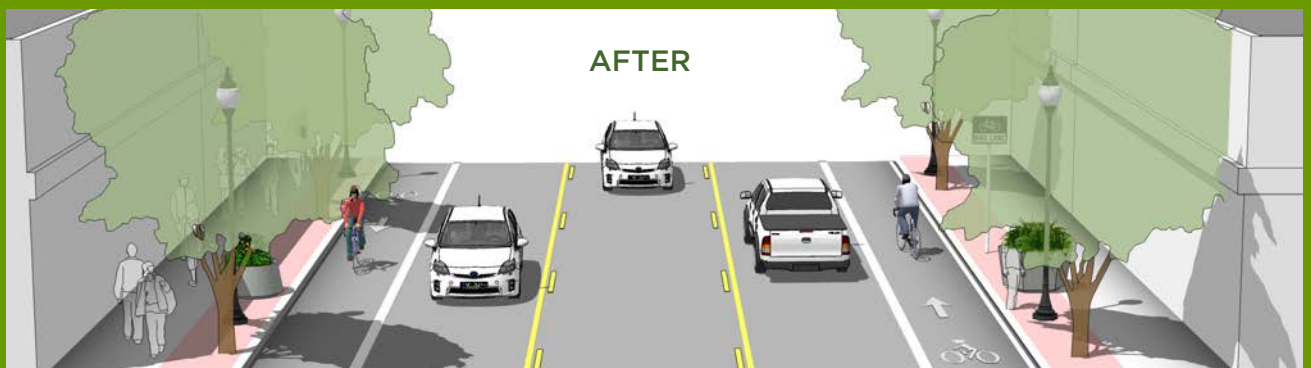
## LANE RECONFIGURATION

The removal of a single travel lane will generally provide sufficient space for bike lanes on both sides of a street. Streets with excess vehicle capacity provide opportunities for bike lane retrofit projects. Depending on a street's existing configuration, traffic operations, user needs and safety concerns, various lane reduction configurations may apply. For instance, a four-lane street (with two travel lanes in each direction) could be modified to provide one travel lane in each direction, a center turn lane, and bike lanes. Prior to implementing this measure, a traffic analysis should identify potential impacts. Considerations include:

- Width depends on project. No narrowing may be needed if a lane is removed.
- Guidance on bicycle lanes applies to this treatment; see Appendix A for a list of Design Guide Resources.



*Example lane-reconfiguration recommendation: Renfro St in Mount Airy, NC (existing conditions above and photo-rendering of "after" scenario below).*

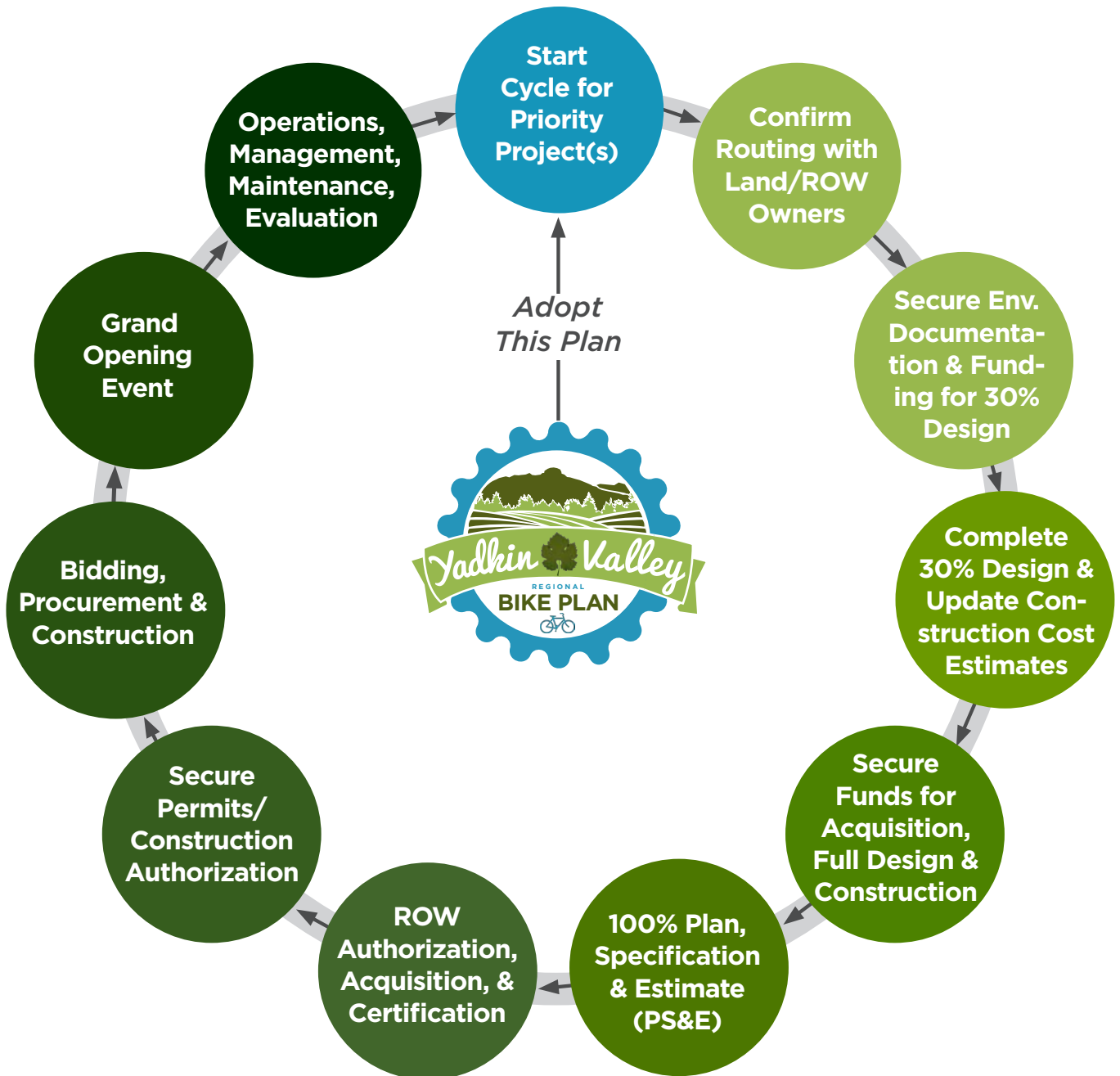






## TYPICAL PROJECT DEVELOPMENT PROCESS

These are the steps typically involved in bicycle facility development, when the project is being built independent of other major development or roadway projects. Certain funding sources may have additional requirements, and some steps may occur simultaneously or in a different order.



## IMPLEMENTATION ACTION STEPS TABLE

POLICY & COORDINATION				
#	Action Step	Lead Agency	Support	Phase
1	<b>PASS RESOLUTIONS OF SUPPORT IN LOCAL COMMUNITIES &amp; PLAN ADOPTION BY MPOs &amp; RPOs:</b> Focus on the health, safety, and economic benefits of bicycling (Chapter 1) and key recommendations (Chapters 3). Adoption signals intent to implement the plan over time; it does not commit funding. See example resolution of support at end of this chapter. PTRC can provide a plan summary PPT and plan materials to be used in presentations by local staff.	County and Municipal Partners + MPOs/RPOs	PTRC & Alta Planning + Design	Short Term (2020)
2	<b>COORDINATE WITH NCDOT ON KEY RECOMMENDATIONS, INCLUDING CTP UPDATES:</b> This plan and the recommended bicycle facilities should be officially recognized by NCDOT and incorporated in CTPs. NCDOT should also refer to this document when assessing the impact of future projects and plans, such as bicycle facilities on future bridge improvements. Effort should be made between state and local partners to include parallel bicycle facilities on planned future roadways and roadway reconstruction projects, especially where they appear on adopted plans.	County and Municipal Partners + MPOs/RPOs	NCDOT Division 9, 11, & 12; NCDOT-IMD; Alta Planning + Design	Short Term (2020)
3	<b>AMEND DEVELOPMENT ORDINANCES AND TECHNICAL STANDARDS:</b> County and local development ordinances should be amended to ensure that, as residential and commercial development is planned and reviewed, the facility recommendations in this plan are incorporated. This would entail amending development regulations to have developers set aside land for facilities when development proposals overlap with the proposed routes, as adopted. Local governments should also consider requirements such as dedicated easements, connections to adjacent land uses, issuing credits, and offering some form of recognition to developers who go above and beyond the requirements for trail development. See Chapter 5 for more information, including links to model policy language from other communities.	County and Municipal Partners	County & Local Planning Boards; North Carolina Chapter of the American Planning Association	Short Term (2020)
4	<b>REVISE SEWER, STORMWATER AND UTILITY EASEMENT POLICIES:</b> New sewer, stormwater, and utility easements should be considered for allowing public access as a matter of right. Such a consideration should allow for access that does not require landowner approval for each parcel the easement overlaps. As trails are developed, also review applicable existing easements for similar revision considerations.	County and Municipal Partners	County & Local Planning Boards	Short Term (2020)
5	<b>DEVELOP A CORPORATE SPONSORSHIP POLICY FOR NEW AND UPCOMING PROJECT SEGMENTS:</b> For a comprehensive sponsorship policy example, see that of Portland Parks and Recreation: <a href="http://www.portlandonline.com/shared/cfm/image.cfm?id=155570">www.portlandonline.com/shared/cfm/image.cfm?id=155570</a> . For a sponsorship brochure example, see that of the 'Mountains to Sound Greenway': <a href="https://mtsgreenway.org/support/sponsorships/">https://mtsgreenway.org/support/sponsorships/</a>	County and Municipal Partners	Local Private Sector Partners	Short Term (2021)
6	<b>DEVELOP A COORDINATED OPERATIONS &amp; MAINTENANCE PLAN:</b> A maintenance plan (or alternatively, a memorandum of understanding (MOU)), will help to apportion responsibility between agencies where facilities cross jurisdictional boundaries or where pooled efforts can reduce costs. This will become increasingly important as regional trails continue to grow and expand across jurisdictions.	County and Municipal Partners	NCDOT Division 9, 11, & 12	Mid-Term (2022)

NCDOT: North Carolina Department of Transportation | IMD: Integrated Mobility Division  
MPO: Metropolitan Planning Organization | RPO: Rural Transportation Planning Organization



PROGRAMS				
#	Action Step	Lead Agency	Support	Phase
1	<b>RELEASE THE ONLINE &amp; BROCHURE MAPS PRODUCED FOR THIS PLAN:</b> Provide the brochure maps and links to the online map to local-area tourism agencies and visitors bureaus. Offer and provide training to tourism representatives on how to use the online map, so they can in-turn promote it successfully. See Appendix D for details, and the online map here: <a href="https://velogirlrides.com/yadkin-valley-regional-bicycle-tourism-map/">https://velogirlrides.com/yadkin-valley-regional-bicycle-tourism-map/</a>	PTRC (possibly with Velo Girl Rides)	Tourism agencies & visitors bureaus	Short Term (2020)
2	<b>REGULARLY DISCUSS PROGRESS ON ACTION STEPS &amp; THE NEXT STEPS FOR PLAN IMPLEMENTATION.</b> Progress reports about this plan's implementation should be added to the agendas of regularly scheduled MPO and RPO meetings. The purpose is to establish regional coordination for bicycle facility development between the member agencies. Meeting discussions should evaluate implementation progress and set goals to be achieved before the next meeting. These meeting agendas could also feature special presentations by stakeholders and invited guests related to plan progress.	PTRC, MPOs and RPOs	All Project Stakeholders	Short Term (2020); Semi-annual meetings thereafter
3	<b>SHARE GEOGRAPHIC INFORMATION SYSTEM (GIS) DATA</b> with the Pedestrian and Bicycle Infrastructure Network (PBIN) as updates are made to both existing and planned bicycle facilities in the region. The PBIN is a statewide GIS inventory of existing and planned bicycling and walking facilities in North Carolina. The PBIN is maintained by the NCDOT-IMD and the Institute for Transportation Research and Education (ITRE). More information can be found here: <a href="https://itre.ncsu.edu/technical-services/geospatial">https://itre.ncsu.edu/technical-services/geospatial</a>	County and Municipal Partners	MPOs and RPOs	Ongoing; Consider Semi-annual updates (consider same time as workshop)
4	<b>CONDUCT BICYCLE FACILITY RIDERSHIP COUNTS:</b> Bicycle facility usage data is needed to strengthen grant requests and influence policy and funding decisions. A complete picture of bicyclist characteristics can be developed and outcomes can help to identify if additional amenities would improve the bicyclist experience.	PTRC or City of City of Winston-Salem	Planning Consultant or Using In-House Equipment	Short Term (2020-2021)
5	<b>SAFE ROUTES TO SCHOOL PROGRAMS:</b> While many schools and communities across the region have successfully engaged in these types of programs in the past, it is recommended that all schools and communities aim to increase the number of elementary and middle school students who safely walk and bike to school. See the North Carolina Safe Routes to School Handbook: <a href="https://www.communityclinicalconnections.com/srtshandbook/index.html">https://www.communityclinicalconnections.com/srtshandbook/index.html</a> and the Safe Routes to School National Partnership: <a href="https://www.saferoutespartnership.org/safe-routes-school">https://www.saferoutespartnership.org/safe-routes-school</a>	County Schools/ Partners	County Planners, Fire and Police Departments	Short Term (2020-2021)
6	<b>LAUNCH PRIORITY PROGRAMS:</b> Stakeholders should coordinate to launch new programs, such as those also described in Chapter 4.	PTRC and Municipal Partners	All Project Stakeholders	Short Term (2020 -2022)
7	<b>ESTABLISH A REGIONAL BRANDING AND WAYFINDING SYSTEM</b> for bicycle routes and other points of interest throughout the region. After more of the longer-distance routes are connected throughout the region, a wayfinding system is recommended to create a cohesive and easy-to-use platform for navigating the regional bicycle route system. The system should be designed so that it is flexible enough to be updated as new projects are completed, and should be implemented in conjunction with a statewide and national marketing strategy. See Chapter 4 and Appendix A for more information about wayfinding program and design resources.	PTRC, MPOs and RPOs	Planning Consultant or In-House Design	Medium Term (2022 -2023)

NCDOT: North Carolina Department of Transportation | IMD: Integrated Mobility Division  
MPO: Metropolitan Planning Organization | RPO: Rural Transportation Planning Organization



INFRASTRUCTURE				
#	Action Step	Lead Agency	Support	Phase
1	<b>IDENTIFY AND SECURE SPECIFIC FUNDING SOURCES</b> for Priority Projects & begin design and construction phases as soon as possible. Partnerships for joint funding opportunities should be pursued (see organizational framework and related discussion at beginning of this chapter). Combine financial and management resources for bicycle facility development with surrounding municipalities, regional entities, and private sector partners (see 'Engaging Private Funding' section at the end of this Chapter). "Shovel-ready" designed projects should be prepared in the event that future funds become available. Coordinate with NCDOT to incorporate recommendations from this plan into the STIP and other funding sources (see Appendix B).	MPOs/RPOs, County, and Municipal Partners	NCDOT Division 9, 11, & 12 + NCDOT-IMD	Short Term (2020); Ongoing
2	<b>BUILD FURTHER PUBLIC SUPPORT</b> and input during the design phase for projects. Involve the general public in the design stage for bicycle facility development. Some groups can help with both routing ideas and public support from specific neighborhoods.	County & Municipal Partners	Local Advocates & General Public	Short Term (2020); Ongoing
3	<b>DEVELOP A LONG-TERM FUNDING STRATEGY</b> to allow continued development of the overall system. Capital funds for bicycle facility construction should be set aside every year, even if only a small amount; small amounts of local and county funding can be matched to outside funding sources, such as federal, state and private funds. Funding for an ongoing maintenance program should also be included in local operating budgets. Cross-jurisdictional projects lend themselves well to collaboration on funding, as coordinated multi-jurisdictional projects are often looked upon more favorably by outside funding sources than single-jurisdiction applications.	County & Municipal Partners	MPOs/RPOs	Short Term (2020); Ongoing
4	<b>MAINTAIN PAVED SHOULDERS:</b> When paved shoulders are implemented, especially along sections that carry higher traffic volumes and accumulate excess debris, regular maintenance should include clearing this debris so that bicyclists are not deterred from riding in this space.	NCDOT	County & Municipal Partners	Short Term (2020); Ongoing
5	<b>RE-EVALUATE AND RECONFIRM THE SHORT TERM PRIORITIES:</b> Every year, reevaluate short-term priorities based on what has been completed, and reconfirm the agenda of "priority" projects. Consider sticking with earlier projects that were not successful to-date, versus new opportunities that may have arisen or become more feasible since 2020.	PTRC, MPOs and RPOs	Project Consultants	Medium Term (2021-ongoing)
6	<b>UPDATE THIS PLAN:</b> In 2025, reassess systemwide goals and reevaluate the approach to implementation. In 2030, complete a full plan update.	PTRC and NCDOT-IMD	Project Consultants	Long Term (2025 & 2030)
7	<b>MEASURE PERFORMANCE:</b> See the following pages for potential performance measures that can be used to monitor progress of plan implementation over time.	MPOs/RPOs	County & Municipal Partners	Ongoing

NCDOT: North Carolina Department of Transportation | IMD: Integrated Mobility Division  
MPO: Metropolitan Planning Organization | RPO: Rural Transportation Planning Organization



## PERFORMANCE MEASURES

Measuring performance over time is essential to implementation. Tracking performance measures within communities and across the region will allow implementing agencies to understand progress, communicate successes and challenges, and motivate leaders to take further actions.

The following performance measures were selected to track progress toward the goals of this plan. Implementation progress updates at MPO/RPO meetings could be used as an opportunity to evaluate progress against these measures. Individual counties or municipalities may also be interested in tracking and reporting progress independently.

***Due to the difficulty in tracking all of these measures, suggestions for a select few that are more readily available are marked in bold below.***

### CONNECTIVITY, EQUITY, AND LIVABILITY MEASURES

- **Percentage of roadways that have designated or separated bicycle facilities**
- Percentage of new projects built as Complete Streets with connectivity to surrounding destinations
- Percentage of signalized intersections that have bike and pedestrian friendly accommodations
- Percentage of bridges with bicycle facilities
- Number of advocacy groups promoting bicycling
- Total funding devoted to the construction of bicycle facilities
- Towns, businesses, and colleges designated as Bicycle Friendly by the League of American Bicyclists
- Number of schools participating in bicycle safety education/encouragement programs

## HEALTH & ENVIRONMENTAL MEASURES

- **Mileage of greenways per person (residents and visitors)**
- **Bicyclist mode share**
- Percentage of trails completed through the region
- Physical inactivity rates & obesity rates
- Reduction in transportation-related emissions from increase in bicycling trips

### BICYCLING SAFETY MEASURES

- **Bicyclist crash and fatality rates per capita**
- Percentage of police departments completing bicycle education courses
- Number of citations related to bicycle safety violations to bicyclists and motorists
- Number of "Ride Guides" distributed. See 'Ride Guide: North Carolina Bicycle Laws' [https://www.bikelaw.com/wp-content/uploads/2014/11/BIKELAW\\_RG\\_NC\\_Web.pdf](https://www.bikelaw.com/wp-content/uploads/2014/11/BIKELAW_RG_NC_Web.pdf)

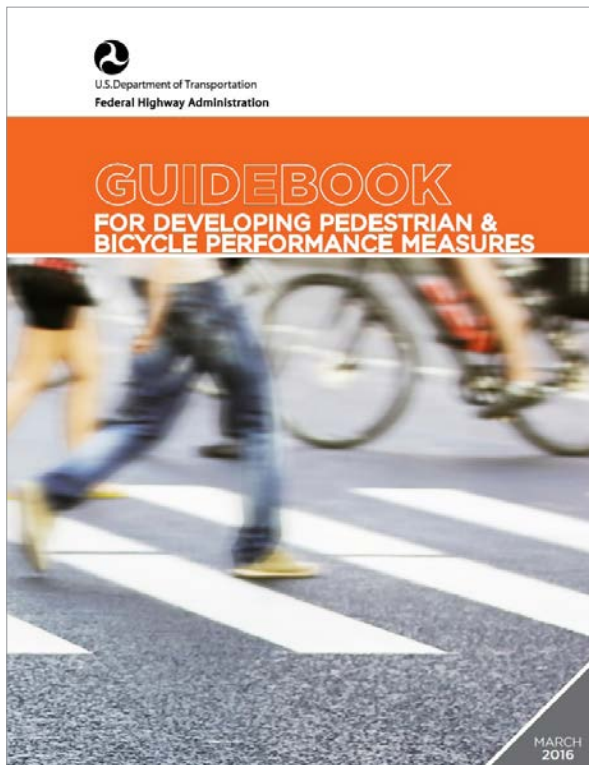
### ECONOMIC IMPACT MEASURES

- **Number of bike events in region and corresponding economic impact**
- Return on investment measures such as job creation, small business development, tourism, home prices
- Number of Chambers of Commerce, Visitor Bureaus, and other groups promoting bicycling
- Number of visitors coming to region partially due to bicycling amenities

## PERFORMANCE MEASURE RESOURCE: THE GUIDEBOOK FOR DEVELOPING PEDESTRIAN AND BICYCLE PERFORMANCE MEASURES

The goals of this plan, outlined in Chapter 1, were adapted from the Federal Highway Administration's Guidebook for Developing Pedestrian and Bicycle Performance Measures. This in-depth guidebook outlines 30 performance measures, including information on:

- Goals related to each measure
- Context/performance measure application
- How to track each measure
- Data needs & sources
- Peers tracking each measure
- Additional notes on each measure



*The Federal Highway Administration's Guidebook for Developing Pedestrian and Bicycle Performance Measures.*

Measures covered in the guidebook include:

- Access to Community Destinations
- Access to Jobs
- Adherence to Accessibility Laws
- Adherence to Traffic Laws
- Average Travel Time
- Average Trip Length
- Connectivity Index
- Crashes
- Crossing Opportunities
- Delay
- Density of Destinations
- Facility Maintenance
- Job Creation
- Land Consumption
- Land Value
- Level of Service
- Miles of Pedestrian/Bicycle Facilities
- Mode Split
- Network Completeness
- Pedestrian Space
- Person Throughput
- Physical Activity and Health
- Population Served by Walk/Bike/Transit
- Retail Impacts
- Route Directness
- Street Trees
- Transportation-Disadvantaged Population Served
- User Perceptions
- Vehicle Miles Traveled (VMT) Impacts
- Volume

The full guidebook is available for download through the Transportation Research Board at <http://www.trb.org/Main/Blurbs/174295.aspx>





## RESOLUTION OF SUPPORT

Elected officials can support the goals of this plan without immediately dedicating funding to it. This is usually expressed in the form of a resolution of adoption or support. Having an adopted plan will improve a community's chances of drawing outside funding, from state, federal, or private sources, and in some cases may be a prerequisite to eliminating local match requirements for NCDOT projects. Local communities need not adopt the entire regional plan, but may instead prefer to adopt the recommendations relating to their own jurisdiction. This approach is reflected in the example resolution below.

### ***DRAFT RESOLUTION ADOPTING THE YADKIN VALLEY REGIONAL BICYCLE PLAN***

WHEREAS, cities, towns, and regions around the country are increasingly recognizing the benefits that bicycle-friendly communities offer in terms of quality of life to residents and visitors; and

WHEREAS, representatives from counties, municipalities, transportation agencies, planning agencies, bicycling clubs, trail organizations, and multiple NCDOT divisions in the Yadkin Valley region of North Carolina have worked cooperatively for over a year on the Yadkin Valley Regional Bicycle Plan (the Plan) in order to make bicycling a safe and accessible form of transportation and recreation; and

WHEREAS, there were 264 reported bicycle crashes from 2007-2015 that have resulted in five bicyclist fatalities in the region; and

WHEREAS, the Plan will improve the quality and safety of bicycling through new and improved infrastructure, policies and programs, for all types of bicyclists; and

WHEREAS, the Plan will increase transportation choices by improving connectivity of the bicycle network while increasing accessibility to key destinations throughout the region; and

WHEREAS, BlueCross BlueShield North Carolina has stated that every \$1 investment in trails for physical activity can save about \$3 in medical expenses; and

WHEREAS, the Plan will improve health and wellness by increasing access to bikeways, thereby offering more opportunities for recreation, active transportation, and physical activity; and



## DRAFT RESOLUTION (CONTINUED)

WHEREAS, a 2018 study that evaluated the economic contribution of shared use paths in North Carolina found that every \$1.00 of trail construction supports \$1.72 annually from local business revenue, sales tax revenue, and benefits related to health and transportation; and...

WHEREAS, the Plan promotes bicycle-related tourism and economic development for communities in Surry, Stokes, Forsyth, Yadkin, Iredell, and Davie counties; and

WHEREAS, this Plan included an open and participatory process, with hundreds of mapping comments and public comment forms and in-person public outreach opportunities in each county; and

WHEREAS, over 80% of comment form respondents said they would be very likely to bike more often if more greenways and bicycle lanes physically separated from roadways were available; and

WHEREAS, it is envisioned that a more bicycle-friendly Yadkin Valley region would offer multiple quality of life benefits to residents and visitors by increasing public safety, supporting health and the environment, expanding choices for mobility, and growing the economy and tourism in local communities throughout the region, and;

WHEREAS, supporting this resolution does not replace local plans nor dedicate funding, but rather indicates a willingness to support the Plan's recommended bicycle projects and programs.

NOW THEREFORE, BE IT RESOLVED that the \_\_\_\_\_ hereby supports the Town of \_\_\_\_\_'s recommendations within the Yadkin Valley Regional Bicycle Plan.

This the \_\_\_\_\_ day of \_\_\_\_\_, 2019.

BY: \_\_\_\_\_  
\_\_\_\_\_

Name, Title

ATTEST:

Name, Title



## ENGAGING PRIVATE FUNDING

In the Yadkin Valley Region, many of the recommended long-term bicycle facility projects are in the form of greenway trails and rail-trails (see projects proposed throughout Chapter 3). According to public comment forms, greenway trails and other types of separated bikeways are the preferred facility type of many current and potential bicyclists, yet they are also the most challenging to develop. This is due to the costs related to trail construction and assembling trail right-of-way (as opposed to many on-road bicycle projects that can be achieved through restriping within existing public right-of-way). With cost as a major deterrent to realizing these long-term, long-distance greenway projects, it is important to look at how other communities are achieving success in this area.

Across the United States, one of the fastest emerging funding sources for greenway development is the private sector. Philanthropic organizations, corporate and family foundations, non-profit organizations and corporations have stepped up their involvement in greenway facility development in the form of financial support. This trend is occurring for various reasons, including support for improvements to quality of life, health and wellness, alternative transportation, conservation of natural resources and economic development. Most importantly, private financial support has enabled the greenway development process to move faster, so that facilities can be completed more efficiently.

## FOUR BASIC STEPS FOR ENGAGING PRIVATE FUNDING

### 1. DEVELOP THE “PITCH.”

*For the Yadkin Valley Region, this plan can become part of that pitch, particularly the benefits outlined in Chapter 1, the regional tourism maps, and the reasons for support outlined in the draft resolution of support at the end of this chapter.*

### 2. MAKE THE “ASK.”

*The team making the ask should expect to work extremely hard in advance of the ask, delivering the pitch to all participants, so that when the time comes for the ask, the results will be more or less expected.*

### 3. LEVERAGE A “LEAD GIFT.”

*A lead gift from a prominent and respected local project sponsor signifies the importance of the project throughout the entire community, and can be used to leverage other private funds, and/or as a match for public sector grants.*

### 4. CREATE AN INVITE LIST

*Continue to build momentum by asking additional organizations. Which groups, organizations and entities should be on a “short list” of invitees to help leverage the lead gift? See Appendix B for potential participants.*



## PRIVATE FUNDING CASE STUDIES

### RAZORBACK GREENWAY

In Northwest Arkansas, the Razorback Regional Greenway was conceived by the Northwest Arkansas Regional Planning Commission as a network of primarily on-road trails spanning the two-county region (Benton and Washington counties). In 2009, the Walton Family Foundation stepped in and spearheaded a public-private partnership that resulted in the development of a 36-mile, primarily off-road, world class regional greenway.

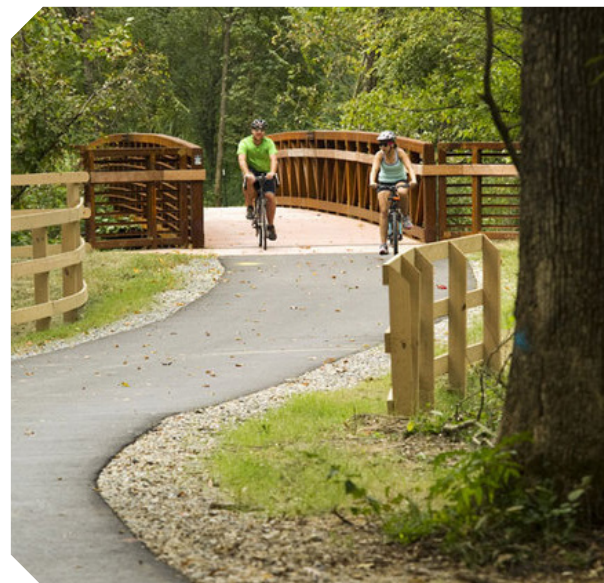
The Razorback Regional Greenway was funded from a combination of public and private funds, including a USDOT TIGER 2 grant of \$15 million, and a dollar for dollar gift from the Walton Family Foundation of \$15 million. Other grant funds were added later bringing the total funding to more than \$40 million. Without the lead gift from the Family Foundation, the project would never have happened. The Foundation based its gift on two community goals: 1) improve the health of local residents, and 2) support economic development throughout the region to keep Northwest Arkansas competitive for years to come. The 36-mile Razorback Regional Greenway was officially completed and opened for use in May 2015.

In reaction to a post-construction economic impact and trail usage study, Tom Walton of the Walton Family Foundation said, “While the energy generated by trails and paved paths is palpable across Northwest Arkansas, these findings validate cycling as a regional economic engine that supports local businesses, attracts tourists and builds healthier communities.” <https://www.waltonfamilyfoundation.org/about-us/newsroom/bicycling-provides-137-million-in-economic-benefits-to-northwest-arkansas>



### WOLF RIVER GREENWAY

In Memphis, Tennessee, the 36-mile Wolf River Greenway has been the brainchild of the Wolf River Conservancy (a non-profit land trust based in Memphis) for more than 35 years. Using a traditional approach of relying on public sector leadership and funding to build the project, the Conservancy became frustrated with the glacial pace of greenway facility development – in 35 years, approximately 5 miles of trail had been completed. In 2014, the Conservancy decided to fund the development of 22 miles of the trail within the Memphis city limits using private sector funds. As of 2016, the Conservancy has raised approximately \$40 million in support of facility development, with more than half of that coming from private sector sources. The Conservancy has then leveraged the private sector support to gain public sector support from the City of Memphis and Shelby County. The Conservancy expects to design, permit and build the entire 22 mile Memphis portion of the Greenway by 2019.







*Granite City Greenway in Mount Airy (photo: Alta)*





## OVERVIEW

Planners and project designers should refer to these standards and guidelines in developing the infrastructure projects recommended by this plan. The following resources are from the NCDOT website, for “Bicycle & Pedestrian Project Development & Design Guidance”, located here:

<https://connect.ncdot.gov/projects/BikePed/Pages/Guidance.aspx>

All resources listed below are linked through the web page listed above, retrieved in August 2018.

## NATIONAL GUIDELINES

American Association of State Highway and Transportation Officials (AASHTO):

- Guide for the Development of Bicycle Facilities
- Guide for the Planning, Design, and Operation of Pedestrian Facilities

The Federal Highway Administration (FHWA):

- Accessibility Guidance
- Design Guidance
- Facility Design
- Facility Operations

Manual on Uniform Traffic Control Devices (MUTCD):

- 2009 NC Supplement to MUTCD
- Part 4E: Pedestrian Control Features
- Part 7: Traffic Controls for School Areas
- Part 9: Traffic Controls for Bicycle Facilities

National Association of City Transportation Officials (NACTO):

- Urban Bikeway Design Guide
- Urban Street Design Guide

Safe Routes to School (SRTS) Non-Infrastructure:

- National Center for Safe Routes to School
- National Partnership for Safe Routes to School

US Access board:

- ABA Accessibility Standards
- ADA Accessibility Guidelines
- ADA Accessibility Standards
- Public Rights-of-Way, Streets & Sidewalks, and Shared Use Paths

## NORTH CAROLINA GUIDELINES

North Carolina Department of Transportation (NCDOT):

- WalkBikeNC: Statewide Pedestrian & Bicycle Plan
- Glossary of North Carolina Terminology for Active Transportation
- NCDOT Roadway Design Manual (will include additional complete streets design guidance during 2021 update)
- Evaluating Temporary Accommodations for Pedestrians
- NC Local Programs Handbook
- Traditional Neighborhood Development Guidelines

Greenway Construction Standards:

- Greenway Standards Summary Memo
- Design Issues Summary
- Greenway Design Guidelines Value Engineering Report
- Summary of Recommendations
- Minimum Pavement Design Recommendations for Greenways
- Steps to Construct a Greenway or Shared-Use Trail

NCDOT Bicycle and Pedestrian Policies

<https://connect.ncdot.gov/projects/BikePed/Pages/Policies-Guidelines.aspx>

Additional FHWA resources not currently linked through the main NCDOT link above:

- Achieving Multimodal Networks (2016)  
[https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/multimodal\\_networks/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multimodal_networks/)
- Separated Bike Lane Planning and Design Guide (2015)  
[https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/separated\\_bikelane\\_pdg/page00.cfm](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page00.cfm)
- Incorporating On-Road Bicycle Networks into Resurfacing Projects (2016)  
[https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/resurfacing/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/resurfacing/)
- Small Town and Rural Multimodal Networks Design Guide (2017)

Main Guide:

<http://ruralsideguide.com/>

Section specific to side paths:

<http://ruralsideguide.com/physically-separated/sidepath>





*Touring the Yadkin Valley Region by bicycle (photo: Velo Girl Rides)*

## OVERVIEW

When considering possible funding sources for bicycle and pedestrian projects, it is important to remember that not all construction activities or programs will be accomplished with a single funding source. It will be necessary to consider several sources of funding that together will support full project completion. Funding sources can be used for a variety of activities, including: programs, planning, design, implementation, and maintenance. This appendix outlines the most likely sources of funding from the federal, state, and local government levels as well as from the private and non-profit sectors. Note that this reflects the funding available at the time of writing. Funding amounts, cycles, and the programs themselves may change over time.

## FEDERAL FUNDING SOURCES

Federal funding is typically directed through state agencies to local governments either in the form of grants or direct appropriations. Federal funding typically requires a local match of five percent to 50 percent, but there are sometimes exceptions. The following is a list of possible Federal funding sources that could be used to support construction of pedestrian and bicycle improvements.

### FIXING AMERICA'S SURFACE TRANSPORTATION (FAST ACT)

In December 2015, President Obama signed the FAST Act into law, which replaces the previous Moving Ahead for Progress in the Twenty-First Century (MAP-21). The Act provides a long-term funding source of \$305 billion for surface transportation and planning for FY 2016-2020. Overall, the FAST Act retains eligibility for big programs - Transportation Investments Generating Economic Recovery (TIGER), Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ), and Highway Safety Improvement Program (HSIP) - and funding levels between highways and transit.

In North Carolina, federal monies are administered through the North Carolina Department of Transportation (NCDOT) and Metropolitan Planning Organizations (MPOs). Most, but not all, of these programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system. For more information, visit: <https://www.transportation.gov/fastact>.

## TRANSPORTATION ALTERNATIVES

Transportation Alternatives (TA) is a funding source under the FAST Act that consolidates three formerly separate programs under SAFETEA-LU: Transportation Enhancements (TE), Safe Routes to School (SRTS), and the Recreational Trails Program (RTP). These funds may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, side paths, and rail-trails. TA funds may also be used for selected education and encouragement programming such as Safe Routes to School, despite the fact that TA does not provide a guaranteed set-aside for this activity as SAFETEA-LU did.

Funding for the Surface Transportation Block Grant Program (STPBG) will grow from the current level of \$819 million per year to \$835 million in 2016 and 2017 and to \$850 million in 2018 through 2020.

The FAST Act provides \$84 million for the Recreational Trails Program. Funding is prorated among the 50 states and Washington D.C. in proportion to the relative amount of off-highway recreational fuel tax that its residents paid. To administer the funding, states hold a statewide competitive process. The legislation stipulates that funds must conform to the distribution formula of 30% for motorized projects, 30% for non-motorized projects, and 40% for mixed used projects. Each state governor is given the opportunity to "opt out" of the RTP.



For the complete list of eligible activities, visit: <http://www.fhwa.dot.gov/fastact/factsheets/stbgfs.cfm>

For funding levels, visit: <http://trade.railsto-trails.org/index>

## **SURFACE TRANSPORTATION PROGRAM**

The Surface Transportation Program (STP) provides states with flexible funds which may be used for a variety of highway, road, bridge, and transit projects. A wide variety of pedestrian improvements are eligible, including trails, sidewalks, crosswalks, pedestrian signals, and other ancillary facilities. Modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is also an eligible activity. Unlike most highway projects, STP-funded pedestrian facilities may be located on local and collector roads which are not part of the Federal-aid Highway System. 50 percent of each state's STP funds are allocated by population to the MPOs; the remaining 50 percent may be spent in any area of the state. For more information, visit <http://www.fhwa.dot.gov/specialfunding/stp/>

## **HIGHWAY SAFETY IMPROVEMENT PROGRAM**

HSIP provides \$2.4 billion for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. Bicycle and pedestrian safety improvements, enforcement activities, traffic calming projects, and crossing treatments for non-motorized users in school zones are eligible for these funds. For more information: <http://www.fhwa.dot.gov/fastact/factsheets/hsipfs.cfm>

## **CONGESTION MITIGATION/AIR QUALITY PROGRAM**

The Congestion Mitigation/Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and particulate matter which reduce transportation related emissions. States with no non-attainment areas may use their CMAQ funds for any CMAQ or STP eligible project. These federal dollars can be used to build bicycle

and pedestrian facilities that reduce travel by automobile. Purely recreational facilities generally are not eligible. Communities located in attainment areas who do not receive CMAQ funding apportionments may apply for CMAQ funding to implement projects that will reduce travel by automobile. For more information: <http://www.fhwa.dot.gov/fastact/factsheets/cmaqfs.cfm>

## **FEDERAL TRANSIT ADMINISTRATION ENHANCED MOBILITY OF SENIORS AND INDIVIDUALS WITH DISABILITIES**

This program can be used for capital expenses that support transportation to meet the special needs of older adults and persons with disabilities, including providing access to an eligible public transportation facility when the transportation service provided is unavailable, insufficient, or inappropriate to meeting these needs. For more information: <https://www.transit.dot.gov/funding/grants/enhanced-mobility-seniors-individuals-disabilities-section-5310>

## **SAFE ROUTES TO SCHOOL (SRTS) PROGRAM**

SRTS enables and encourages children to walk and bike to school. The program helps make walking and bicycling to school a safe and more appealing method of transportation for children. SRTS facilitates the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. Most of the types of eligible SRTS projects include sidewalks or a shared-use path. However, intersection improvements (i.e. signalization, marking/upgrading crosswalks, etc.), on street bicycle facilities (bike lanes, wide paved shoulders, etc.) or off-street shared-use paths are also eligible for SRTS funds.

The North Carolina Department of Transportation's Safe Routes to School (SRTS) Program was established in 2005 through SAFETEA-LU as a federally-funded program to provide an opportunity for communities to improve conditions for bicycling and walking to school. It is currently supported with Transportation Alternatives federal





funding through the Surface Transportation Block Grant program established under the FAST Act. The SRTS Program has set aside \$1,500,000 per year of Transportation Alternative Program (TAP) funds for non-infrastructure programs and activities. Funding may be requested to support activities for community-wide, regional or state-wide programs. This competitive reimbursement program is 80% federally funded – a 20% local match is required. For more information: <https://connect.ncdot.gov/projects/BikePed/Pages/Non-Infrastructure-Alternatives-Program.aspx>

Also see: <http://saferoutespartnership.org/healthy-communities/policy-change/federal/FAST-act-background-resources>

## OTHER FEDERAL FUNDING SOURCES

### FEDERAL LAND AND WATER CONSERVATION FUND

The Land and Water Conservation Fund (LWCF) provides grants for planning and acquiring outdoor recreation areas and facilities, including trails. Funds can be used for right-of-way acquisition and construction. The program is administered by the Department of Environment and Natural Resources as a grant program for states and local governments. Maximum annual grant awards for county governments, incorporated municipalities, public authorities, and federally recognized Indian tribes are \$250,000. The local match may be provided with in-kind services or cash. For more information: [http://www.ncparks.gov/About/grants/lwcf\\_main.php](http://www.ncparks.gov/About/grants/lwcf_main.php)

### RIVERS, TRAILS, AND CONSERVATION ASSISTANCE PROGRAM

The Rivers, Trails, and Conservation Assistance Program (RTCA) is a National Parks Service (NPS) program providing technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance—there are no implementation funds available. Projects are prioritized for assistance based on criteria including

conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. This program may benefit trail development in North Carolina locales indirectly through technical assistance, particularly for community organizations, but is not a capital funding source. Annual application deadline is August 1st. For more information: <http://www.nps.gov/ncrc/programs/rtca/> or contact the Southeast Region RTCA Program Manager Deirdre “Dee” Hewitt at (404) 507- 5691

### FEDERAL LANDS TRANSPORTATION PROGRAM (FLTP)

The FLTP funds projects that improve access within federal lands (including national forests, national parks, national wildlife refuges, national recreation areas, and other Federal public lands) on federally owned and maintained transportation facilities. More than \$300 million per fiscal year has been allocated to the program for 2017 and 2018. For more information: <https://flh.fhwa.dot.gov/programs/fltp/>

### ENERGY EFFICIENCY AND CONSERVATION BLOCK GRANTS

The Department of Energy’s Energy Efficiency and Conservation Block Grants (EECBG) may be used to reduce energy consumptions and fossil fuel emissions and for improvements in energy efficiency. Section 7 of the funding announcement states that these grants provide opportunities for the development and implementation of transportation programs to conserve energy used in transportation including development of infrastructure such as bike lanes and pathways and pedestrian walkways. Although the current grant period has passed, more opportunities may arise in the future. For more information: <https://www.energy.gov/eere/wipo/weatherization-and-intergovernmental-programs-office>



## BUILD TRANSPORTATION DISCRETIONARY GRANT PROGRAM

The Consolidated Appropriations Act, 2018 appropriated \$1.5 billion, available for obligation through September 30, 2020, for National Infrastructure Investments previously known as TIGER grants, and now renamed BUILD Transportation grants. As with previous rounds of TIGER, funds for the FY2018 BUILD Transportation program are to be awarded on a competitive basis for projects that will have a significant local or regional impact.

Funding provided under National Infrastructure Investments have supported capital projects which repair bridges or improve infrastructure to a state of good repair; projects that implement safety improvements to reduce fatalities and serious injuries, including improving grade crossings or providing shorter or more direct access to critical health services; projects that connect communities and people to jobs, services, and education; and, projects that anchor economic revitalization and job growth in communities. DOT intends to award a greater share of FY2018 BUILD Transportation grants to projects located in rural areas that align well with the selection criteria than to such projects in urban areas.

For more information: <https://www.transportation.gov/BUILDgrants/2019-build-application-faqs>

## ECONOMIC DEVELOPMENT ADMINISTRATION

Under Economic Development Administration's (EDA) Public Works and Economic Adjustment Assistance programs, grant applications are accepted for construction, non-construction, technical assistance, and revolving loan fund projects. "Grants and cooperative agreements made under these programs are designed to leverage existing regional assets and support the implementation of economic development strategies that advance new ideas and creative approaches to advance economic prosperity in distressed communities." Application deadlines are typically in March and June. For more information: <https://www.eda.gov/funding-opportunities/>

## ENVIRONMENTAL SOLUTIONS FOR COMMUNITIES GRANT PROGRAM

The National Fish and Wildlife Foundation (NFWF) and Wells Fargo seek to promote sustainable communities through Environmental Solutions for Communities by supporting highly-visible projects that link economic development and community well-being to the stewardship and health of the environment. Priority for grants to projects that successfully address one or more of the following:

- Support innovative, cost-effective programs that enhance stewardship on private agricultural lands to enhance water quality and quantity and/or improve wildlife habitat for species of concern, while maintaining or increasing agricultural productivity.
- Support community-based conservation projects that protect and restore local habitats and natural areas, enhance water quality, promote urban forestry, educate and train community leaders on sustainable practices, promote related job creation and training, and engage diverse partners and volunteers.
- Support visible and accessible demonstration projects that showcase innovative, cost-effective and environmentally-friendly approaches to improve environmental conditions within urban communities by 'greening' traditional infrastructure and public projects such as storm water management and flood control, public park enhancements, and renovations to public facilities.
- Support projects that increase the resiliency of the Nation's coastal communities and ecosystems by restoring coastal habitats, living resources, and water quality to enhance livelihoods and quality of life in these communities.
- In North Carolina, strong preference will be given to projects located in the regions of Charlotte, Raleigh, or Winston Salem.

For more information: <https://www.nfwf.org/environmentalsolutions/Pages/home.aspx>



# STATE FUNDING SOURCES

There are multiple sources for state funding of bicycle and pedestrian transportation projects. However, beginning July 1, 2015, state transportation funds cannot be used to match federally-funded transportation projects, according to a law passed by the North Carolina Legislature.

## NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) STRATEGIC TRANSPORTATION INVESTMENTS (STI)

Passed in 2013, the Strategic Transportation Investments law (STI) allows NCDOT to use its funding more efficiently and effectively to enhance the state's infrastructure, while supporting economic growth, job creation and a higher quality of life. This process encourages thinking from a statewide and regional perspective while also providing flexibility to address local needs.

STI also establishes a way of allocating available revenues based on data-driven scoring and local input. It is used for the State Transportation Improvement Program (STIP), which identifies the transportation projects that will receive funding during a 10-year period. STIP is a state and federal requirement, which NCDOT updates it every two years.

### STI'S QUANTITATIVE SCORING PROCESS

All independent bicycle and pedestrian projects are ranked based on a quantitative scoring process, with the following main steps:

1. Initial Project Review (NCDOT Strategic Prioritization Office (SPOT))
2. Review Projects and Data (NCDOT Integrated Mobility Division (IMD))
3. Review Data (MPOs, RPOs, Divisions)
4. Review Updates and Calculate Measures (NCDOT IMD)
5. Score Projects (NCDOT SPOT)

## BICYCLE AND PEDESTRIAN PROJECT ELIGIBILITY REQUIREMENTS:

- Minimum total project cost = \$100,000
- Eligible costs include right-of-way, preliminary engineering, and construction
- **Bicycle and pedestrian and public transportation facilities that appear in a state, regional or locally adopted transportation plan will be included as part of the proposed roadway project. NC-DOT will fully fund the cost of designing, acquiring right of way, and constructing the identified facilities** (see full policy at the end of this chapter)
- Includes adopted bicycle plans, greenway plans, pedestrian plans, Safe Routes to School action plans, comprehensive transportation plans (CTPs), and long range transportation plans

## SPECIFIC IMPROVEMENT TYPES :

1. Grade-Separated Bicycle Facility (Bicycle)
2. Off-Road/Separated Linear Bicycle Facility (Bicycle)
3. On-Road; Designated Bicycle Facility (Bicycle)
4. On-Road Bicycle Facility (Bicycle)
5. Multi-Site Bicycle Facility (Bicycle)
6. Grade-Separated Pedestrian Facility (Pedestrian)
7. Protected Linear Pedestrian Facility (Pedestrian)
8. Multi-Site Pedestrian Facility (Pedestrian)
9. Improved Pedestrian Facility (Pedestrian)

## BUNDLING PROJECTS :

- Allow across geographies and across varying project types
- Bundling will be limited by project management requirements rather than geographic limitations
- Any bundled project must be expected to be under one project manager/administrative unit (must be a TAP-eligible entity)
- Makes projects more attractive for LIPs and easier to manage/let





## STI BICYCLE & PEDESTRIAN PROJECT SCORING:

Criteria	Measure	Division Needs (50%)
Safety	(Number of crashes x 40%) + (Crash severity x 20%) + (Safety risk x 20%) + (Safety benefit x 20%)	20%
Accessibility/ Connectivity	Points of Interest pts + Connections pts + Route pts	15%
Demand/ Density	# of households and employees per square mile near project	10%
Cost Effectiveness	(Safety + Accessibility/Connectivity + Demand/Density) / Cost to NCDOT	5%

### MORE INFO ON PRIORITIZATION 6.0:

NCDOT's Prioritization Data page has training slides that explain the prioritization process:

<https://connect.ncdot.gov/projects/planning/Prioritization%20Data/Forms/AllItems.aspx>

See the "Prioritization Training" folder and the following session information within:

- Session 3: Detailed information on overall scoring components, including local input points.
- Session 4: Features relevant project funding information, and
- Session 7: Detailed slides explaining the bicycle and pedestrian project scoring

## HIGH IMPACT/LOW COST FUNDS

Established by NCDOT in 2017 to provide funds to complete low cost projects with high impacts to the transportation system including intersection improvement projects, minor widening projects, and operational improvement projects. Funds are allocated equally to each Division.

### PROJECT SELECTION CRITERIA:

- Each Division is responsible for selecting their own scoring criteria for determining projects funded in this program. At a

minimum, Divisions must consider all of the following in developing scoring formulas:

1. The average daily traffic volume of a roadway and whether the proposed project will generate additional traffic.
  2. Any restrictions on a roadway.
  3. Any safety issues with a roadway.
  4. The condition of the lanes, shoulders, and pavement on a roadway.
  5. The site distance and radius of any intersection on a roadway.
- \$1.5M max per project unless otherwise approved by the Secretary of Transportation
  - Projects are expected to be under contract within 12 months of funding approval by BOT

### NCDOT TECHNICAL REVIEW & APPROVAL:

- Division Engineer completes project scoring and determines eligibility.
- Division Engineer determines projects to be funded and requests approval of funding from the Chief Engineer. Division Engineer shall supply all necessary project information included funding request forms, project designs and cost estimates.
- The Project Review Committee will make a recommendation for further investigation or to include on the Board Agenda for action by the Secretary, NCDOT.



## INCIDENTAL PROJECTS

Bicycle and Pedestrian accommodations such as; bike lanes, wide paved shoulders, sidewalks, intersection improvements, bicycle and pedestrian safe bridge design, etc. are frequently included as “incidental” features of larger highway/roadway projects. This is increasingly common with the adoption of NCDOT’s “Complete Streets” Policy.

In addition, bicycle safe drainage grates and handicapped accessible sidewalk ramps are now a standard feature of all NCDOT highway construction. Most pedestrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of federal and state roadway construction funds, and usually with a local match. On-road bicycle accommodations, if warranted, typically do not require a local match.

“Incidental Projects” are often constructed as part of a larger transportation project, when they are justified by local plans that show these improvements as part of a larger, multi-modal transportation system. Having a local bicycle or pedestrian plan is important, because it allows NCDOT to identify where bike and pedestrian improvements are needed, and can be included as part of highway or street improvement project. It also helps local government identify what their priorities are and how they might be able to pay for these projects. Under “Complete Streets” local governments may be responsible for a portion of the costs for bicycle and pedestrian projects.

## DUKE ENERGY WATER RESOURCES FUND

Duke Energy is investing \$10 million in a fund for projects that benefit waterways in the Carolinas. The fund supports science-based, research-supported projects and programs that provide direct benefit to at least one of the following focus areas:

- Improve water quality, quantity and conservation;
- Enhance fish and wildlife habitats;
- Expand public use and access to waterways; and
- Increase citizens’ awareness about their roles in protecting these resources.

This resource could be considered for proposed creekside greenways. For more information: <http://www.duke-energy.com/community/foundation/water-resources-fund.asp>

## CLEAN WATER MANAGEMENT TRUST FUND

The Clean Water Management Trust Fund is available to any state agency, local government, or non-profit whose primary purpose is the conservation, preservation, and restoration of North Carolina’s environmental and natural resources. Grant assistance is provided to conservation projects that:

- enhance or restore degraded waters;
- protect unpolluted waters, and/or
- contribute toward a network of riparian buffers and greenways for environmental, educational, and recreational benefits;
- provide buffers around military bases to protect the military mission;
- acquire land that represents the ecological diversity of North Carolina; and
- acquire land that contributes to the development of a balanced State program of historic properties.

The application deadline is typically in February. For more information: <http://www.cwmtf.net/#appmain.htm>

## SPOT SAFETY PROGRAM

The Spot Safety Program is a state funded public safety investment and improvement program that provides highly effective low cost safety improvements for intersections, and sections of North Carolina’s 79,000 miles of state maintained roads in all 100 counties of North Carolina. The Spot Safety Program is used to develop smaller improvement projects to address safety, potential safety, and operational issues. The program is funded with state funds and currently receives approximately \$9 million per state fiscal year. Other monetary sources (such as Small Construction or Contingency funds) can assist in funding Spot Safety projects, however, the maximum allowable contribution of Spot Safety funds per project is \$250,000.



The Spot Safety Program targets hazardous locations for expedited low cost safety improvements such as traffic signals, turn lanes, improved shoulders, intersection upgrades, positive guidance enhancements (rumble strips, improved channelization, raised pavement markers, long life highly visible pavement markings), improved warning and regulatory signing, roadside safety improvements, school safety improvements, and safety appurtenances (like guardrail and crash attenuators).

A Safety Oversight Committee (SOC) reviews and recommends Spot Safety projects to the Board of Transportation (BOT) for approval and funding. Criteria used by the SOC to select projects for recommendation to the BOT include, but are not limited to, the frequency of correctable crashes, severity of crashes, delay, congestion, number of signal warrants met, effect on pedestrians and schools, division and region priorities, and public interest. For more information: <https://connect.ncdot.gov/resources/safety/Pages/NC-Highway-Safety-Program-and-Projects.aspx>

## POWELL BILL FUNDS

Annually, State street-aid allocations (Powell Bill Funds) are made to incorporated municipalities which establish their eligibility and qualify as provided by G.S. 136-41.1 through 136-41.4. Powell Bill funds shall be expended only for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways. Beginning July 1, 2015 under the Strategic Transportation Investments initiative, Powell Bill funds may no longer be used to provide a match for federal transportation funds such as Transportation Alternatives. Certified Statement, street listing, add/delete sheet and certified map from all municipalities are due between July 1st and July 21st of each year. Additional documentation is due shortly after. More information: <https://connect.ncdot.gov/municipalities/State-Street-Aid/Pages/default.aspx>

## HIGHWAY HAZARD ELIMINATION PROGRAM

The Hazard Elimination Program is used to develop larger improvement projects to address safety and potential safety issues. The program is funded with 90 percent federal funds and 10 percent state funds. The cost of Hazard Elimination Program projects typically ranges between \$400,000 and \$1 million. A Safety Oversight Committee (SOC) reviews and recommends Hazard Elimination projects to the Board of Transportation (BOT) for approval and funding. These projects are prioritized for funding according to a safety benefit to cost (B/C) ratio, with the safety benefit being based on crash reduction. Once approved and funded by the BOT, these projects become part of the department's State Transportation Improvement Program (STIP). For more information: <https://connect.ncdot.gov/resources/safety/Pages/NC-Highway-Safety-Program-and-Projects.aspx>

## GOVERNOR'S HIGHWAY SAFETY PROGRAM

The Governor's Highway Safety Program (GHSP) funds safety improvement projects on state highways throughout North Carolina. All funding is performance-based. Substantial progress in reducing crashes, injuries, and fatalities is required as a condition of continued funding. This funding source is considered to be "seed money" to get programs started. The grantee is expected to provide a portion of the project costs and is expected to continue the program after GHSP funding ends. State Highway Applicants must use the web-based grant system to submit applications. For more information: <http://www.ncdot.org/programs/ghsp/>

## EAT SMART, MOVE MORE NORTH CAROLINA COMMUNITY GRANTS

The Eat Smart, Move More (ESMM) NC Community Grants program provides funding to local communities to support their efforts to develop community-based interventions that encourage, promote, and facilitate physical activity. The current focus of the funds is for projects addressing youth physical activity. Funds have been used to construct trails and conduct educational programs. For more information: <http://www.eatsmartmovemorenc.com/Funding/Funding.html>





## THE NORTH CAROLINA DIVISION OF PARKS AND RECREATION – RECREATIONAL TRAILS

The North Carolina Division of Parks and Recreation and the State Trails Program offer funds to help citizens, organizations and agencies plan, develop and manage all types of trails ranging from greenways and trails for hiking, biking, and horseback riding to river trails and off-highway vehicle trails. The Recreational Trails Program (RTP) is a \$1.3 million grant program funded by Congress with money from the federal gas taxes paid on fuel used by off-highway vehicles. Grant applicants must be able to contribute 20% of the project cost or in-kind contributions. Both grant applications are typically due in January or February. For more information: <https://www.ncparks.gov/more-about-us/grants/trail-grants>

## NC PARKS AND RECREATION TRUST FUND (PARTF)

The Parks and Recreation Trust Fund (PARTF) provide dollar-for-dollar matching grants to local governments for parks and recreational projects to serve the general public. Counties, incorporated municipalities, and public authorities, as defined by G.S. 159-7, are eligible applicants. A local government can request a maximum of \$500,000 with each application. An applicant must match the grant dollar-for-dollar, 50 percent of the total cost of the project, and may contribute more than 50 percent. The appraised value of land to be donated to the applicant can be used as part of the match. The value of in-kind services, such as volunteer work, cannot be used as part of the match. Grant applications are typically due in February. For more information: <https://www.ncparks.gov/more-about-us/parks-recreation-trust-fund/parks-and-recreation-trust-fund>

## COMMUNITY DEVELOPMENT BLOCK GRANT FUNDS

Community Development Block Grant (CDBG) funds are available to local municipal or county governments that qualify for projects to enhance the viability of communities by providing decent housing and suitable living environments and by expanding economic opportunities, principally for persons of low and moderate income. State

CDBG funds are provided by the U.S. Department of Housing and Urban Development (HUD) to the state of North Carolina. All North Carolina small cities are eligible to apply for funds except for 23 entitlement cities that receive funds directly from the U.S. Department of Housing and Urban Development (HUD). Each year, CDBG provides funding to local governments for hundreds of critically-needed community improvement projects throughout the state. More information: <https://www.nccommerce.com/ruraldevelopment/state-cdbg/grant-categories>

## CLEAN WATER MANAGEMENT TRUST FUND (CWMTF)

This fund was established in 1996 and has become one of the largest sources of money in North Carolina for land and water protection, eligible for application by a state agency, local government, or non-profit. At the end of each year, a minimum of \$30 million is placed in the CWMTF. The revenue of this fund is allocated as grants to local governments, state agencies, and conservation non-profits to help finance projects that specifically address water pollution problems. Funds may be used for planning and land acquisition to establish a network of riparian buffers and greenways for environmental, educational, and recreational benefits. Deadlines are typically in February. For more information: <http://www.cwmtf.net/#appmain.htm>

## SAFE ROUTES TO SCHOOL (SRTS)

SRTS is managed by NCDOT, but is federally funded; See Federal Funding Sources above for more information.

## URBAN AND COMMUNITY FORESTRY GRANT

The North Carolina Division of Forest Resources Urban and Community Forestry grant can provide funding for a variety of projects that will help toward planning and establishing street trees as well as trees for urban open space. The goal is to improve



public understanding of the benefits of preserving existing tree cover in communities and assist local governments with projects which will lead to a more effective and efficient management of urban and community forests. Grant requests should range between \$1,000 and \$15,000 and must be matched equally with non-federal funds. Grant funds may be awarded to any unit of local or state government, public educational institutions, approved non-profit 501(c)(3) organizations, and other tax-exempt organizations. First time municipal applicant and municipalities seeking Tree City USA status are given priority for funding. Grant applications are due by March 31 at 5:00 pm and recipients are notified by mid-July each year.

For more about Tree City USA status, including application instructions, visit: [https://www.ncforestservice.gov/Urban/urban\\_grant\\_program.htm](https://www.ncforestservice.gov/Urban/urban_grant_program.htm)

## LOCAL GOVERNMENT FUNDING SOURCES

Municipalities often plan for the funding of pedestrian and bicycle facilities or improvements through development of Capital Improvement Program (CIP) or occasionally, through their annual Operating Budgets. In Raleigh, for example, the greenways system has been developed over many years through a dedicated source of annual funding that has ranged from \$100,000 to \$500,000, administered through the Recreation and Parks Department. CIPs should include all types of capital improvements (water, sewer, buildings, streets, etc.) versus programs for single purposes. This allows municipal decision-makers to balance all capital needs. Typical capital funding mechanisms include the capital reserve fund, capital protection ordinances, municipal service district, tax increment financing, taxes, fees, and bonds. Each category is described below. A variety of possible funding options available to North Carolina jurisdictions for implementing pedestrian and bicycle projects are also described below. However, many will require specific local action as a means of establishing a program, if not already in place.

## CAPITAL RESERVE FUND

Municipalities have statutory authority to create capital reserve funds for any capital purpose, including pedestrian facilities. The reserve fund must be created through ordinance or resolution that states the purpose of the fund, the duration of the fund, the approximate amount of the fund, and the source of revenue for the fund. Sources of revenue can include general fund allocations, fund balance allocations, grants, and donations for the specified use.

## CAPITAL PROJECT ORDINANCES

Municipalities can pass Capital Project Ordinances that are project specific. The ordinance identifies and makes appropriations for the project.

## LOCAL IMPROVEMENT DISTRICT (LID)

Local Improvement Districts (LIDs) are most often used by cities to construct localized projects such as streets, sidewalks, or bike-ways. Through the LID process, the costs of local improvements are generally spread out among a group of property owners within a specified area. The cost can be allocated based on property frontage or other methods such as traffic trip generation.

## MUNICIPAL SERVICE DISTRICT

Municipalities have statutory authority to establish municipal service districts, to levy a property tax in the district additional to the town-wide property tax, and to use the proceeds to provide services in the district. Downtown revitalization projects are one of the eligible uses of service districts, and can include projects such as street, sidewalk, or bikeway improvements within the downtown taxing district.

## TAX INCREMENT FINANCING

Project Development Financing bonds, also known as Tax Increment Financing (TIF) is a relatively new tool in North Carolina, allowing localities to use future gains in taxes to finance the current improvements that will create those gains. When a public project (e.g., sidewalk improvements) is constructed, surrounding property values generally increase and encourage surrounding development or redevelopment. The increased tax revenues are then dedicated to finance the debt created by the original public



improvement project. Streets, streetscapes, and sidewalk improvements are specifically authorized for TIF funding in North Carolina. Tax Increment Financing typically occurs within designated development financing districts that meet certain economic criteria that are approved by a local governing body. TIF funds are generally spent inside the boundaries of the TIF district, but they can also be spent outside the district if necessary to encourage development within it. Although larger cities use this type of financing more often, Woodfin, NC is an example of another small town that has used this type of financing.

## OTHER LOCAL FUNDING OPTIONS

- Bonds/Loans
- Taxes
- Impact fees
- Exactions
- Installment purchase financing
- In-lieu fees
- Partnerships

## PRIVATE AND NON-PROFIT FUNDING SOURCES

Many communities have solicited funding assistance from private foundations and other conservation-minded benefactors. Below are several examples of private funding opportunities available.

### LAND FOR TOMORROW CAMPAIGN

Land for Tomorrow is a diverse partnership of businesses, conservationists, farmers, environmental groups, health professionals, and community groups committed to securing support from the public and General Assembly for protecting land, water, and historic places. The campaign was successful in 2013 in asking the North Carolina General Assembly to continue to support conservation efforts in the state. The state budget bill includes about \$50 million in funds for key conservation efforts in North Carolina. Land for Tomorrow works to enable North

Carolina to reach a goal of ensuring that working farms and forests, sanctuaries for wildlife, land bordering streams, parks, and greenways, land that helps strengthen communities and promotes job growth, and historic downtowns and neighborhoods will be there to enhance the quality of life for generations to come. For more information: <http://www.land4tomorrow.org/>

### THE ROBERT WOOD JOHNSON FOUNDATION

The Robert Wood Johnson Foundation was established as a national philanthropy in 1972 and today it is the largest U.S. foundation devoted to improving the health and health care of all Americans.

Grant making is concentrated in four areas:

- To ensure that all Americans have access to basic health care at a reasonable cost
- To improve care and support for people with chronic health conditions
- To promote healthy communities and lifestyles
- To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs

Projects considered for funding typically are innovative and aim to create meaningful, transformative change. Project examples include: service demonstrations; gathering and monitoring of health-related statistics; public education; training and fellowship programs; policy analysis; health services research; technical assistance; communications activities; and evaluations. For more specific information about what types of projects are funded and how to apply, visit <http://www.rwjf.org/en/how-we-work/grants/what-we-fund.html>

### NORTH CAROLINA COMMUNITY FOUNDATION

The North Carolina Community Foundation, established in 1988, is a statewide foundation seeking gifts from individuals, corporations, and other foundations to build endowments and ensure financial security for non-profit organizations and institutions throughout the state. Based in Raleigh, the foundation also manages a number of com





munity affiliates throughout North Carolina, that make grants in the areas of human services, education, health, arts, religion, civic affairs, and the conservation and preservation of historical, cultural, and environmental resources. The foundation also manages various scholarship programs statewide. For more information: <http://nccommunityfoundation.org/>

### RITE AID FOUNDATION GRANTS

The Rite Aid Foundation is a foundation that supports projects that promote health and wellness in the communities that Rite Aid serves. Award amounts vary and grants are awarded on a one year basis to communities in which Rite Aid operates. The Rite Aid Foundation focuses on three core areas for charitable giving: children's health and well-being; special community health and wellness needs; and Ride Aid's own community of associates during times of special need. Online resource: <https://www.riteaid.com/about-us/rite-aid-foundation>

### Z. SMITH REYNOLDS FOUNDATION

This Winston-Salem-based Foundation has been assisting the environmental projects of local governments and non-profits in North Carolina for many years. The Foundation focuses its grant making on five focus areas: Community Economic Development; Environment; Public Education; Social Justice and Equity; and Strengthening Democracy. Deadline to apply is typically in August. For more information: [www.zsr.org](http://www.zsr.org)

### BANK OF AMERICA CHARITABLE FOUNDATION, INC.

The Bank of America Charitable Foundation is one of the largest in the nation. There are numerous different initiatives and grant programs, yet the ones most relevant to increased recreational opportunities and trails are the Revitalizing Neighborhoods and Environment Programs. Starting in 2013, a new 10-year, \$50 billion goal to be a catalyst for climate change was launched. This initiative aims to spark the "innovation economy and advance a transition to a low-carbon future." For more information: [www.bankofamerica.com/foundation](http://www.bankofamerica.com/foundation)

### DUKE ENERGY FOUNDATION

Funded by Duke Energy shareholders, this non-profit organization makes charitable grants to selected non-profits or governmental subdivisions. Each annual grant must have:

- An internal Duke Energy business "sponsor"
- A clear business reason for making the contribution

The grant program has several investment priorities: Education; Environment; Economic and Workforce Development; and Community Impact and Cultural Enrichment. Related to this project, the Foundation would support programs that support conservation, training, and research around environmental and energy efficiency initiatives. For more information: <http://www.duke-energy.com/community/foundation.asp>

### AMERICAN GREENWAYS EASTMAN KODAK AWARDS

The Conservation Fund's American Greenways Program has teamed with the Eastman Kodak Corporation and the National Geographic Society to award small grants (\$250 to \$2,000) to stimulate the planning, design, and development of greenways. These grants can be used for activities such as mapping, conducting ecological assessments, surveying land, holding conferences, developing brochures, producing interpretive displays, incorporating land trusts, and building trails. Grants cannot be used for academic research, institutional support, lobbying, or political activities. For more information: <http://www.rlch.org/funding/kodak-american-greenways-grants>

### NATIONAL TRAILS FUND

American Hiking Society created the National Trails Fund in 1998, the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting and maintaining foot trails in America. 73 million people enjoy foot trails annually, yet many of our favorite trails need major repairs due to a \$200 million backlog of badly needed maintenance. National Trails Fund grants help give local organizations the resources they need to secure access, volunteers,



tools and materials to protect America's cherished public trails. To date, American Hiking has granted more than \$588,000 to 192 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from \$500 to \$10,000 per project.

Projects the American Hiking Society will consider include:

- Securing trail lands, including acquisition of trails and trail corridors, and the costs associated with acquiring conservation easements.
- Building and maintaining trails which will result in visible and substantial ease of access, improved hiker safety, and/or avoidance of environmental damage.
- Constituency building surrounding specific trail projects - including volunteer recruitment and support.

For more information: <http://www.american-hiking.org/national-trails-fund/>

## THE CONSERVATION ALLIANCE

The Conservation Alliance is a non-profit organization of outdoor businesses whose collective annual membership dues support grassroots citizen-action groups and their efforts to protect wild and natural areas. Grants are typically about \$35,000 each. Since its inception in 1989, The Conservation Alliance has contributed \$4,775,059 to environmental groups across the nation, saving over 34 million acres of wild lands.

The Conservation Alliance Funding Criteria:

- The Project should be focused primarily on direct citizen action to protect and enhance our natural resources for recreation.
- The Alliance does not look for mainstream education or scientific research projects, but rather for active campaigns.
- All projects should be quantifiable, with specific goals, objectives, and action plans and should include a measure for evaluating success.

- The project should have a good chance for closure or significant measurable results over a fairly short term (within four years).

For more information: <http://www.conservationalliance.com/grants>

## THE JOHN REX ENDOWMENT

The John Rex Endowment sees environmental, policy, and systems approaches as necessary to achieve long-term, sustainable changes that support healthy weight in children. Learn about their goal to improve policies and implement changes to the built environment that increase children's access to healthy foods and active living opportunities in Wake County municipalities:

<http://www.rexendowment.org/what-we-fund/funding-areas/healthy-weight>

## NATIONAL FISH AND WILDLIFE FOUNDATION (NFWF)

The National Fish and Wildlife Foundation (NFWF) is a private, non-profit, tax exempt organization chartered by Congress in 1984. The National Fish and Wildlife Foundation sustains, restores, and enhances the Nation's fish, wildlife, plants, and habitats. Through leadership conservation investments with public and private partners, the Foundation is dedicated to achieving maximum conservation impact by developing and applying best practices and innovative methods for measurable outcomes.

The Foundation provides grants through more than 70 diverse conservation grant programs. A few of the most relevant programs for bicycle and pedestrian projects include Acres for America, Conservation Partners Program, and Environmental Solutions for Communities. Funding priorities include bird, fish, marine/coastal, and wildlife and habitat conservation. Other projects that are considered include controlling invasive species, enhancing delivery of ecosystem services in agricultural systems, minimizing the impact on wildlife of emerging energy sources, and developing future conservation leaders and professionals.

For more information: <http://www.nfwf.org/whatwedo/grants/Pages/home.aspx>



## THE TRUST FOR PUBLIC LAND

Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the TPL is the only national non-profit working exclusively to protect land for human enjoyment and well-being. TPL helps acquire land and transfer it to public agencies, land trusts, or other groups that have intentions to conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities. For more information: <http://www.tpl.org>

## BLUE CROSS BLUE SHIELD OF NORTH CAROLINA FOUNDATION (BCBS)

Blue Cross Blue Shield (BCBS) focuses on programs that use an outcome approach to improve the health and well-being of residents. Healthy Places grant concentrates on increased physical activity and active play through support of improved built environment such as sidewalks, and safe places to bike. Eligible grant applicants must be located in North Carolina, be able to provide recent tax forms and, depending on the size of the non-profit, provide an audit. For more information: <http://www.bcbsncfoundation.org/>

## ALLIANCE FOR BIKING & WALKING: ADVOCACY ADVANCE GRANTS

Bicycle and pedestrian advocacy organizations play the most important role in improving and increasing biking and walking in local communities. Rapid Response Grants enable state and local bicycle and pedestrian advocacy organizations to develop, transform, and provide innovative strategies in their communities. Since 2011, Rapid Response grant recipients have won \$100 million in public funding for biking and walking. The Advocacy Advance Partnership with the League of American Bicyclists also provides necessary technical assistance, coaching, and training to supplement the grants. For more information, visit [www.peoplepoweredmovement.org](http://www.peoplepoweredmovement.org)

## LOCAL TRAIL SPONSORS

A sponsorship program for trail amenities allows smaller donations to be received from both individuals and businesses. Cash donations could be placed into a trust fund to be accessed for certain construction or acquisition projects associated with the greenways and open space system. Some recognition of the donors is appropriate and can be accomplished through the placement of a plaque, the naming of a trail segment, and/or special recognition at an opening ceremony. Types of gifts other than cash could include donations of services, equipment, labor, or reduced costs for supplies.

## CORPORATE DONATIONS

Corporate donations are often received in the form of liquid investments (i.e. cash, stock, bonds) and in the form of land. Municipalities typically create funds to facilitate and simplify a transaction from a corporation's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented.

## PRIVATE INDIVIDUAL DONATIONS

Private individual donations can come in the form of liquid investments (i.e. cash, stock, bonds) or land. Municipalities typically create funds to facilitate and simplify a transaction from an individual's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented.

## FUNDRAISING/CAMPAIGN DRIVES

Organizations and individuals can participate in a fundraiser or a campaign drive. It is essential to market the purpose of a fundraiser to rally support and financial backing. Often times fundraising satisfies the need for public awareness, public education, and financial support.

## VOLUNTEER WORK

It is expected that many citizens will be excited about the development of a greenway corridor. Individual volunteers from the





community can be brought together with groups of volunteers form church groups, civic groups, scout troops and environmental groups to work on greenway development on special community workdays. Volunteers can also be used for fund-raising, maintenance, and programming needs.

## INNOVATIVE FUNDING OPTIONS

Crowdsourcing “is the process of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, and especially from an online community, rather than from traditional employees or suppliers.” For some success stories and ideas for innovative fundraising techniques: <http://www.americantrails.org/resources/funding/TipsFund.html>

An example crowdsourcing tool used locally with some success is “ioby”, which offers the ability to organize different forms of capital—cash, social networks, in-kind donations, volunteers, advocacy: <https://www.ioby.org/about>

## BICYCLE/TRAIL PARTNERSHIP CASE STUDIES IN THE CAROLINAS

Local communities in the region may be able to partner with the private sector for funding or sponsorship for some aspects of this plan. Some examples of trail partnerships in the Carolinas are provided below.

### WILMINGTON/NEW HANOVER COUNTY & BLUE CROSS BLUE SHIELD (BCBS)

BCBSNC and their GO NC! program donated funds to complete the final phase of the 15-mile Gary Shell CrossCity Trail from Wade Park to the drawbridge at Wrightsville Beach. In addition to completing the trail, other enhancements include mile markers along the 15-mile trail and five bicycle fix-it stations along the trail. This partnership came about during development of the WMPO’s Wilmington/New Hanover County Comprehensive Greenway Plan in 2012. <http://www.bcbsnc.com/content/campaigns/gonc/index.htm>

## SPARTANBURG, SC & THE MARY BLACK FOUNDATION

The Mary Black Foundation Rail Trail was a collaboration between the Mary Black Foundation, Palmetto Conservation Foundation, City of Spartanburg, Partners for Active Living, SPATS, and local citizens. It extends from downtown Spartanburg at Henry Street, between Union and Pine Streets, and continues 2 miles to Country Club Road. Since its inception there has been buzz about redeveloping the Rail Trail corridor. The commuter and recreational trail brings together all walks of life, and connects neighborhoods, businesses, restaurants, a school, a bike shop, the YMCA, a grocery store, and a skate park. As the Hub City Connector segment of the Palmetto Trail through Spartanburg County, the Rail Trail is an outdoor transportation spine for Spartanburg from which other projects are expected to spin off. One great example is the first phase of B-cycle bicycle-sharing program located at the Henry Street trailhead. Project contact: Lisa Bollinger, Spartanburg Area Transportation Study, Spartanburg, SC.

## SWAMP RABBIT TRAIL AND GREENVILLE HEALTH SYSTEM, GREENVILLE, SC

The Greenville Health System Swamp Rabbit Trail is a shared-use-path that runs along the Reedy River through Greenville County, connecting parks, schools, and local businesses. The GHS Swamp Rabbit has become very popular among residents and visitors for recreational and transportation purposes. The Greenville Health System has become a private sponsor because of the health benefits offered by the trail as well as the branding opportunity achieved by having its name and logo on the trail’s signs. The GHS Swamp Rabbit Trail continues to increase in size and popularity, with communities in neighboring counties making plans to extend the trail into their towns. Project contact: Ty Houck, Greenville County Parks, Recreation and Tourism, Taylors, SC.

## COMPLETE STREETS IMPLEMENTATION GUIDE

The full guide is provided in for reference on the following pages.



## **North Carolina Department of Transportation Complete Streets Implementation Guide**

The North Carolina Department of Transportation (NCDOT) Complete Streets Implementation Guide (Guide) is designed to assist NCDOT staff engineers, project managers and designers in implementing the Complete Streets Policy as adopted by the NCDOT Board of Transportation. This document provides comprehensive guidance for incorporating a Complete Streets approach into NCDOT's planning, programming, design, and maintenance processes.

### **Elements of this Guide:**

- 1. Planning**
- 2. Project Development**
- 3. Resurfacing and Maintenance Activities**
- 4. Work Zone Accommodations**
- 5. Related Policies**
- 6. Cost Share**
- 7. Design Guidance**
- 8. Administration**

This Guide will be updated periodically as processes and procedures are refined, with a comprehensive review and update every five years, beginning in August 2024.

### **1. Planning**

This section outlines the approach for ensuring Complete Streets elements are evaluated as a roadway project is planned, prioritized and programmed. Each proposed roadway project will include the preparation of a Complete Streets Project Sheet as detailed below. The Project Sheet will identify planned multi-modal facilities and document any exceptions considered in the course of project development.

### **1.1 Adopted Plans**

A Comprehensive Transportation Plan (CTP) is a mutually adopted transportation planning document that identifies the multi-modal transportation needs of a community or jurisdiction. The CTP may include and/or reference locally adopted plans for public transportation, bicycle facilities, pedestrian facilities and greenways. The adopted CTP will be considered the controlling plan for the identification of non-motorized facilities to be evaluated as part of a roadway project. Other locally adopted plans will be considered so long as 1) the planned facility addresses a transportation need and 2) the planned facility meets the design guidance standards referenced in Section 7.

### **1.2 Complete Streets Project Sheet (Prioritization 6.0)**

For projects where a project sheet has yet to be developed as part of the CTP process, a Complete Streets Project Sheet will be used to document the types of pedestrian, bicycle, public transit, and other multimodal facilities to be evaluated in each roadway project. This sheet will be submitted during the Strategic Prioritization submittal process. The Complete Streets Project Sheet will carry forward as a key document in the Project Advancing Transportation through Linkages, Automation, and Screening (ATLAS) workbench, allowing any personnel to access the project later in development.

### **1.3 Complete Streets Project Sheet (within the CTP)**

Comprehensive Transportation Plans (CTP) developed through NCDOT's Transportation Planning Division identify projects to address network deficiencies for motorists, pedestrians, bicyclists, and transit users. Complete Streets Project Sheets are being introduced into the CTP 2.0 process. The Project Sheet outlines the recommended improvement, proposes a typical cross-section for roadway projects, explains the identified need for the project, provides current and projected traffic volume and capacity, identifies high-level environmental constraints and provides Complete Street recommendations. These sheets lay the foundation for Complete Streets facilities and serve as a starting point for projects selected for Strategic Prioritization submittal and carry forward as a key document in the project development phase.

### **1.4 Exceptions to Policy**

The Complete Streets Project Sheet will capture requests and approvals of any exceptions to the Complete Streets Policy. Documentation of exceptions will reference the reason for such action, including unique site constraints, prohibition of pedestrians or bicyclists on the facility or a lack of existing or planned public transit service. Exceptions may be requested and considered any time throughout the process through the Complete Streets Program Administrator in the Integrated Mobility Division.

A multi-disciplinary Complete Streets Review Team will review all requests for exceptions to the Complete Streets Policy. The Review Team will consider the justification for the proposed exception as detailed on the Complete Streets Project Sheet and decide whether to recommend approval of the exception. Exceptions will be automatically granted if requested by the local government.

If the exception is not approved, the Review Team will initiate additional discussion with relevant parties, including the Project Manager, to explore options and alternatives for including appropriate multi-modal elements in the project. If necessary, the decision will be elevated to the Chief Deputy Secretary and/or Secretary for a final decision.



The Complete Streets Review Team consists of:

- Complete Streets Program Administrator,
- State Traffic Engineer or designee,
- State Roadway Engineer or designee,
- Integrated Mobility Division Director or designee, and
- Division Planning Engineer/Corridor Development Engineer or designee.

## 2. Project Development

The project development phase carries a project from concept to the specific roadway design to be constructed. The project development process considers the context, constraints and purpose of a project. All planned facilities will receive the same consideration as a project moves through the development process.

The Complete Streets Project Sheet will carry forward with a project through the project development phase. Project managers will use the Complete Streets Project Sheet early in project development to assist with determining facilities to be included in preliminary project design alternatives. The person/entity serving as the project manager varies depending on where the project is in the development process – this may be the entity that submits the project for prioritization, the NCDOT project manager or the Complete Streets Program Administrator.

The Complete Streets Project Sheet will be a ‘key document’ in the Project Advancing Transportation through Linkages, Automation, and Screening (ATLAS) workbook, allowing all personnel working on the project throughout the development process to refer to the information. Project ATLAS features a workbook tool to organize technical reports and data needed during project delivery. As part of the Workbook structure, the Project Manager will be responsible for documenting how Complete Street elements are reflected in the project design.

### 2.1 Project Scoping

The Project Engineer will coordinate with NCDOT’s Integrated Mobility Division (IMD) on all programmed roadway projects. The Integrated Mobility Division will participate in scoping meetings and provide a written summary memo identifying facility recommendations and design guidance as appropriate.

### 2.2 Bridge Projects

The Complete Streets Project Sheet will be integrated into the Structures Management Planning Process for bridge replacements and refurbishments. Until specific procedures are complete, the Project Engineer will coordinate with the Integrated Mobility Division through scoping requests to incorporate Complete Streets elements in bridge designs for each bridge replacement project undertaken by NCDOT.

Due to the long useful life of bridges, on bridges with shoulder approach sections, where:

- A pedestrian need is identified through an adopted plan, sufficient deck space will be made available on the replacement bridge for future construction of sidewalks.
- A bicycle need is identified through an adopted plan, sufficient width for bike facilities will be provided.

- A multi-use path or sidepath need is identified through an adopted plan, sufficient width for the appropriate facility will be provided on and/or below the structure.

### **2.3 Equal or Better Performance of a Facility**

Conditions often change between the time a project is added to the STIP and the when the project development process begins that may support the incorporation of a different type of bicycle or pedestrian improvement than shown in an adopted plan. NCDOT will review an alternative facility to the bicycle and/or pedestrian facility type proposed in the adopted plan upon the written request of the local representatives to the Project Engineer. The Project Engineer will consult with the Complete Streets Program Administrator to request the evaluation of an alternative facility. The decision of the Complete Streets Review Team will be documented in the Complete Streets Project Sheet.

An alternative facility will be evaluated by the Complete Streets Review Team based on:

- Purpose and need of the proposed facilities
- Current or anticipated land use context of the project area
- Traffic count data
- Design speed
- Crash history
- Topographic and geometric features of the roadway
- Safety

## **3. Resurfacing and Maintenance Activities**

### **3.1 Scheduled Resurfacing**

Each year, a county-level resurfacing schedule is developed within each NCDOT Division. NCDOT Division staff will meet with local agencies to review the scheduled roadways and identify locations to evaluate Complete Streets improvements. These may include striping, markings and associated signage.

The following process will be followed to review resurfacing projects for complete street improvements:

- The Operations Program Management Unit will coordinate with the Integrated Mobility Division to identify planned facilities within the project limits suitable for implementation in conjunction with maintenance activities.
- Identified locations for Complete Streets improvements will be noted on a resurfacing list distributed to each unit of local government.
- The local government concurrence with recommended Complete Streets improvements will be provided to the local NCDOT Division in writing.
- Completed improvements will be incorporated into the Pedestrian and Bicycle Infrastructure Network (PBIN) and ATLAS upon completion.

### 3.2 Addition of Rumble Strips/Stripes

Rumble strips/strips are recognized as a safety countermeasure to reduce lane departure motor vehicle crashes. Rumble strips/strips, raised traffic bars, asphalt or concrete dikes, reflectors and other such surface alterations where installed on roadways without full access control will be placed in a manner as not to present hazards to bicyclists or interfere with existing on-road bicycle facilities.

Rumble strips/strips will not be extended across the shoulder of the roadway or other areas intended for bicycle travel. For shoulders suitable for bicycle use, refer to the authoritative design references outlined in Section 7 of this Guide. The Mobility & Safety Division in coordination with the Integrated Mobility Division will evaluate situations on a case by case basis where rumble strips/strips recommended for safety may conflict with bicycle travel.

## 4. Work Zone Accommodations

The continuity of existing bicycle and pedestrian facilities will be maintained during construction and maintenance activities. During the construction phase of a roadway project, NCDOT's [Guidelines for the Level of Pedestrian Accommodation in Work Zones](#) will be followed.

## 5. Policy References

### 5.1 Eliminated Policies

The following policy documents are superseded by the Complete Streets Policy (2019):

- *Complete Streets Policy* (2009) and *Complete Streets Planning and Design Guidelines* (2012)
- *Bicycle Policy* (2009, update)
- *Pedestrian Policy Guidelines* (2001)
- *Administrative Action to Include Local Adopted Greenway Plans in the NCDOT Highway Planning Process* (1994)

### 5.2 Related Policies

The following policy documents include elements related to Complete Streets implementation:

- *Traditional Neighborhood Development Manual* (2000)
- *Bridge Policy* (2000)
- *Policy on Street and Driveway Access to North Carolina Highways* (2003)
- *Exceptions to Maintenance Responsibilities on State Highway System Streets in Municipalities* (2003)
- *Guidelines for Inclusion of Greenway Accommodation Underneath a Bridge as Part of a NCDOT Project* (2015)
- *Subdivision Roads: Minimum Construction Standards* (2016)



## 6. Cost Share

### 6.1 Complete Street Cost Share

The table below illustrates the funding responsibilities for Complete Streets incorporating bicycle and pedestrian and public transportation facilities.

Complete Street Cost Share			
Facility Type	In Plan	Not in Plan, but Need Identified	Betterment
Pedestrian Facility	NCDOT pays full	Cost Share	Local
On Road Bicycle Facility	NCDOT pays full	NCDOT pays full	Local
Side Path	NCDOT pays full	Cost Share	Local
Greenway Crossing	NCDOT pays full	Cost Share	Local
Bus Pull Out	NCDOT pays full	Cost Share	Local
Bus Stop (pad only)	NCDOT pays full	Cost Share	Local

Bicycle, pedestrian and public transportation facilities that appear in an adopted Plan directly or by reference as described in Section 1.1 will be included as part of the proposed roadway project. Facilities will be designed based on the authoritative design references outlined in Section 7 of this Guide. NCDOT will fully fund the cost of designing, acquiring right of way, and constructing facilities, not including elements identified as betterments as defined in Section 6.3.

NCDOT is responsible for the full cost of bridge replacements and bridge widenings, including approved pedestrian facilities on the structure. Bridges will not be included in the total project construction cost for cost-sharing purposes. Where an alternative facility requiring equal or lesser right-of-way is deemed to perform on an equal or better basis with concurrence by the Integrated Mobility Division, NCDOT will construct the alternative facility at no cost to the local jurisdiction.

### 6.2 Cost Share Formula

Bicycle and pedestrian facilities incidental to a roadway project where a need has been identified through the project scoping process but not identified in an adopted plan may be included in the project. Inclusion of these incidental facilities requires the local jurisdiction to share the incremental cost of constructing the identified improvements, based on the population thresholds below.

Cost Share Formula		
Jurisdiction Population*	Cost Participation	
	NCDOT	Local
> 100,000	80%	20%
50,000 to 100,000	85%	15%
10,000 to 50,000	90%	10%
< 10,000	95%	5%
<i>*For counties, the non-municipal county population, OSBM</i>		

NCDOT will estimate the incremental cost of proposed improvements. The percentage of the total cost share for these improvements will be set according to the population of the jurisdiction in the most recent [annual certified estimate of population](#) as determined by the state demographer, and executed through a local agreement.

### 6.3 Betterment

A roadway project betterment is defined as:

- A requested bicycle, pedestrian or public transportation improvement that exceeds the recommendations appearing in an adopted plan and/or exceeds the needs identified through the project development process; or
- Aesthetic materials and treatments, if this cost is determined to exceed the cost of standard construction materials; or
- Landscaping in excess of standard treatments as defined by NCDOT [Roadside Aesthetics Policy](#); or
- Lighting in excess of standard treatments as defined by NCDOT lighting policy.

The additional costs associated with inclusion of these elements in a roadway project are the responsibility of the local jurisdiction, executed through a local agreement.

### 6.4 Maintenance

Bicycle and pedestrian improvements inside a municipal boundary are subject to local maintenance. A local maintenance agreement will be executed prior to the completion of a construction project.

For bicycle and pedestrian improvements outside of a municipal boundary where a county maintenance agreement is not executed to maintain the facility, NCDOT will maintain the facility after construction if the bicycle or pedestrian facility lies within NCDOT right-of-way.

## 7. Design Guidance

The NCDOT **Roadway Design Manual** will serve as the authoritative reference for Complete Streets design. Cross-sections from the Manual will be used in each stage of project planning, prioritization and development.

American Association of State Highway Transportation Officials (**AASHTO**) guides will serve as authoritative references for street design and will be used in coordination with the NCDOT Roadway Design Manual.

National Association of City Transportation Officials (**NACTO**) guides will serve as supplemental references for street design and will be used in coordination with the NCDOT Roadway Design Manual and AASHTO guides.

The Federal Highway Administration (**FHWA**) provides supplemental guidance on selecting appropriate bicycle and pedestrian facilities. These include guides on countermeasures, bikeways, raised medians and other facilities.

## 8. Administration of the Policy

The Complete Streets Core Technical Team (CTT) will meet quarterly to oversee the implementation of Complete Streets. The primary role of the CTT will be to review and maintain the Implementation Guide, recommend updates and process improvements and establish performance metrics for implementation. The CTT will direct the implementation of recommendations contained within the NCDOT Complete Streets 2.0 Recommendations document.

The CTT is comprised of representatives of the following units:

- ADA/Title VI Office
- Integrated Mobility Division
- Chief Deputy Secretary's Office
- Division of Highways
- Environmental Policy Unit
- Mobility & Safety
- Planning & Programming
- Rail Division
- Roadway Design Unit
- Technical Services
- Transportation Planning Division





## P6.0 Complete Streets Project Sheet

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Mode: \_\_\_\_\_

*Note that this sheet does not need to be completed for ferry vessel projects, freight rail infrastructure projects, or aviation projects.*

SPOT ID: \_\_\_\_\_ TIP #: \_\_\_\_\_

Route/Project Name: \_\_\_\_\_

Submitting Organization: \_\_\_\_\_ Contact Name: \_\_\_\_\_

Date: \_\_\_\_\_

The NCDOT Complete Streets Policy requires pedestrian, bicycle, and public transportation facilities to be evaluated for all transportation projects. Facility recommendations will vary depending on a project's context. Final determination of facilities to be included will be made in Project Development.

Complete the boxes below and on page 2 to note which facilities are being evaluated as part of the project. Check all facilities that apply, or if facilities for a particular mode will not be evaluated, check the reason(s) that apply.

### **Pedestrian facilities to be evaluated:**

- ☐ Sidewalks\*
- ☐ Marked crosswalks
- ☐ Pedestrian crossing countermeasures
- ☐ Pedestrian signalization
- ☐ Multi-use path or sidepath\*
- ☐ Other element(s):

### **Pedestrian facilities will NOT be evaluated because (at least one):**

- ☐ Location is greater than one mile from any existing or planned pedestrian facility, residential or commercial land use, school, or public transit stop.
- ☐ Location has unique site constraints.
- ☐ Pedestrian uses are prohibited.
- ☐ Additional reasons(s) or notes:

\*Subject to local municipal agreement

### **Bicycle facilities to be evaluated:**

- ☐ Multi-use path or sidepath\*
- ☐ Protected bike lane
- ☐ Striped bike lane (buffered or standard)
- ☐ Marked shoulder with supplemental pavement markings
- ☐ Other element(s):

### **Bicycle facilities will NOT be evaluated because (at least one):**

- ☐ Location has unique site constraints.
- ☐ Bicycle uses are prohibited.
- ☐ Additional reasons(s) or notes:

\*Subject to local municipal agreement



## P6.0 Complete Streets Project Sheet

10

### Public transit improvements to be evaluated:

- ☐ Improved bus stops\*
- ☐ Sidewalks\*
- ☐ Pedestrian crossing treatments
- ☐ Bus pullouts
- ☐ Transit signal priority
- ☐ Bus on Shoulder System (BOSS)
- ☐ Dedicated lanes/Bus Rapid Transit Facility
- ☐ Other element(s):

### Public transit improvements will NOT be evaluated because (at least one):

- ☐ Location is not served by any public transit routes and no new service is identified in any public transit agency plans.
- ☐ Location has unique site constraints
- ☐ Additional reason(s) or notes:

\*Subject to local municipal agreement

### EXCEPTIONS

If **no** facilities for pedestrians, bicycles, or public transportation will be evaluated, an exception to the Complete Streets Policy is required. Please provide detailed information to justify the exception to including any Complete Streets elements in this project. **Note that Exceptions will be reviewed by the Complete Streets Review Team upon programming in the STIP of the project.**

*Remainder of sheet is intended for use by Complete Streets Review Team.*

Date reviewed:

- ☐ Exception has been reviewed and approved by the Complete Streets Review Team.
- ☐ Exception has not been reviewed and NOT approved by the Complete Streets Review Team.

State Traffic Engineer or designee

Date

Director of Bike Ped/Public Transportation Division or designee

Date

Division Planning Engineer/Corridor Development Engineer or designee

Date



*A creative and welcoming sign in Elkin, NC (photo: Velo Girl Rides)*



## OVERVIEW

Throughout the United States, communities, universities, and businesses have an opportunity to be recognized on the national level for achieving safer roads, stronger communities, and promoting a bicycle-friendly America. In order to achieve this level of recognition, those communities must implement a certain level of plans, policies, programs and infrastructure it takes to provide bikeability for every skill level.

Established in 1880, The League of American Bicyclists is a nonprofit organization that focuses on advocacy and education of bicycling within the United States. The League provides best practices and the technical resources needed to help communities, businesses, universities and states seeking to improve bicycle safety. One of their key programs is the Bicycle Friendly America program, which focuses on advocacy, education and promotion of bicycling.

## BICYCLE FRIENDLY AMERICA PROGRAM

Established in 1995, the Bicycle Friendly America (BFA) program is the League's flagship advocacy campaign. Sectioned by state, communities, businesses and universities, each applicant is awarded based on a comprehensive online application, as well as collected data on activities within five areas that include: engineering, education, encouragement, enforcement, and evaluation. The application results provide customized feedback as well as the tools and guidelines needed to improve conditions for cyclists at both the state and local level.

The Bicycle Friendly America program's goals include:

- Sets standards for what constitutes a real bicycling culture and environment
- Affects decisions on how communities, businesses, universities and states grow
- Inspires action, involvement and coordination among people that want to improve conditions for bicyclists



- Guides progress by acting as a roadmap for what communities, businesses, universities and states should do next
- Rewards persistence as people respond to feedback, make changes and come back again and again to get recognition.
- Raises expectations as to what really is expected and involved in making a great place for bicycling

Since the beginning of the Bicycle Friendly Community Program in 1995, there have been over 1,500 community applications processed and over 450 recognized Bicycle Friendly Communities (BFCs) in the United States.

## THE FIVE E'S

The program collects data on activities within five broad areas:

- 1. Engineering:** Physical infrastructure and hardware to support cycling in order to create safe and convenient places to ride and park
- 2. Education:** Programs that ensure the safety, comfort and convenience of cyclists and fellow road users of all ages and abilities
- 3. Encouragement:** Incentives, promotions and opportunities that inspire and enable people to ride in order to create a strong bike culture that celebrates bicycling
- 4. Enforcement:** Equitable laws and programs that ensure motorists and cyclists are held accountable for their actions
- 5. Evaluation:** Processes that demonstrate a commitment to measuring results and planning for the future of bicycling as a safe and viable transportation option



## BENEFITS OF BECOMING PART OF THE PROGRAM

Bicycle Friendly Communities often are great destinations that provide safe and healthy accommodations for its residents and visitors. Simple steps to make bicycling safe and comfortable pay huge dividends in civic, community and economic development. Given the opportunity to ride, residents enjoy dramatic health benefits, reduced congestion, increased property values and more money in their pockets to spend in the local economy. When a community is considered bike-friendly, tourism booms, businesses attract the best and the brightest, and governments save big on parking costs while cutting their carbon emissions. See Chapter 1 of this plan for more on the benefits of bicycle-friendly communities.

## APPLICATION PROCESS

Any municipality, county, Census Designated Place, military base, regional planning agency or Indian Country can apply to the BFC program. A community official responsible for bicycling issues usually completes the application. However, much of the application can be completed by anyone familiar with what a community has done for bicycling as long as the community's governing body approves its final submission.

There are two application cycles a year – one in spring and one in fall. A new cycle usually begins the day after an application cycle closes, so applicants have several months to fill out the online application. Tips for completing an application include:

- When the application asks about bicycle amenities, services and other resources in your community, only list what is provided within your jurisdiction's boundaries.
- The application is designed for communities of all sizes. The conditions that make the community unique -- size, type, location, climate -- are important when determining how to best encourage and support bicycling, and will be taken into consideration when reviewing the application.
- It is not necessary to be able to check every box on this application. The League provides a comprehensive menu of all the ways a community can be bicycle-friendly, and some options are more valuable than others, but they don't expect any community to do everything on the list.
- After a brief review of the general community profile, the applicant will continue to the reporting portion of the application, which asks questions about the community's engineering, education, encouragement, enforcement and evaluation efforts (the five E's). Most questions are multiple choice. This comprehensive questionnaire is designed to yield a holistic picture of an applicant community's work to promote bicycling.
- Unless a question specifically asks about plans for the future, only check boxes for things that are already being done. So if most improvements for bicyclists are still in the planning stage, the applicant can either wait a year or two before you apply to increase your chances to receive an award, or they can apply now to see the community move up in the award levels in the future (which can be a powerful way to show the impact of investments).
- If the community is doing something that isn't listed in the check-boxes, or that goes above and beyond any of the check box options, it is important to tell The League. There is bonus point questions at the end of each 'E' section and the 'Final Overview' section at the end of the application to give them more details. This not only helps the League to better understand the community, it also helps improve the program by identifying new trends and best practices.
- Don't be shy to tell The League about the community's weaknesses. This gives them a more accurate snapshot of the community, and displays that they are critically evaluating the community's internal efforts, which is an important component of the final 'E', Evaluation & Planning.



## AWARD DETERMINATION

After a deadline the League staff process information provided by a community as follows:

- Point criteria are automatically applied to most data submitted by an applicant. These criteria determine the majority of each community's category scores.
- League staff retrieves census data on the number of estimated bicycle commuters and the percentage of commuters who bike to work.
- Certain data is separated and run through separate point formulas. This is done where our criteria depends upon some relative measure that is produced by comparing different data provided by a community or census data.
- Data is checked for inconsistencies and adjusted if necessary.

Starting in 2016, the League implemented a public input process to provide the opportunity for additional public input on communities. As part of this process the following actions are taken:

- An optional public survey link is sent to all communities to be distributed by the community. This link is also sent to any bicycle and pedestrian advocates that a community identified and provided contact information for in its application.
- The League of American Bicyclists sends an additional survey that provides space for open-ended responses to bicycle and pedestrian advocates that a community identified and provided contact information for and bicycle and pedestrian advocates who are organizational members of the League.
- These surveys are typically distributed within 2 weeks of the closing of a deadline and are open for about a month.

Award decisions are made based upon:

- Points assigned to the data by formulas;
- Personal review of each application by League staff, including supplemental materials;
- Comparisons to similar communities in our award database, particularly based upon the Building Blocks of a Bicycle Friendly Community and characteristics such as population and type of community; and
- If necessary, review of public and advocate surveys or direct outreach to local advocates.

## "BUILDING BLOCKS" DATA ANALYSIS

Award levels are based upon all data provided by the application. In particular, close attention is paid to the 10 Building Blocks of Bicycle Friendly Communities:

### 1. High Speed Roads with Bicycle

**Facilities:** This building block reflects the reported bicycle facilities on roads with posted speed limits of more than 35 mph. It replaced the building block "percentage of arterials and major collectors with bicycle facilities" when our application changed to ask for information on the specific types of bicycle facilities on roads of different posted speed limits. The average Bronze community has bicycle facilities on 19% of its high speed roads.

### 2. Total Bicycle Network mileage to Total Road Network Mileage:

This building block reflects the entirety of bicycle facilities, located on and off-road, divided by the reported centerline miles of all roadways. The average Bronze community has a ratio of roughly 1 mile of bike network for every 4 miles of road network.

### 3. Bicycle Education in Schools:

This building block reflects the percentage of elementary, middle, and high schools that offer bicycle education and the type of education offered at each school. Prevalence and type are used to create descriptive categories, with the average Bronze having average Bicycle Education in Schools.





**4. Share of Transportation Budget Spent on Bicycling:**

This building block reflects the reported percentage of each community's total transportation budget, over the past 5 years, invested in bicycle projects. The average Bronze community reports that 9% of its transportation budget is invested in bicycle projects.

**5. Bike Month and Bike to Work Events:**

This building block reflects the number of events promoted as part of bike month in each community. The number of events is used to create descriptive categories, with the average Bronze having either average or Good Bike Month and Bike to Work Events.

**6. Active Bicycle Advocacy Group:** This building block reflects reported bicycle, active transportation, and transportation equity advocacy groups. Over 90% of communities that apply report the existence of an advocacy group in their community.

**7. Active Bicycle Advisory Committee:**

This building block reflects whether a bicycle advisory committee exists and how often it is reported to meet. The average Bronze community has a bicycle advisory committee that meets roughly every two months.

**8. Bicycle Friendly Laws & Ordinances:**

This building block reflects local

ordinances or state laws that are reported to protect or restrict bicyclists in each community. The number of restrictive laws is subtracted from the number of protective laws and that number is used to create descriptive categories. The average Bronze community has between acceptable and average Bicycle Friendly Laws & Ordinances.

**9. Bike Plan is Current and is Being Implemented:**

This building block reflects reported information on the existence of a bike plan, the age of the bike plan, whether that bike plan has goals, and whether those reported goals are being met. Nearly 70% of communities that apply report having a bike plan that is current and is being implemented.

**10. Bike Program Staff to Population:**

This building block reflects reported information on the number of full-time equivalent employees in each community and the population of each community. We divide the population of each community by the reported full time equivalent employees, so this statistic can be higher than the population of a community. It is reported in the number of thousands of residents per one full-time staff person. The average Bronze community has 148,000 residents per one staff person.

## BICYCLE FRIENDLY COMMUNITIES (INCLUDING AWARD AND YEAR) IN NORTH CAROLINA INCLUDE:

- Asheville (bronze) - Spring 2016
- Boone (bronze) - Spring 2016
- Carrboro (silver) - Fall 2014
- Cary (bronze) - Fall 2016
- Chapel Hill (silver) - Fall 2018
- Charlotte (bronze) - Fall 2016
- Davidson (bronze) - Spring 2015
- Durham (bronze) - Fall 2018
- Greensboro (bronze) - Fall 2017
- Raleigh (bronze) - Fall 2015
- Wake Forest (bronze) - Spring 2018
- Wilmington (bronze) - Spring 2016
- Winston-Salem (bronze) - Fall 2017



## WINSTON-SALEM: NEXT STEPS FOR A SILVER-LEVEL BICYCLE FRIENDLY COMMUNITY AWARD

Winston-Salem earned a Bronze-Level Bicycle Friendly Community Award in the fall of 2017. According to transportation planners within the City, the next key step for applying for a silver-level award will be making significant strides in infrastructure development.

Increasing mileage of existing facilities is a key goal and component of the City's 2019 Bicycle Master Plan. According to that plan, the priority projects for bicycle facility investment and development include the following:

1. Northside Trace
2. Robinhood Road
3. Northwest Connector
4. Westside Bike Boulevard
5. Eastern Trace
6. CrossTown Connector
7. Lewisville Connector
8. Parkland South Connector
9. Southern Fiddle
10. Bethabara Brightway
11. Walktertown Quarry Connector
12. Reynolda Link
13. Long Branch
14. Forsyth Medical
15. Forsyth Tech Connector
16. Waughtown Route
17. Downtown Connector

These routes are shown on page 175, and can be found in Figure 5-2 of the Winston-Salem Bicycle Master Plan, available at: <https://www.cityofws.org/832/Bike-Plan>

## BICYCLE-FRIENDLY COMMUNITY REPORT CARD FOR WINSTON SALEM

See the following pages for Winston-Salem's BFC Report Card.



# WINSTON-SALEM, NC

## TOTAL POPULATION

242,203

## TOTAL AREA (sq. miles)

132.4

## POPULATION DENSITY

1,829

# OF LOCAL BICYCLE FRIENDLY BUSINESSES

3

# OF LOCAL BICYCLE FRIENDLY UNIVERSITIES

0

## 10 BUILDING BLOCKS OF A BICYCLE FRIENDLY COMMUNITY

Average Silver Winston-Salem

High Speed Roads with Bike Facilities	40%	0%
Total Bicycle Network Mileage to Total Road Network Mileage	47%	4%
Bicycle Education in Schools	GOOD	ACCEPTABLE
Share of Transportation Budget Spent on Bicycling	11%	UNKNOWN
Bike Month and Bike to Work Events	GOOD	AVERAGE
Active Bicycle Advocacy Group	YES	YES
Active Bicycle Advisory Committee	MEETS EVERY TWO MONTHS	MONTHLY OR MORE FREQUENTLY
Bicycle-Friendly Laws & Ordinances	SOME	ACCEPTABLE
Bike Plan is Current and is Being Implemented	YES	SOMEWHAT
Bike Program Staff to Population	1 PER 91K	1 PER 121K

## CATEGORY SCORES

<b>ENGINEERING</b> <i>Bicycle network and connectivity</i>	2.7 /10
<b>EDUCATION</b> <i>Motorist awareness and bicycling skills</i>	4.1 /10
<b>ENCOURAGEMENT</b> <i>Mainstreaming bicycling culture</i>	5.2 /10
<b>ENFORCEMENT</b> <i>Promoting safety and protecting bicyclists' rights</i>	4.5 /10
<b>EVALUATION &amp; PLANNING</b> <i>Setting targets and having a plan</i>	5.5 /10

## KEY OUTCOMES

Average Silver Winston-Salem

<b>RIDERSHIP</b> <i>Percentage of Commuters who bike</i>	2.6%	0.2%
<b>SAFETY MEASURES CRASHES</b> <i>Crashes per 10k bicycle commuters</i>	549	885
<b>SAFETY MEASURES FATALITIES</b> <i>Fatalities per 10k bicycle commuters</i>	7.3	0



## KEY STEPS TO SILVER



» Update your 2005 Bicycle Plan to reflect best practices in bicycle planning, with a particular emphasis on expanding the bicycle network and implementing road diets/traffic calming to improve safety for all road users. Regularly updating your bicycle plan is key to improving conditions for bicycling and institutionalizing processes for continual improvement.

» Develop a design manual that meets current NACTO standards or adopt the NACTO Urban Bikeway Design Guide. This will make it easier for city staff to propose and implement bicycle facility designs that have been shown to improve conditions for people who bike in other cities throughout the United States.

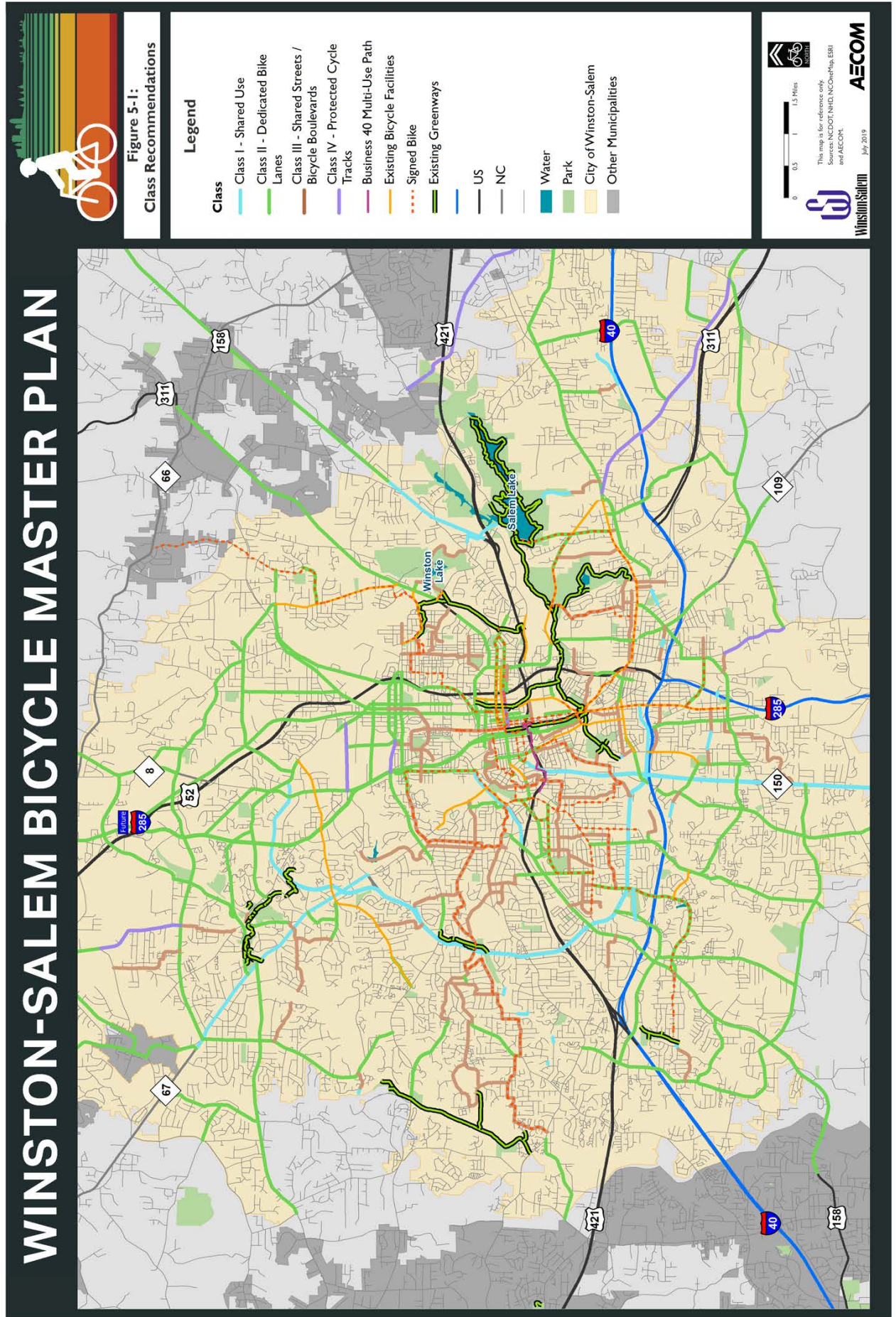
» Bicycle-safety education should be a routine part of education, for students of all ages, and schools and the surrounding neighborhoods should be particularly safe and convenient for

biking and walking. Work with local bicycle groups and interested parents to expand and improve your in-school bicycle education program.

» Your application indicated that there are no bicycle facilities on roads below 25 MPH, or above 35 MPH. Ensure that high speed and/or high volume roads do not pose a barrier to bicycling in your community. Implement road diets in appropriate locations to make streets more efficient and safer for all road users. Use the newly created space for bicycle and pedestrian facilities. On existing low-speed streets, develop a network of bike boulevards/neighborhood greenways to encourage and optimize bicycle travel on low-stress corridors. Diverters, wayfinding, chicanes, and other treatments can be effective at reducing vehicle speeds and promoting the bicycle-oriented nature of a bike boulevard.



Figure 5-1: Recommended Network by Class







*Touring the Yadkin Valley Region by bicycle (photo: Velo Girl Rides)*



## OVERVIEW

As part of the plan, **Velo Girl Rides** performed an on-site survey and researched the potential for cycling tourism in the region, including finding and testing numerous cycling routes. This appendix documents the results of that work, an analysis of the existing assets, and makes specific recommendations for developing the Yadkin Valley Region as a destination for the Cycling Tourist.



### CYCLING TOURISM

If you're not one of the 48 million people in the U.S. that ride a bicycle recreationally<sup>1</sup>, you may not realize that many cyclists organize their vacations and day trips around their plans to ride their bike at a specific destination (and spend an estimated \$83 billion in trip-related expenses each year<sup>2</sup>).

With so many people enjoying Cycling Tourism, inevitably there is a wide variety of interests and activities – any specific visitor might prefer riding on the road, or exploring gravel roads with wider tires, or riding single track trails on mountain bikes. Some ride to test their endurance for distance, or difficulty climbing steep grades. Others want to meet the community, experience the culture, and see the sights like any tourist, albeit at a slower speed. Some combine all of these objectives during their visit.

And most cyclists enjoy eating a wide variety of food and drink during their visit, since their riding is increasing their fitness and health and they're hungry!

### DEFINITION: CYCLING TOURISM

Visiting an area to ride a bicycle in order to experience nature, recreation, exercise, test physical endurance, see the sights, as well as to experience the culture and meet the community. A specific visitor may focus on just one of these experiences; or attempt to take in the full breadth of what is available. They may visit for a few hours, or several days – staying overnight and taking meals in the community.

### ABOUT THE AUTHOR

The co-founder of Velo Girl Rides, Jennifer Billstrom, creates and leads beautiful cycling experiences in North Carolina, South Carolina, Tennessee and Virginia including the entire length of the Blue Ridge Parkway. She has been designing routes and leading rides for more than 18 years and hosting luxury multi-day and day tours for the past 8 years. She is an Ambassador for Ride With GPS, her favorite route-mapping tool.

Jen is also the creator and director of the Cycle to Farm® metric century cycling events, long-time director of the Bookwalter Binge Charity Gran Fondo, and the first paid director for the WNC Flyer. She taps this experience to help Farm to Fork Fondo, Stackhouse Century and Cycle North Carolina as an event consultant. Jen's decades-long experience in corporate finance equips her to see the big picture, while tracking all the details. She is passionate about bicycle/pedestrian transportation and utilizing bicycle tourism to drive economic development.

Jen knows that the economic impact created by cycling events and tours can be profound. Her series of Cycle to Farm bicycle events, originally envisioned to promote small farms, generated more than \$500,000 of local economic impact over a multi-year period (conservatively estimated and including reporting from more than 60% of participants). The economic impact of bicycle tourism is well-documented elsewhere, but Jen has experienced it firsthand for years.





## THE CYCLING TOURIST

In areas that are known as cycling destinations, Cycling Tourists can choose from a variety of events and tours every weekend. Many choose to spend their vacations exploring an area by bicycle.

Demographic information collected during Velo Girl Rides<sup>3</sup> cycling events (18+) and guided cycling tours (8+) over many years reveals the profile of the Cycling Tourist:

- Approximately 60% are between 40 and 65 years old.
- Approximately 50% of cycling tourists travel more than 50 miles to participate in one-day cycling events (this statistic is trending up)
- 70-75% of participants in one-day cycling events are male.
- 50% of participants in multi-day cycling tours are female.
- The cost of a good quality bicycle ranges between \$1,000 and \$2,500... and many cycling tourists have bicycles with retail values of \$5,000 - \$10,000 (and sometimes own several).
- Cycling tourists spend approximately \$265 per day on food, lodging, and shopping.

Reviewing this demographic profile helps explain why many believe that “cycling is the new golf” for opportunities to combine business networking with an outdoor activity.

Promoting Cycling Tourism in a region can create a meaningful economic impact, as multiple studies and analysis has shown. A recent example is the \$137 million dollar impact to Northwest Arkansas from cycling. And the region was not previously known for cycling, nor known to cyclists, prior to the investment in cycling and promotion of the region as a brand to Cycling Tourists<sup>4</sup>.

And some Cycling Tourists don’t just visit, but eventually buy second homes or even move to the region to live and work full-time. A region that establishes their brand as a cycling destination usually receives an improved success rate for recruiting potential employees and future residents.

One last thing about the Cycling Tourist: after they get off the bike, clean up and head out for shopping or dinner... you might not recognize them without their helmet.



*These Cycling Tourists celebrate reaching the halfway point of the Blue Ridge Parkway, located near Cumberland Gap Recreation Area. They have just ridden 235 miles from Cherokee, NC in 4 days. Both are grandmothers from Morganton, NC.*



*An example of branding a town as friendly to cyclists: Cycle Elkin. This is also an example of what a Cycling Tourist looks like after riding, and ready for shopping.*

## IDENTIFYING EXISTING ASSETS

The Yadkin Valley Region enjoys numerous assets that can be tapped to encourage cycling tourism. Through our research and during on-site survey trips we found the following:

### TRANSPORTATION INFRASTRUCTURE

- Paved roads in the region are typically in good or excellent condition. Pavement is smooth and very well maintained, relative to other regions.
- Most intersections encountered were well-marked.
- There are numerous roads with light traffic.

### RECREATION INFRASTRUCTURE

- Numerous municipalities within the region have invested in creating bike trails that are paved, natural surface and single-track mountain bike trails.
- Sections of the Carolina Thread Trail system lie in the southern portion of region.
- Major parks in the region include:
  - Hanging Rock State Park in Stokes County
  - Pilot Mountain State Park in Stokes County
  - Cumberland Gap Recreational Area in Surry County
  - Smith Lake Park in Forsyth County
  - Quarry Park in Forsyth County

### EXISTING CYCLING EVENTS

- Tour de Vino – held in mid-May.
- Tour de Llama – held in June.
- Bike MS - Tour of Tanglewood – held in late September.
- Ride for Robbie – held in mid-September.

## POINTS OF INTEREST

- Wineries and vineyards are numerous (36+).
- Tobacco farms offer a look at a lovely crop that is a part of our history.
- Downtown Winston-Salem is vibrant and offers a cultural diversity that is unique in the region.

## AMENITIES

The region already serves visitors traveling by vehicle, and in general there are well-established amenities:

- Lodging options are easy to find throughout most parts of the region; this obvious advantage is not always a given (for example there are very few lodging options for cyclists on the Blue Ridge Parkway).
- Restaurants offering basic regional dishes are the most common, and some areas enjoy a wider selection of options.
- A pint of beer is often a favorite way to end a bicycle ride, and this region has several craft breweries with well-established brands including Foothills Brewing in Winston-Salem and Elkin breweries Angry Troll Brewing and Skull Camp Brewing.
- Live music is often featured at wineries and in downtown music festivals throughout the region.



*Cycling through the wine region provides a chance to see and smell the grapes growing on the vine.*



*Angry Troll Brewing in Elkin NC*



## OPPORTUNITIES AND RECOMMENDATIONS

### ***"BUILD IT AND THEY WILL COME" IS NOT ENOUGH***

It is simply not true that potential visitors will know about a beautiful road, a paved bike path, a comfortable hotel, a new brewery, or even a local park. We struggle to find the hidden gems.

It is not enough to invest in the infrastructure, the amenities, and to identify the asset. Even residents may not know what is available locally, let alone visitors.

#### **AN EXAMPLE FROM BLACK MOUNTAIN, NC:**

*"Recently I met a couple who traveled from Maryland to visit Asheville. When they travel for vacation, they bring bikes and seek out bike paths to ride. They parked at the start of one of our most beautiful bike paths, which is paved and goes through U.S. Forest Service land. As they unloaded their bicycles, they asked me for help. They were not certain they were in the right place and didn't know how to access the trail. They weren't sure where the trail went.*

*After providing some advice, I visited the town website as if I were a visitor, to see if I could find information about bike paths. While I found a listing of greenways and trails, I found no map or directions or even addresses for the listed features. This is despite years of development of these bike paths, which are beautiful."*

*- Jen Billstrom, Velo Girl Rides*

For example, Mt. Airy NC has invested in the Granite City Greenway which is an impressive multi-use paved path that nearly completes an entire circle around the town. The park lies adjacent to the Ararat River and provides cyclists, walkers, runners and paddlers with nearly 7 miles of paved path and blueways to enjoy.

The untold story is that Granite City Greenway grew from connecting several sections of existing greenways. A true story of success. But, if you're planning to visit Mt Airy and are wondering if you should take your bicycle along, you may never know about this greenway (or the successful story of its creation) because you won't find this story, or even the name "Granite City Greenway" on the municipal website.

If you dig deep enough, you will find a list of greenways and trails on VisitMayberry.com, but no maps and little information about how to enjoy these trails. This is an opportunity to promote an existing asset.

Another example is from Winston-Salem, NC, where the Historic Brookstone Inn is located just one block from the Strollway, a 1.2 mile paved and pea gravel trail that connects to the Salem Creek Greenway. During a recent visit, during this planning process, the front desk clerk had no idea how to access either trail and was unaware it was being improved and lengthened.

These are not unusual stories—but far more common than many realize. **The first recommendation for the Yadkin Valley Region is to brand and promote the existing Assets listed in Section 2.**







## SUPPORTING EVENTS

Directly supporting, encouraging, and volunteering for existing cycling events in the Yadkin Valley Region will help the development of cycling tourism.

Supporting these events with cash sponsorships provides funds needed by the events to run marketing and promotional campaigns to attract participants. The profitability of these events (which are almost always held to benefit a charitable cause, not a business) is largely determined by the number of participants paying registration fees.

Why help attract participants? Because they will not only pay registration fees, but they will be traveling to the Yadkin Valley from another location – spending money during their visit!

Our experience<sup>5</sup> shows that participants in cycling events in North Carolina will fit this profile:

- 70% will be 30–59 years old.
- 36% of attendees will participate in five or more organized rides each year.
- 80% will be male if the event is marketed as challenging and competitive; the number of female participants will grow to 25–30% if the event is marketed as an outdoor experience.
- Household income for 85% of the participants will be \$75,000 or more.
- 50–60% will travel more than 50 miles to participate in the event and will stay for at least one night.
- 50%–55% will learn about the event by word of mouth.

An example of how a business community embraces cycling tourism through an organized cycling event can be found in Brevard NC. Held in early April, Assault on the Carolinas has grown to more than 1,000 riders and is a successful annual fundraiser for the Pisgah Forest Rotary Club. Experience shows that approximately 500 of those riders will be visitors; at last count they traveled to Brevard from 20 different states.

“Supporting the Event” comes in many forms. For example, during the Assault on the Carolinas, Brevard residents cheer cyclists along the route with bells provided by the local newspaper, business owners post welcoming posters in their shop windows, and special events such as live music and sidewalk sales occur throughout the weekend.

For both local government and businesses owners that want to speak to this type of demographic and promote healthy lifestyles within the community, sponsoring a cycling event can be an excellent use of the marketing budget.

**The second opportunity for promoting cycle tourism in the region is to directly support the existing Cycling Events with sponsorship dollars.**

## PROMOTING YOUR POINTS OF INTEREST

Riding past the vineyards in this region is a lovely experience but getting riders to stop and enjoy the ambiance and offerings of a local winery or general store improves the cyclist’s connection to the place and the culture. It also provides increased economic opportunity for local businesses.

Several years ago, Velo Girl Rides organized a cycling event called Cycle to Farm® as a way to introduce cyclists to the local farms and farmers. Rest stops were hosted by farmers, samples of their product provided to the riders. Riders could purchase items from the farmers at that moment (like cheese, jam, vegetables, eggs, wine, etc...) and volunteers would transport purchases to the Finish area, to be distributed during the farm-to-table lunch.

The riders paused long enough to learn more about the area they were riding through, Farmers sold product directly to the riders (who became new customers), and the community dined together at the Finish. It wasn’t unusual for the farmers to discover they already knew some of the riders, once the riders removed their helmets to enjoy lunch—Community!



This concept could easily be recreated at Yadkin Valley wineries. And once successful, it could be expanded to daily tours offerings—a popular activity in Napa and Sonoma counties in the California wine region, as well as many locations in Europe.

**The third recommendation is to choose one or two Points of Interest and create a way to highlight these existing assets to the cyclists.**

### CYCLING TOURISM MAP

Whether they are riding in their own town or visiting a new area, people who ride bicycles often don't know how to identify a good route to follow. Many do not feel confident in their skills to find suitable routes or do not have time to explore.

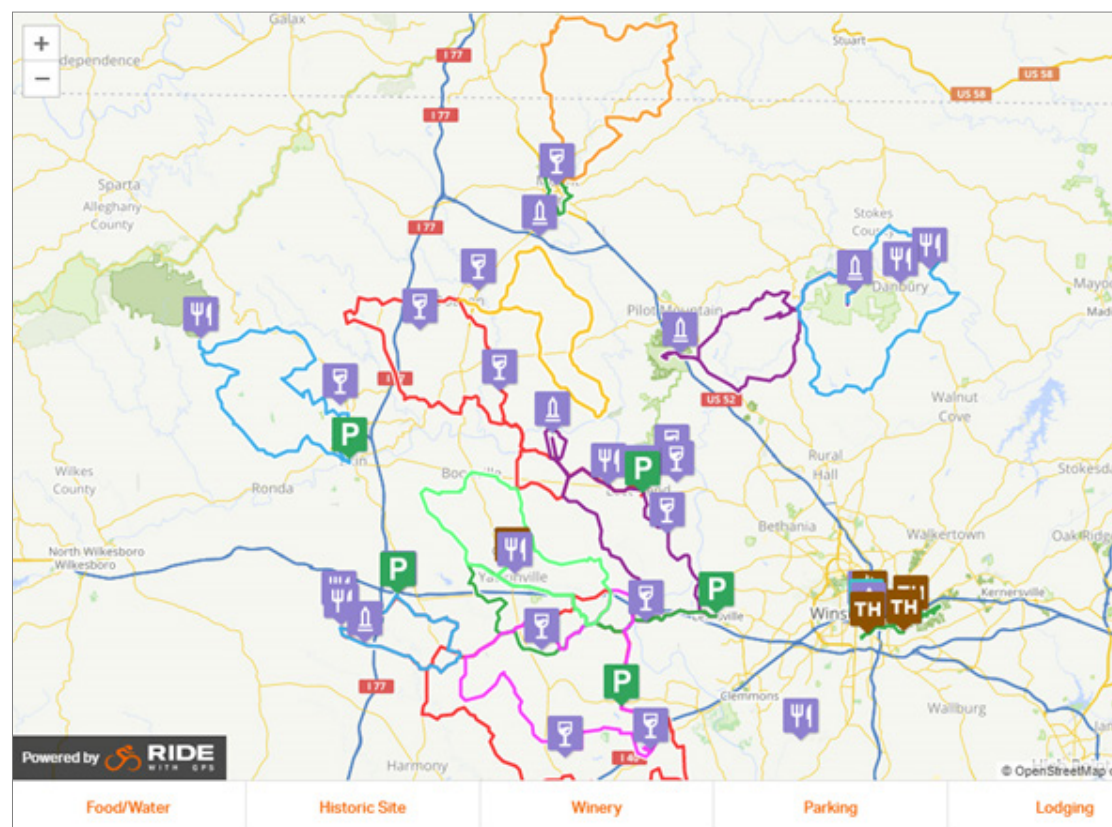
Some will seek assistance by joining a cycling club, but a lack of confidence about the route (both safety issues and the commitment required for the length of the ride) can be a barrier to visiting.

The Yadkin Valley Regional Bike Plan now includes the new Yadkin Valley Regional Bicycle Tourism Map. This map provides:

- Bicycle routes of various lengths throughout the region
- Points of Interest that can help cyclists better enjoy the region
- Access to turn-by-turn instructions in printed form, for smart phone apps, or for use on GPS devices

This map can be embedded on websites. Unlike a printed cycling map, no paper is required. It can be viewed on a smartphone or tablet, and edits and additions can be made at any time in the future as the information changes.

See map below for an example of how the interactive map is presented to the cycling tourist.



*Bicycle Tourism Map created for the Yadkin Valley Region. This is accessed on a computer or smartphone and can be accessed on the GPS device carried by many Cycling Tourists.*

<https://velogirlrides.com/yadkin-valley-regional-bicycle-tourism-map/>

The map doesn't have to be promoted exclusively on the Internet. Using the "QR Code" technology (a type of barcode), physical paper such as posters or flyers can be printed with the QR Code. Visitors scan the code with their smartphone, and it will take them directly to the Cycling Tourism Map. Of course, the map can also be offered on a simple computer display in local businesses and in visitor centers.

## BRANDING THE REGION FOR CYCLING TOURISM

Imagine the power of branding the region as a cycling destination. Examples of branding that defines the attractions of a region include:

- Blue Ridge Music Trails of North Carolina
- Overmountain Victory National Historic Trail
- The Crooked Road -- Virginia's Heritage Music Trail



*A route sign that is for both wayfinding and branding. The result is an asset of the region becomes part of its brand.*

Cycling routes can be made more accessible to both residents and visitors with a wayfinding route sign (a component of the recommendation made previously in this report). But the route sign itself can also offer more than navigation – it can identify, describe and label an asset of the region.

**The fourth recommendation is for a specific cycling route brand sign. For example, a route name or number on the sign could be adjacent to a brand identifier for cycling tourism in the Yadkin Valley. Something as simple as "A Yadkin Valley Bike Route" would help brand the Yadkin Valley as a cycling destination.**

## CREATIVE INCENTIVE IDEAS

Established cycling destinations have already shown the power of collaborating and combining incentive packages for visitors. This is an opportunity to leverage existing assets in the Yadkin Valley:

- As discussed, about 50% of the participants of the organized cycling events (identified in Section 2) will be visiting and need lodging. Local businesses to create lodging, dining and attraction packages targeted at these visitors (including enticements to stay for an extra day or two).
- Create periodic promotions to encourage local business owners and their employees to tour bike trails and greenways so that they can learn about area assets through personal experience (e.g. provide advice to visitors).
- Hotels and Inns may want to consider providing secure storage for bicycles, especially if they want to discourage guests keeping their bicycles in the guest rooms.
- Inns and restaurants may want to learn about the unique dining requirements of cyclists- breakfast especially can be challenging for these visitors.



*A popular destination for cycling tourists to gather for a pre-ride breakfast, this restaurant made special accommodations for expanding seating to the ancient steps outside their doorway. They also loaned bicycle locks free of charge to be used on their bicycle rack to put patrons at ease while they dined.*





*Cyclists traveling on Sonoma Marin Area Rail Transit (SMART) in California to reach the start of their ride without worrying about traffic, or parking once they arrive.*

- Assist with funding for placement of bicycle racks in retail districts.
- Encourage use of alternative transportation into a region. An example is using passenger rail service to travel with a bicycle to explore new cycling routes.

All of these initiatives could be led and supported by Tourism Development Authority (TDA) organizations already at work in the Yadkin Valley. **This is the fifth recommendation for enhancing the attractiveness of the region as a cycling destination.**

## CONCERNS AND TOPICS FOR FUTURE ATTENTION

There are a few challenges in the Yadkin Valley Region that may slow the progress of becoming a destination for Cycling Tourists. There are three key issues:

### UNRESTRAINED DOGS IN THE ROAD

North Carolina counties are known by cyclists for their reputation in establishing and enforcing off-leash regulations. Some counties and regions are known for rigorous enforcement. Dog owners know that not only will they receive a citation, but they will be liable for damages from injuries caused by their dog. As a result, it is rare to see a dog in the road, or to hear of injuries caused by loose dogs.

During the research for this report, numerous unrestrained dogs were encountered on every ride – in the road, not controlled by the owner, and dangerous. Encounters with dogs don't need an animal bite to be dangerous; cyclists can crash because of the dog.

Conversations with numerous local cyclists confirmed a grim reputation for the region: "We all either know a cyclist who has been injured by a loose dog, or we ourselves have been personally injured by a loose dog, or both."

Word-of-mouth is a powerful tool for promoting a brand, but it can work against the region as well. **The recommendation is to evaluate existing regulations and consider enforcement and/or expanding regulations.** Numerous other counties in the state have already confronted and resolved this issue.

### UNDERSTANDING THE RULES OF THE ROAD

Establishing the Yadkin Valley Region for cycling tourists means that potential visitors planning to ride on the roads will notice if the state law is observed. Specifically, NC recently enacted new regulations for people who drive cars (and people who ride bicycles) to allow both to travel the same road with increased safety for the person on the bicycle.

During the research for this report, we noticed that there seems to be a lack of knowledge of one of the newer sections of the North Carolina law pertaining to one vehicle passing a slower vehicle<sup>6</sup>.

It was our experience that many people who drive automobiles in the region are unaware that they can (and should) legally cross the center of the double-line on the highway to more safely pass a person riding a bicycle.

Instead, we experienced numerous "squeeze passes" where the person in the car attempts to "stay in their lane" while passing the person on the bicycle. Not only is this unsafe, but it is now illegal in NC to pass a slower moving vehicle (including a bicycle) by less than 4 feet of space. This will be

experienced as aggressive driving by the person riding the bicycle, and if it happens often enough, they won't be back – and they'll even warn their friends to stay away.

Again, word-of-mouth is a powerful tool for promoting a brand, but it can work against the region as well. The recommendation is to work with local law enforcement agencies to educate the public, both people who ride bicycle and people who drive cars, to understand the correct procedure for passing slower vehicles.

Especially with the agricultural heritage of the Yadkin Valley, this should be possible. The people on bicycles are traveling about the same speed as the people driving tractors on the road. Numerous other regions in the country have embraced this education challenge successfully, augmented with road signs to remind people driving cars of their responsibilities as drivers.

## SYMBOLS OF A WELCOMING COMMUNITY

People who ride bicycles, just like people who do not ride bicycles, want to be recognized as human residents and visitors to a region. Signs of hate speech and intolerance serve to make people feel unwelcome.

During the research for this report, we often felt welcome, safe and respected as human beings while riding in the Yadkin Valley. But there were a few signs that blared intolerance (see below) and a personal encounter with a farmer who was kind enough to come out of her house to offer tools to repair a flat tire, but then remained adamant in telling us that she did not want cyclists to pass by her farm.

If cycling tourists are discouraged from visiting, then they will not visit.



*Sign of intolerance near State Road, NC.*



*A welcoming sign in Elkin, NC*



## CONCLUSION

As part of the Yadkin Valley Regional Bike Plan conducted by the Piedmont Triad Regional Council, Velo Girl Rides performed an on-site survey and researched the potential for cycling tourism in the region, including finding and testing numerous cycling routes across the six counties included in the region.

In the previous pages of this report, we provided a list of existing assets, an explanation of their relevance to visitors, and five specific recommendations on leveraging those assets to encourage visitors. The region indeed enjoys numerous assets that will appeal to Cycling Tourists!

In addition to the existing assets, which can be promoted to potential cycling tourists, we also identified several opportunities for creating additional inducements for visitors. We also highlight three concerns that may slow the establishment of the region for cycling tourism.

One of the inducements proposed to encourage cycling tourists is an interactive map<sup>7</sup> that offers numerous routes, of varying ability and length, for the rider to use during (or before) their visit to the Yadkin Valley Region. The map can be downloaded to a smartphone, a GPS device of the type often used by cyclists, and can also be offered (embedded) on a website, such as the business, government, and TDA (tourism development authority) websites that want to promote cycling tourism in the region.

Velo Girl Rides developed and tested the map, and it is available now at:

<https://velogirlrides.com/yadkin-valley-regional-bicycle-tourism-map/>

## SOURCES

An excellent source of information about Bicycle Tourism is maintained by the non-profit organization Adventure Cycling Association (ACA):

<https://www.adventurecycling.org/advocacy/building-bike-tourism/bicycle-tourism-101/>

Economic impact of Bicycle Tourism has been extensively researched by many, and the ACA maintains a collection of reports here:

<https://www.adventurecycling.org/advocacy/building-bike-tourism/economic-impact/>

We have worked closely with the staff at Ride With GPS for years now on numerous projects, and appreciate their commitment to excellent tools for planning rides and their innovation in offering interactive maps of the type used in the Yadkin Valley Region.

Numerous experienced riders in the region provided essential advice on favorite routes, trails, bike paths, Points of Interest, and other information too long to list here. I want to especially thank Judi Lawson Wallace, Alan Norman, Louis Newton, Mary Ellen Griffin, Matthew Burczyk and Mitch Hopkins.

## APPENDIX D END NOTES

1. Latest statistic from the Outdoor Industry Association, 2017
2. Trip-related spending not including gear and equipment purchases, Outdoor Industry Association, 2018
3. Velo Girl Rides has provided guided and self-guided bicycle tours for many years, as well as event management for many cycling events, including Gran Fondo style races. Statistics collected from these activities are either directly submitted by the participants during registration (age, address) or solicited via surveys, which enjoy a 60% or better response rate.
4. March 29, 2018: Bicycling Provides \$137 Million in Economic Benefits to Northwest Arkansas. <https://www.waltonfamilyfoundation.org/about-us/newsroom/bicycling-provides-137-million-in-economic-benefits-to-northwest-arkansas>



5. Statistics collected over 10 years by Velo Girl Rides at more than 25 cycling events in and near North Carolina.
6. The relevant portion is § 20-146: Drive on Right Side of the Road: § 20-146. *Drive on right side of highway; exceptions. (a) Upon all highways of sufficient width a vehicle shall be driven upon the right half of the highway except as follows: (1) When overtaking and passing another vehicle proceeding in the same direction under the rules governing such movement; (2) When an obstruction exists making it necessary to drive to the left of the center of the highway; provided, any person so doing shall yield the right-of-way to all vehicles traveling in the proper direction upon the unobstructed portion of the highway within such distance as to constitute an immediate hazard; (3) Upon a highway divided into three marked lanes for traffic under the rules applicable thereon; or (4) Upon a highway designated and sign-posted for one-way traffic.*
7. The interactive map is made possible with the technology hosted by Ride With GPS, one of the leading providers of navigation systems to cyclists. More information is available at: <https://ridewithgps.com/>



PREPARED FOR THE PIEDMONT TRIAD REGIONAL COUNCIL AND NCDOT  
*with* THE WINSTON-SALEM URBAN AREA MPO, THE NORTHWEST  
PIEDMONT RPO, *and* SURROUNDING COUNTIES/MUNICIPALITIES

PREPARED BY ALTA PLANNING + DESIGN  
*with* WALLACE CONSULTING *and* VELO GIRL RIDES | 2020

