

# Albemarle Regional Bicycle Plan



# Acknowledgements

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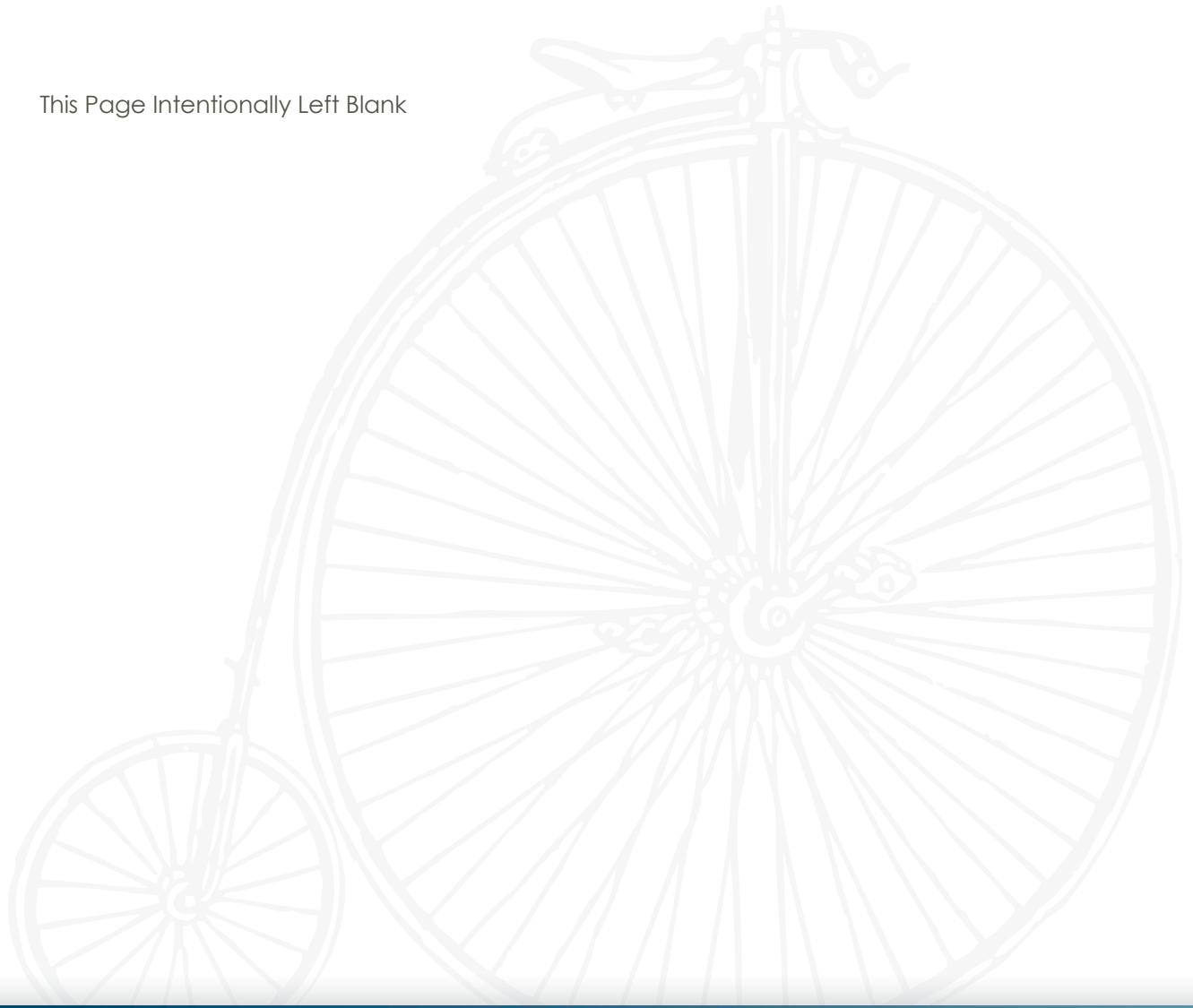
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*Roanoke Island, Dock off Eagle Point*



# Chapter One

## Introduction

### PROJECT OVERVIEW

In the summer of 2012, the Albemarle Rural Planning Organization (ARPO), with funding from the North Carolina Department of Transportation (NCDOT), began developing a regional bicycle plan for the ten counties of northeastern North Carolina. The purpose of this bicycle plan is to provide a clear framework for the development of new facilities, programs, and policies that will support safe and efficient bicycling throughout the region, which includes the municipalities of Columbia, Creswell, Duck, Edenton, Elizabeth City, Gatesville, Hertford, Kill Devil Hills, Kitty Hawk, Manteo, Nags Head, Plymouth, Roper, Southern Shores, and Winfall.

Nationally, such recent trends as unstable gas prices, environmental damage, loosening social ties, economic decline, and the prevalence of health issues like obesity and heart disease are demonstrating the need for a more diverse set of transportation options and a reevaluation of our current style of development. At the same time, towns and cities around the country are recognizing that bicycle-friendly communities attract new businesses and visitors alike and help to combat many of these trends. On a regional level, this plan represents a strong commitment to take on such issues, translating them into affordable

personal mobility, carbon-free transportation, vibrant communities, appealing tourism destinations, and healthy, active lifestyles for residents and visitors of the Albemarle region. The chief outcome of this plan will be an integrated, seamless transportation network to facilitate biking as a viable transportation alternative and recreation option throughout the region.

The development of this plan included an open, participatory process, with residents providing input through public events, stakeholder meetings, the project Steering Committee, social media, and an online comment form.

This plan includes the following features:

- A thorough analysis of current conditions for cycling in the Albemarle Region
- A comprehensive, recommended bicycle network
- Design guidelines for the development of bicycle facilities
- A prioritized list of recommended strategic and low-cost improvements
- Recommendations for the integration of bicycle-friendly policy into codes and ordinances
- Recommendations for programming, maintenance, and funding

### Chapter Contents

*Project Overview*

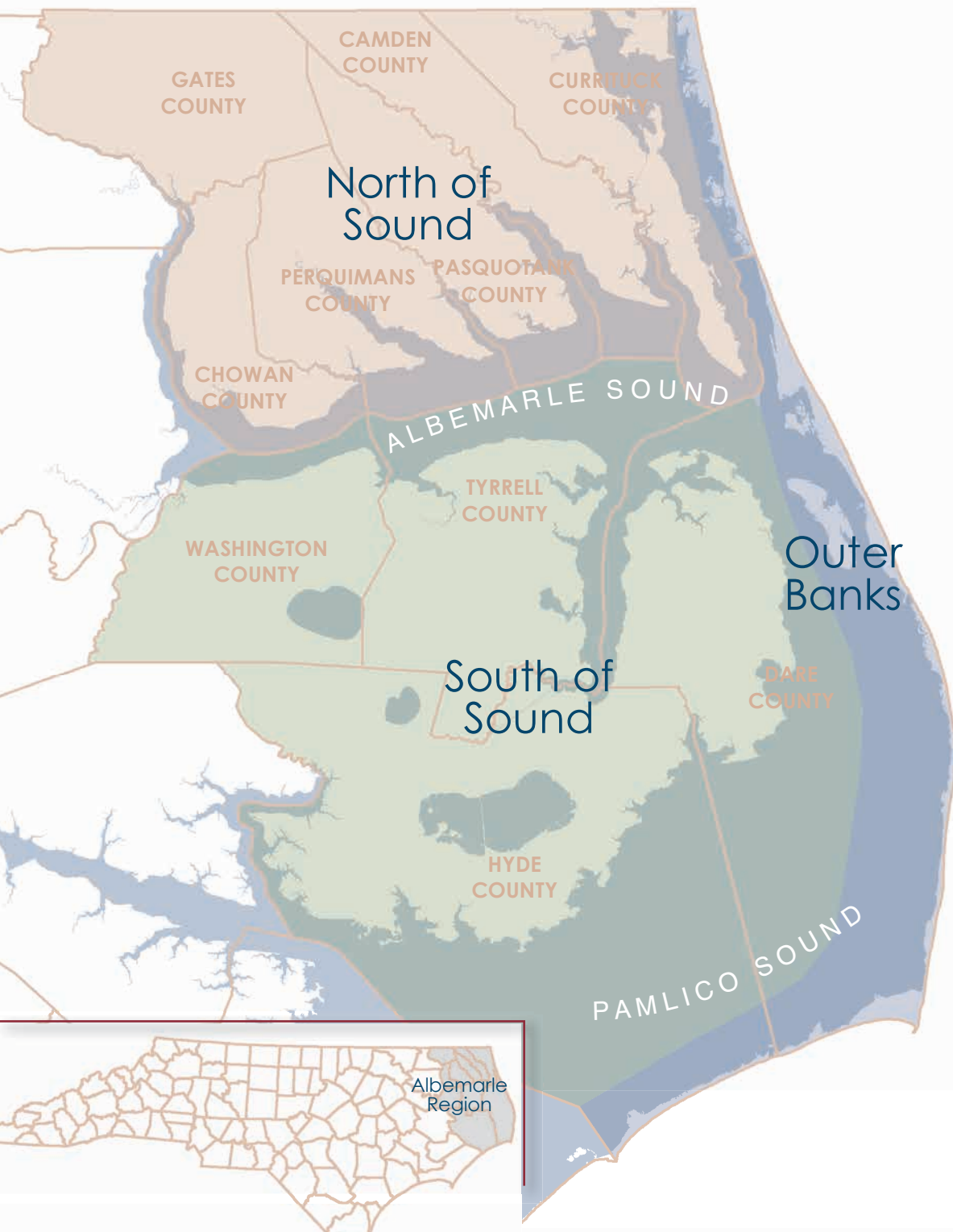
*Study Area &  
Subregions*

*Vision Statement  
and Goals*

*Planning Process*

*The Value of a  
Bicycle-Friendly  
Region*

*Types of Bicyclists*



## STUDY AREA & SUBREGIONS

The Albemarle region as defined in this plan includes the ten counties of Camden, Chowan, Currituck, Dare, Gates, Hyde, Pasquotank, Perquimans, Tyrrell, and Washington. The region is rich in natural heritage and deeply rooted in history. The physical variation and unique natural destinations and historic sites throughout the region characterize the towns, farms, and crossroads communities that traverse its many rivers and estuaries. In physical terms, the region is divided by the Albemarle and Pamlico Sounds into three subregions. The major analysis and recommendations sections of this plan are structured by these subregions, which are termed North of Sound, South of Sound, and the Outer Banks. All recommendations are consistent across the subregions and aim toward a single vision for the entire region, as laid out on the following page.

*Note: Where demographic data is presented by subregion, the results follow county boundaries rather than geographic boundaries because of the lack of available data for the latter. Thus, unincorporated areas of Currituck County on the Outer Banks, including Corolla, are grouped in with the North of Sound subregion, and unincorporated portions of Dare County are grouped in with the South of Sound subregion. Data for Ocracoke, however, has been included with the Outer Banks figures despite its inclusion in Hyde County since data was available for this village.*



## VISION STATEMENT & GOALS

The following vision statement guides the Albemarle Regional Bike Plan:

*The Albemarle region is a **Bicycle Destination for the World** where roadways comfortably accommodate all modes of transportation. Opportunities exist for residents and visitors to safely and efficiently bicycle for both transportation and recreation. Cycling is a common, fun, and preferred means of transportation, recreation, and healthy living that improves our communities.*

The purpose of this plan is to make this vision a reality. Specific goals derived from this vision are listed below.

*Goal 1: Increase the quality of bicycling throughout the region*

*Goal 2: Improve health outcomes in the region*

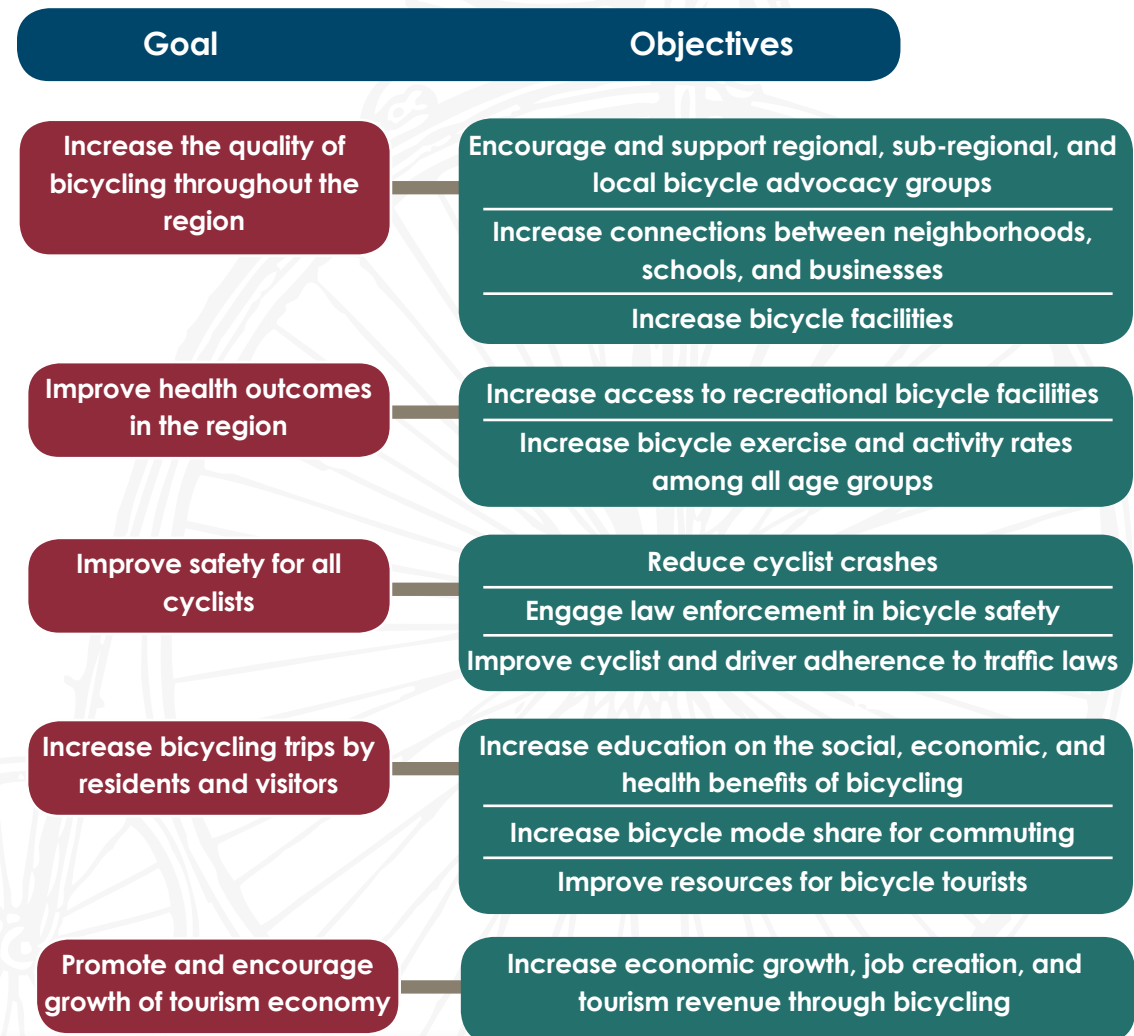
*Goal 3: Improve safety for all cyclists*

*Goal 4: Increase bicycling trips by residents and visitors*

*Goal 5: Promote and encourage the growth of the tourism economy*

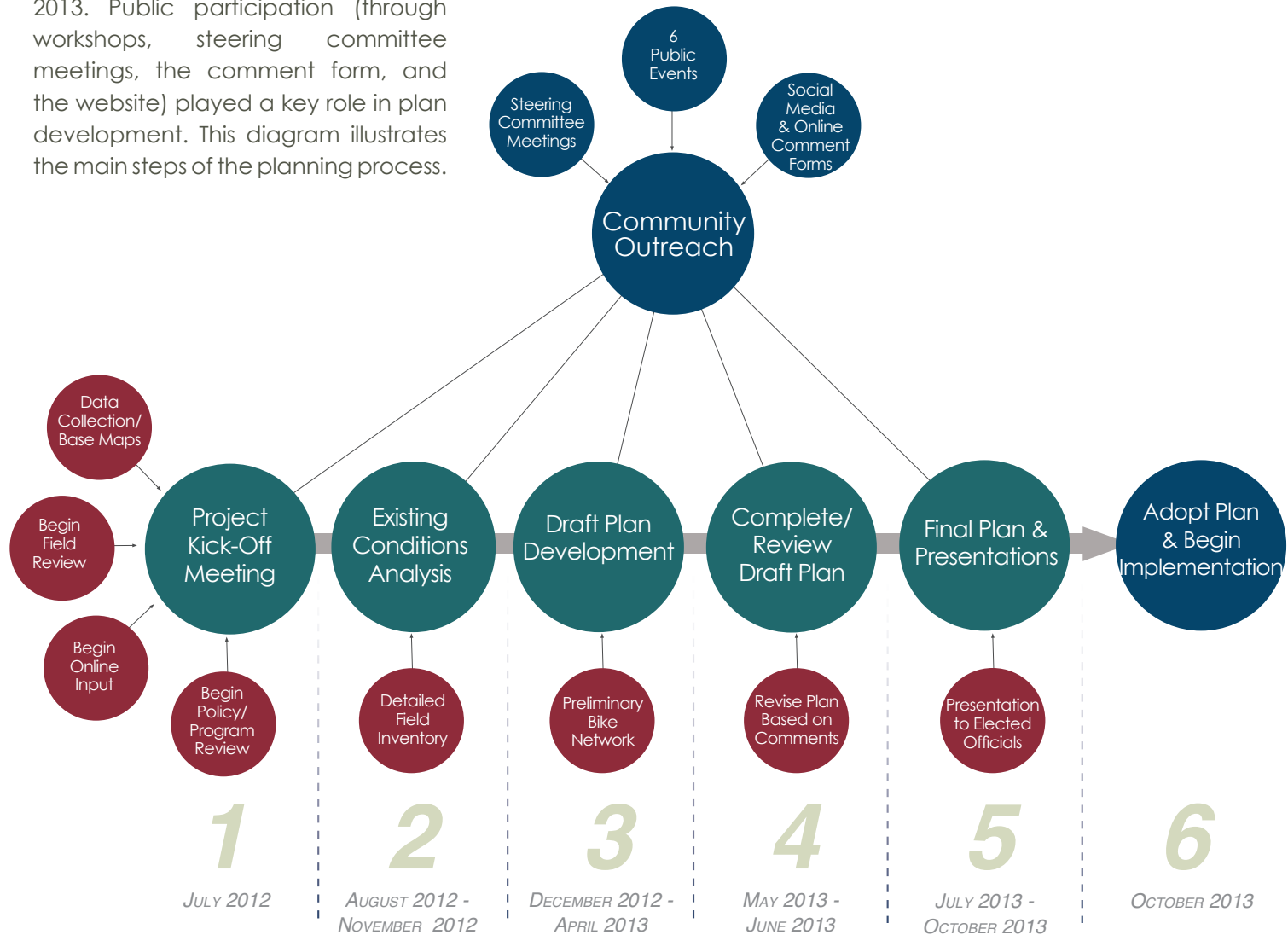
While the RPO and local government agencies must provide leadership and resources for this effort, overall success will also require continued, active participation and encouragement from residents and community organizations throughout the region. This plan aims for full implementation within 30 years of completion.

The following objectives clarify what must be done to achieve each goal. The plan's recommendations and implementation strategy will build on the Albemarle region's existing bicycling infrastructure and bicycling community to achieve these objectives, and ultimately to achieve the plan's vision



## PLANNING PROCESS

The planning process began in July 2012 and concluded in October of 2013. Public participation (through workshops, steering committee meetings, the comment form, and the website) played a key role in plan development. This diagram illustrates the main steps of the planning process.





## THE VALUE OF A BICYCLE-FRIENDLY REGION

Improvements that encourage bicycling can provide a wide range of benefits to a community and its residents. Better bicycling facilities improve safety and encourage more people to ride, which in turn improves health, provides a boost to the local economy, creates a cleaner environment, reduces congestion and fuel costs, and contributes to a better quality of life and sense of community.

Communities across the country are experiencing the benefits of providing a supportive environment for bicycling. With a better bicycle network, the Albemarle region can create stronger, more vibrant communities and take advantage of the many benefits described below.

### IMPROVED HEALTH THROUGH ACTIVE LIVING

Regular physical activity is recognized as an important contributor to good health. The Centers for Disease Control and Prevention (CDC) recommend 30 minutes of moderate physical activity each day for adults and 60 minutes each day for children.<sup>1</sup> Unfortunately, many people do not meet these recommendations because they lack environments where they can be physically active. The CDC reports that “physical inactivity causes numerous physical and mental health problems, is responsible for an estimated 200,000 deaths per year, and contributes

to the obesity epidemic.”<sup>2</sup> These conditions also increase families’ medical expenses; each year North Carolinians spend over \$24 billion on health care costs associated with a lack of physical activity, excess weight, type II diabetes, and poor nutrition.<sup>3</sup>

Having accessible bicycle facilities available, such as bike lanes and paths, can help people more easily incorporate physical activity into their daily lives. Sixty percent of North Carolinians say they would increase their level of physical activity if they had better access to walking and bicycling facilities, such as sidewalks and trails.<sup>4</sup> Regular physical activity, such as bicycling, is shown to have numerous health benefits:<sup>5</sup>

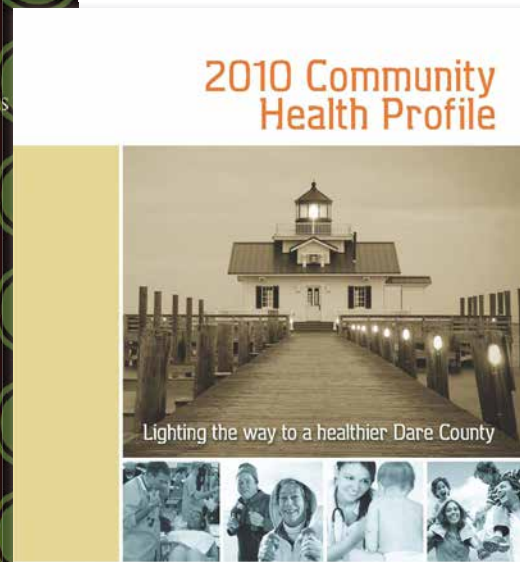
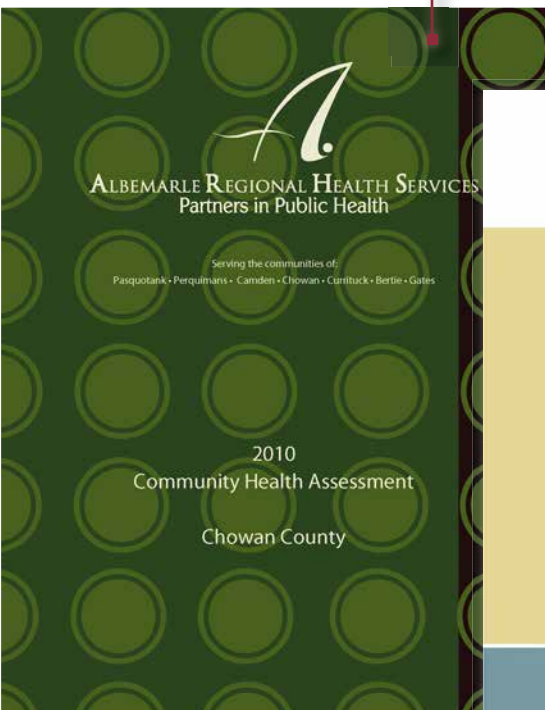
- Reduces the risk and severity of heart disease and diabetes
- Reduces the risk of some types of cancer
- Improves mood
- Controls weight
- Reduces the risk of premature death



Cyclists making use of the Corolla Bike Path.

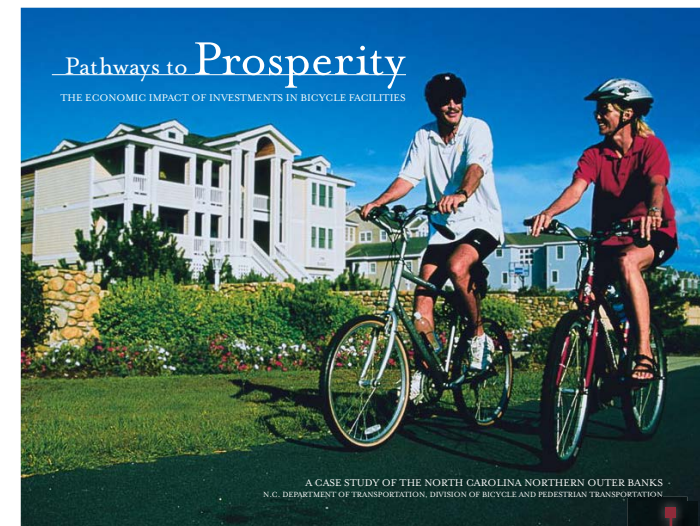
According to the 2010 Regional Community Health Assessment by Albemarle Regional Health Services, heart disease and cancer are the two leading causes of death in the Albemarle region.<sup>6</sup> Moreover, the cancer and heart disease rates for Chowan, Currituck, Pasquotank, and Perquimans counties are higher than the state rate. In addition, Dare County's own 2010 Community Health Assessment shows that childhood obesity rates in the county surpass those of North Carolina, which ranks fifth highest of the 50 states in childhood obesity.<sup>7</sup> Establishing a safe and well-connected network of bike lanes and paths throughout the Albemarle region will provide residents with access to the physical activity options that they need to maintain good health and reduce the risk of disease.

2010 County Health Assessments for Camden, Chowan, Currituck, Gates, Pasquotank, and Perquimans Counties are available at [www.arhs-nc.org/cha/2010](http://www.arhs-nc.org/cha/2010)



### *INCREASED TOURISM ATTRACTION AND PROPERTY VALUES*

Local investments in bicycling attract visitors and boost tourism revenues. A study of the impact of bicycle tourism in the 2004 Northern Outer Banks reports that a one-time investment of \$6.7 million in bicycling improvements resulted in \$60 million in tourism revenue every year. An estimated 1,400 jobs are created or supported annually with expenditures from bicycle tourists, with 680,000 tourists engaging in some bicycle activity in the region annually. The same study shows that bicycle facilities also encourage return visits; 43 percent of visitors surveyed said that bicycling was a factor in their decision to visit the

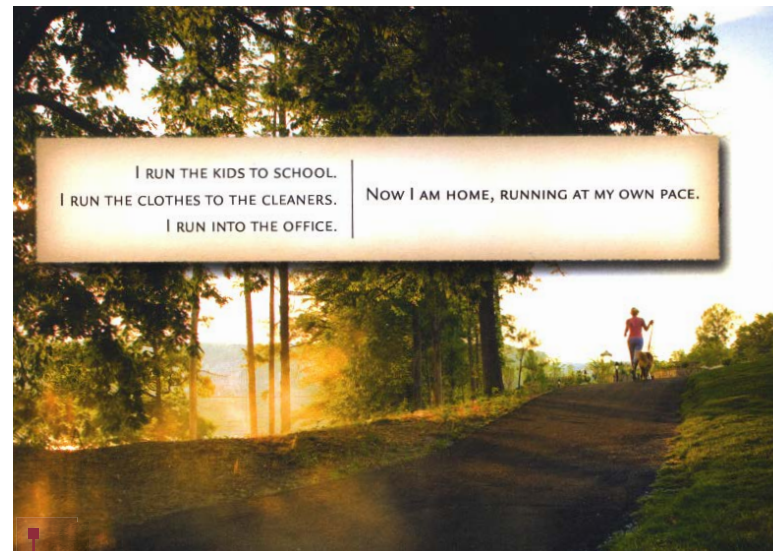


Download the full report, "Pathways to Prosperity", from: <http://www.ncdot.gov/bikeped/researchreports>



Northern Outer Banks, and 53 percent reported that the quality of bicycle facilities would be a major factor in their decision to return in the future. Considering the increase in visitation to the Outer Banks since the data was collected for this report (2003), relative increased interest in bicycling, and inflation, the annual impact is estimated at over \$100 million in 2012. See Appendix A for details on this estimate.

Bicycle facilities such as bike lanes, paths, and greenway trails are popular community amenities that add value to properties nearby. According to a 2002 survey by the National Association of Realtors and the National Association of Homebuilders, homebuyers rank trails as the second-most important community amenity out of 18 choices, above golf courses, ball fields, parks, security, and others.<sup>8</sup> This preference for trails is reflected in property values around the country. In the Shepard's Vineyard residential development in Apex, North Carolina, homes along the regional greenway were priced \$5,000 higher than other residences in the development – and these homes were still the first to sell.<sup>9</sup> A study of home values along the Little Miami Scenic Trail in Ohio found that single-family home values increased by \$7.05 for every foot closer a home is to the trail. These higher prices reflect how trails and greenways add to the desirability of a community, attracting homebuyers and visitors alike.

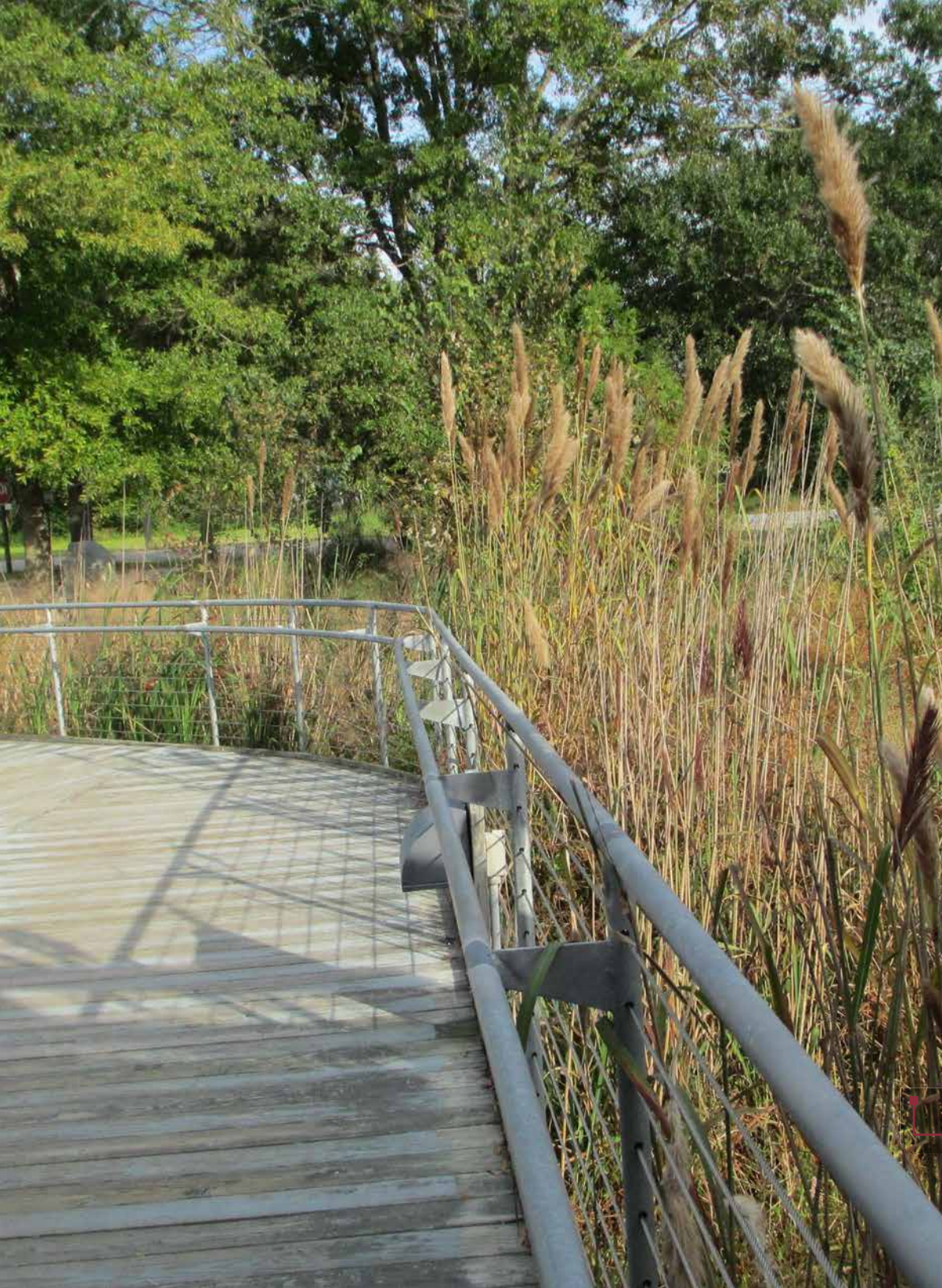


*At the award-winning Fishhawk Ranch, nearly 30 miles of trails weave throughout the community, connecting the many parks, amenities, villages and neighbors. Soon to be one of the largest community trail systems in the country, each pathway was carefully positioned to minimize the impact on the existing plant life.*

**I WANT**  
top schools nearby  
my kids to get fresh air  
my kids to have lots of friends  
our TV to be ignored







### *IMPROVED ENVIRONMENTAL QUALITY*

Providing the option of bicycling as an alternative to driving can reduce the volume of car-related emissions, which in turn improves air quality. Cleaner air reduces the risk and complications of asthma, particularly for children, the elderly, and people with heart conditions or respiratory illnesses.<sup>10</sup> Lower automobile traffic volumes also help to reduce neighborhood noise levels and improve local water quality by reducing automobile-related discharges that are washed into local rivers, streams, and lakes. Based on existing bicycle mode shares in the Albemarle region, estimated annual bicycling benefits already include 837,000 less vehicle miles traveled with 681,000 pounds of CO<sub>2</sub> emissions reduced (See Appendix A for more information).

Greenways and trails are a key component of any bicycle network and carry environmental benefits as well. Greenways help to preserve wildlife habitats and act as buffers against natural hazards, such as flooding. By conserving plant cover, greenways also preserve the natural air filtration processes provided by plants, filtering out harmful pollutants, such as ozone, sulfur dioxide, carbon monoxide, and airborne heavy metal particles. By providing a vegetative buffer along streams, rivers, and other waterways, greenways also prevent soil erosion and filter out pollution from agricultural operations and road runoff.

Boardwalk at the Walter B Jones, Sr.  
Center for the Sounds, Columbia, NC



### *TRANSPORTATION BENEFITS*

Many North Carolinians do not have access to a vehicle or are unable to drive. According to the 2001 National Household Travel Survey, 12 percent of persons age 15 or older do not drive, and 8 percent of U.S. households do not own an automobile. Providing a well-connected bicycle network provides those who are unable or unwilling to drive with a safe transportation option. Bicycle improvements can increase access to important destinations for the young, the elderly, low-income families, and others who may be unable to drive or do not have a motor vehicle.

Investing in bicycle facilities can also help to reduce congestion and the pollution, gas costs, wasted time, and stress that comes with it. Each person who makes a trip by bicycle is one less car on the road or in the parking lot. A network of wide shoulders, bike lanes, and paths gives people the option of making a trip by bike, which helps to alleviate congestion for everyone. Bicycle facilities can also help to substantially reduce transportation costs by providing a way of getting around without a car for some trips. About half of all trips taken by car are three miles or less, equivalent to a 15-minute bike ride.<sup>11</sup> With a safe, convenient bicycle network, some of these shorter trips could be comfortably made by bike, saving money on gas, parking costs, and vehicle wear and tear over time.

### *BETTER QUALITY OF LIFE*

Increasingly, citizens are demanding a cleaner, safer, more enjoyable community that provides amenities for adults and children alike. Trails for biking and walking are considered one of the most important amenities a neighborhood can have. Communities with quality greenways, trails, and bicycle routes attract new residents as well as new businesses and industries. Getting outdoors and being physically active also helps to relieve stress, improve mood, and foster social connections between residents.

Transportation and recreation options will be especially important for older Americans in the coming years. According to the Brookings Institution, the number of older Americans is expected to double over the next 25 years. Seniors who find themselves unable to drive or who become uncomfortable with driving will find that their mobility is severely limited if another transportation option isn't available. Trails and paths will provide seniors with a place to take a low-intensity bike ride or a stroll around the neighborhood, or a way to get to nearby shops and services. Paths and trails are also valuable transportation connections for



A cyclist visiting the Elizabeth City Farmers Market.

the elderly because they accommodate motorized wheelchairs, which can provide many seniors with the independent mobility that they would not have otherwise. The aging trend across America is particularly relevant to the Albemarle region. The percentage of residents over the age of 65 in this region is two percentage points higher than that of the state, or 18 percent greater. In the South of Sound subregion, that percentage jumps to 33 percent, with a median age 5.6 years greater than the state average. Both the South of Sound and Outer Banks subregions hold significant older populations that may increasingly seek alternatives to driving as they age.

Children can also benefit greatly from a safe, well-connected bicycle network in their neighborhoods. In recent years, increased traffic and a lack of pedestrian and bicycle facilities have made it less safe for children to travel to school or to a friend's

house. In 1969, 48 percent of students walked or biked to school, but by 2001, less than 16 percent of students walked or biked to or from school. By reevaluating and improving the regional bicycle network, children in the Albemarle region could once again safely bike in their communities. According to the National Center for Safe Routes to School, "Walking or biking to school gives children time for physical activity and a sense of responsibility and independence; allows them to enjoy being outside; and provides them with time to socialize with their parents and friends and to get to know their neighborhoods."<sup>12</sup> Ensuring that children have safe connections to their schools and throughout their neighborhoods can encourage them to spend time outdoors, get the physical activity they need for good health, and offer a higher quality of life.

*Age Distribution in the Albemarle Region*

Geography	< 19	20 - 34	35 - 54	55 - 64	> 65	Median Age
North Carolina	27.0%	20.0%	28.7%	11.5%	12.6%	37.1
Albemarle region	25.4%	16.7%	29.8%	13.2%	14.9%	40.9
North of Sound subregion	26.6%	17.0%	29.2%	12.5%	14.7%	40.0
South of Sound subregion	23.7%	15.5%	29.6%	14.3%	16.9%	42.7
Outer Banks subregion	22.3%	16.5%	31.9%	14.9%	14.3%	42.9



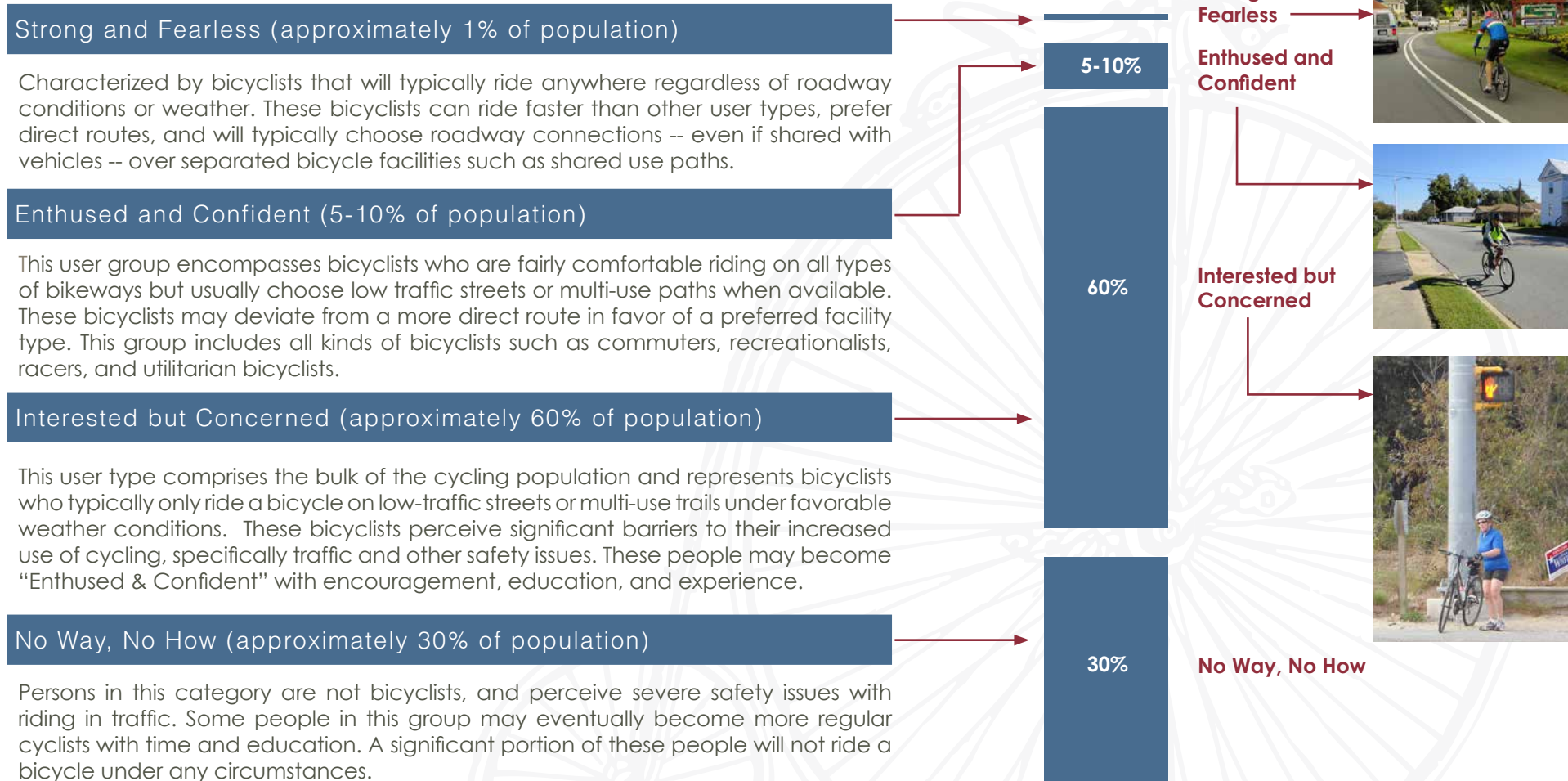


## TYPES OF BICYCLISTS

There are a variety of bicyclists of all skill levels in the Albemarle region. This plan seeks to meet the needs of the "Strong and Fearless," "Enthusied and Confident," and "Interested but Concerned." Bicycle infrastructure should accommodate as many user

types as possible, with the goal of creating safe bicycling environments to encourage more ridership. A framework for understanding the characteristics, attitudes, and infrastructure preferences of different bicyclists in the US population as a whole is illustrated below.

TABLE 1.1 TYPES OF BICYCLISTS <sup>13</sup>



## ENDNOTES

1. <http://www.cdc.gov/physicalactivity/everyone/guidelines/index.html>
2. U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. (1996). Physical Activity and Health: A Report of the Surgeon General
3. Be Active North Carolina. (2005). The Economic Cost of Unhealthy Lifestyles in North Carolina. Retrieved from [www.beactivenc.org/mediacenter/Summary%20Report.pdf](http://www.beactivenc.org/mediacenter/Summary%20Report.pdf).
4. North Carolina State Center for Health Statistics. (2007). Behavioral Risk Factor Surveillance System (BRFSS), Calendar Year 2007 Results, [www.schs.state.nc.us/SCHS/brfss/2007/index.html](http://www.schs.state.nc.us/SCHS/brfss/2007/index.html).
5. National Prevention Council. (2011). National Prevention Strategy: America's plan for better health and wellness. Retrieved from <http://www.healthcare.gov/prevention/nphpphc/strategy/report.pdf>
6. Albemarle Regional Health Services. (2010). 2010 Regional Community Health Assessment. Retrieved from: <http://www.arhs-nc.org/cha/#highlightDocument>
7. Dare County Department of Public Health and Health Carolinians of the Outer Banks. (2010). Dare County Community Health Assessment. Retrieved from <http://www.co.dare.nc.us/health/docs/CommHlthPrfle.pdf>
8. National Association of Homebuilders. (2008). [www.nahb.com](http://www.nahb.com)
9. Rails to Trails Conservancy. (2005). Economic Benefits of Trails and Greenways.
10. Health Effects Institute (2010). Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects. Special Report 17.
11. U.S. Department of Transportation and Federal Highway Administration. (2009). National Household Travel Survey.
12. National Center for Safe Routes to School. (2006). National Center for Safe Routes to School Talking Points.
13. *Four Types of Cyclists*. (2009). Roger Geller, City of Portland Bureau of Transportation. Supported by data collected nationally since 2005.

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*Edenton, View of Edenton Bay at Water Street*



# Chapter Two

## Existing Conditions

### OVERVIEW

Many factors influence the quality and quantity of cycling in a particular place. The presence of bicycling facilities, distribution of land uses, connectivity of the road network, and norms regarding sharing of the road are just a few. Further, these factors and others influence the viability of particular improvements and therefore will guide the recommendations of this plan. Recommendations will vary throughout the region given the significant variation in both culture and the built environment seen across it.

This chapter provides a brief overview of these factors and their variations across the region, as well as their relevance to cycling today and to potential improvements for cycling in the future. This overview is presented in a series of descriptive maps. Following this map series, an explanation of the methods used to gather public input is provided. Finally, plans, programs, and policies relevant to bicycling in the Albemarle region are summarized.

The following maps provide a summary of existing conditions in the Albemarle region:

- Regional Land Use
- Destinations
- Major Routes
- Population Density
- Employment Density
- Equity
- Commute Mode Share
- Crash Density
- Previous Plans

### Chapter Contents

*Overview*

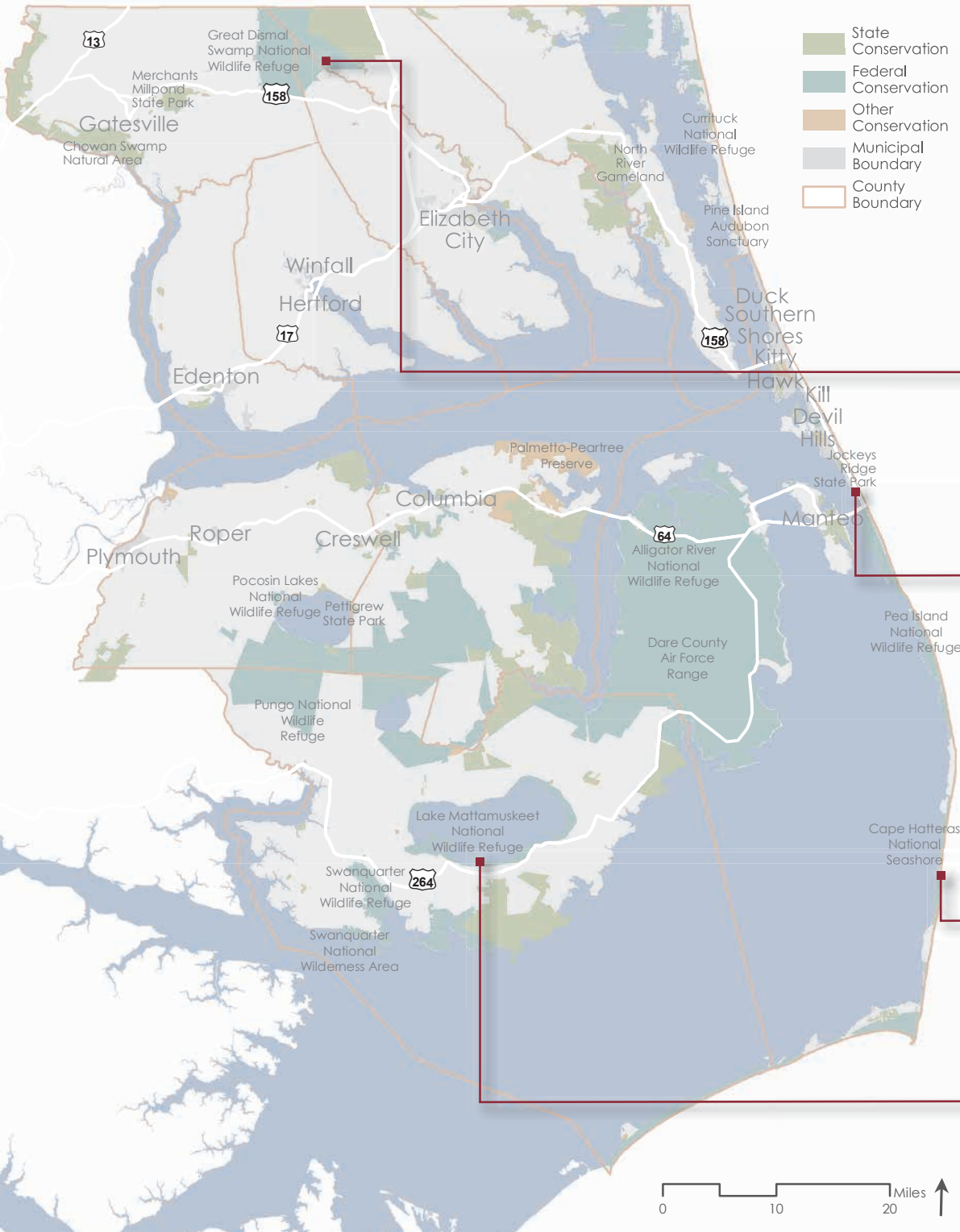
*Descriptive Map Series*

*Land Use Summary*

*Public Input*

*Program Summary*

*Plan and Policy  
Summary*



## REGIONAL LAND USE

The Albemarle region holds extensive public lands at the state and federal level ranging from national wildlife refuges to state parks to military lands. These public holdings provide both opportunities for partnerships and potential constraints to the development of bicycle facilities.

*The Great Dismal Swamp National Wildlife Refuge (NWR) extends into Virginia and provides trails for biking and hiking.*

*Jockys Ridge State Park hosts the tallest natural sand dune on the east coast and beautiful sunsets, attracting millions of visitors.*

*Cape Hatteras National Seashore extends 70 miles from Nags Head to Ocracoke, with several historic landmarks along the way including the Cape Hatteras Lighthouse.*

*Mattamuskeet NWR boasts the state's largest natural lake. The lake is a popular destinations for birders, as it attracts thousands of wintering waterfowl each year.*



## DESTINATIONS

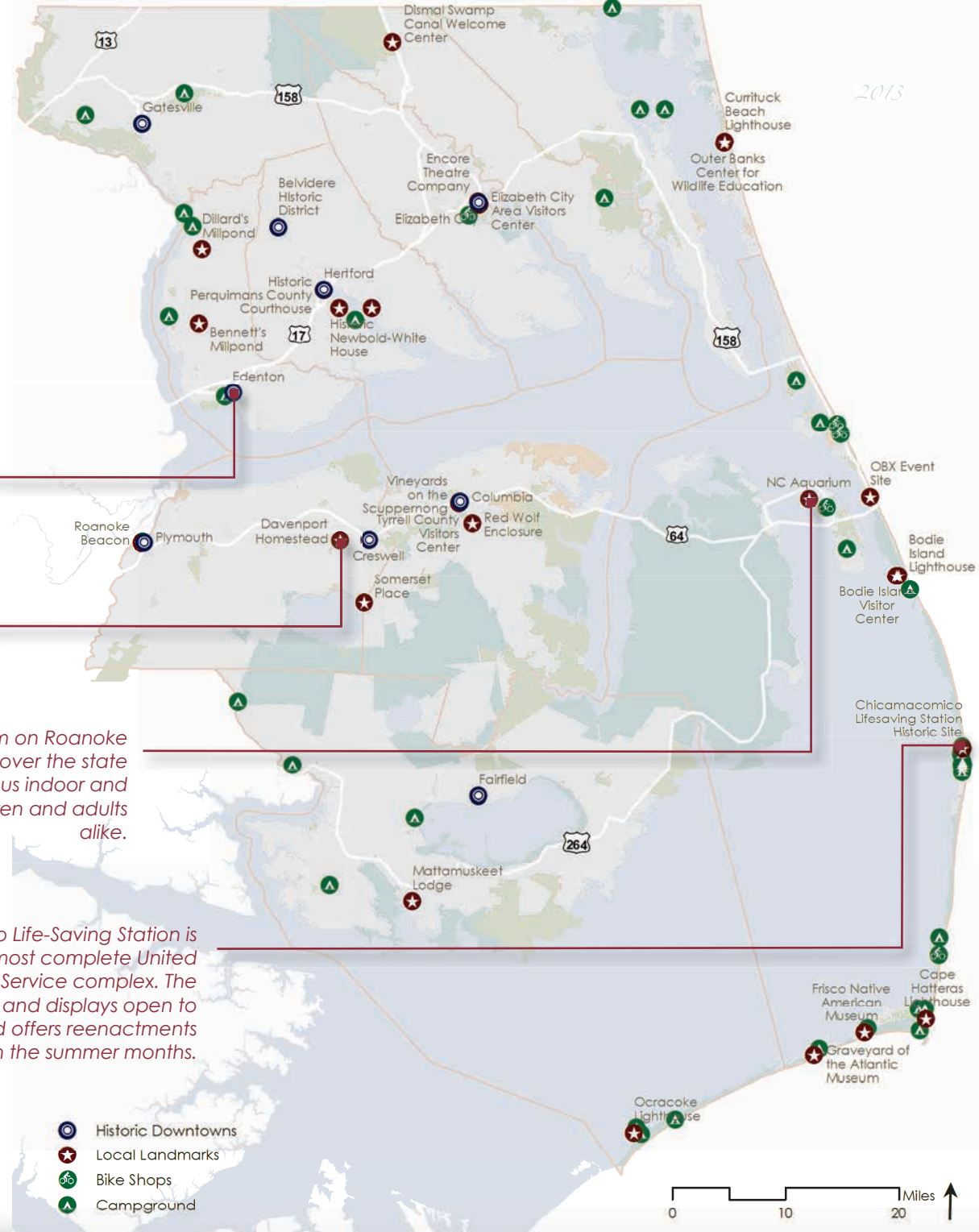
The Albemarle region has a long history dating back to the first English colony in the New World. Many historic sites are preserved, offering visitors a rich assortment of destinations. A few notable sites are described below with information from the Historic Albemarle Tour ([www.historicalbemarletour.org](http://www.historicalbemarletour.org).) The region also offers extensive camping and recreation opportunities, including hiking, mountain biking, fishing, wildlife viewing, and hunting.

*Historic Edenton is North Carolina's second oldest town, incorporated in 1722 seventeen years after Bath, where the notorious pirate Blackbeard's name is recorded. The Cupola House and the Chowan County Courthouse are two National Historic Landmarks located here.*

*The Davenport Homestead in Creswell provides a glimpse of life in the 18th century. It was built by the future North Carolina senator Daniel Davenport of Washington County.*

*The North Carolina Aquarium on Roanoke Island attracts visitors from all over the state to the coast, offering numerous indoor and outdoor programs for children and adults alike.*

*The Chicamacomico Life-Saving Station is the nation's largest, most complete United States Life-Saving Service complex. The site contains artifacts and displays open to self-guided tours and offers reenactments in the summer months.*



## *LAND USE SUMMARY*

From the beaches of the Outer Banks to the farms of Gates County to the townscape of Edenton, the 10-county Albemarle region is as large as it is diverse. The region's diversity may be characterized by 7 normative settlement types, which are described below in more detail and can be used to structure appropriate, context-sensitive transportation, and land use planning decisions.

### *NATURAL*

Albemarle's natural land exists in an unaltered or nearly unaltered state, including forests, fields, swamps, creeks, rivers, harbor, beach, grassland, and other environments. Via a few regional roads or shared use paths, some of the region's most stunning natural environments are accessible by bicycle. Ex. Dismal Swamp State Park

### *FARMLAND*

Farmland in the Albemarle region is characterized by flat, sparsely populated land dedicated almost entirely to the growing of crops (tobacco, cotton, etc.) and the tending of livestock. The limited built landscape is comprised of single-family homes on large plots of land located close to rural roadways, which often include numerous other structures used for related activities. The scenic quality is high, but the bicycling appeal varies along these roads; traffic is generally light but speeds are relatively high and many roads do not have shoulders. Ex. Lake Landing

### *HAMLET*

Located at the intersection of two or more regional thoroughfares, hamlets are small clusters of buildings that feature residential or agricultural land uses. The transition between a hamlet and farmland or natural land is almost immediate, which makes recreational bicycling appealing. Ex. Fairfield

### *VILLAGE*

Villages maintain a small, irregular network of streets connecting a cluster of homes and a limited amount of other land uses, including local retail and other small businesses, places of worship, parks, and schools. To this last point, villages in the Albemarle region are regional focal points because they often accommodate the county's elementary or middle schools. Ex. Winfall

### *TOWN*

Towns are typically located adjacent to the Albemarle Sound, or along one of its major tidal tributaries. They feature a regular grid of streets, and a wider variety of land uses than villages. Residential neighborhoods and other civic and commercial uses are clustered around a historic main street core that includes 2-3 story mixed-used buildings. While most towns in the Albemarle region have retained a meaningful relationship with their countryside, recent auto-oriented development on the fringe is slowly altering the compact town fabric and making walking and bicycling more difficult. Ex. Edenton

*CITY*

Cities are the cultural, governmental, commercial, and educational centers for a given region. They feature the highest diversity and density of land uses, connected by a network of streets that encourage bicycling and walking. Recent auto-oriented development created by land use regulations are damaging not only the fringe, but also the core, which makes walking and bicycling challenging where it should be the easiest. Ex. Elizabeth City

*BEACH DISTRICT*

Districts feature large swaths of land dedicated to a single purpose. In the Outer Banks, this includes either residential or commercial uses. Beach districts feature relatively high density but lack the mixed-use neighborhood structure found in traditional towns and cities, as described above. Ex. Kill Devil Hills

*SUBREGION SETTLEMENT TYPES**OUTER BANKS*

Natural

Hamlet

Village

Town

Beach District

*NORTH OF SOUND*

Natural

Farmland

Hamlet

Village

Town



City

*SOUTH OF SOUND*

Natural

Farmland

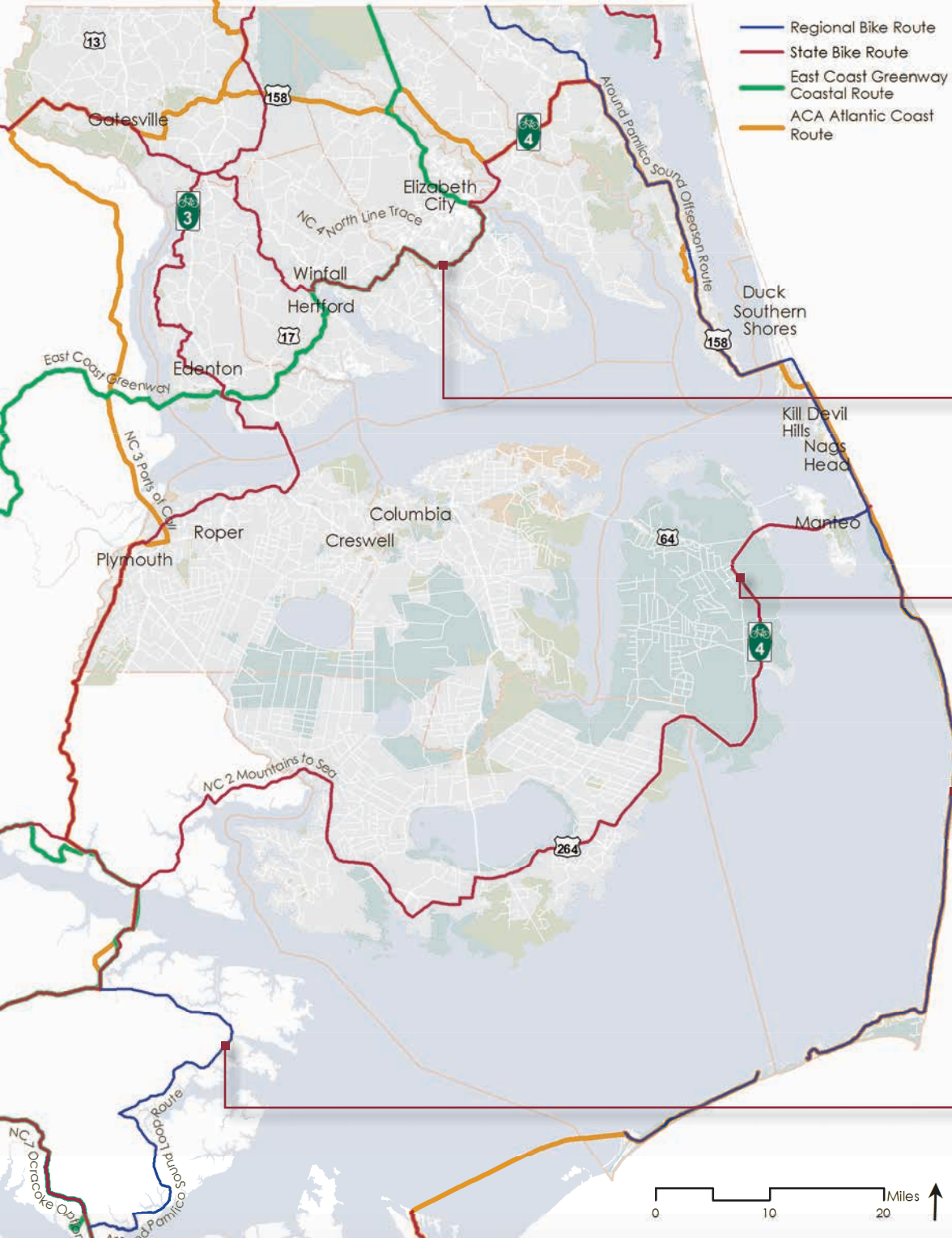
Hamlet



Village

Town





## MAJOR ROUTES

A variety of regional, state, and national bicycle routes are currently designated through the Albemarle region. Three state bike routes, the Adventure Cycling Association's Atlantic Coast Route's two alternatives, the East Coast Greenway Coastal Route, and the regional Around Pamlico Sound route all draw long-distance cyclists to the area.

*The East Coast Greenway (ECG) is a long-distance urban trail project in development that will eventually connect 25 major cities from Maine to Florida. Through North Carolina, the ECG splits into spine and coastal route alternatives.*

*State Bike Routes 2,3, and 4; the Mountains to Sea, Ports of Call, and North Line Trace routes; connect most of the Towns in the Albemarle region. These routes are part of the nine-route, 2,400-mile long system that connects scenic landscapes around the state. The majority of state bike routes do not contain exclusive space for bicyclists, such as paved shoulders or bicycle lanes.*

*Note: State bike routes shown throughout this plan represent updated routes developed in 2013 as part of the North Carolina Statewide Pedestrian & Bicycle Plan.*

*The Adventure Cycling Association is a non-profit organization that produces cycling maps to encourage long-distance cycling around the country. Two alternatives of the ACA's Atlantic Coast Route weave through the Albemarle region, overlapping with many of the other routes described here.*

*The Around Pamlico Sound route connects five state parks, historic sites, the National Seashore and other destinations around the region. Given the large difference in traffic patterns during the summer, on- and off-season routes provide options for cyclists looking to loop the region.*



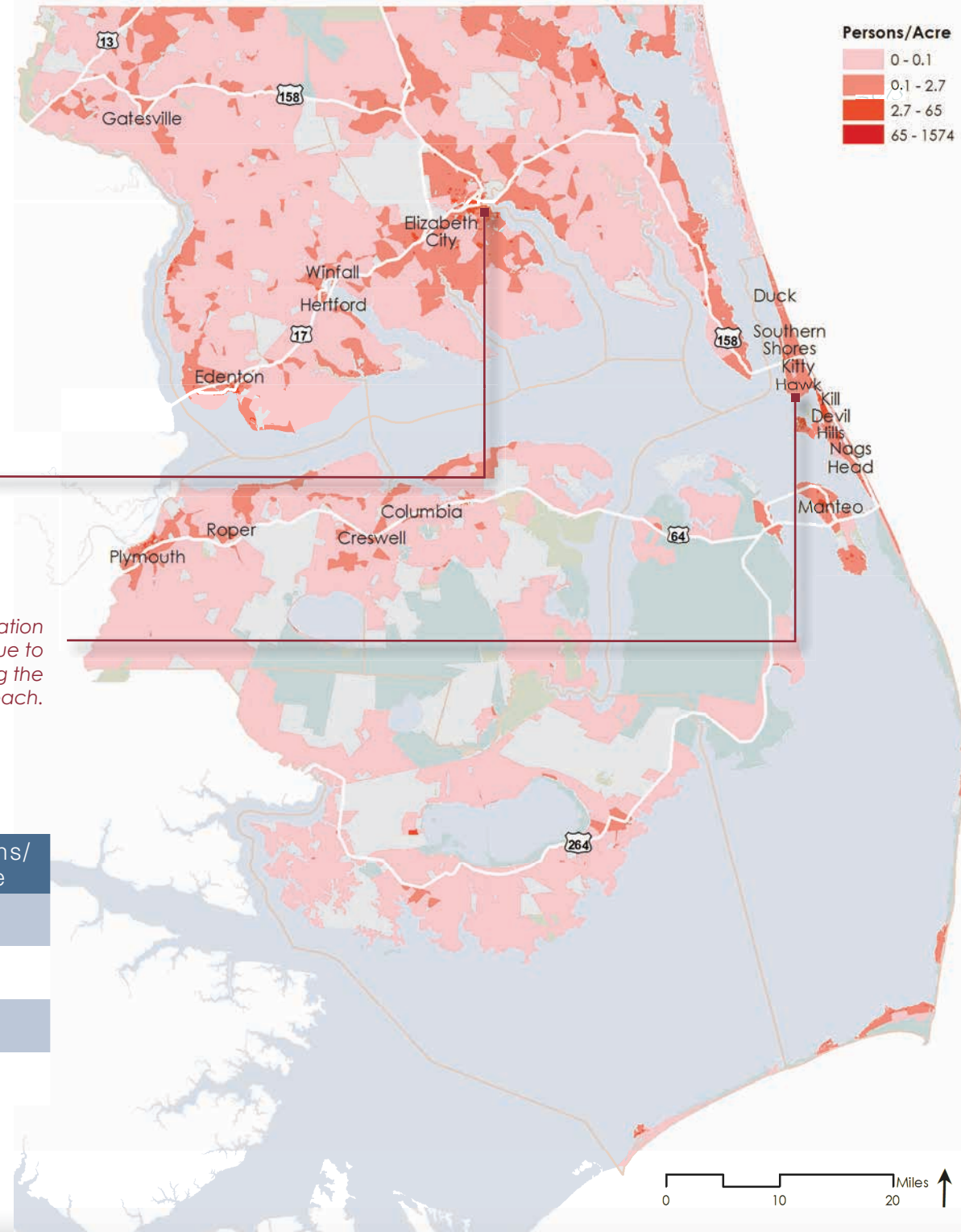
## POPULATION DENSITY

Two-thirds of the Albemarle population lives in the North of Sound subregion, and one third of those in the largest municipality, Elizabeth City. The Outer Banks subregion is second with twenty percent of the population, but is estimated to increase six-fold each summer with the influx of visitors, according to the Outer Banks Chamber of Commerce. This estimate brings the peak season population of the region to almost 350,000 or twice that of the off-season.

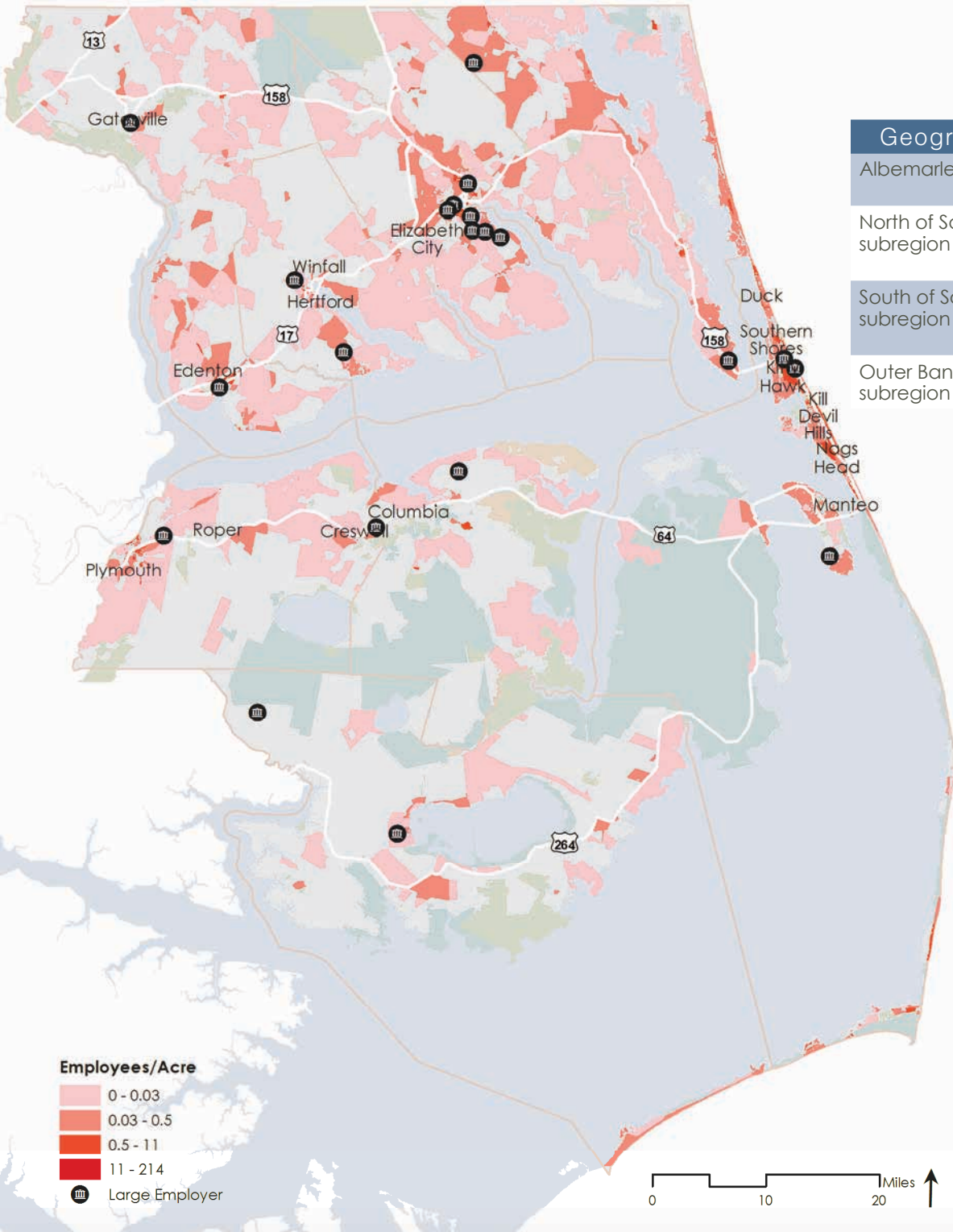
*Elizabeth City holds the largest year-round population center in the region.*

*The Central Outer Banks see the largest population shift between peak season and off-season due to the large number of visitors that vacation along the beach.*

Geography	Population	Households	Persons/Acre
Albemarle region	170,167	67,024	0.08
North of Sound subregion	113,174	43,064	0.12
South of Sound subregion	22,913	8,286	0.01
Outer Banks subregion	34,080	15,674	0.23



0 10 20 Miles ↑



## EMPLOYMENT DENSITY

Geography	#1	#2	#3
Albemarle region	Retail Trade (20%)	Educational Services (14%)	Accommodation & Food Services (13%)
North of Sound subregion	Educational Services (18%)	Retail Trade (17%)	Health Care & Social Assistance (14%)
South of Sound subregion	Educational Services (16%)	Health Care & Social Assistance (14%)	Retail Trade (13%)
Outer Banks subregion	Retail Trade (26%)	Accommodation & Food Services (20%)	Real Estate & Rental & Leasing (12%)

Employment is largely concentrated in the Outer Banks and North of Sound subregions, particularly in and around Elizabeth City. 56 percent of all jobs are found in the North of Sound subregion, where two-thirds of the population lives. The Outer Banks subregion contains a high share of jobs relative to its population; 33 percent of all jobs are in the Outer Banks, yet just 20 percent of the population resides there. The South of Sound subregion has relatively balanced employment and population densities, with 11 percent of the jobs and 14 percent of the population. These figures suggest that many workers in the Albemarle region likely commute from the North of Sound and South of Sound to the Outer Banks for work.

In the Outer Banks, the top employment sectors are primarily tourism-related; retail trade, accommodation and food services, and real estate, rental and leasing together make up 58 percent of jobs. While agriculture and fishing have historically been major sources of employment in the Albemarle region and remain a vibrant part of the economy, landscape, and culture, today they account for just 2 percent of jobs. These jobs are almost entirely located in the North of Sound (61%) and South of Sound (35%) subregions, with few agriculture and fishing jobs in the Outer Banks.

## Equity

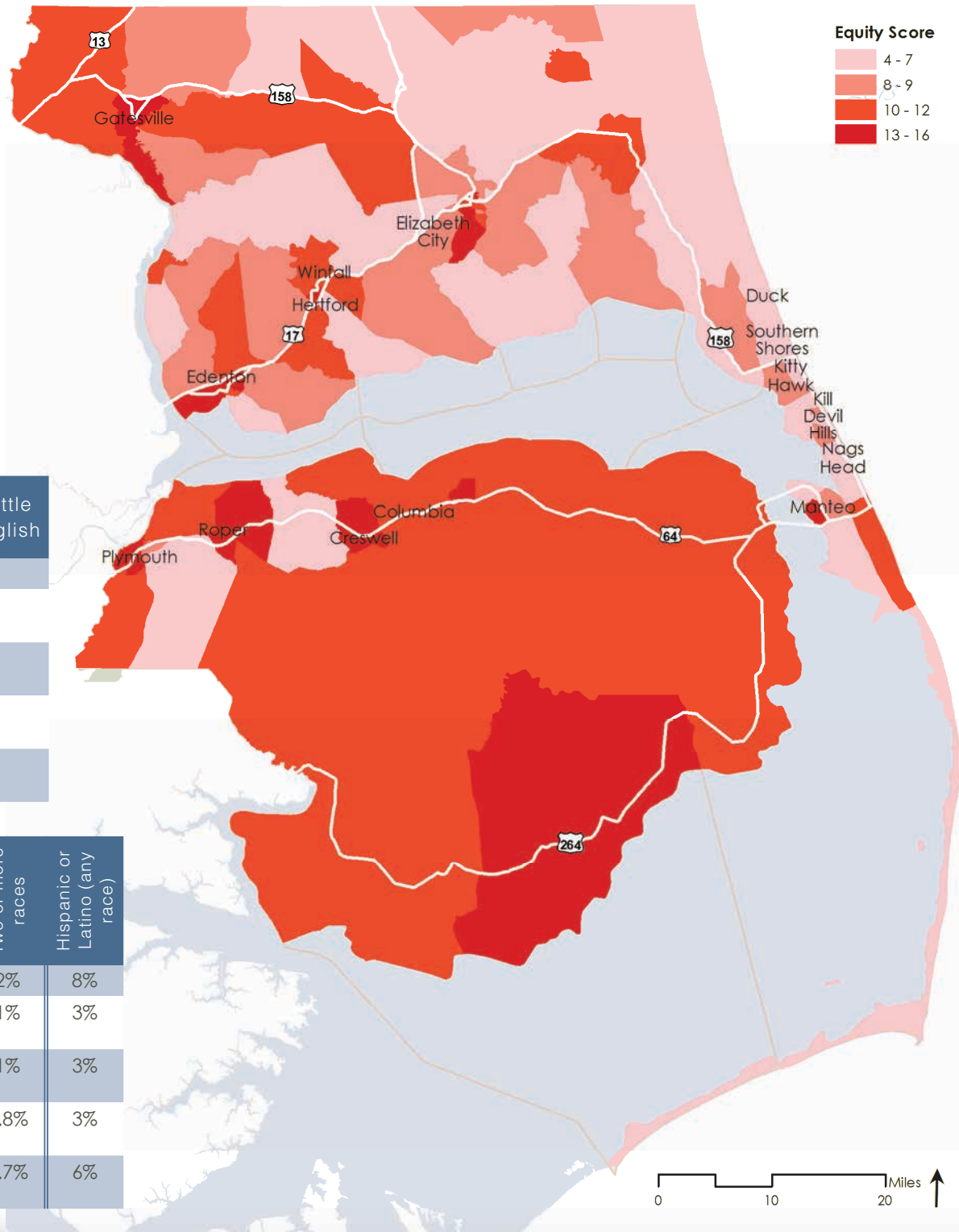
An important goal of this plan is to recommend a course for the Albemarle region that will benefit all residents, including those typically underserved or underrepresented. An equity analysis was completed to identify the locations where such residents are located in order to target public outreach to those areas and ensure recommendations meet the needs of those residents. The map at right displays an 'equity score', which represents a composite of several factors – Race, vehicle availability, income, and English fluency.

### Demographics in the Albemarle Region

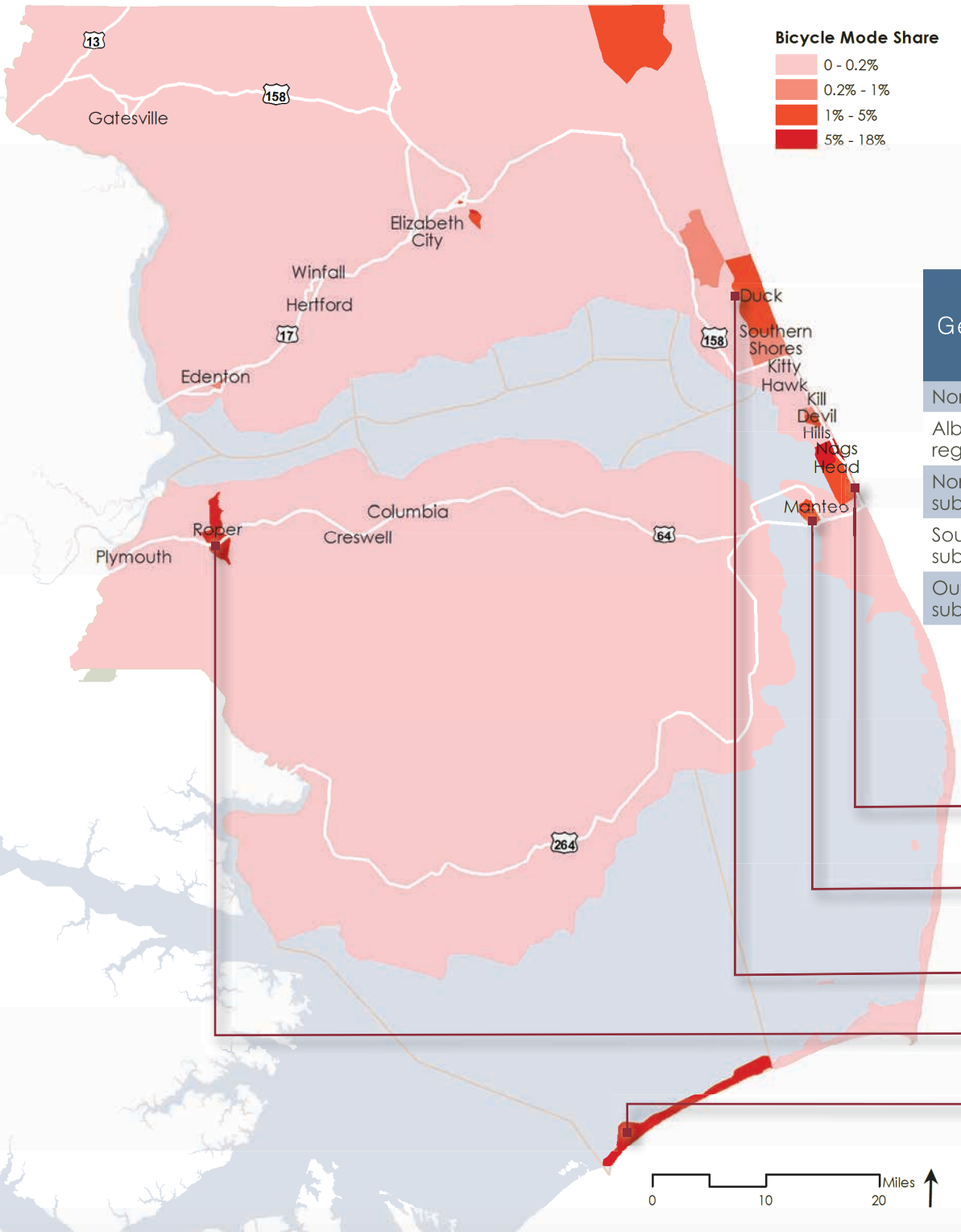
Geography	No vehicle available	Median Household Income	Speak little to no English
North Carolina	2.5%	\$45,570	2.9%
Albemarle region	1.8%	\$46,548	1.4%
North of Sound subregion	1.9%	\$46,957	1.2%
South of Sound subregion	4.9%	\$33,888	1.8%
Outer Banks subregion	0.4%	\$53,701	2.1%

### Race and Ethnicity in the Albemarle Region

Geography	White	Black or African Amer.	Amer. Indian and Alaska Native	Asian	Some other race	Two or more races	Hispanic or Latino (any race)
North Carolina	70%	21%	1%	2%	4%	2%	8%
Albemarle region	72%	25%	0%	1%	1%	1%	3%
North of Sound subregion	69%	27%	0.4%	0.7%	1%	1%	3%
South of Sound subregion	50%	46%	0.4%	0.2%	2%	0.8%	3%
Outer Banks subregion	94%	4%	0.3%	0.3%	1%	0.7%	6%







## COMMUTE MODE SHARE

Bicycle mode share is greater than the state average of 0.2 percent in two of Albemarle's three subregions. South of the Albemarle Sound, the percentage of commuters who bicycle to work is two times that of the state rate, and in the Outer Banks it is four times as high.

Geography	Employed Population	Drive alone	Carpool	Transit	Bicycle	Walk	Other
North Carolina	4,205,946	81%	11%	1%	0.2%	2%	1%
Albemarle region	75,213	78%	13%	0.4%	0.4%	2.0%	3%
North of Sound subregion	49,692	80%	13%	0.4%	0.2%	2%	3%
South of Sound subregion	7,696	72%	17%	0.6%	0.5%	3%	2%
Outer Banks subregion	17,825	76%	11%	0.3%	0.8%	2%	2%

Several towns have even higher bike mode shares, where bicycling is a part of the daily culture. In the following towns, more than one percent of commuters travel by bicycle:

Nags Head – 3.1%

Manteo – 2.7%

Duck – 8%

Roper – 18%

Ocracoke – 18%

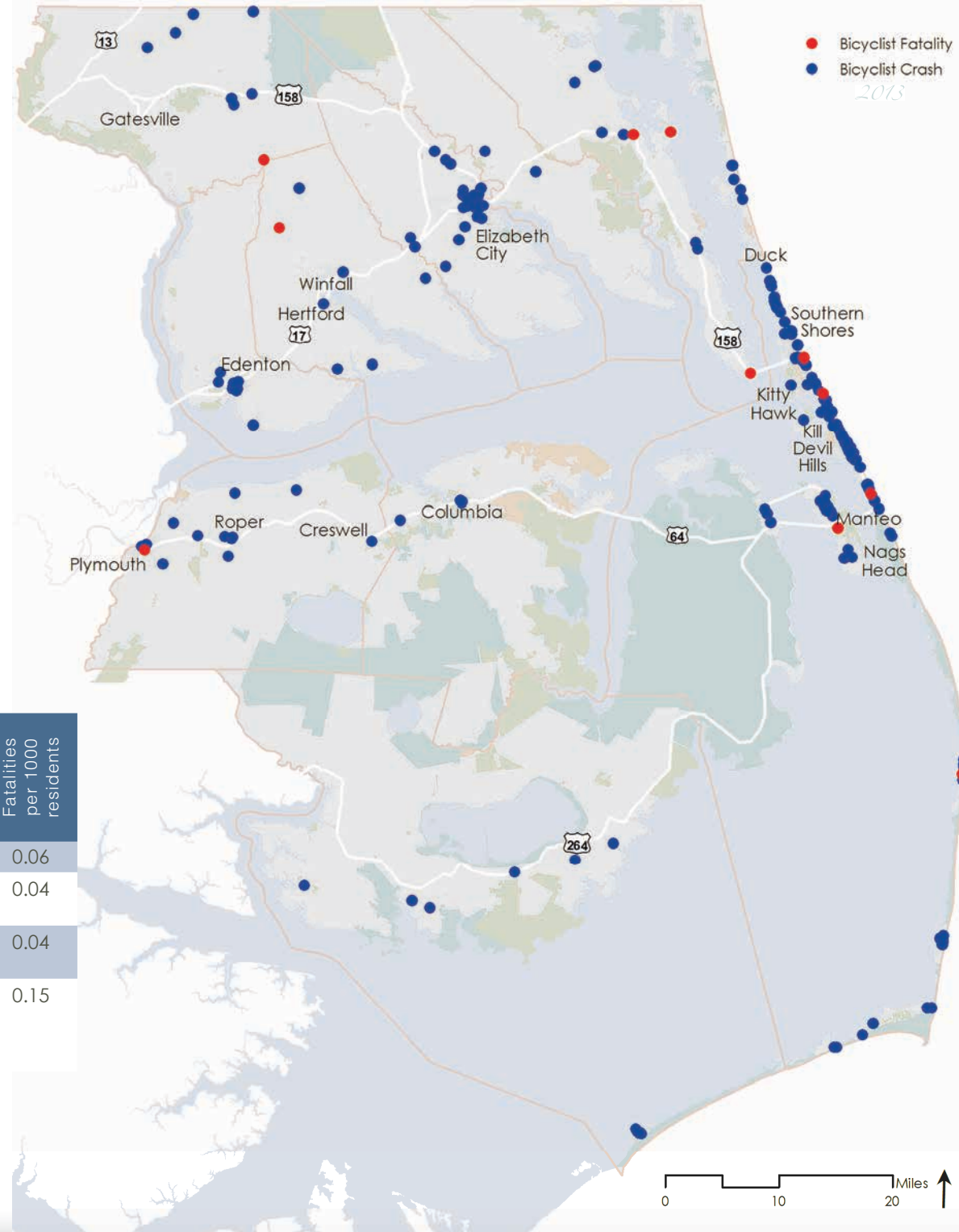
## CRASH DENSITY

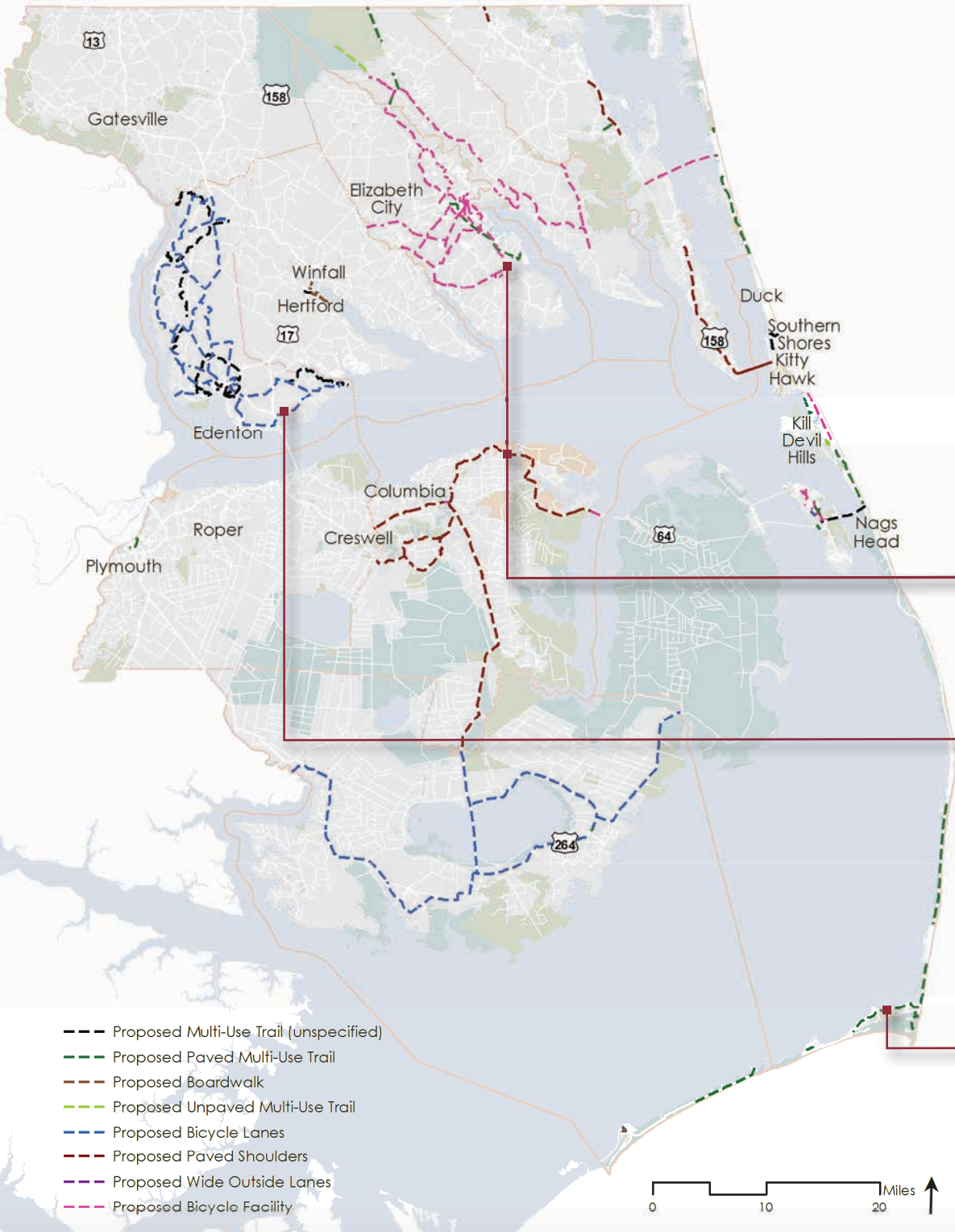
Cyclist crashes over the last ten years reveal safety patterns across the Albemarle region. Crashes are overrepresented in the Outer Banks relative to its year-round population, but there are two possible explanations for this. First, the Outer Banks population is greatly increased in the summer, and over half of the crashes took place between June and August. Second, bicycle mode share is greater in the Outer Banks, so crashes per bicycle trip may actually be lower. The following table displays crashes per bicycle commuter, a proxy for crashes per bicycle trip, and reveals that the Outer Banks is still overrepresented relative to the other subregions. This proxy does not account for visiting cyclists and non-work trips, however, and is therefore limited.

Notably, 42 percent of crashes took place in rural areas outside the municipalities of the region. These are likely occurring on rural roads with narrow shoulders and fast-moving vehicles.

Geography	Crashes	Crashes per 1000 residents	Crashes per bicycle commuters	Fatalities	Fatalities per 1000 residents
Albemarle region	277	1.6	1.04	11	0.06
North of Sound subregion	87	0.8	0.95	5	0.04
South of Sound subregion	28	1.2	0.78	1	0.04
Outer Banks subregion	162	4.8	1.17	5	0.15

Source: NCDOT





## PREVIOUS PLANS

Many existing plans for municipalities and counties in the Albemarle region contain recommendations relevant to cycling. These vary from proposals for specific facility locations to program and policy recommendations. The findings and recommendations of these plans provide the starting point for this plan. Recommendations are considered in light of recent trends and the goals and vision of this plan, and then incorporated or modified as appropriate. The map at left displays the facility recommendations from existing plans.

*Recent Comprehensive Transportation Plans for several counties including Camden, Currituck, Hyde, Tyrell, and Pasquotank recommend bicycle facilities varying from paved shoulders and bicycle lanes to multi-use paths.*

*The 2003 Chowan County and Edenton Greenway and Open Space Plan recommends a system of trails and protected areas along streams and other natural resources in the county.*

*The Hatteras Island Pathways Plan recommends a sidepath along the length of NC 12 to provide a recreational resource and connection in and between the island's four villages. As a result of this study, 8 miles of sidepath within these four villages was constructed in 2013.*



Project website with links to project information



# PUBLIC COMMENT FORM for THE REGIONAL BICYCLE PLAN

1. How do you use personal bicycles to travel to the following listed places? (please check one)

*Excellent    Fair    Poor*

2. How important is it to improve bicycling conditions to the following listed places? (please check one)

*Very important    Somewhat important    Not important*

3. How often do you ride a bike? (please check one)

*never    Just times per month    Just times per week    3 or more per week*

4. Would you take more often to bike to work, school, and other destinations even provided for bicyclist?

*Yes    No*

5. How do you feel about bicycling in your area typically between annual bicyclist?

*Excellent    Good    Fair    Poor*

6. Would public funds be used to improve bicyclist facilities?

*Yes    No*

7. Which types of funds should be used for bicycle infrastructure improvements? (please check all that apply)

*Local funds    State funds    Federal funds    Other*

8. How do you feel bicycling in your area typically between? (please check all that apply)

*Excellent    Good    Fair    Poor*

9. Which types of funds should be used for bicycle infrastructure improvements? (please check all that apply)

*Local funds    State funds    Federal funds    Other*

10. For what purposes do you bike most now? (please check all that apply)

*Exercise or recreation    Transportation to work    Transportation to school    Travel to grocery store, shops and retail opportunities    Just for fun/recreation*

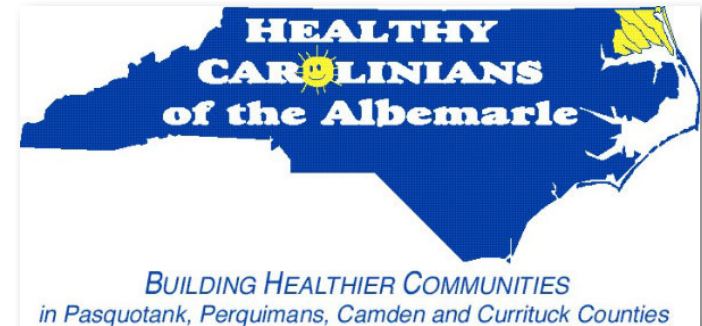
A series of **public workshops** were held in October 2012 and May 2013 to receive input into the process.



## PROGRAM SUMMARY

In addition to the natural and built environment, the social environment in the form of programs and resources helps to create and sustain a bicycle-friendly community or region. A useful framework for describing the categories into which such resources fall is the four E's: Education, Enforcement, Encouragement, and Engineering. While the last E represents physical infrastructure, the first three require programmatic solutions. The following programs and resources currently exist in the Albemarle region. For a description of each organization, see Appendix A.

- Outer Banks Visitors Bureau
- Three Rivers Healthy Carolinians
- Tyrrell County Ecotourism Committee



## STATE ORGANIZATIONS AND RESOURCES

- Eat Smart Move More NC
- North Carolina Amateur Sports
- North Carolina Department of Health and Human Services
- North Carolina Department of Transportation

## REGIONAL ORGANIZATIONS AND RESOURCES

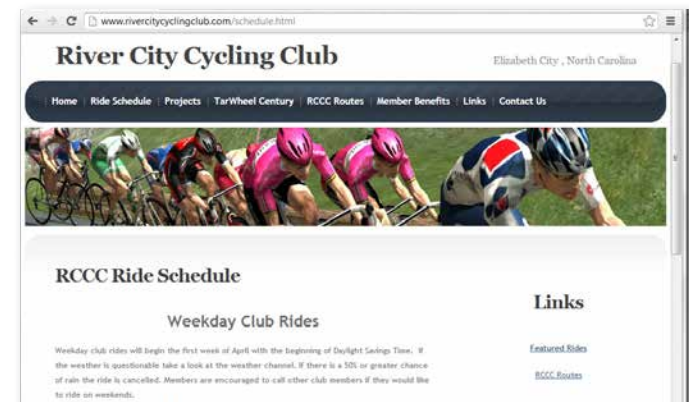
- Albemarle Regional Health Services
- Currituck County Visitors Center
- Gates Partners for Health
- Greater Tyrrell County Chamber of Commerce
- Healthy Carolinians of the Albemarle

## LOCAL ORGANIZATIONS AND RESOURCES

- Cycle Speedway
- River City Cycling Club
- Numerous bicycle shops and rentals



The Inner Banks Cycle Shop in Plymouth both sells and services bicycles.





## *PLAN AND POLICY SUMMARY*

Certain areas in the Outer Banks notwithstanding, Albemarle's relatively slow growth has kept its rural character and historic townscapes intact. This is fortunate because on their own, rural counties, small towns, and villages typically have few resources in which to proactively engage planning. While also limited in its resources, the Albemarle Regional Planning Organization provides a framework and support for the planning and development of the region.

A decade of regional, county, and local planning and policy documents were reviewed as part of this planning effort. Very few of the efforts are directly related to bicycle planning. Yet, all levels of land use, transportation, and urban design must be considered together as it's their coordination, or lack thereof, that ultimately determines the appeal of bicycling for recreation, transportation, and utility purposes.

### *CAMA / LAND USE PLANS / COMPREHENSIVE PLANS*

Established in 1974, the Coastal Area Management Act (CAMA) requires each of the 20 coastal counties in North Carolina to develop a local land use plan in accordance with guidelines established by the Coastal Resources Commission.

A sample of CAMA plans reviewed include those from Gates County, Duck, Manteo, Chowan County/Edenton, Dare County, Perquimans County, Tyrell County, Nags Head, Pasquotank County/Elizabeth

City, and Southern Shores. Given their wide scope, CAMA plans address a wide range of issues but generally offer few details. All CAMA plans do address general transportation issues, and most (especially the most recent plans) include the goal of developing more bicycle facilities.

The Camden County Comprehensive Plan was completed in 2012 and serves as an update to the County's 2005 CAMA plan. This new plan "provides a more strategic set of goals, policies, and actions for the future, while also carrying forward the state mandated critical policies in the CAMA Plan that affect local day-to-day decision making." The Plan, which relates to the County's Unified Development Ordinance and upcoming Comprehensive Transportation Plan, explicitly includes bicycling and walking as a key part of a multi-modal transportation system

### *ZONING / BICYCLE PARKING ORDINANCES*

Zoning is typically embedded within a county's Unified Development Ordinance. While most communities in the region envision a future that promotes growth while protecting their rural character and historic centers, the reality is that many of the zoning tools found in these ordinances do not always ensure such a result. Moreover, the disconnect between stated land use/zoning and transportation goals with the actual tools used to project transportation needs commonly undermine a community's ability to implement their vision.

In order to maintain and/or create new bicycle and



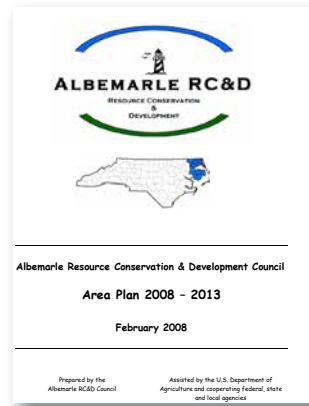
pedestrian-friendly development, bicycle parking regulations are often embedded within zoning codes. Currituck County has developed their own bicycle parking ordinances.

### **CONSERVATION PLANS**

The general thrust of the CAMA planning process includes efforts to conserve Albemarle's rural and natural character on a local and countywide basis. The Albemarle Resource Conservation and Development Council Area planning process is intended to support local efforts, but to also set a broader regional agenda with goals and policies addressing a variety of conservation and development challenges.

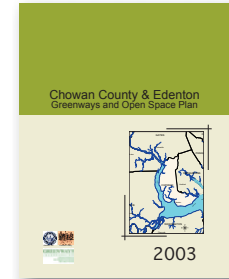
The most recent Albemarle Resource Conservation & Development Council Area Plan was completed in 2008. The 5-year plan addresses the need to balance conservation efforts with development in the 10-county region.

The Great Dismal Swamp and Nansemond National Wildlife Refuges Comprehensive Plan (2006) is a product of the US Fish & Wildlife Service. The Plan's focus is on conserving wildlife and its habitat, with a desire to expand the Great Dismal Swamp Bicycle Trail.



### **OPEN SPACE AND RECREATION PLANS**

As the Albemarle region continues to grow, there exists a need to maintain open space and expand recreational opportunities. In recognition of this need, Chowan County and the Town of Edenton worked together in 2003 to create the Chowan County & Edenton Greenway and Open Space Plan. The Plan serves as the guiding policy and physical planning document for protecting open space, increasing recreational and increasing active transportation opportunities through the development of multi-use greenways.



The Town of Nags Head recently finished its own Parks and Recreation Plan, which includes a number of physical recommendations for the ongoing development of a trail and wayfinding system.

### **COMPREHENSIVE TRANSPORTATION PLANS**

Each county within the Albemarle RPO is required to produce a comprehensive transportation plan (CTP). The following plans were either ongoing or completed recently as of fall 2012:

- 2011 Camden County CTP
- 2012 Currituck County CTP
- 2012 Hyde County CTP (Draft)
- 2012 Tyrell County CTP (Draft)
- 2012 Pasquotank County CTP Deficiency

#### Analysis

- 2012 Dare County CTP Survey Results

Each CTP now includes recommendations for making multi-modal improvements, including the identification of specific corridors slated for bikeway treatments. In rural areas the recommendations generally call for the addition of shoulders or shared use paths, while in towns and cities the recommendations typically include bicycle lanes.

While the addition of bikeways into the CTPs is a positive step forward, a lack of coordination between transportation and land use planning is still apparent. Additionally, there exists an opportunity to expand the range of best practices to include more bikeways, policies, and tools that could demonstrably improve bicycling in the Albemarle region.

#### *BICYCLE PLANS*

While CAMA, CTP, and various recreational/open space plan efforts have incorporated bikeway improvement recommendations (the engineering hardware) local, county, and regional plans have yet to fully include education, encouragement, evaluation, equity, and enforcement goals and policies (the software). This makes the Albemarle Region Bicycle Plan the first of its kind.

In addition to the above planning efforts, two specific bicycling related studies have been completed in the region. The first is the 2004 Case Study of the Northern OBX: Economic Impacts of Investments in Bicycle

Facilities, which describes the favorable return on investment gained from relatively small investments in bicycle infrastructure.

The second study is the 2011 Dismal Swamp Canal Trail Extension Plan, which looks at extending the existing facility.

#### *PEDESTRIAN PLANS*

While this current planning effort is focused on bicycling, pedestrian-friendly environments are almost always bicycle-friendly as well. To date, the towns of Columbia, Hertford, and Edenton have completed pedestrian plans in the Albemarle region.

#### *CORRIDOR PLANS*

Corridor planning provides an opportunity to directly coordinate transportation and land use planning so that development and conservation are appropriately balanced.

The 2011 Camden Co/US 17 Hwy Corridor Plan, which includes the greenway extension recommendations made in the Dismal Swamp Canal Trail Extension Plan, is one example of corridor planning in the Albemarle region. Dealing primarily with a rural section of Camden County, this type of planning should be expanded to other areas in the region to help limit development that only makes congestion worse, bicycling and walking less appealing, and the built environment less in keeping with the region's unique character.

### *STATE POLICIES*

Several state policies help to support bicycling and walking in the Albemarle region. Key excerpts of these policies are provided below, with links to more information.

#### *Complete Streets Policy*

"This policy requires that NCDOT's planners and designers will consider and incorporate multimodal alternatives in the design and improvement of all appropriate transportation projects within a growth area of a town or city unless exceptional circumstances exist. Routine maintenance projects may be excluded from this requirement; if an appropriate source of funding is not available."

More information: <http://www.completestreetsnc.org/> and [http://www.bytrain.org/fra/general/ncdot\\_streets\\_policy.pdf](http://www.bytrain.org/fra/general/ncdot_streets_policy.pdf)

#### *NCDOT Bicycle Policy Guidelines*

"The Board of Transportation finds that bicycling is a bonafide highway purpose subject to the same rights and responsibilities and eligible for the same considerations as other highway purposes... It is the policy of the Board of Transportation that bicycle facility planning be included in the state thoroughfare and project planning process."

More information: [http://www.ncdot.gov/bikeped/download/bikeped\\_laws\\_Bicycle\\_Policy.pdf](http://www.ncdot.gov/bikeped/download/bikeped_laws_Bicycle_Policy.pdf)

#### *NCDOT Greenway Policy*

"The Department will incorporate locally adopted plans for greenways into the ongoing planning processes within the Statewide Planning (thoroughfare plans) and the Planning and Environmental (project plans) Branches of the Division of Highways. This incorporation of greenway plans will be consistent throughout the department. Consideration will be given to including the greenway access as a part of the highway improvement."

More information: [http://www.ncdot.gov/\\_templates/download/external.html?pdf=http%3A//www.ncdot.gov/bikeped/download/bikeped\\_laws\\_Greenway\\_Admin\\_Action.pdf](http://www.ncdot.gov/_templates/download/external.html?pdf=http%3A//www.ncdot.gov/bikeped/download/bikeped_laws_Greenway_Admin_Action.pdf)

#### *NCDOT Board of Transportation Resolution for Bicycling and Walking*

"NOW, THEREFORE, BE IT RESOLVED, the North Carolina Board of Transportation concurs that bicycling and walking accommodations shall be a routine part of the North Carolina Department of Transportation's planning, design, construction, and operations activities and supports the Department's study and consideration of methods of improving the inclusion of these modes into the everyday operations of North Carolina's transportation system; and BE IT FURTHER RESOLVED, North Carolina cities and towns are encouraged to make bicycling and pedestrian improvements an integral part of their transportation



planning and programming."

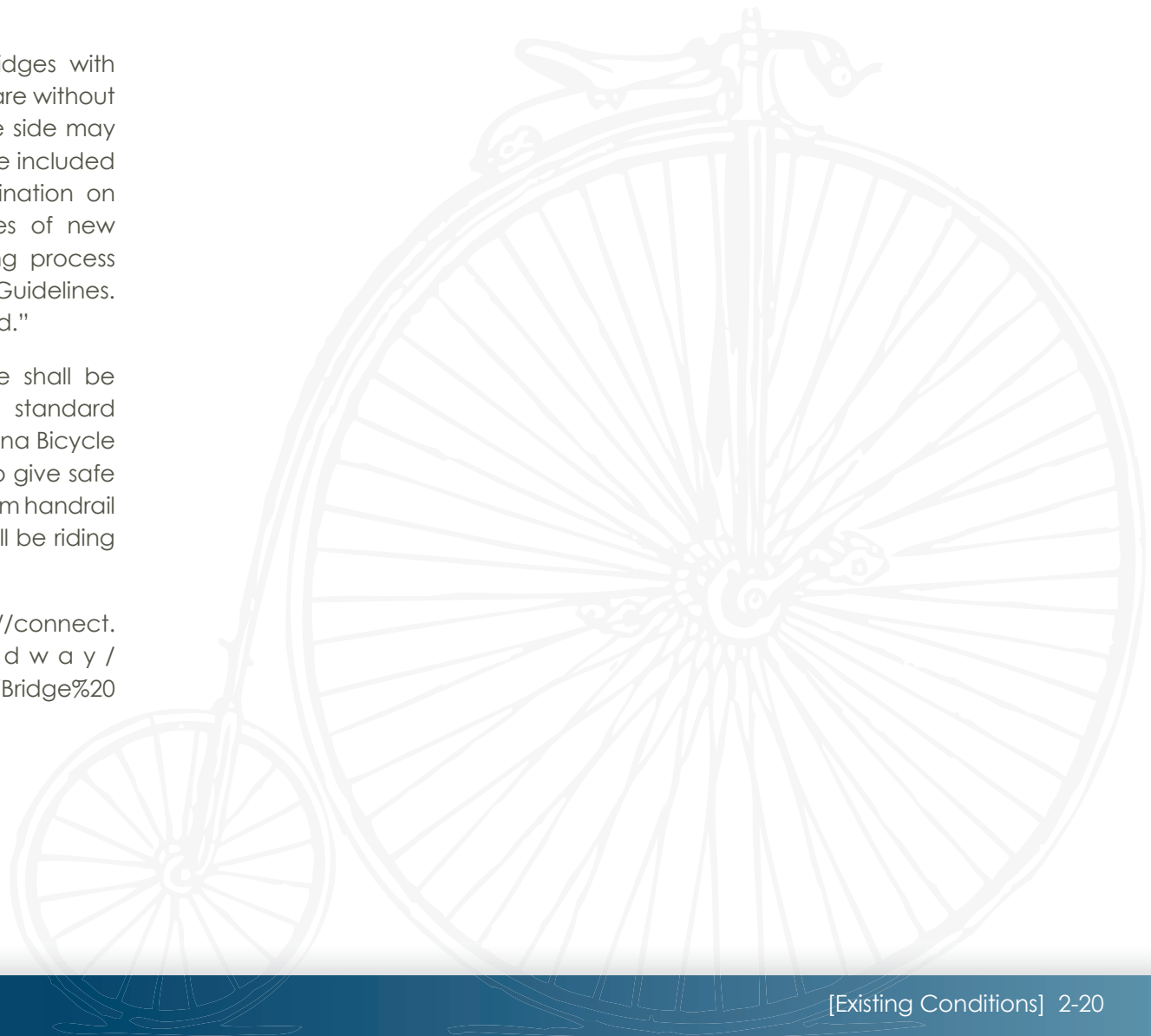
More information: [http://www.ncdot.gov/bikeped/download/bikeped\\_laws\\_BOT\\_Mainstreaming\\_Resolution.pdf](http://www.ncdot.gov/bikeped/download/bikeped_laws_BOT_Mainstreaming_Resolution.pdf)

### *Bridge Policy*

"Sidewalks shall be included on new bridges with curb and gutter approach roadways that are without control of access; in some cases, only one side may warrant a sidewalk. Sidewalks should not be included on controlled access facilities. A determination on providing sidewalks on one or both sides of new bridges will be made during the planning process according to the NCDOT Pedestrian Policy Guidelines. A minimum handrail height of 42" is required."

"When a bikeway is required, the bridge shall be designed in accordance with AASHTO standard bicycle accommodations and North Carolina Bicycle Facilities Planning and Design Guidelines to give safe access to bicycles where feasible. A minimum handrail height of 54" is required where bicyclists will be riding next to the handrail. "

More information: <https://connect.ncdot.gov/projects/Roadway/RoadwayDesignAdministrativeDocuments/Bridge%20Policy.pdf>



NC-12, Hatteras Island



# Chapter Three

## Needs Assessment

### OVERVIEW

Building on the findings of Chapter Two, this chapter takes a closer look at the existing facilities and conditions within each subregion and identifies the major needs of each subregion.

### NORTH OF SOUND SUBREGION NEEDS ASSESSMENT

#### AMENITIES OF THE SUBREGION

The North of Sound subregion includes the upriver communities along the Pasquotank, Perquimans, and Chowan Rivers: Elizabeth City, Hertford, Winfall, Edenton, and Gatesville. The rivers are major tributaries of the Albemarle Sound. The North of Sound subregion offers several wilderness areas, including the Great Dismal Swamp National Wildlife Refuge, Dismal Swamp State Park, Merchants Millpond State Park, and Chowan Swamp State Natural Area. These natural areas offer opportunities for paddling, mountain biking, fishing, and birding. The remainder of the North of Sound subregion is largely rural with coastal farmland.

Elizabeth City is a major commercial hub and the largest city in the Albemarle region. The town's waterfront

is popular for its docks, shops, spas, and attractions, including a historic museum. There are events year-round, held at the waterfront, that celebrate historic events, culture, and holidays. Active events, such as the TarWheel Century Bicycle Ride, International Cup Regatta, and River City Bull Bash, draw residents and visitors alike.

Hertford boasts some of the richest historic structures in the state, such as the Newbold-White House and Leigh's Plantation. Victorian and Georgian homes line the banks of the Perquimans River and are toured by visitors year-round. The downtown offers shopping, dining, and architectural walking tours. Missing Mill Park is within walking distance from downtown; it offers paddling, fishing, and picnicking, and it hosts a seasonal farmers market.

Edenton is a waterfront village with a colonial history and an active downtown. Historic district tours are held daily, and visitors can enjoy shopping, dining, special events, and bed and breakfast lodging. There are many active outdoor recreation events and opportunities for sailing, paddling, and bicycling.

Gatesville and Winfall are much smaller river towns

### Chapter Contents

#### Overview

#### North of Sound Subregion Needs Assessment

#### South of Sound Subregion Needs Assessment

#### Outer Banks Subregion Needs Assessment



with rich farmlands and views of the rivers. Both towns are known for their historic homes and plantations. Gatesville offers paddling and wildlife viewing at Bennetts Creek and is a gateway to Merchants Millpond State Park.

[ Water Street Park, Elizabeth City



[ Mid-Atlantic Park, Elizabeth City



[ Typical cotton field





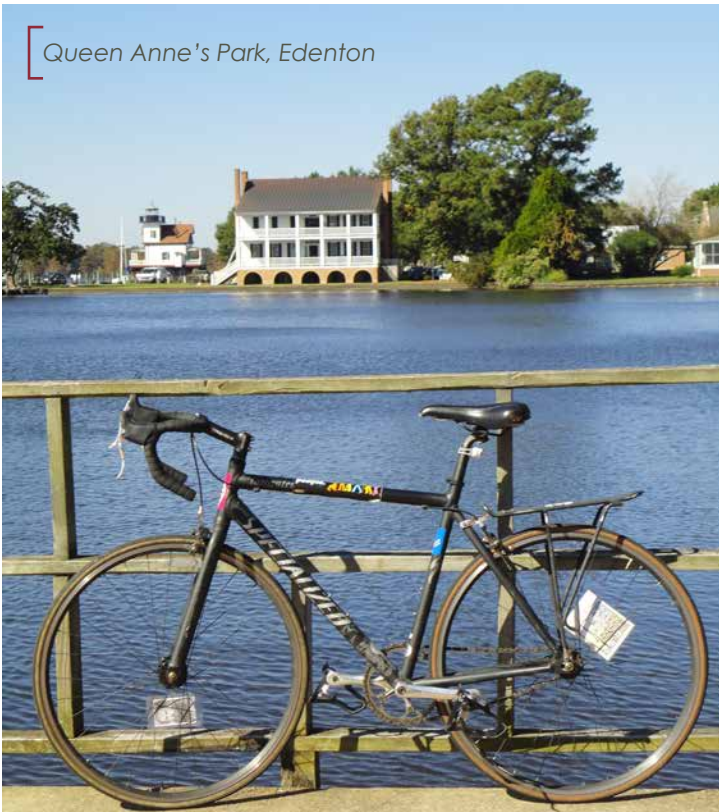
YMCA, Barco



Water Street Park, Edenton



Queen Anne's Park, Edenton



Downtown Hertford



### EXISTING BICYCLE FACILITIES

Few bicycling facilities exist in the North of Sound subregion, as displayed on the following maps. Facilities are summarized in the table at right and shown relative to the area's population and total road network mileage. While a few miles of paved shoulder

are present around Gatesville and Hertford, the majority of roads in this subregion have no separated space for cyclists. The Dismal Swamp Greenway is the only existing multi-use trail in the area, and is complemented by unpaved trail through the Dismal Swamp State Park.

Two state bike routes traverse the subregion (see page 2-7 for more information). State bike routes are signed but do not contain exclusive facilities for bicyclists. Similarly, several local signed routes have been designated through and around Hertford, totaling 55 miles. These include the 1968 Bike Trail, the Joppa Loop Bike Route, and the Bethel Loop Bike Route. The latter two routes are not signed. None of these local bike routes have other facilities like bike lanes.



Trail users are comfortably away from highway traffic along the Dismal Swamp Canal Trail.

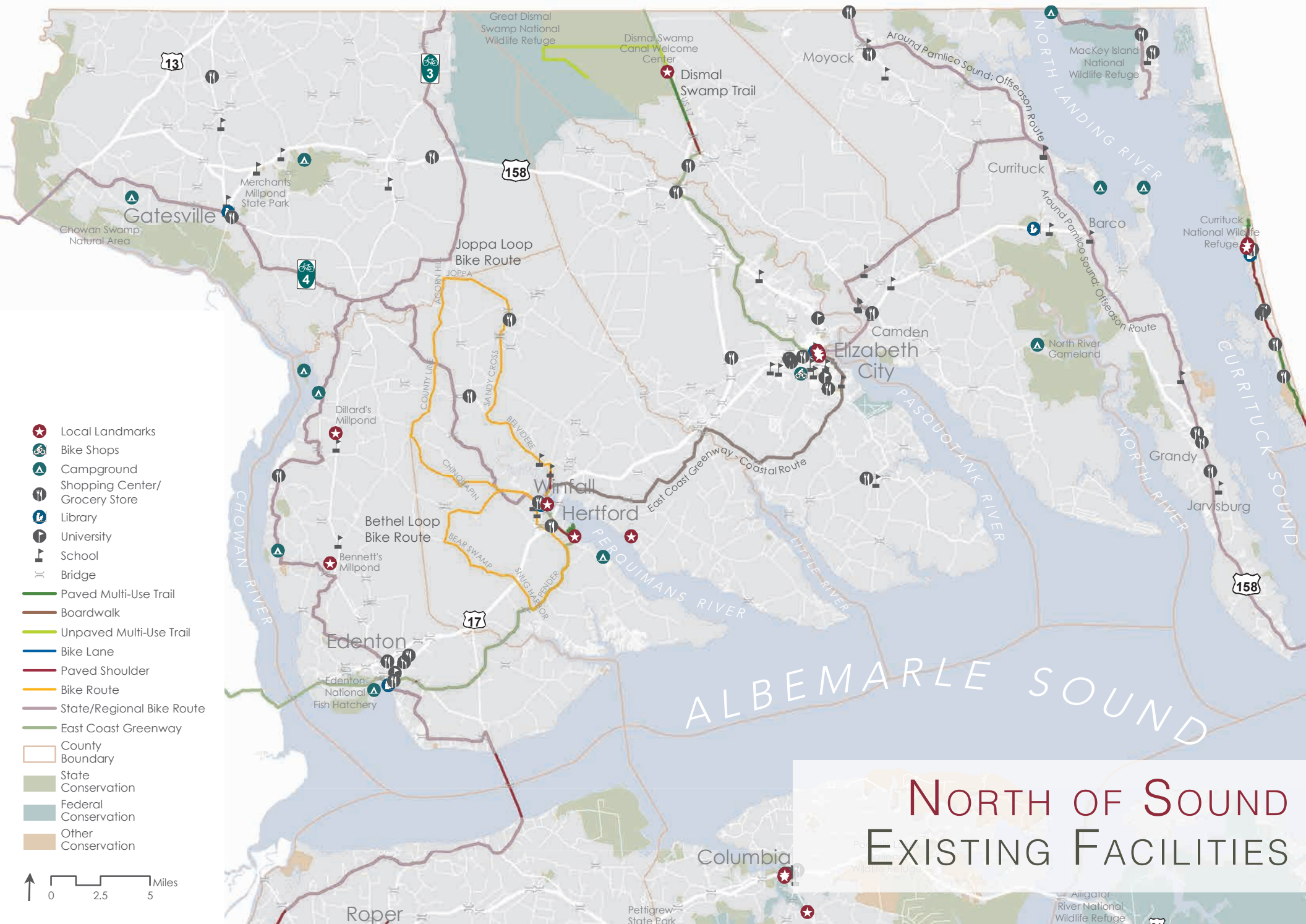
Facility Type	Mileage
Designated Route	55
Bicycle Lane (BL)	0
Multi-Use Trail (T)	14
Paved Shoulder (PS)	6
Total Physical Facilities (BL + T + PS)	20
Physical Facility Miles/1,000 Roadway Miles	8
Physical Facility Miles/1,000 Residents	0.2

### BICYCLING OPPORTUNITIES

This region is composed largely of rural farmland with historic port towns along river entryways to the Albemarle Sound. Despite a lack of bicycle facilities, some existing roadway and traffic conditions do create opportunities for bicycling:

- Low-volume, two-lane roadways offer calm, scenic long-distance bicycling.
- The historic towns of Edenton, Hertford, and Elizabeth City are compact featuring grid roadway networks that are connected and accessible by bicycle.
- The Dismal Swamp Canal Trail, part of the East Coast Greenway and parallel to US-17, provides a scenic, off-road, long distance multi-use trail that is planned to connect to Virginia. However, the closest population center to the existing portion of the Dismal Swamp Canal Trail is Elizabeth City, approximately 15 miles away.





- Local Landmarks
- Bike Shops
- Campground
- Shopping Center/ Grocery Store
- Library
- University
- School
- Bridge
- Paved Multi-Use Trail
- Boardwalk
- Unpaved Multi-Use Trail
- Bike Lane
- Paved Shoulder
- Bike Route
- State/Regional Bike Route
- East Coast Greenway
- County Boundary
- State Conservation
- Federal Conservation
- Other Conservation

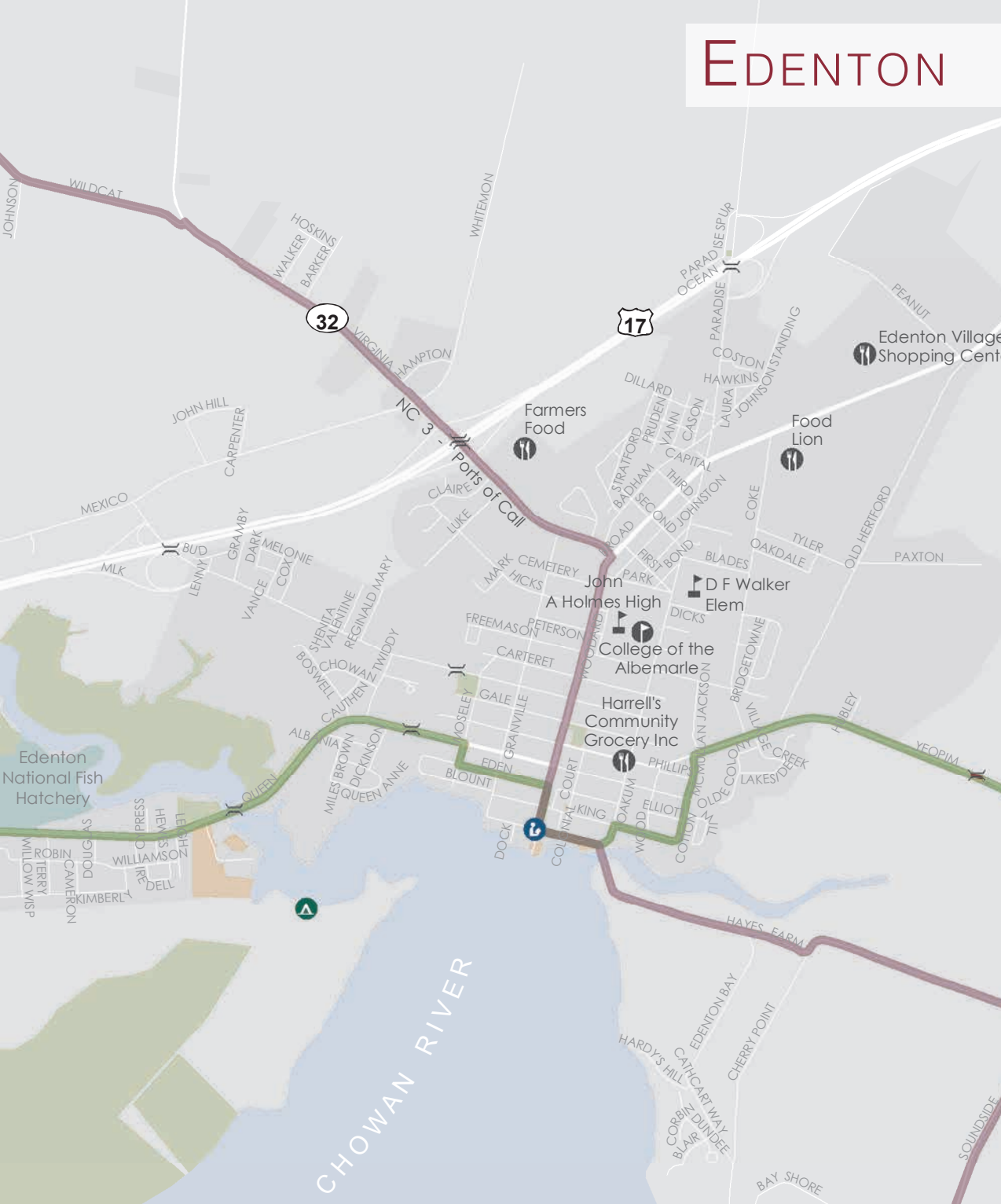
# NORTH OF SOUND EXISTING FACILITIES

# ELIZABETH CITY

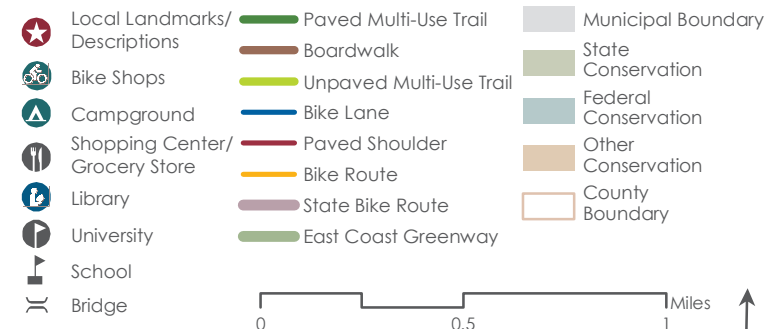
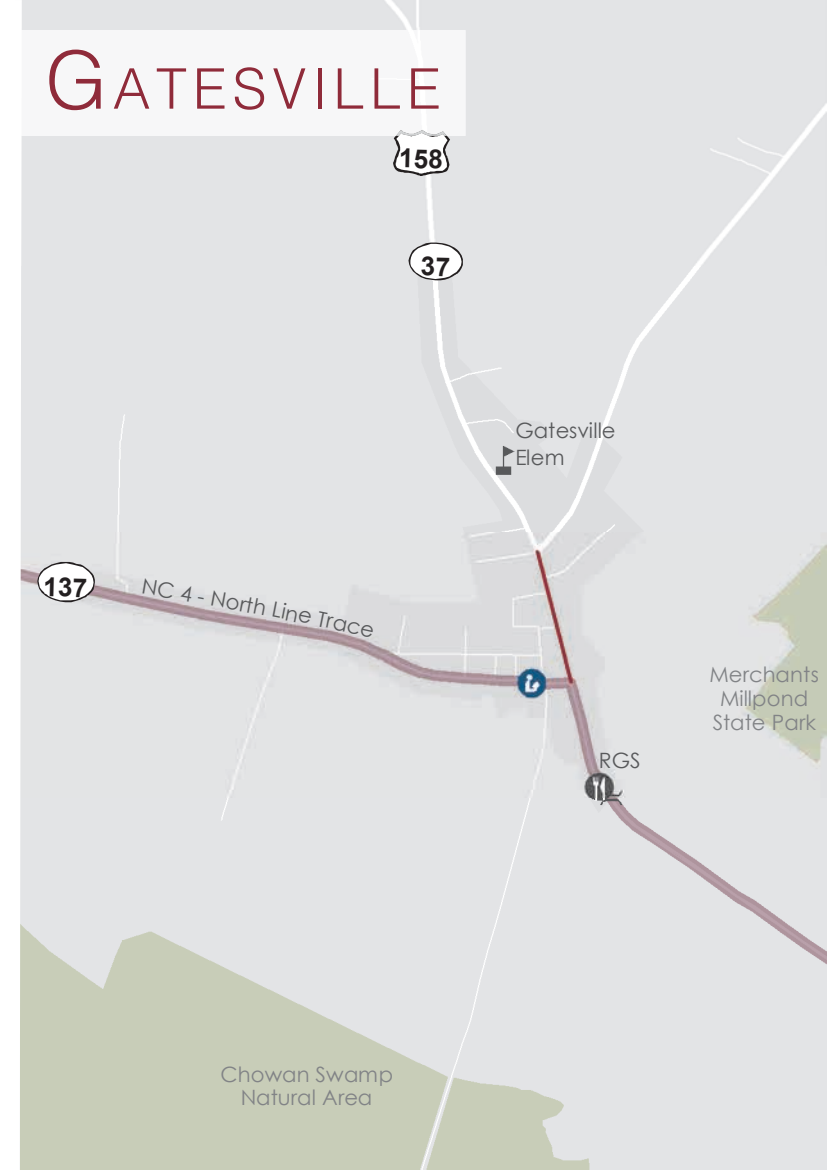




# EDENTON



# GATESVILLE





# HERTFORD



### *BICYCLE FACILITY OPPORTUNITIES*

There are very few bicycle facilities in the region. However, there are opportunities to implement new bicycle facilities with the following methods:

- Add paved shoulder during resurfacing/ reconstruction along commonly-used roadways
- Develop bicycle boulevards utilizing existing grid networks in Hertford, Edenton, and Elizabeth City.
- Stripe, restripe, or implement road diets to incorporate bicycle facilities where sufficient roadway width exists, especially in Gatesville, Hertford, Edenton, and Elizabeth City.
- Utilize roadway right-of-way or railroad right-of-way to develop multi-use trails, especially in Edenton, Hertford, and Elizabeth City.
- Include bicycle facility space with bridge reconstruction.



Even active rail lines could provide opportunities for rail-with-trail projects, as seen in this view of the rail corridor from Bear Swamp Road.



Additional paved shoulder space is needed along bicycling routes, such as NC Highway 37, east of Gatesville.



Many small, recently reconstructed bridges in the subregion include adequate width for separated bicyclist space, such as Yeopim Rd, just outside Edenton.



### BICYCLIST ACTIVITY AND BEHAVIOR

Bicyclist activity was observed during field observations (October, 2012), with local residents making up the majority of ridership. Activity and behavior characteristics include:

- High<sup>1</sup> daily, utilitarian bicycle activity in lower-income urban areas of Edenton, Hertford, and Elizabeth City.
  - » Often, these bicyclists were observed not wearing helmets, riding against traffic, and riding on sidewalks.
- Light recreational bicycle activity on lower-volume, rural roadways with heavier usage on weekends.
  - » These bicyclists tend to ride along the correct side of the roadway and wear helmets.
- Medium bicycle activity on the Dismal Swamp Canal Trail, primarily for recreation.
  - » These bicyclists tend to wear helmets.



Cyclists were observed without helmets, as shown here on Riverside Drive and Church Street in Elizabeth City.

<sup>1</sup>High, Medium, and Light descriptions of activity are relative terms based on field observations. They do not indicate a specific daily volume of cyclists.

Even though the NC Highway 94 bridge is marked with signage at its entrance, it is still a barrier to bicycling due to narrow shoulder space.

### PHYSICAL BARRIERS TO BICYCLING

Generally, there are more barriers than opportunities for bicycling. Key barriers include:

- **Bridge barriers:** Multiple bridges serve as barriers due to a lack of paved shoulder, low bridge railings, traffic, and exposed, windy conditions. Key barriers are:
  - » US-17 Bridge (Hertford) – Limited paved shoulder, high traffic speeds, low railings
  - » Business US-17 Bridge (Hertford) – Although it contains narrow lane widths and no separated space for bicyclists, traffic speeds are lower, bridge length is short, sidewalk is present between the roadway and the railing, and the bridge is less exposed, making this bridge manageable for bicyclists.
  - » NC-94/NC-32 (Creswell to Edenton) – Limited paved shoulder, low railings, high exposure,





high traffic speeds, long bridge

- » US-17 Bridge (Edenton) - Limited paved shoulder, high traffic speeds, low railings
- » US-158 Bridge (Elizabeth City) – No paved shoulder, high traffic speeds, high traffic volumes
- » US-158 Bridge (Kitty Hawk) - Limited paved shoulder, high traffic speeds, high traffic volumes especially in high tourist season, low railings, long bridge

- **Connectivity issues:** There is a lack of connectivity between existing bicycle facilities and destinations.
- **Crossing high-volume, high speed roadways:** There are numerous busy roadways that are difficult for bicyclists to cross safely.
- **High-volume, high-speed roadways:** There are many high-volume arterial roadways throughout the region with high speeds, including US-17 and US-158.
- **Narrow roadways and lanes:** There are also many roadways throughout the region that are too narrow for bicyclists to travel safely. These roads have little or no shoulder, often contain blind curves, and have relatively high vehicle travel speeds which pose multiple hazards for bicyclists.
- **Driveway access management:** A high frequency of driveways and parking lot curb-cuts present repeated hazards to cyclists as the automobile

crosses the cyclists' path of travel, especially in urban and suburban areas of Elizabeth City.

- **Roadways currently designed for automobile only:** Many roads were designed around the automobile and need to be redesigned or re-stripped to become more bicycle friendly. Narrowing existing lanes and adding planted medians, sidewalks, and shade trees could help reduce speeding and its associated hazards.

### *BARRIERS TO BICYCLE FACILITY DEVELOPMENT*

- **Bridge barriers:** Bridges in North Carolina have an average lifespan of 75 years. Reconstruction and/or the addition of bicycle facilities is a costly endeavor.
- **Environmental Constraints:** Environmentally-sensitive areas are scattered throughout the region, including the Great Dismal Swamp. Micro-scale barriers include ditches and macro-scale barriers include large wetlands.
- **Land ownership/right-of-way:** Land acquisition can be a difficult and costly process. Multi-use trails, separated from the roadway, often fall outside the roadway right-of-way.



This cyclist in Elizabeth City is more comfortable on the grass than riding in traffic on the commercial corridor of US-17.

## ***SOUTH OF SOUND SUBREGION NEEDS ASSESSMENT***

### ***AMENITIES OF THE SUBREGION***

Abundant farmlands, fresh water lakes, and wilderness areas characterize the region south of Albemarle Sound. Framed on three sides by the Pamlico, Roanoke, and Albemarle Sounds, the subregion is quiet and more remote than its neighbors to the north and east. Water is the hallmark natural feature of the area. The Alligator River, Pamlico River, Scuppernong River, and Roanoke River offer a multitude of wildlife viewing and natural resource-based recreation opportunities. Phelps Lake, New Lake, Pocosin Lake, and Lake Mattamuskeet provide hiking, paddling, fishing, bicycling, and other passive uses. There are four national wildlife refuges in the southern subregion:

Swanquarter, Mattamuskeet, Pocosin Lakes, and Alligator River. Many of the refuges include recreation opportunities, such as hiking and bicycling. Pettigrew State Park and the Upper Pungo River Complex offer paddling and hiking trails. Several small towns, including Plymouth and Columbia, dot the north side of the subregion. The remainder of the area is punctuated by historic structures along crossroads communities and rural landscapes.

*Phelps Lake, Pettigrew State Park*



*Canal along NC-94*



*Engelhard*





Plymouth has a small population and is the largest town in the south of sound region. It has become more of a draw for tourists in recent years due to its access to the Roanoke River along the riverfront boardwalk and its historic value during the American Civil War. The Roanoke River Lighthouse, Roanoke River Maritime Museum, and Port 'O Plymouth Museum are located in downtown. A recently opened bicycle shop offers bicycle rentals and sales along Water Street, which also boasts the Rail Switch Nature Trail along with shops and eateries.

Columbia sits along the Scuppernong River and is the location of the historic Somerset Place, an antebellum plantation from the 1780s.



*Downtown Plymouth*

Visitors can shop, dine, and visit the Pocosin Lakes National Wildlife Refuge (NWR) Headquarters, which includes a boardwalk trail along the Scuppernong River. Walking tours of historic buildings, the Columbia Theater Cultural Resources Center, and the Pocosin Arts Center are several cultural attractions. Columbia is a gateway to the Palmetto-Peartree Preserve, Pocosin Lakes NWR, and Pettigrew State Park. Activities range from horseback riding to hiking, biking, camping, and paddling in these locations.



*Historic Nebraska House*



*Nature Trail, Columbia*



### EXISTING FACILITIES

With the exception of a few miles of paved shoulder and two state bike routes (see page 2-7 for more information), bicycling facilities do not exist South of the Albemarle Sound. Even considering the low population of this subregion, this puts the indicators of facilities per roadway mile and facilities per resident at the lowest in the region. The following summary table does not include state bike route mileage.

Facility Type	Mileage
Designated Route	0
Bicycle Lane (BL)	0
Multi-Use Trail (T)	0
Paved Shoulder (PS)	6
Total Physical Facilities (BL + T + PS)	6
Physical Facility Miles/1,000 Roadway Miles	2
Physical Facility Miles/1,000 Residents	0.2

### BICYCLING OPPORTUNITIES

Despite a lack of bicycle facilities, the south region does have existing roadway and traffic conditions opportunistic for bicycling:

- Low-volume, rural, two-lane roadways offer calm, scenic, long-distance bicycling.
- The historic towns of Plymouth and Columbia feature compact downtown cores with grid roadway networks accessible by bicycle.

- Plymouth includes a locally-owned bicycle shop with access to air, water, bicycle rentals, maps, and recommended routes.
- Numerous natural areas offer access to on- and off-road bicycle facilities, including the Pocosin Lakes and Alligator River National Wildlife Refuges and Pettigrew State Park.

### BICYCLE FACILITY OPPORTUNITIES

There are very few bicycle facilities in the region. However, there are opportunities to implement new bicycle facilities with the following methods:

- Add paved shoulder during resurfacing/reconstruction along commonly used roadways such as 264 and 94.
- Develop bicycle facilities along low-traffic roadways that parallel busier roadways utilizing existing grid networks in Plymouth and Columbia.
- Incorporate bicycle route signage and wayfinding signage near destinations in more remote areas of the south region.
- Utilize roadway right-of-way to develop multi-use trails, where possible, along busy thoroughfares into Plymouth and Columbia.

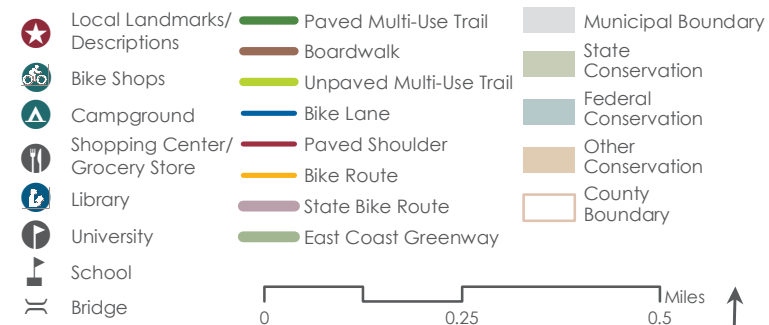
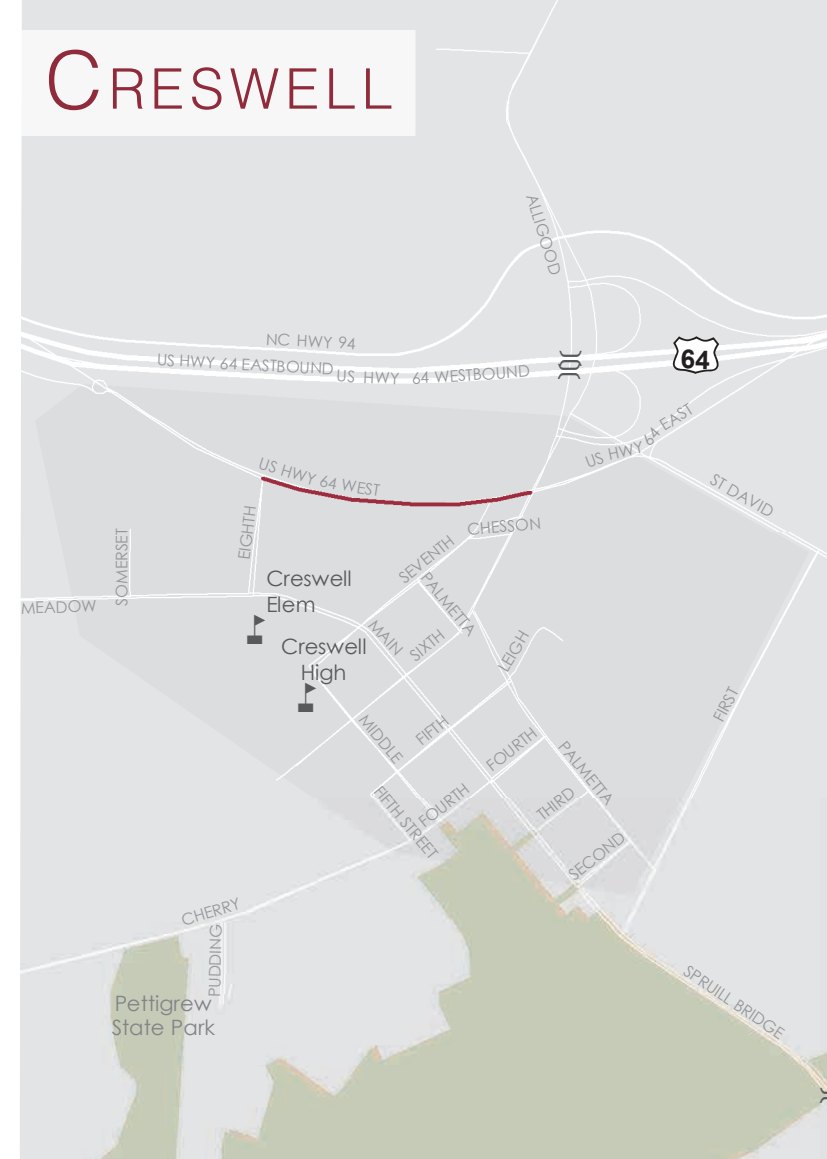






# COLUMBIA

# CRESWELL



### BICYCLIST ACTIVITY AND BEHAVIOR

Bicyclist activity was observed during field observations (October, 2012), with local residents making up the majority of ridership. Activity and behavior characteristics, based on both field observations and reports of local stakeholders, include:

- Utilitarian bicycle activity in lower-income urban areas of Plymouth, Creswell, Roper, and Columbia.
  - » Often, these bicyclists were observed not wearing helmets, riding against traffic, erratically crossing roadways, or riding on sidewalks.
- Recreational bicycle activity on lower-volume, rural roadways with heavier usage on weekends.
  - » These bicyclists tend to ride along the correct side of the roadway and wear helmets.

### PHYSICAL BARRIERS TO BICYCLING

A number of physical barriers deter people from considering trips made by bicycle. In addition to an absence of on- or off-road dedicated facilities, unsafe roadway intersections, high-volume and high-speed roadways, and issues with connected facilities

discourage even experienced bicyclists.

- **Remote corridors:** Many of the roadways in this part of the Albemarle region are rural, remote, or traverse large wildlife refuges. This type of condition is desirable to a limited number of experienced recreational bicyclists.
- **Distance between destinations:** There are a number of attractive destinations and activities in this region, however the mileage that separates them is extensive. For example, Columbia to Lake Mattamuskeet is 32 miles one way; Plymouth to Pettigrew State Park is 20 miles one way.
- **Lack of safe facilities:** Within the more populated areas (Columbia and Plymouth), more practical uses of bicycling were observed with users connecting to employment and commercial areas. Many users were observed riding in the center of roadways, the wrong direction, or on sidewalks because of the lack of dedicated facilities connecting these destinations.
- **Absence of bicycle support facilities:** With the exception of the areas in and around small towns and crossroads communities, it is likely that a majority of the bicycling that occurs in this region is happening on a recreational level. Recreational riders need more frequent access to water, rest areas, and toilets than other types of bicyclists, facilities that are not readily available in this region.



Plymouth and Manteo are both over 30 miles from Columbia.



Restrooms in Engelhard

- **Bridge barriers:** Multiple large-scale roadway bridges are missing shoulders and proper railings, include high traffic volumes and speeds, and present exposed, windy conditions.
- **Narrow roadways and lanes:** Many roadways throughout the region are too narrow for bicyclists to travel safely. These roads have little or no shoulder, often contain blind curves, and have relatively high vehicle travel speeds that pose multiple hazards for bicyclists.



NC-94 bridge over the sound

## BARRIERS TO BICYCLE FACILITY DEVELOPMENT

Physical barriers also prevent the construction of bicycle facilities. Roadway metrics and the surrounding landscape often determine the feasibility of facility development.

- **Drainage:** While roadways are characteristically flat and appear to be candidates for on-road bicycle facilities, there are drainage channels varying in width and depth along the majority of roadways in the region.
- **Environmental Constraints:** A number of existing natural areas include wildlife refuges, wetlands, and estuaries, presenting development barriers for future facilities.
- **Land ownership/right-of-way:** Land acquisition can be a difficult and costly process. Multi-use trails, separated from the roadway, often fall outside the roadway right-of-way.



A canal along NC-94 constrains the cross-section available for roadway widening or the addition of a multi-use trail.



## OUTER BANKS SUBREGION NEEDS ASSESSMENT

### AMENITIES OF THE SUBREGION

The Outer Banks subregion includes Ocracoke Island north to Cape Hatteras National Seashore, from Manteo and Nags Head north to Corolla. This 100-mile-long area is a series of barrier islands and a popular tourist destination for its historical value, ecological fragility, and windswept beaches. North Carolina State Highway 12 connects the majority of the barrier islands, extending from Corolla to Hatteras Village and linking many of the small Outer Banks towns and villages. Ocracoke Island is accessible by ferry. The National Park Service manages the Cape Hatteras

National Seashore from Bodie Island to Ocracoke Island. There are numerous natural and cultural resources available along the seashore, including day use areas and opportunities for outdoor recreational activities, such as camping, hiking, and biking.

Towns and communities along the Outer Banks region include Corolla, Duck, Southern Shores, Kitty

An ocean view in Corolla



Soundside sunset



Main Street, Ocracoke





Hawk, Kill Devil Hills, Nags Head, Manteo, Wanchese, Rodanthe, Waves, Salvo, Avon, Buxton, Frisco, Hatteras, and Ocracoke, each unique in its lifestyle. Many of these communities share similar historical value and offer user access to parks, natural areas, and educational and cultural facilities. The Currituck Heritage Park, Jockey's Ridge State Park, Nags Head Woods Ecological Preserve, Wright Brothers National Memorial, Buxton Woods Coastal Reserve, Pea Island National Wildlife Refuge, and the Cape Hatteras National Seashore are the most significant attractions on the Outer Banks, drawing many tourists each year. In addition to the activities offered within these areas, museums, lighthouses, fishing piers, watersport access, bicycling trails, walking trails, and camping areas are available in and around many of the Outer Banks communities. The towns and villages offer restaurants, shops, waterfront docks, music, arts, and cultural activities.



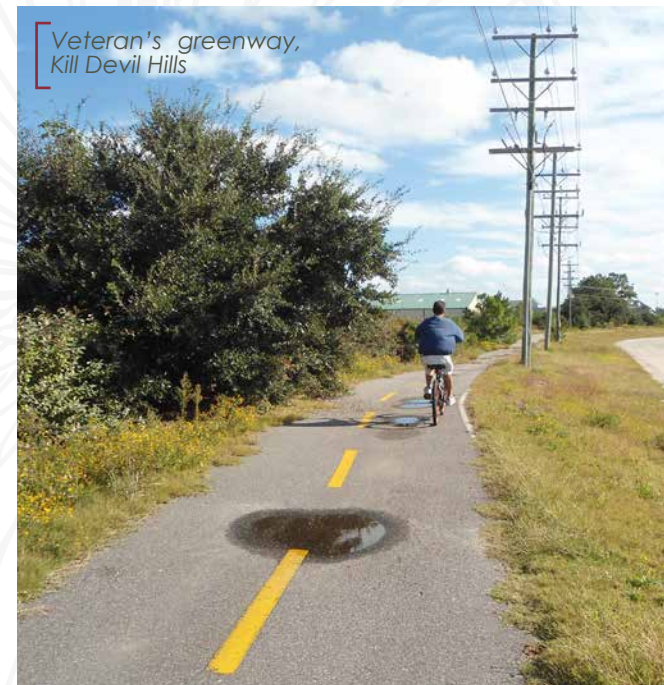
[Downtown Duck



[Cape Hatteras  
Lighthouse



[Manteo docks



[Veteran's greenway,  
Kill Devil Hills

### EXISTING FACILITIES

The Outer Banks contains the greatest mileage of bicycling facilities of the three subregions, as summarized below. The majority of facilities are in the form of paved shoulders or multi-use trails. Two local signed routes also exist: the Wright Brothers Bikeway and the Ten Mile Loop Route. The Around Pamlico Sound regional route is also designated through this subregion (see page 2-7 for more information) but is not signed and not included in the following summary table.

Facility Type	Mileage
Designated Route	26
Bicycle Lane (BL)	2
Multi-Use Trail (T)	66
Paved Shoulder (PS)	146
Total Physical Facilities (BL + T + PS)	214
Physical Facility Miles/1,000 Roadway Miles	299
Physical Facility Miles/1,000 Residents	6

### BICYCLING OPPORTUNITIES

This subregion offers bicycling opportunities for all types and levels of cyclists. With the exception of the bridges that provide access to and from the Outer Banks, the terrain is primarily flat, making traveling by bicycle appealing to all levels of cyclists. In addition to the attractive beaches, there are many destinations throughout this subregion, including the Wright

Brothers Memorial, retail centers, historic lighthouses, and a wealth of restaurant. The following existing roadway and traffic conditions create opportunities for bicycling:

- “Bicycles - Share the Road” signs exist throughout Dare County on US 158, US-64, US-264, and NC 12, helping to raise awareness of both motorists and cyclists.
- The communities of the Outer Banks are compact, with destinations accessible by short trips.
- Low-volume neighborhood roads offer convenient and safe travel opportunities.



Cyclists on a comfortable road in Kitty Hawk





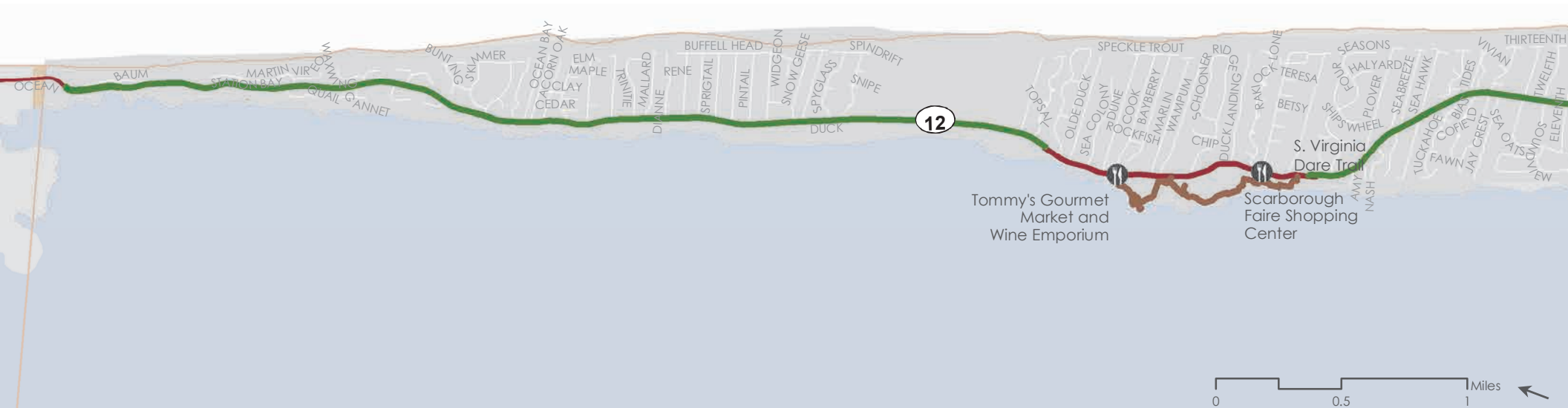
# Outer Banks Existing Facilities

# COROLLA



- Local Landmarks/ Destinations
- Bike Shops
- Campground
- Shopping Center/ Grocery Store
- Library
- University
- School
- Bridge
- Paved Multi-Use Trail
- Boardwalk
- Unpaved Multi-Use Trail
- Bike Lane
- Paved Shoulder
- Bike Route
- State Bike Route
- East Coast Greenway
- Municipal Boundary
- State Conservation
- Federal Conservation
- Other Conservation
- County Boundary

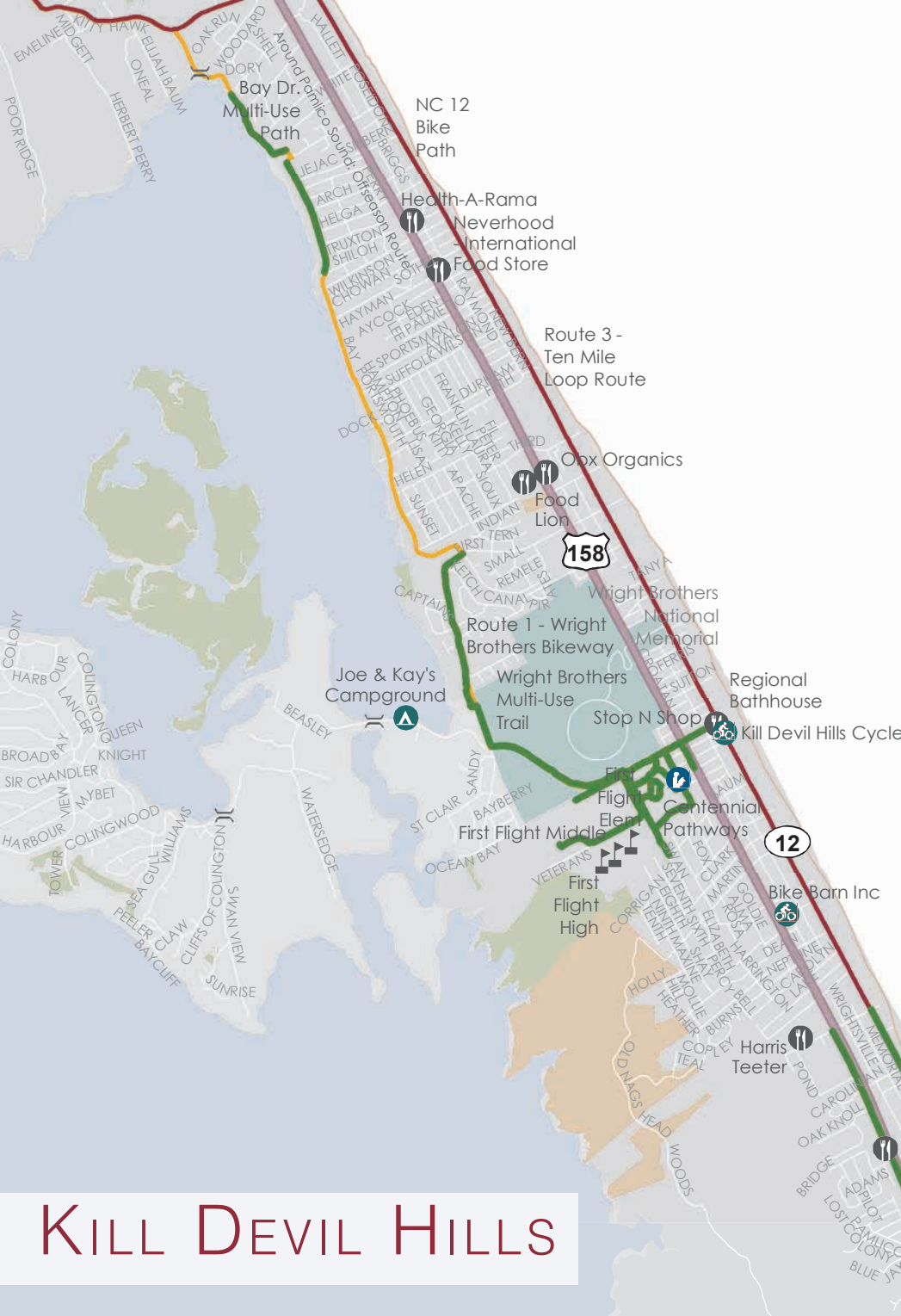
# DUCK











# KILL DEVIL HILLS



# NAGS HEAD

- Local Landmarks/ Destinations
- Bike Shops
- Campground
- Shopping Center/ Grocery Store
- Library
- University
- School
- Bridge
- Paved Multi-Use Trail
- Boardwalk
- Unpaved Multi-Use Trail
- Bike Lane
- Paved Shoulder
- Bike Route
- State/Regional Bike Rte.
- East Coast Greenway
- Municipal Boundary
- State Conservation
- Federal Conservation
- Other Conservation
- County Boundary





### **BICYCLE FACILITY OPPORTUNITIES**

Many bicycling facilities in this subregion do not meet current industry design standards. Existing multi-use trails and paved shoulders vary in width and hold debris or sand in some areas. While environmental and right-of-way constraints prevent wider facilities in some cases, substantial opportunities exist in other locations to enhance existing facilities and provide additional facilities to meet the growing needs of this subregion. Facilities could be implemented with the following methods:

- Add paved shoulder during resurfacing/reconstruction along commonly used roadways.
  - Develop north-south and east-west bicycle boulevards as part of existing roadway corridors, such as Lindberg Avenue and Eckner Street in Kitty Hawk, Memorial Avenue in Kill Devil Hills and Nags Head, Bay Street and Fifth Street in Kill Devil Hills, and Eighth Street and Barnes Street in Nags Head.
  - Utilize roadway right-of-way to develop multi-use trails, especially along US-158 from Southern Shores through Nags Head, along NC-12 through Hatteras Island, and between



Existing paved shoulders in Duck



Memorial Boulevard, Nags Head



Existing paved shoulders in Nags Head

the Jennette's Pier area and Jockey's Ridge State Park.

- Expand/upgrade existing trails to industry standards where room exists, especially along NC 12 south of Archdale Street in Kill Devil Hills.
- Build short greenways connections in each



community linking existing trails, on-road facilities, and destinations.

### *BICYCLIST ACTIVITY AND BEHAVIOR*

Both local and tourist cyclists were observed on roadways and off-road facilities during fieldwork investigations. In addition to these groups, a significant foreign student population locates in the Outer Banks each summer for work in restaurants, hotels, and other businesses. A 2002 Star-News article ("Banking on Foreign Students") estimated that 1,300 to 2,500 students are employed each summer. Students are often observed travelling to work by bicycle on busy roadways, since many do not own cars.

Activity and behavior characteristics include:

- High<sup>1</sup> daily, utilitarian, bicycle activity in neighborhoods, on existing trails, and in areas surrounding retail centers.
- » Often, these bicyclists were observed not



Kids riding on Eckner St in Kitty Hawk wearing their helmets.

wearing helmets, riding against traffic, or riding on sidewalks.

- Medium activity on connector roads, parallel to US 158 and NC 12.
  - » Often, these bicyclists were observed riding with traffic.
- Light bicycling in areas along US-158; the majority of cyclists were observed crossing US-158 to reach a destination, rather than riding along the roadway.

<sup>1</sup>High, Medium, and Light descriptions of activity are relative terms based on field observations. They do not indicate a specific daily volume of cyclists.

### *PHYSICAL BARRIERS TO BICYCLING*

The Outer Banks subregion has developed significantly as a vacation destination and the existing roadway network has accordingly been designed for the efficient movement of automobiles. Currently, there are physical barriers to bicycling along existing roadways in each community. Key barriers include:

- **Connectivity issues:** There is a lack of connectivity between existing bicycle facilities and destinations.



Narrow roadways like 6th Avenue in Kill Devil Hills leave little room for bicycle facilities.

- **Crossing high-volume, high speed roadways:** US-158 is a busy roadway that offers direct access to numerous destinations, but is difficult for bicyclists to cross and navigate safely.
- **Narrow roadways and lanes:** There are also many roadways throughout the region that are too narrow for bicyclists to travel safely on them. These roads have little or no shoulder, often contain open drainage on either side of the roadway, and have speed limits that are not enforced.



Continuous stretches of driveway in Ocracoke increase potential conflict points between cyclists and drivers.

- **Driveway access management:** A high frequency of driveways and parking lot curb-cuts present repeated hazards to cyclists as automobiles cross cyclists' paths of travel along NC-12, US-158, and in Manteo.

- **Roadways currently designed for automobile only:** Many roads were designed around the automobile and need to be redesigned or re-stripped to become more bicycle friendly. Narrowing existing lanes and adding planted medians, sidewalks, and shade trees could help reduce speeding and its

associated hazards.

### **BARRIERS TO BICYCLE FACILITY DEVELOPMENT**

As the tourism market continues to grow in this subregion, so will the demand and need for on-road and off-road facilities for bicycling. Existing barriers to the development of bicycle facilities include the following:

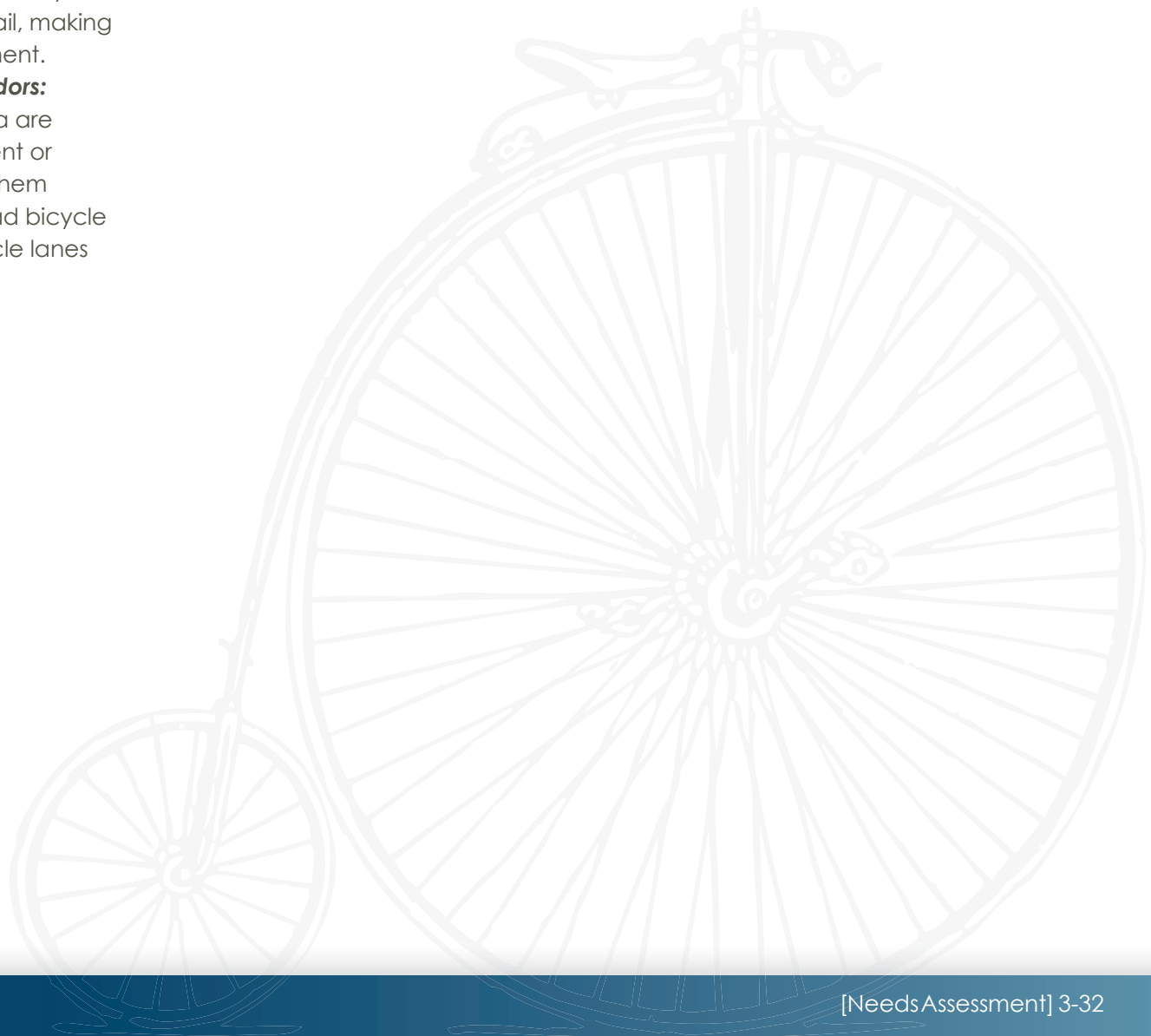
- **Bridge barriers:** Recreational cyclists looking to travel to the mainland have to travel on US-158 across the Wright Memorial Bridge which features narrow travel lanes and high automobile speeds.
- **Environmental Constraints:** Environmentally-sensitive areas are scattered throughout the region, including areas impacted by drifting sand dunes. Dune drift creates an unpredictable environment for the expansion of the multi-use trail along NC-12 in Kitty Hawk. This trail currently requires continuous maintenance due to the



Drifting dunes along NC-12 in Kitty Hawk regularly fill the road's paved shoulder with sand.

accumulation of sand across its width.

- **Land ownership/right-of-way:** Land acquisition can be a difficult and costly process. Along many roads where a multi-use trail is desired, such as Colington Road, the roadway right-of-way does not provide enough width for a trail, making acquisition necessary for trail development.
- **Narrow and constrained roadway corridors:** Numerous roadway corridors in this area are narrow and constrained by development or open drainage on either side, making them difficult to retrofit with separated on-road bicycle facilities such as paved shoulders, bicycle lanes or buffered bicycle lanes.







Downtown Edenton



# Chapter Four

## Infrastructure Recommendations

### OVERVIEW

This plan recommends a complete network of bicycle facilities for the Albemarle region that will link neighborhoods, schools, businesses, and communities. The network consists of existing and proposed on-road and off-road facilities such as bicycle lanes, signed routes, and greenways. It also includes ancillary facilities like bike parking and intersection improvements.

This section covers the methodology for developing the bicycle network, descriptions of the facility types that make it up, and network maps by subregion and community.

### METHODOLOGY

#### TYPES OF CYCLISTS

The recommended bicycle network accommodates all potential cyclists. Off-road paths and marked bicycle boulevards on low-traffic streets are more likely to attract the 'interested but concerned' population, for example, while paved shoulders and bicycle lanes on higher-traffic roadways are suitable for 'enthused and confident' and 'strong and fearless' cyclists (for more on this topic, see *Table 1.1 Types of Bicyclists*, page 1-12).

### INPUTS

The recommended network was developed using many inputs, which are summarized below.



### Chapter Contents

*Overview*

*Methodology*

*Facility Types*

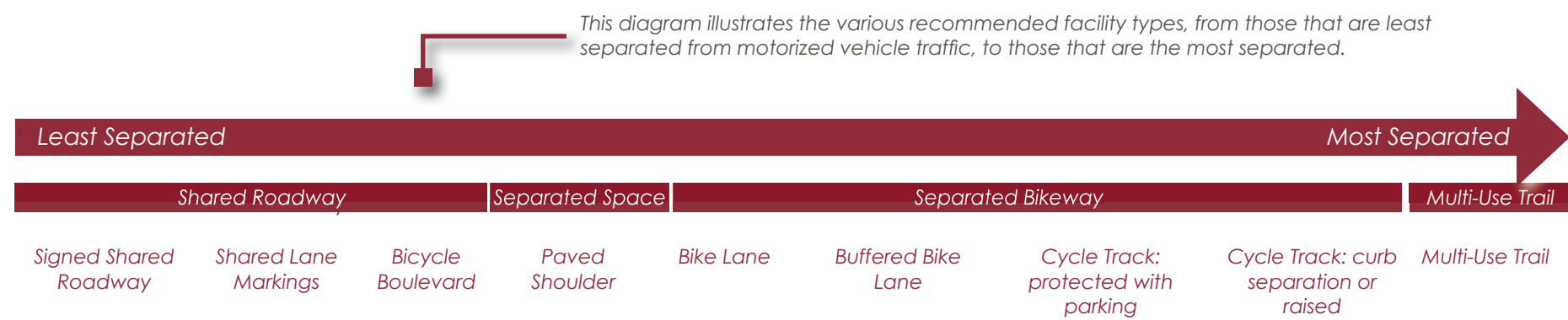
*Summary of Recommendations*

*Ancillary Facilities*

*North of Sound Proposed Network*

*South of Sound Proposed Network*

*Outer Banks Proposed Network*



FACILITY TYPES

The facility types recommended for the region accommodate the types of cyclists described in Chapter 1 as well as the range of settlement types and roadways environments present across the region. Many facility types are appropriate in multiple settlement types, such as signed roadways and multi-use trails, while others are most appropriate in certain areas. The design guidelines in Appendix D provides guidance on where each facility type is most applicable. In certain circumstances, facility types may also work in additional settlement types based on context and professional judgment.

Note: Cycle tracks were considered in several locations during this planning process. While a cycle track was not ultimately recommended in this plan, the facility remains a part of the toolbox that cities and towns in the region should consider as they move

forward and improve their bicycle networks. For that reason, cycle tracks remain in the graphic above and are explained in Appendix D.

**SIGNED SHARED ROADWAY (SIGNED ROUTE):** Roadways where bikeway signage and markings are used to increase driver awareness of bicycles



Signed Shared Roadway; color corresponds to map legend.



on the roadway. Signed Routes may also include traffic calming devices and intersection crossing treatments to enhance bicycle travel. These routes are recommended where calm roadways linking neighborhoods, schools, and parks serve as alternate routes to unsafe corridors. Sharrow markings may be considered in special circumstances such as higher traffic volumes.

### *SHARED LANE MARKINGS (SHARROWS):*

Pavement markings used to indicate shared space for bicyclists and motorists. Sharrows are used on roads where dedicated bicycle lanes are desirable but not possible due to constraints (roadway width, on-street parking, etc). Placed every 100 to 250 feet along a corridor, sharrows make motorists aware of the



Shared Lane Markings; color corresponds to map legend.

potential presence of cyclists, direct cyclists to ride in the proper direction, and remind cyclists to ride further from parked cars to avoid 'dooring' collisions.

*BICYCLE BOULEVARD:* Low-volume and low-speed streets that have been optimized for bicycle travel. Bicycle Boulevard treatments can be applied at several different intensities, which should be identified in detail during project design. Wayfinding signs, pavement markings, traffic calming and intersection treatments are potential elements of these facilities.



Bicycle Boulevard; color corresponds to map legend.

**PAVED SHOULDER:** The part of a roadway that is contiguous to the travel lane, separated by a stripe. A minimum width of four feet is preferred. Paved shoulders are appropriate on rural roadways with low traffic volumes.



*Paved Shoulder; color corresponds to map legend.*

**BICYCLE LANE:** A portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential and exclusive use of bicyclists. Bicycle lanes are always located on both sides of the road (except one way streets), and carry bicyclists in the same direction as adjacent motor vehicle traffic. The minimum width for a bicycle lane is four feet; five- and six-foot bike lanes are typical for collector and arterial roads. Various methods of

bicycle lane construction are described below. For additional design guidance on these methods, see the Appendix D: Design Guidelines section titled 'Retrofitting Existing Streets to Add Bikeways'.

- **New Construction:** Projects requiring the addition of pavement width to accommodate bicycle lanes. It is likely that these bicycle facilities will be implemented with future roadway construction projects.
- **Stripe:** Projects that require only the striping of a bicycle lane, with no other changes needed to the roadway.
- **Restripe:** Projects that require lane width reduction to accommodate bicycle lanes. Narrowing the widths of travel lanes has been demonstrated to



*Bicycle Lanes; color corresponds to map legend.*

have no effect on overall roadway capacity. In this plan, a restripe is recommended where existing travel lanes can be reduced to a minimum of 10 feet. These projects can occur during roadway resurfacing projects.

- *Road Diet:* Projects reducing the number of travel lanes accommodate bicycle lanes. Road diets typically change four-lane roads to three-lane roads with one center turn lane and have traffic calming benefits. These projects can occur during roadway resurfacing projects.

**BUFFERED BICYCLE LANE:** A bicycle lane with additional buffer space between the edge of the bicycle lane and the auto lane. Buffered bicycle lanes increase separation and comfort on high volume or high-speed roads, especially those with large-vehicle traffic.



Buffered Bicycle Lanes; color corresponds to map legend.

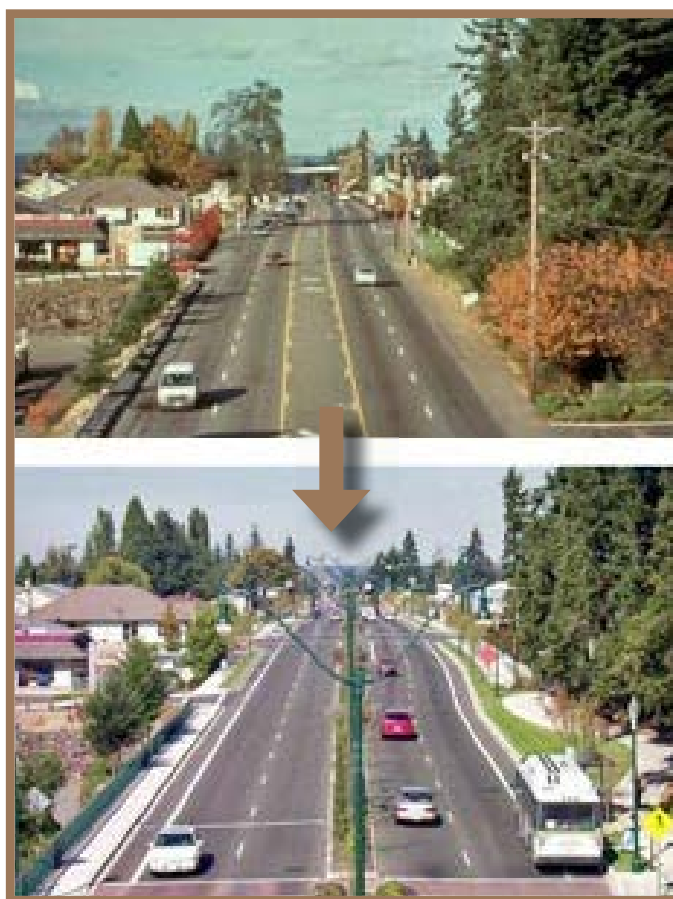
**MULTI-USE TRAIL:** Facility separated from the roadway designed for both bicycling and walking. Multi-Use Trails are the preferred facility for novice and average bicyclists. Multi-Use Trails located within the roadway corridor right-of-way, or adjacent to roads, are called 'Sidepaths'. Those within or adjacent to railroad right-of-ways are called 'Rails-to-Trails.'



Multi-Use Trail; color corresponds to map legend.



**CORRIDOR IMPROVEMENTS:** Full roadway redesign involving driveway consolidation and reduction, landscaping, intersection improvements, and possible lane reconfiguration. Corridor improvements are recommended along roadways where a bike facility cannot be safely implemented without significant changes to the corridor. A full corridor study addressing the items above is recommended in these areas.



Corridor Improvements; color corresponds to map legend.

## SUMMARY OF RECOMMENDATIONS

The table below summarizes the linear facility recommendations. This table does not include recommendations for improvements to existing facilities. This is especially applicable to the Outer Banks subregion, where maintenance and facility upgrades must play a large role in completing the bicycle network.

Facility Type	North of Sound	South of Sound	Outer Banks	Total Mileage
Signed Route		16	9	25
Sharrow	14	6	5	24
Bike Boulevard	3		9	12
Paved Shoulder	286	256	18	559
Bicycle Lane	15	3	12	31
New	6	1	6	12
Restripe	5	1	7	12
Road Diet	1	0		2
Stripe	3	1		4
Buffered Bike Lane	16		1	17
New	14		1	15
Stripe	1			1
Greenway	62	19	72	153
Corridor Improvements	2		18	20
All Facilities	397	301	143	841

The following section summarizes the rationale for the recommendations by subregion and municipality.

## *NORTH OF SOUND*

Facility recommendations are concentrated in the town centers to link destinations, while paved shoulders are recommended on rural roadways connecting those towns. Sidepaths and bicycle lanes are also recommended in several growing population centers in unincorporated areas, such as Moyock, Barco, and Grandy. Two notable regional greenway recommendations are the extension of the Dismal Swamp Greenway to the Virginia state line and a rail-trail between Edenton and Hertford.

### *Edenton*

Several bicycle lanes are recommended in Edenton with either a stripe, restripe, or road diet installation method. These facilities are affordable to implement, taking advantage of existing right-of-way, and connect to schools, grocery stores, and downtown. Greenway recommendations in Edenton are built off of the Town's current Greenway Plan and integrated into a comprehensive bicycle network.

### *Elizabeth City*

A combination of bicycle boulevards, sharrows, sidepaths, and bike lanes are recommended in Elizabeth City to connect neighborhoods, downtown, and shopping centers. These facilities largely make use of existing rights-of-way and aim to improve connectivity for cyclists while directing them away from the busiest roadways.

### *Gatesville*

A bicycle lane stripe and restripe is recommended through Gatesville to take advantage of the roadway width through the town in an affordable way.

### *Hertford & Winfall*

Several opportunities were identified for bicycle lane stripes and restripes in Hertford and Winfall. Sharrows on lower-traffic roadways and constrained locations complement these recommendations, as well as greenways linking Hertford's downtown to shopping and an existing trail south of town.

## *SOUTH OF SOUND*

Like the north of sound subregion, recommendations south of the sound are concentrated within the town centers with paved shoulders recommended along rural roadways connecting the towns. Additional facilities are also recommended in the unincorporated areas of Mattamuskeet, Engelhard, and Manns Harbor. A sidepath is recommended on NC 94 across Lake Mattamuskeet to provide a space for cyclists to take advantage of the great wildlife viewing opportunities at the lake.

### *Columbia & Plymouth*

A sidepath is recommended along US 64 through both Plymouth and Columbia to better meet the current demand for access from the neighborhoods in these towns to nearby grocery stores and shopping centers. Additionally, several bike lane stripes take advantage

of existing wide roadways, and sharrows and signed routes direct cyclists onto preferred routes.

#### *Creswell & Roper*

Sharrows are recommended along key corridors in Creswell & Roper, which link to paved shoulder recommendations coming into the towns. These facilities notify drivers to expect cyclists and indicate proper lane positioning to cyclists.

#### *OUTER BANKS*

Facility recommendations in the Outer Banks subregion aim to provide alternatives to the busy US 158 and NC 12 corridors and improve connectivity to existing facilities. (See page 4-21 for more detail on those major corridors). Sidepaths and bike boulevards are recommended throughout to meet the needs and desires of the many families visiting the Outer Banks each year. These facilities are recommended through Cape Hatteras as well to build on the recent path that has been installed on NC 12 and improve bikeability through the southern Outer Banks.

#### *Duck & Corolla*

Sidepath extensions are recommended in Duck & Corolla to expand the reach of the existing sidepaths and link neighborhoods. A signed route is also recommended in Corolla to alert cyclists to a low-traffic parallel alternative to NC 12. A redesign of the Duck Trail through the center of Duck is recommended to better serve both pedestrians and cyclists there.

See 'Demonstration Projects' for more details.

#### *Kill Devil Hills, Kitty Hawk & Nags Head*

Apart from the recommendations on the two major corridors through these towns (see page 4-21) several sidepaths, sharrows, and signed routes are recommended to improve connectivity for cyclists and build on existing bike infrastructure. Bicycle boulevards are recommended in all three towns where roadways are connected for several blocks in a row between US 158 and NC 12. These boulevards will provide an alternative option for cyclists that prefer low-traffic roadways and can be implemented affordably within existing right-of-way.

#### *Manteo*

Sharrows are recommended through the center of Manteo as an affordable option for the constrained environment. A bicycle boulevard is recommended parallel to much of that route as a low-traffic alternative. Additional sharrows, short trail segments, and signed routes generate overall connectivity for cyclists through the Town.

#### *Southern Shores*

A sidepath is recommended along Dogwood Trail in Southern Shores to provide a separated facility for cyclists consistent with those in other parts of the town. This sidepath will complete a multi-use trail loop around the town together with the existing paths along NC 12 and US 158.



## ANCILLARY FACILITIES

In order to create safe, bikeable communities, it is critical to take a comprehensive approach that looks beyond the construction of linear bike facilities. This includes, but is not limited to, roadway crossings, automobile speed reduction, and end-of-trip facilities such as bicycle parking.

### BICYCLE PARKING & END OF TRIP FACILITIES

Bike parking is an essential, but often forgotten, component of a complete bicycle network. Well-designed and well-placed bike parking at key destinations makes cycling a feasible option for trips to work, the grocery store, shopping, parks, and schools. Parking should be abundant, secure, and complementary to the surrounding streetscape. It should be as convenient as motor vehicle parking. Bike parking can be broadly defined as either short-term or long-term parking:

- *Short-term parking* is meant to accommodate visitors, customers, messengers and others expected to depart within two hours; requires approved standard rack, appropriate location, and installation. (Image: right, above)
- *Long-term parking* is meant to accommodate employees, students, residents, commuters, and others expected to park more than two hours. This parking is to be provided in a secure, weather-protected manner and location. (Image: right, below)



*This trail-side pocket park in Corolla, NC, features several examples of ancillary facilities, including short-term bicycle parking, picnic benches, a water fountain, and a trash can.*



*Long-term parking is an important ancillary facility for those parking their bicycles for more than two hours.*

Short-term bicycle parking facilities include racks which permit the locking of the bicycle frame and at least one wheel to the rack and support the bicycle in a stable position without damage to wheels, frame, or components. Short-term bicycle parking is currently provided in some communities of the Albemarle region, but is especially needed near retail and commercial establishments as well as near popular tourist destinations.

Each community should work with property owners to encourage the installation of additional bicycle parking (short and long-term) at key destinations. Policies should also be put in place to ensure the inclusion of bike parking in new developments. See Chapter 5: Program & Policy Recommendations for more detail on bike parking policies. Additionally, Appendix D presents specific design guidelines for bicycle parking that address many different implementation scenarios.

### ***SPEED LIMIT REDUCTION***

Speed limit reduction should be strongly considered along some of the roadways in the Albemarle region, especially on roadways within cities and towns. Traffic speed is considered a major deterrent to bicycling by the public. It is recommended that further study be conducted locally to determine appropriate speed limit reduction locations and that enforcement also be a part of a comprehensive solution.

### ***INTERSECTIONS & CROSSINGS***

Roadway crossings present a particular challenge for bicyclists. The Albemarle region contains many complex intersections and uncontrolled roadway crossings that are barriers to cyclists. Many of these intersections and unsignalized crossings require further study at the local level to determine appropriate treatment and placement of crossings. For detailed design guidance on intersection improvements, see Appendix D: Design Guidelines sections titled 'Bikeways at Intersections', 'Signalized Intersections', and 'Multi-Use Trails.'

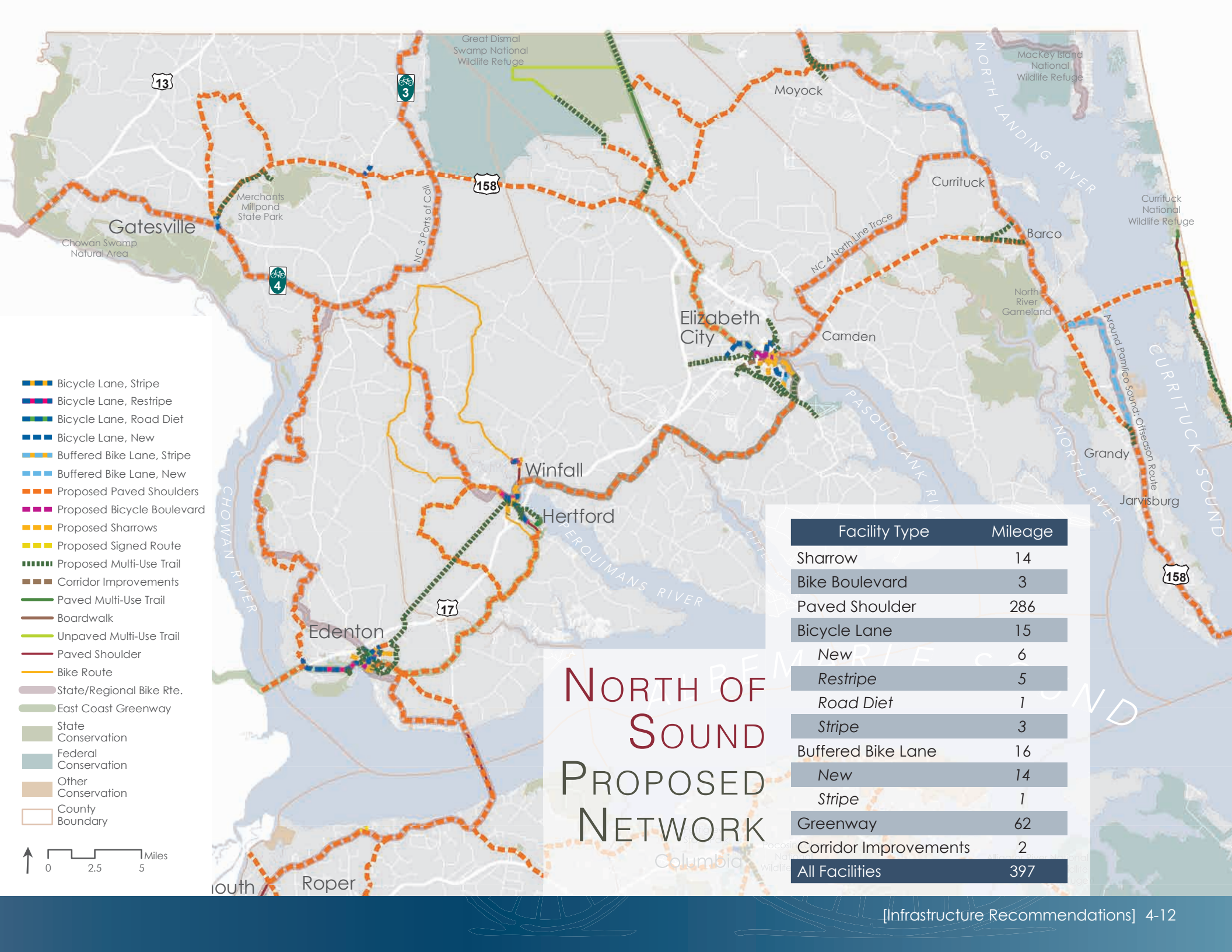
### ***BRIDGES***

NCDOT's bridge policy requires that several bicycle facility design standards be met where a bikeway is required (See page 2-20). These standards should be applied whenever a bridge in this region is replaced or repaired along a roadway where bicycles are permitted.

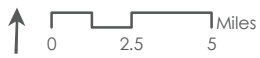
### ***SUPPORT FACILITIES***

Restrooms and water fountains are key needs of long-distance, recreational cyclists. In many areas of the region these amenities are not readily available. As a first step, local planners should work with the Albemarle Rural Planning Organization to add information about the locations of these amenities on the regional bike website (see Chapter 7 Action Steps table). As needs are identified during that process, the ARPO and local planners should work with NCDOT to consider installing public rest stops, or work with private entities to identify private facilities that are open to the public with or without a small purchase.





- Bicycle Lane, Stripe
- Bicycle Lane, Restripe
- Bicycle Lane, Road Diet
- Bicycle Lane, New
- Buffered Bike Lane, Stripe
- Buffered Bike Lane, New
- Proposed Paved Shoulders
- Proposed Bicycle Boulevard
- Proposed Sharrows
- Proposed Signed Route
- Proposed Multi-Use Trail
- Corridor Improvements
- Paved Multi-Use Trail
- Boardwalk
- Unpaved Multi-Use Trail
- Paved Shoulder
- Bike Route
- State/Regional Bike Rte.
- East Coast Greenway
- State Conservation
- Federal Conservation
- Other Conservation
- County Boundary

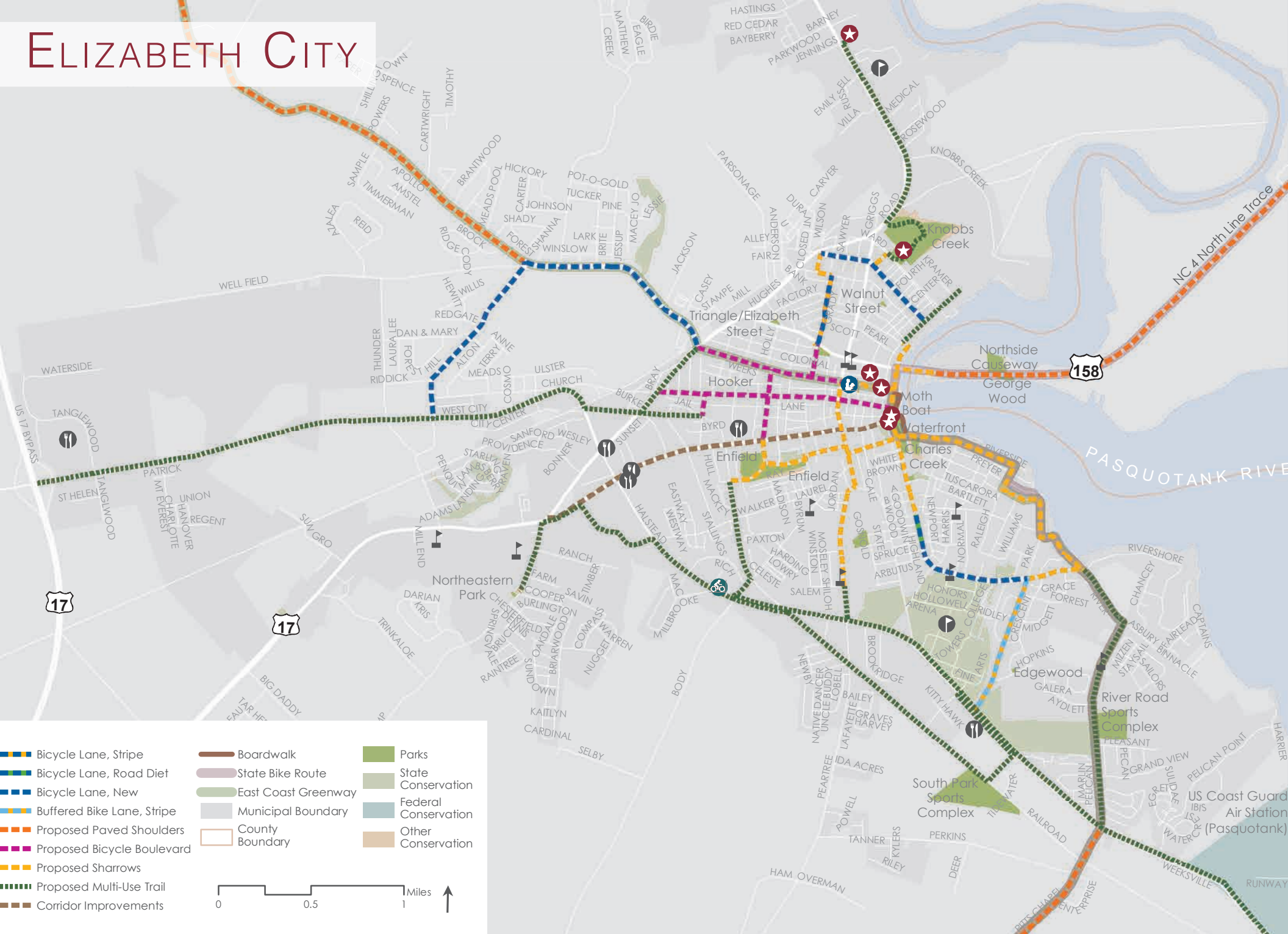


# NORTH OF SOUND PROPOSED NETWORK

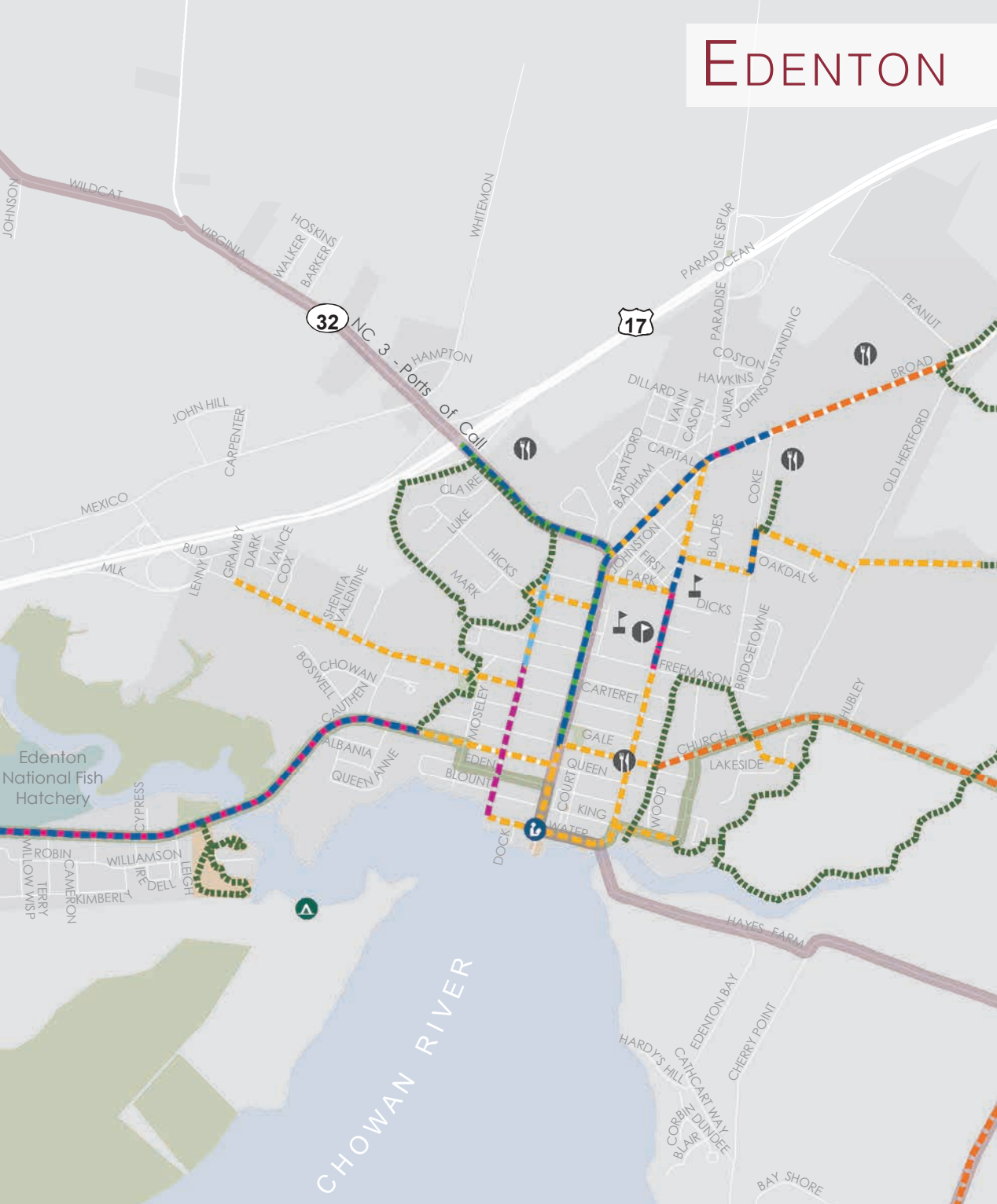
Facility Type	Mileage
Sharrows	14
Bike Boulevard	3
Paved Shoulder	286
Bicycle Lane	15
New	6
Restripe	5
Road Diet	1
Stripe	3
Buffered Bike Lane	16
New	14
Stripe	1
Greenway	62
Corridor Improvements	2
All Facilities	397



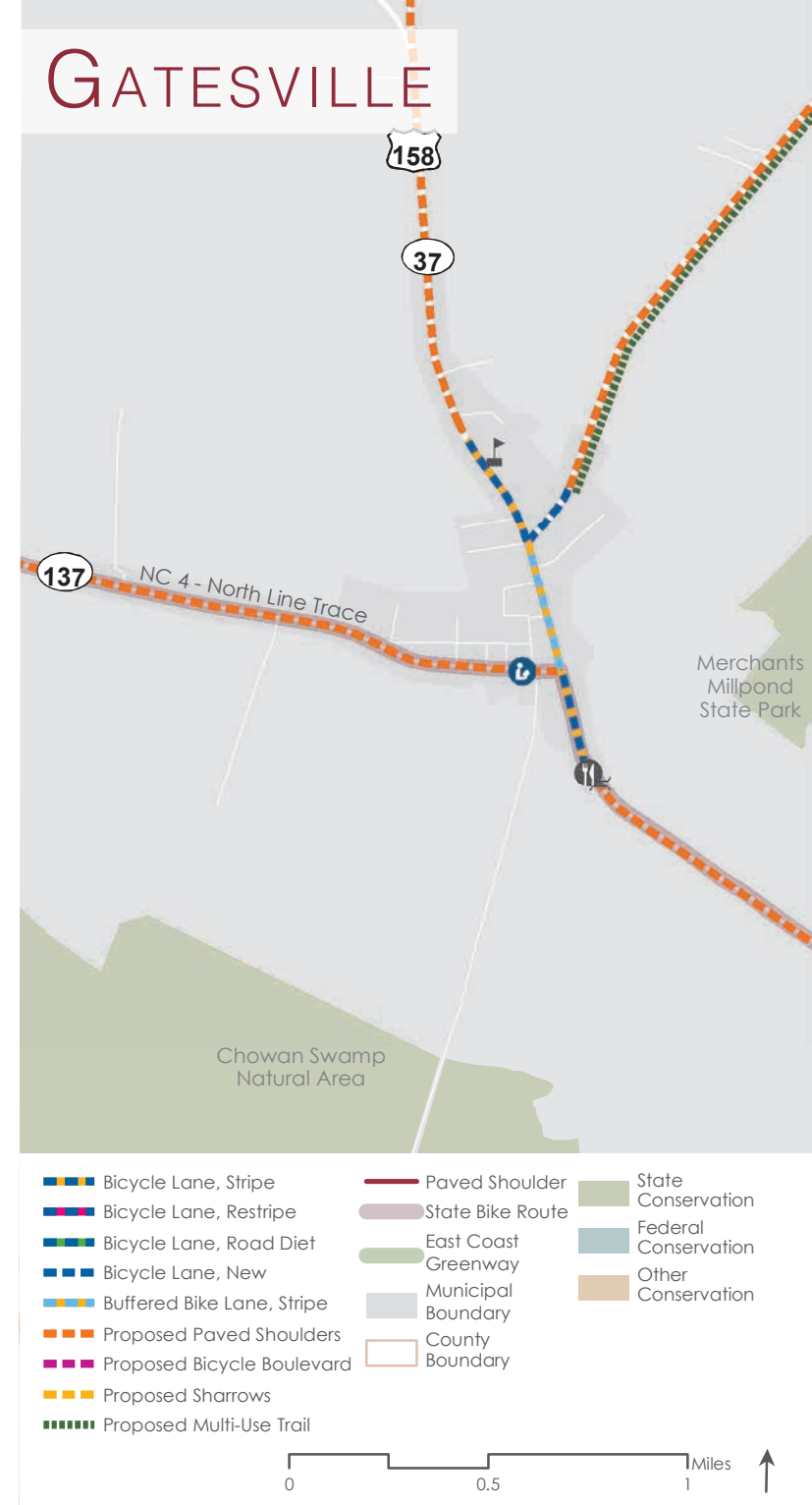
# ELIZABETH CITY



# EDENTON



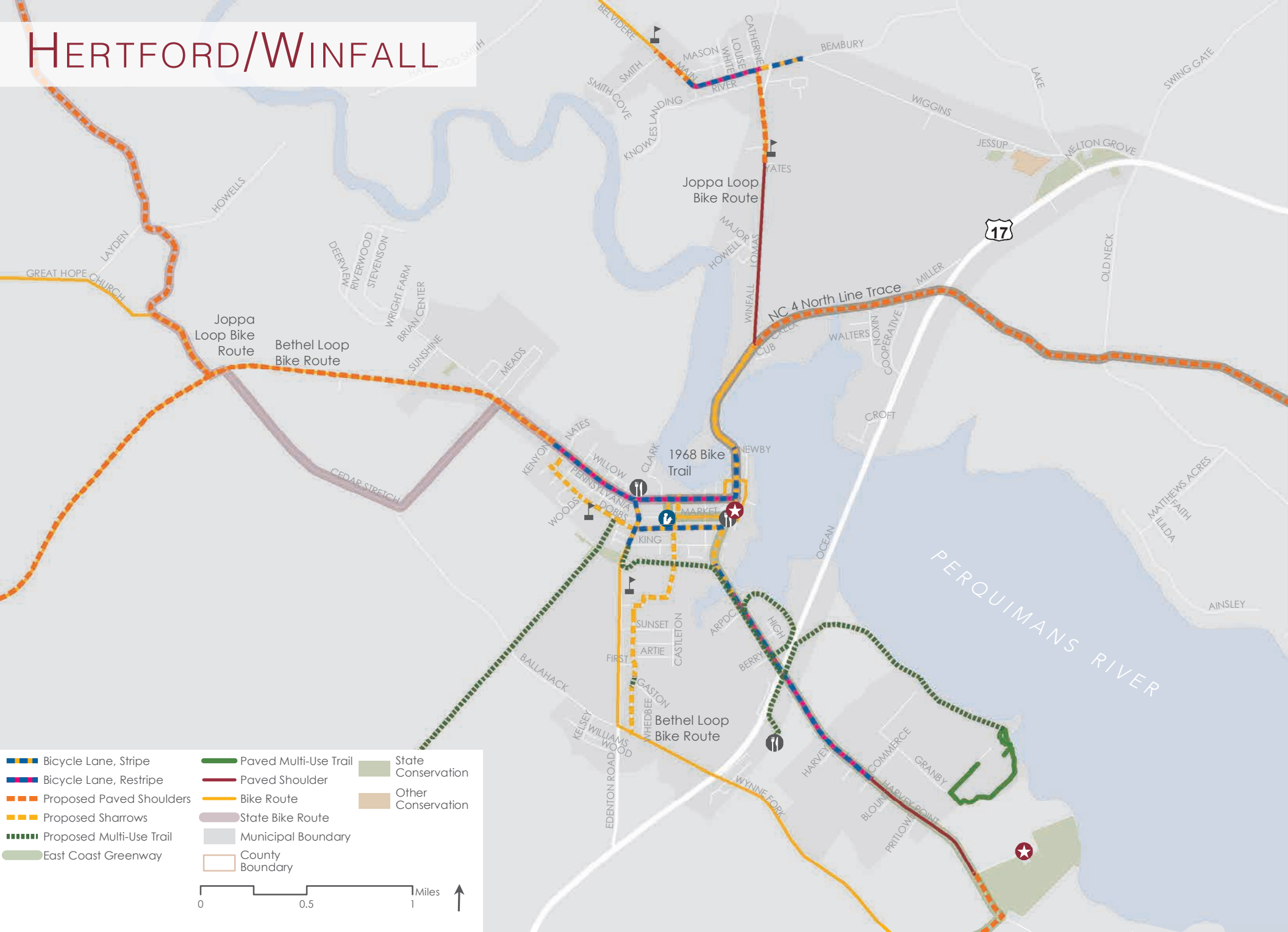
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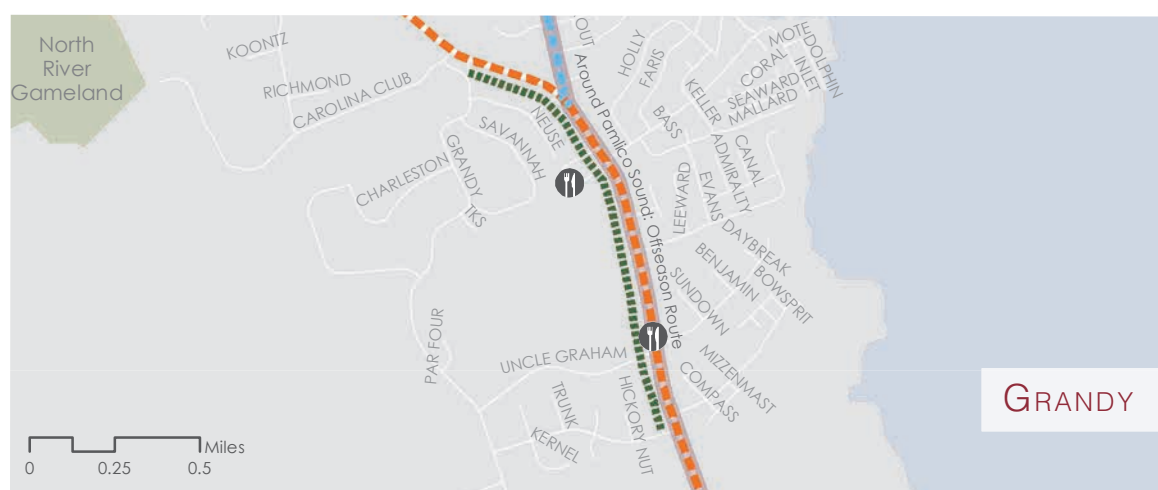
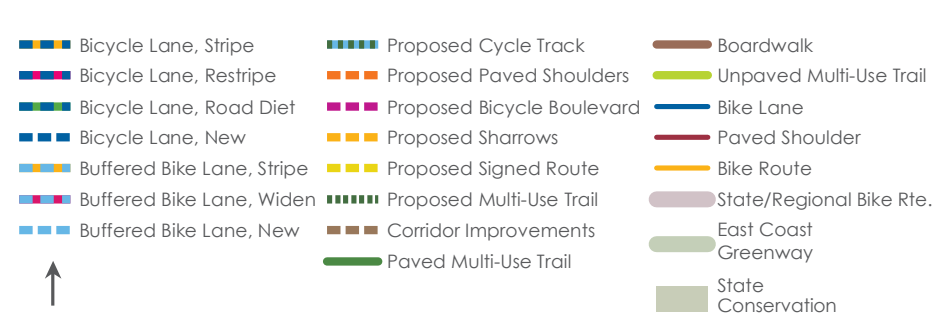
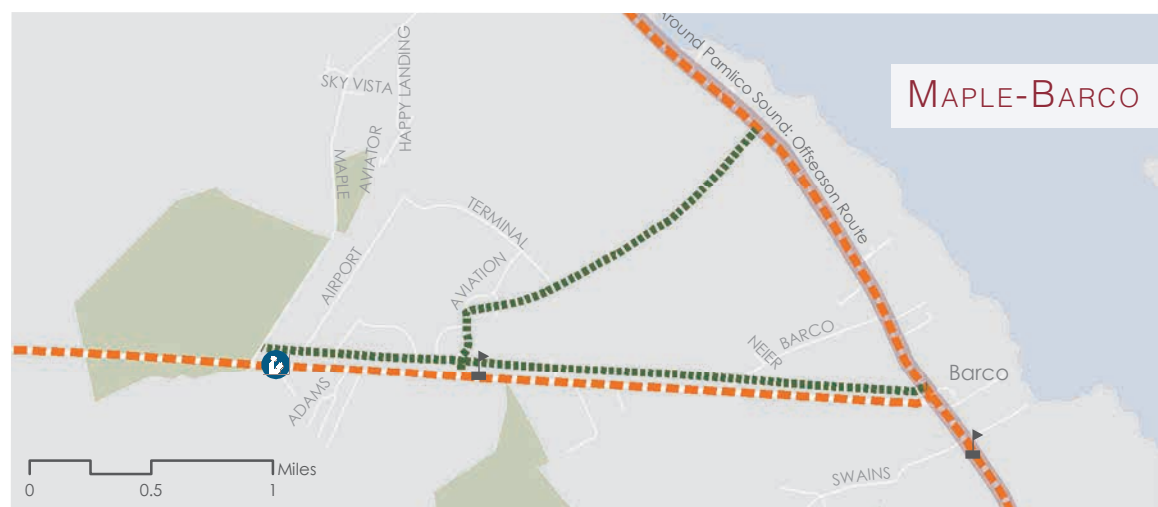
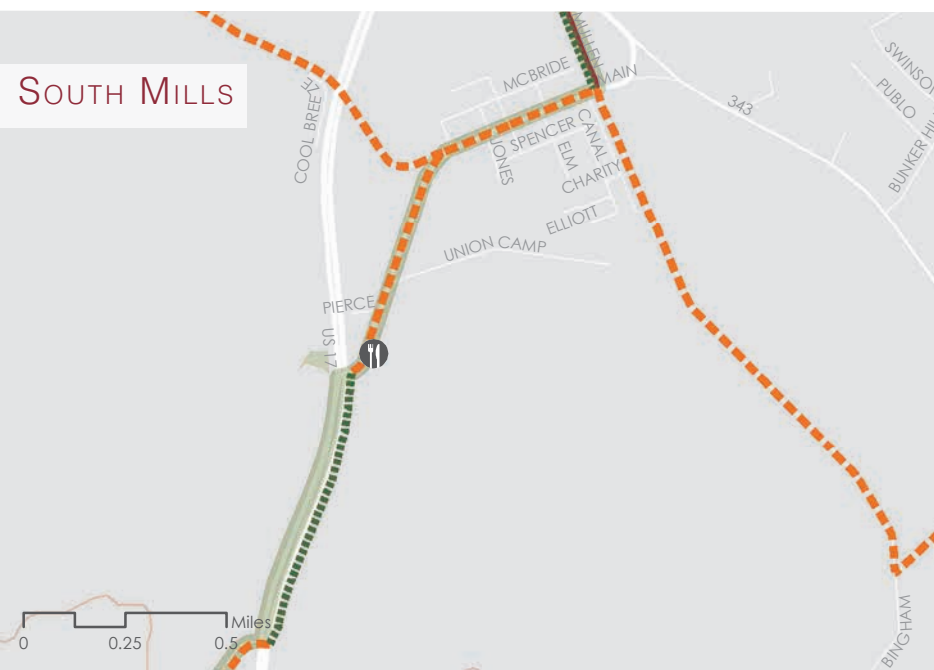
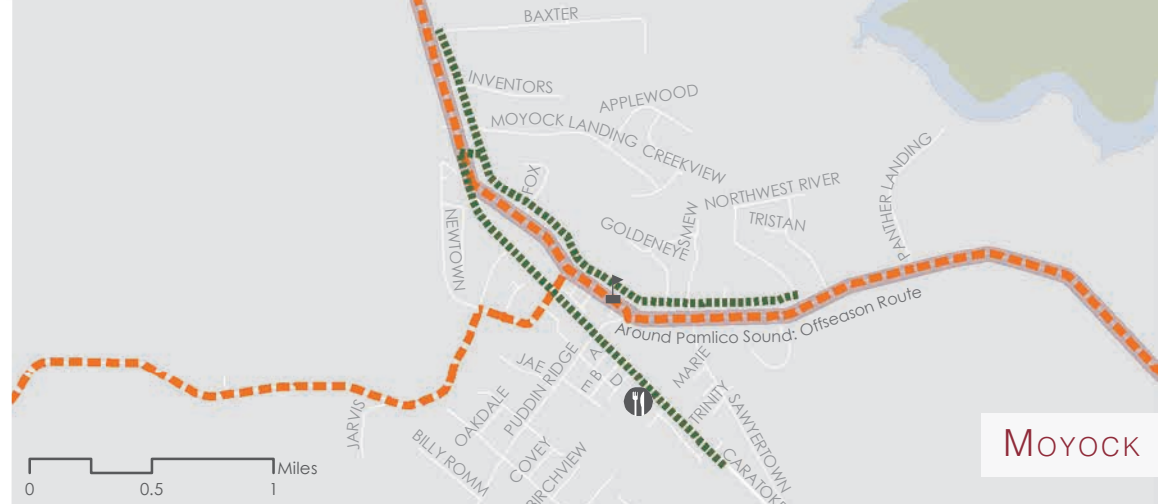
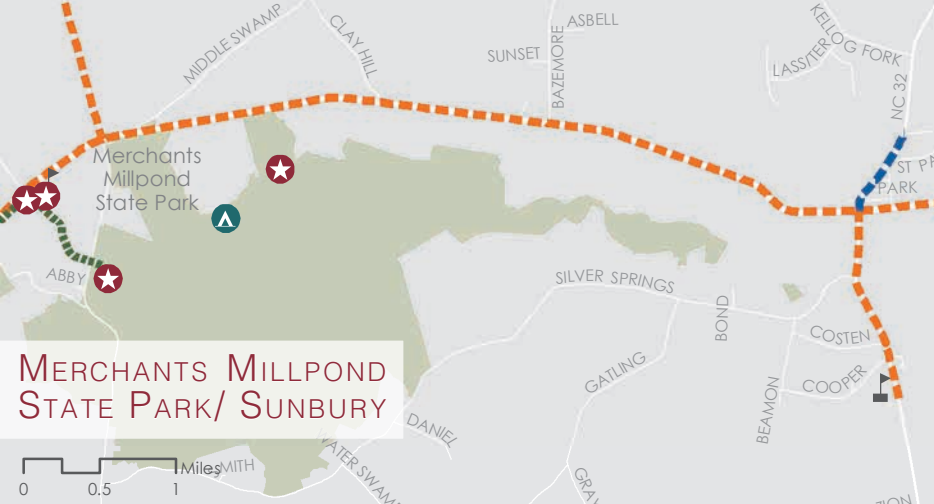
- Bicycle Lane, Stripe
- Bicycle Lane, Restripe
- Bicycle Lane, Road Diet
- Bicycle Lane, New
- Buffered Bike Lane, Stripe
- Proposed Paved Shoulders
- Proposed Bicycle Boulevard
- Proposed Sharrows
- Proposed Multi-Use Trail
- Paved Shoulder
- State Bike Route
- East Coast Greenway
- Municipal Boundary
- County Boundary
- State Conservation
- Federal Conservation
- Other Conservation

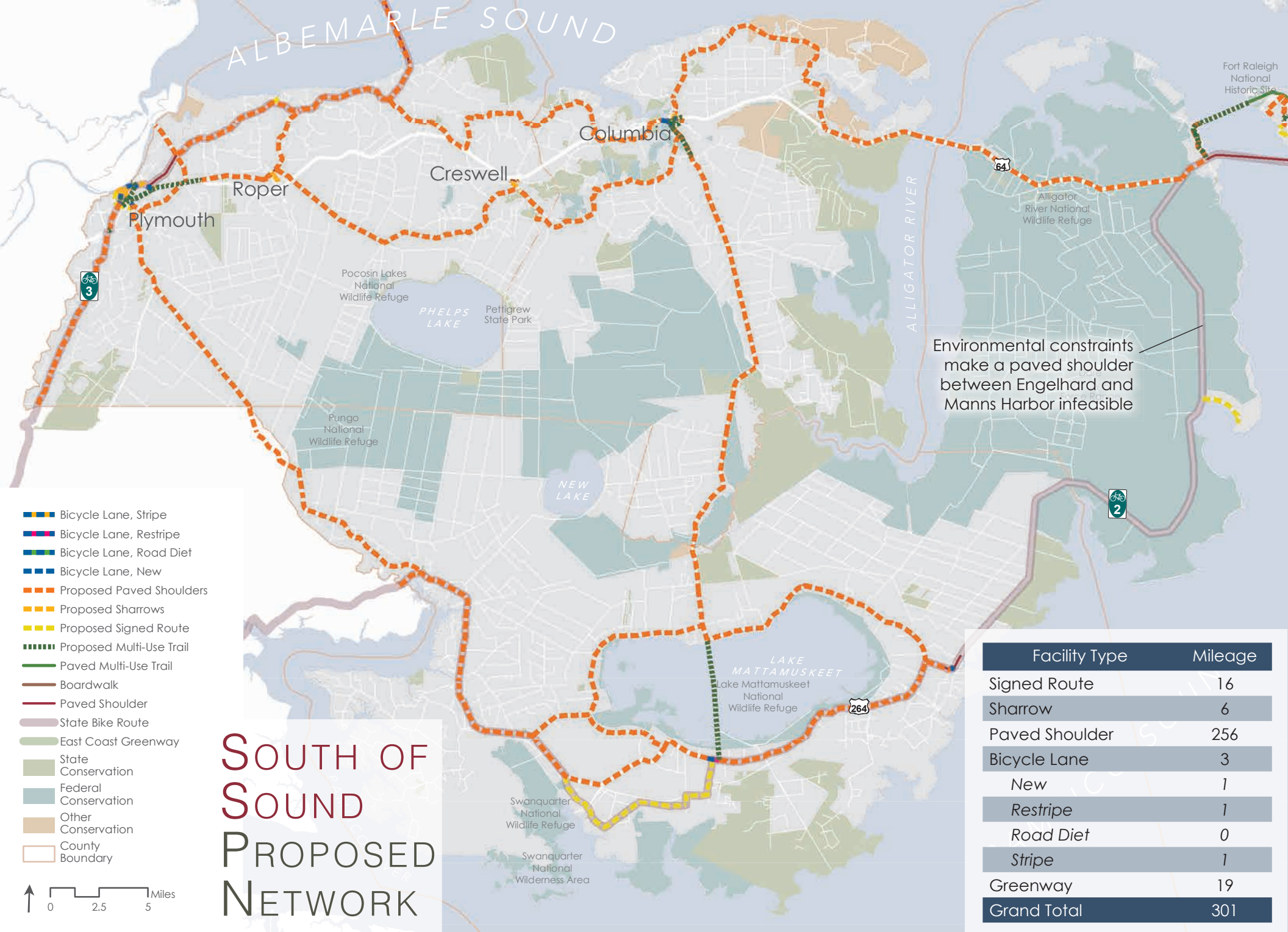


# HERTFORD/WINFALL









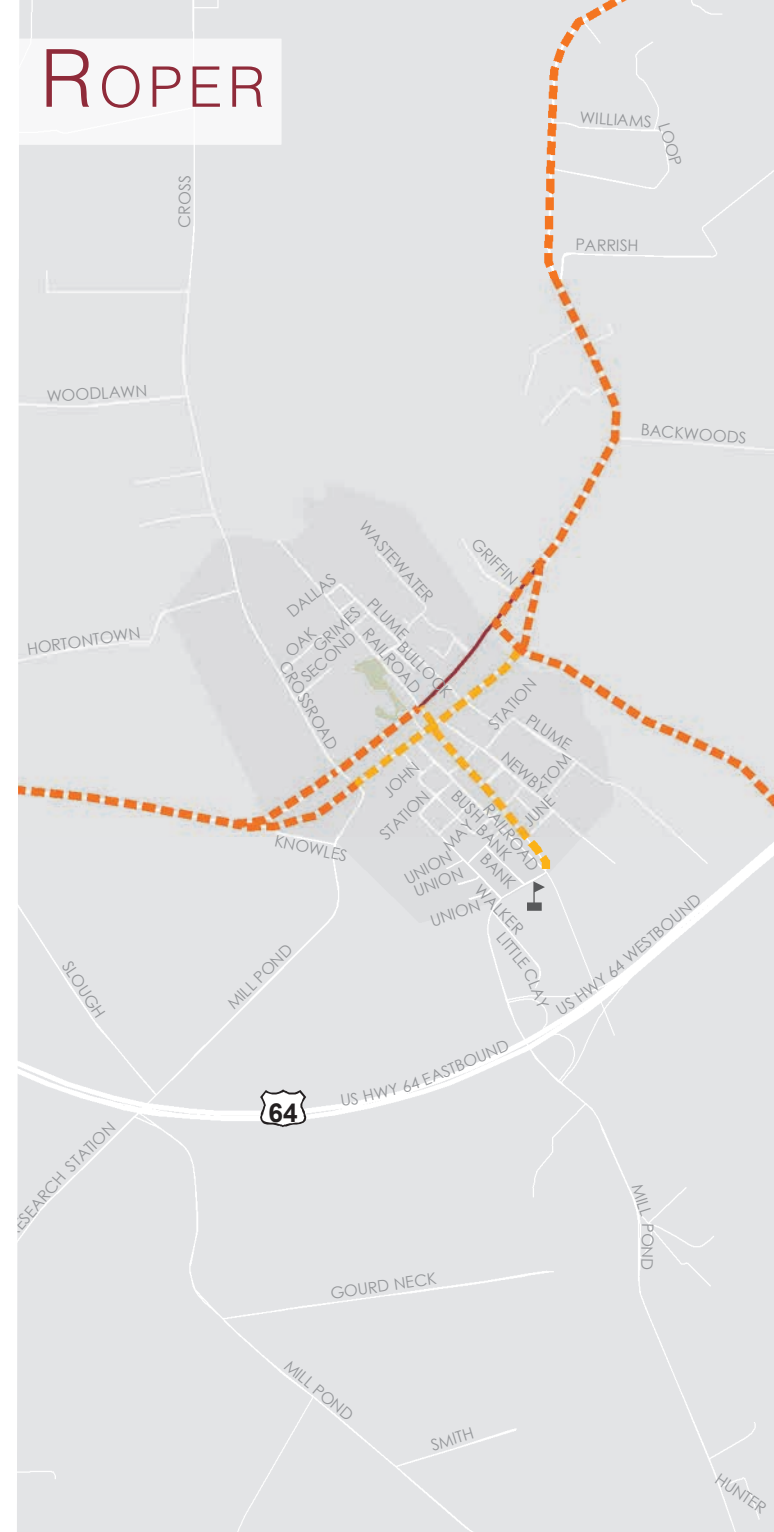


- Bicycle Lane, Stripe
- Bicycle Lane, Restripe
- Bicycle Lane, Road Diet
- Bicycle Lane, New
- Proposed Paved Shoulders
- Proposed Sharrows
- Proposed Signed Route
- Proposed Multi-Use Trail
- Paved Shoulder
- State Bike Route
- Municipal Boundary
- State Conservation
- Other Conservation
- County Boundary

0 0.5 1 Miles

# PLYMOUTH

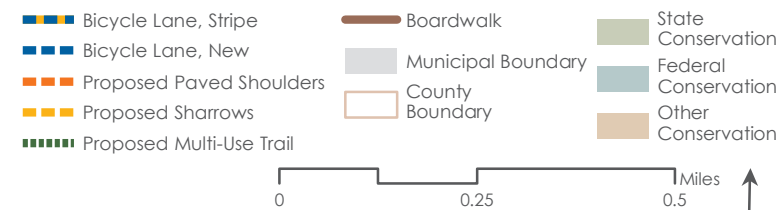
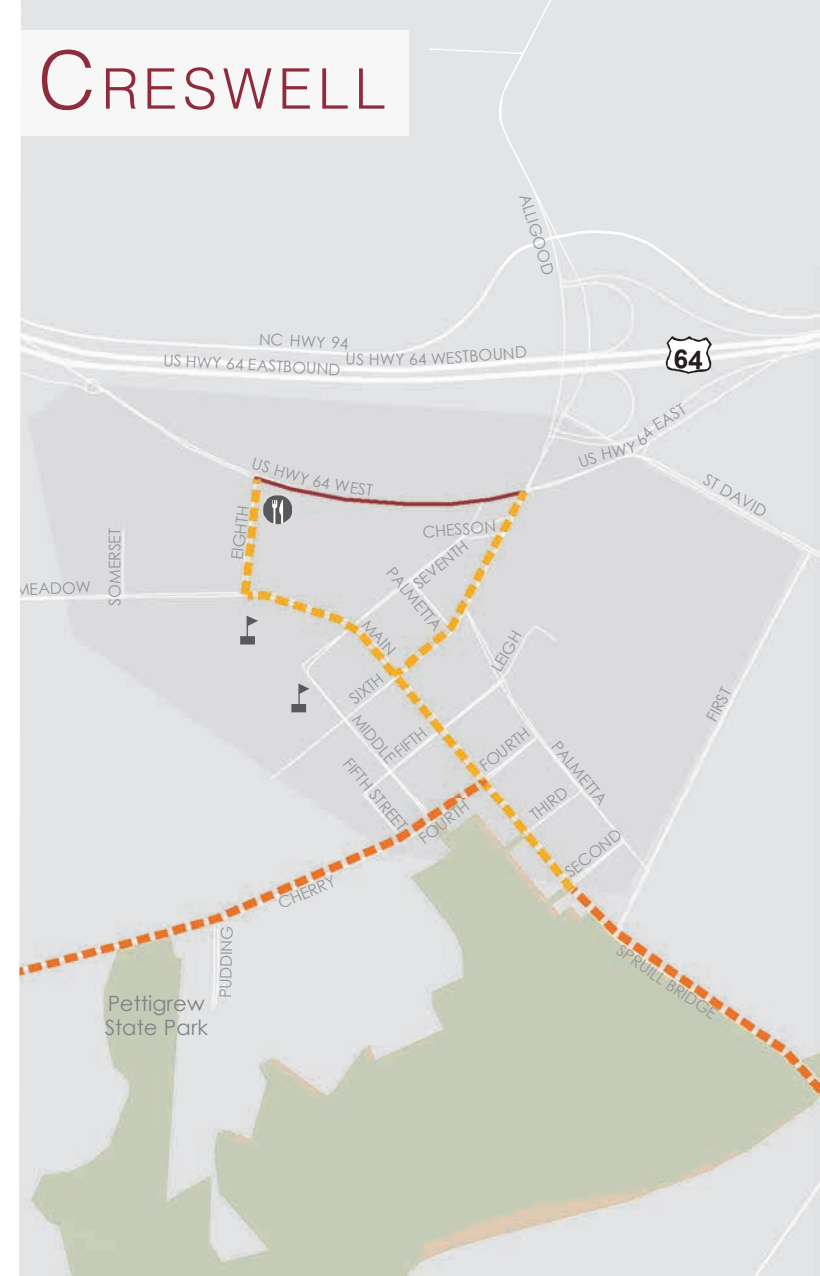
# ROPER





# COLUMBIA

# CRESWELL



MANN'S HARBOR

MASHOES

Harbor

OLD FERRY DOCK

MUSIC

APPLE

PINEY RIDGE

AMBROSE

BEASLEY CROATAN

ROWE

OLD MANN'S HARBOR

AZALEA

NASH

HOOPER

HIGHLAND

PECAN

TAYLOR

SHIPYARD

NC 2 - Mountains to Sea

US 64 264

PEANUT

BRATON

NO NAME

VIRGINIA DARE MEMORIAL

Alligator River National Wildlife Refuge

0 0.25 0.5 Miles

ENGELHARD

SR 1315 SWAMP

SR 1329 SHAW

SR 1321 COOPER

SR 1322 CAHOON

SR 1319 ROPER

SR 1320 GOLDEN

SR 1100 HILL

SR 1101 GOSHEN BACK

SR 1103 SPENCER

BREEZY POINT

NC 2 - Mountains to Sea

0 0.25 0.5 Miles

A map of the Mattamuskeet National Wildlife Refuge area. The map shows a network of roads: US-264 running diagonally from the top left to the bottom right, NC-94 running vertically from the top right to the bottom right, and SR-1121 running vertically from the bottom left to the bottom right. The roads are color-coded: US-264 is orange with a dashed line, NC-94 is green with a dashed line, and SR-1121 is yellow with a dashed line. A scale bar at the bottom left indicates distances of 0, 0.25, and 0.5 miles. A north arrow is located in the top right corner. The text 'MATTAMUSKEET' is written in large, bold, black letters in the top left corner. The text 'Lake Mattamuskeet National Wildlife Refuge' is written in smaller, black letters in the top right corner. The text 'US-264', 'NC-94', and 'SR-1121' are written along their respective roads. The text '0' is written near the bottom right corner. The text '0.25' and '0.5' are written near the scale bar. The text 'Miles' is written at the end of the scale bar. The text 'Lake Mattamuskeet' is written in the top right corner. The text 'National Wildlife Refuge' is written in the top right corner. The text 'MATTAMUSKEET' is written in the top left corner.

- 

## **OUTER BANKS MAJOR CORRIDORS**

Two major corridors along the Outer Banks - US 158 and NC 12 - present particular challenges to bicycle transportation that cannot be addressed solely with new bike facility recommendations. While each community located along these corridors has its own distinct character, many of these challenges are consistent across communities. The following paragraphs describe constraints along these corridors and recommended studies and solutions.

### **US-158**

US-158 is a primary roadway corridor travelling from Southern Shores to Nags Head. Multi-use side paths are recommended to be located within the right-of-way for the entire length of this corridor. A number of complex intersections and uncontrolled roadway crossings on US 158 bar safe access to the many commercial destinations located along it. This is because 1) they cannot be avoided, or 2) creation of a detour would require a major inconvenience for bicyclists, who would be unlikely to use it. Cyclists crossing US-158 have to cross five lanes of traffic, often at non-signalized intersections. No refuge islands exist on US-158, and signal timing at the intersections that are signalized is not adequate for cyclists to safely cross. A full study of US 158 is recommended to determine appropriate treatment and placement of crossings. At minimum, high-visibility crosswalks should be located wherever an intersection connects to beach access. For more information on this corridor, see Chapter 5: Demonstration Projects.



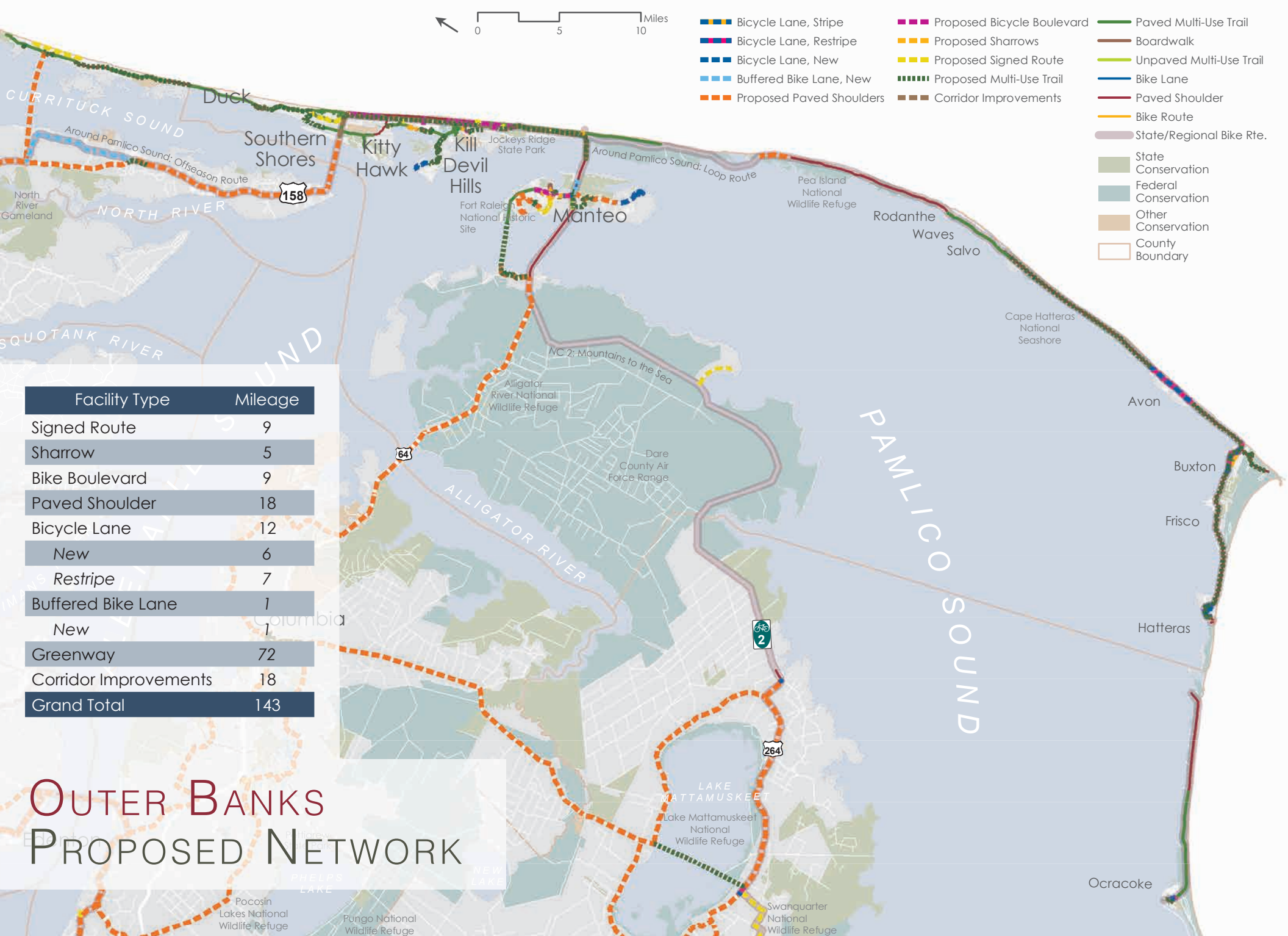
Two-way cycle track facility designed with green paint  
Photo credit: Transportation nation blog

### **NC-12**

NC-12 is also called "Beach Road" and passes through every community on the Outer Banks from Corolla to Ocracoke Island. Sidewalks and sidepaths exist along the majority of NC-12. However, due to the close proximity of Beach Road to the sand dunes along the beach, the existing sidepaths were not built to the recommended ten-foot wide standard. Environmental conditions pose a significant challenge to maintenance of these facilities. In many areas, sand from the sand dunes washes across the sidewalks or sidepath, making the facility unusable. A plan for more frequent maintenance of the facility should be put in place through a coordinated effort of municipal staff along the corridor.

In southern Nags Head, near the Jennette's Pier/Whalebone Junction area, the side path becomes an on-road facility with numerous driveway conflict points as a result of wide curb-cuts and uncontrolled driveway access areas. This area should be considered for further study to determine how to reduce driveway access areas. One potential near-term solution to increasing the visibility of the sidepath and cyclists traveling on the side path is to resurface the side path in this area using colorful paint or longer lasting plastic or epoxy material embedded with reflective glass beads. The photo at left illustrates an example of a two-way cycle track facility designed with green paint. This paint will signal to motorists that the sidepath is not part of the roadway open to vehicles.

























0 5 10 Miles

- Bicycle Lane, Stripe
- Bicycle Lane, Restripe
- Bicycle Lane, New
- Buffered Bike Lane, New
- Proposed Paved Shoulders
- Proposed Bicycle Boulevard
- Proposed Sharrows
- Proposed Signed Route
- Proposed Multi-Use Trail
- Corridor Improvements
- Paved Multi-Use Trail
- Boardwalk
- Unpaved Multi-Use Trail
- Bike Lane
- Paved Shoulder
- Bike Route
- State/Regional Bike Rte.
- State Conservation
- Federal Conservation
- Other Conservation
- County Boundary

Facility Type	Mileage
Signed Route	9
Sharrow	5
Bike Boulevard	9
Paved Shoulder	18
Bicycle Lane	12
New	6
Restripe	7
Buffered Bike Lane	1
New	1
Greenway	72
Corridor Improvements	18
Grand Total	143

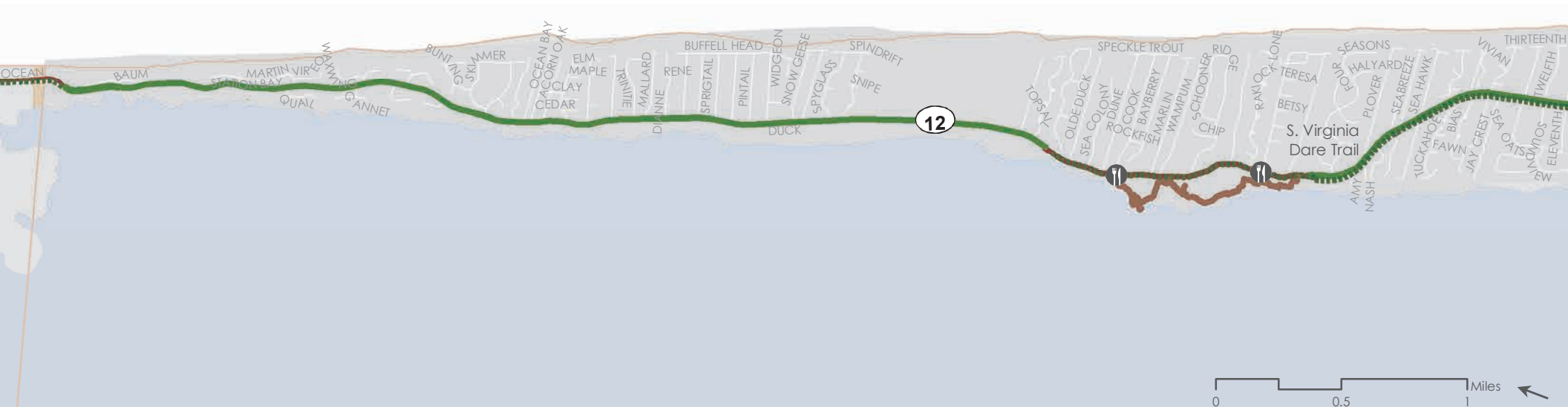
# OUTER BANKS PROPOSED NETWORK

# COROLLA

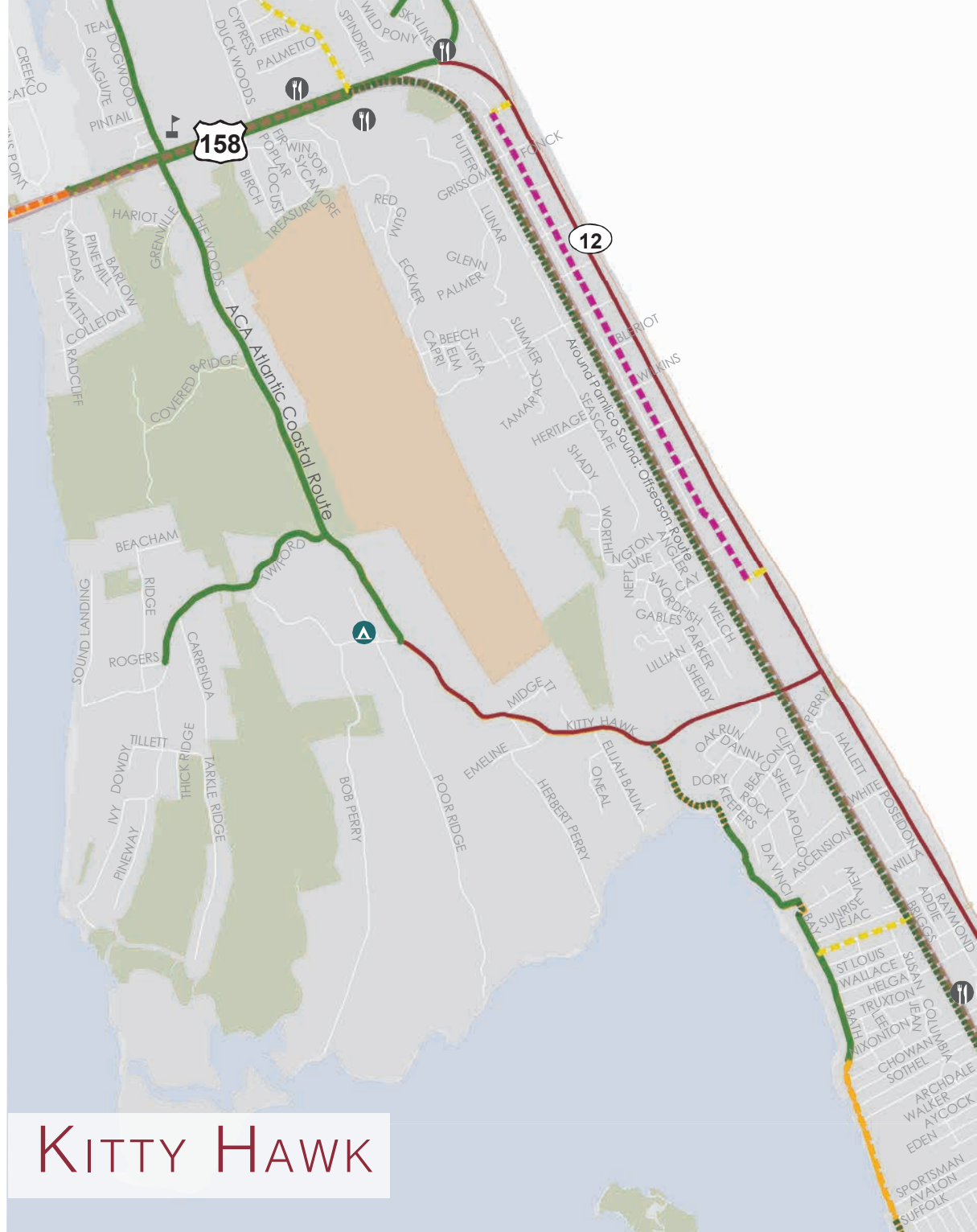
- |  |   |  |   |
|--|---|--|---|
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|  Bicycle Lane, Restripe       |  Proposed Paved Shoulders    |  Boardwalk                |  State Conservation    |
|  Bicycle Lane, Road Diet     |  Proposed Bicycle Boulevard |  Unpaved Multi-Use Trail |  Federal Conservation |
|  Bicycle Lane, New          |  Proposed Sharrows         |  Bike Lane              |  Other Conservation  |
|  Buffered Bike Lane, Stripe |  Proposed Signed Route     |  Paved Shoulder         |  County Boundary     |
|  Buffered Bike Lane, Widen  |  Proposed Multi-Use Trail  |  Bike Route             |   |
|  Buffered Bike Lane, New    |  Corridor Improvements     |  |   |



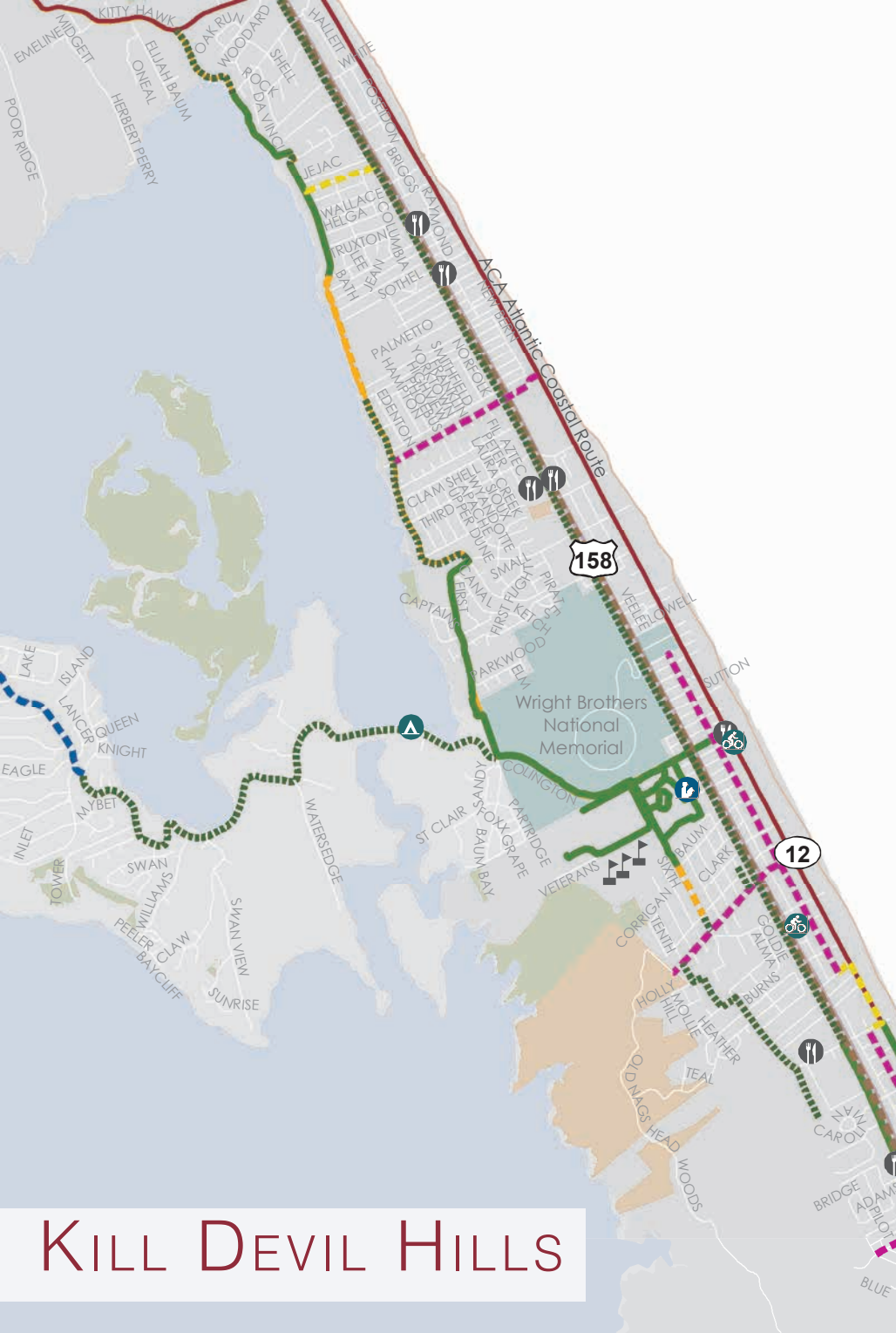
# DUCK

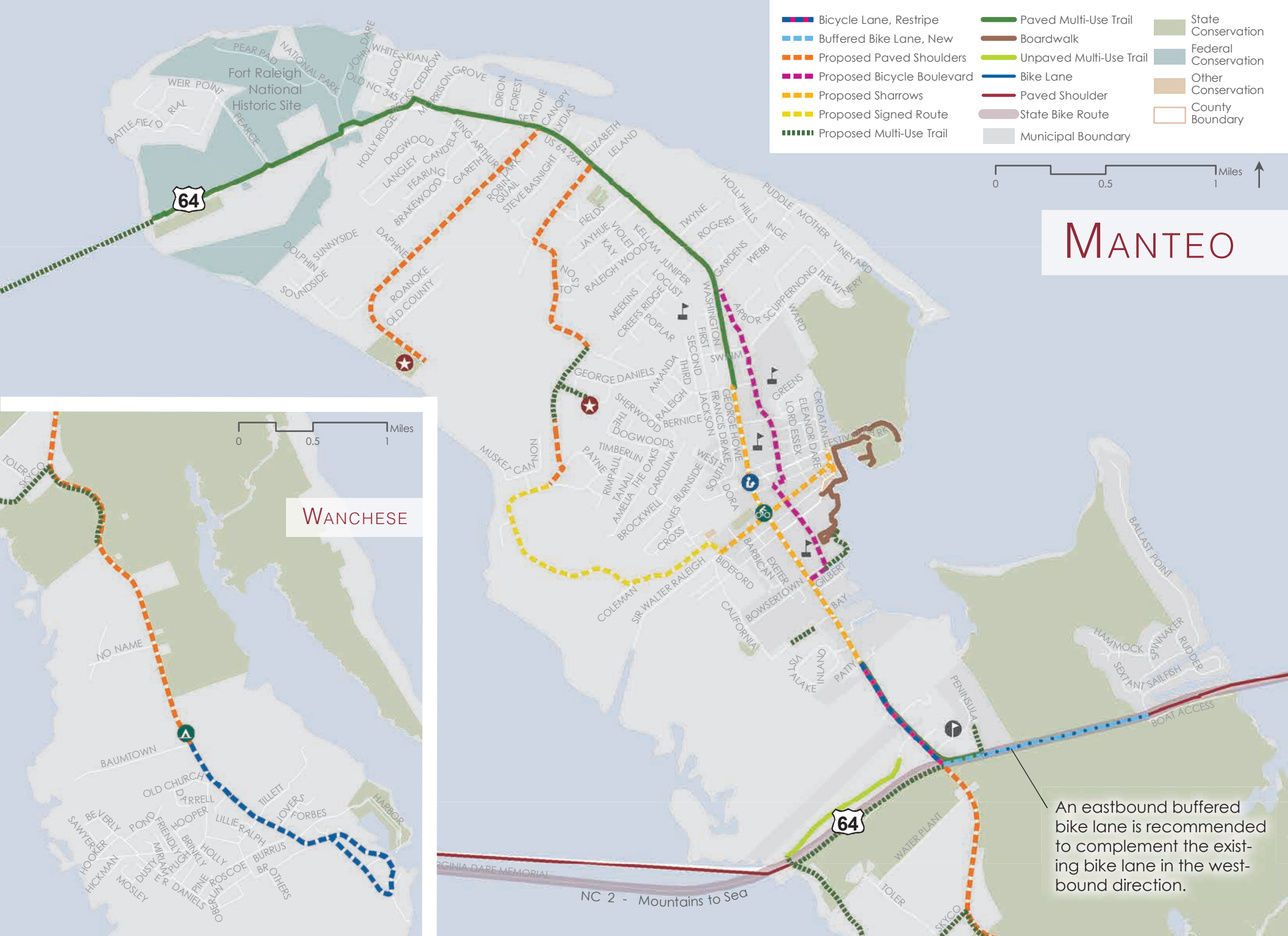










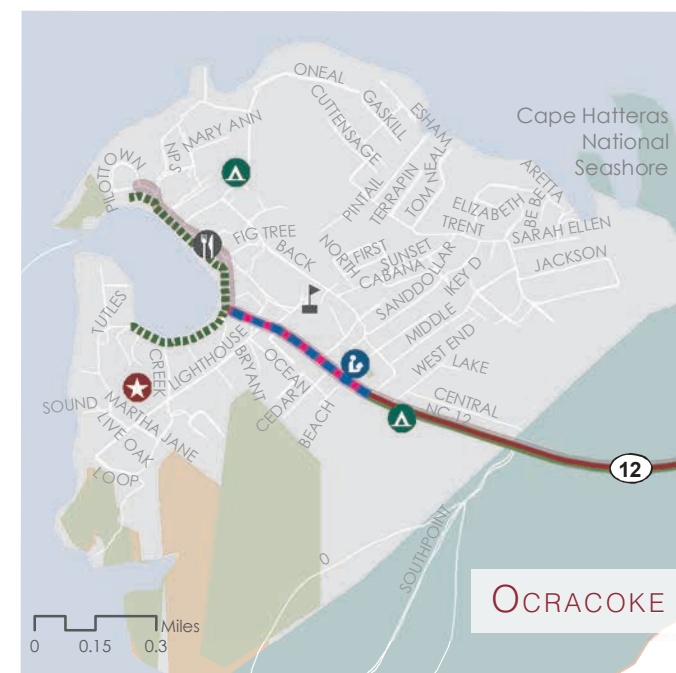
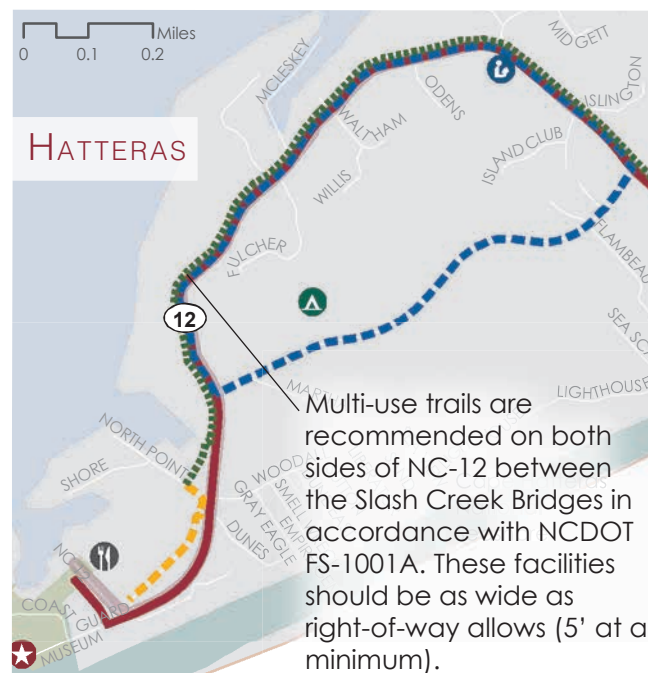
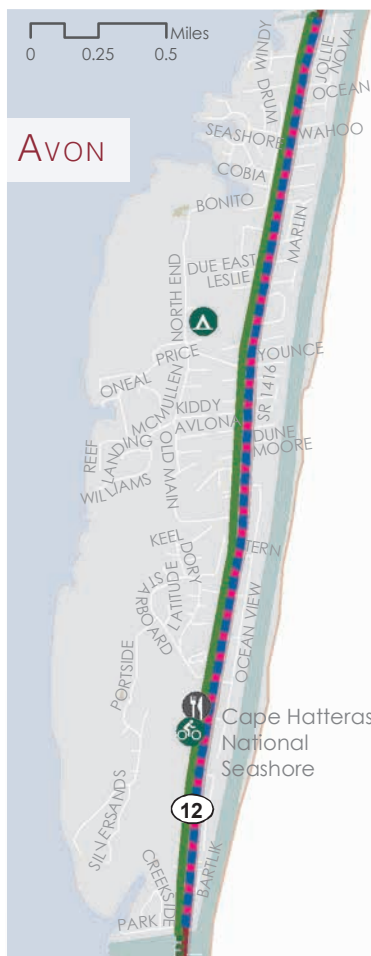
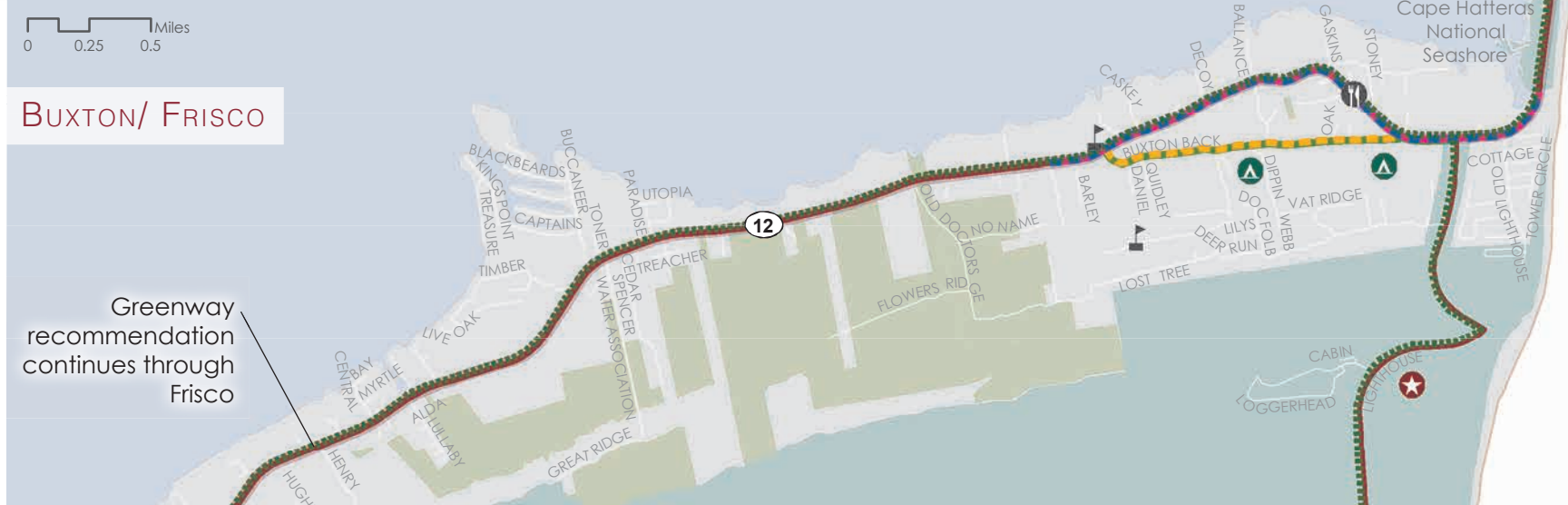
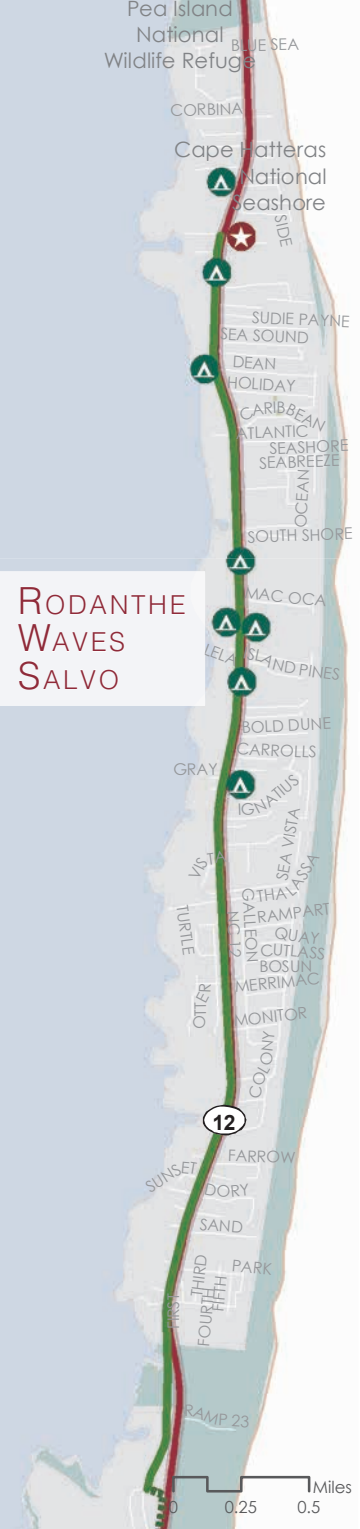


# MANTEO

## WANCHESE

An eastbound buffered bike lane is recommended to complement the existing bike lane in the west-bound direction.





- |                            |                            |                         |                      |
|----------------------------|----------------------------|-------------------------|----------------------|
| Bicycle Lane, Stripe       | Proposed Cycle Track       | Paved Multi-Use Trail   | State Conservation   |
| Bicycle Lane, Restripe     | Proposed Paved Shoulders   | Boardwalk               | Federal Conservation |
| Bicycle Lane, Road Diet    | Proposed Bicycle Boulevard | Unpaved Multi-Use Trail | County Boundary      |
| Bicycle Lane, New          | Proposed Sharrows          | Bike Lane               |                      |
| Buffered Bike Lane, Stripe | Proposed Signed Route      | Paved Shoulder          |                      |
| Buffered Bike Lane, Widen  | Proposed Multi-Use Trail   | Bike Route              |                      |
| Buffered Bike Lane, New    | Corridor Improvements      |                         |                      |



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Before

Photo simulation of the recommended Caratoke Highway sidepath. For more information on this specific project, see page 5-8.



After

# Chapter Five

## Priority & Demonstration Projects

### OVERVIEW

A comprehensive bicycle network for the region was presented in Chapter 4. This chapter features the results of a prioritization of that network, as well as detailed analysis of select demonstration projects. Exhibits describing these demonstration projects contain design direction, cost estimates, and potential funding sources.

The prioritization results are presented for rough guidance only. While it is ideal to develop facilities in order of priority, it is best to also construct facilities as opportunities arise. Some of the most cost-effective opportunities to provide bicycle facilities are during routine roadway construction, reconstruction, and repaving projects. A new commercial development or a roadway widening project, for instance, would provide the means to build facilities as a component of an existing effort, regardless of priority ranking through this process.

### PRIORITIZATION METHODOLOGY

Prioritization began by breaking down infrastructure recommendations into discrete segments at logical points, such as major intersections. These segments were then prioritized with scores based on the

weighted criteria listed below, which was custom designed for this plan based on Steering Committee input, public input through the online comment form, and existing conditions.

Where characteristics are relative (i.e. access to a higher-density residential area), criteria were applied such that a particular project is compared only to other projects within its county, rather than all projects across the region. Thus, scores are only comparable within counties.

### Chapter Contents

*Overview*

*Prioritization  
Methodology*

*Prioritization  
Results*

*Demonstration  
Project Selection*

*Demonstration  
Project Exhibits*

Criteria	Weight
Provides access <sup>1</sup> to a school (any level)	5
Provides access to a higher-density residential area	4
Provides access to a higher-density commercial area	4
Provides access to a park or recreation center (including the beach)	4
Connects to an existing or funded trail	4
Serves low-income areas with low car-ownership rates	4
Segment contains reported bike accidents or provides an alternative to a corridor with a high number of reported accidents	4
Higher relative feasibility (no acquisition required)	4
Top 1-5 "Most in need of improvement" from online comment form	4
Top 6-10 "Most in need of improvement" from online comment form	3
Segment contains a Top 10 Intersection "Most in need of improvement"	3

<sup>1</sup> Access is defined as a connection to the destination's driveway entrance to the nearest public street





## Prioritization Results

The results of prioritization are shown graphically at left. The top three priorities from each county are presented below. The full results of prioritization, showing the criteria met by each proposed facility and associated scores, are presented in Appendix C.

Facility Location	Facility Type	Street Name	From	To
<i>CAMDEN COUNTY</i>				
County	Paved Shoulder	US 158	Pasquotank County	NC 343
County	Paved Shoulder	NC 343	Scotland Rd	158 W
County	Greenway	343 N/Mullen Dr	US 17	Main St
<i>CHOWAN COUNTY</i>				
Edenton	Bicycle Lane, Road Diet	Broad St	Church St	Virginia Rd
Edenton	Bicycle Lane, Road Diet	Virginia Rd	US 17	Broad St
Edenton	Sharrow	Oakum St	Water St	Freemason St
<i>CURRITUCK COUNTY</i>				
County	Paved Shoulder	US 158/Shortcut Rd	NC 343	Tulls Creek Rd
Corolla	Signed Route	Shad St/Lighthouse Dr/Albacore St	Ocean Trl	Ocean Trl
County	Paved Shoulder	Caratoke Hwy	Tulls Creek Rd	Shortcut Rd

Facility Location	Facility Type	Street Name	From	To
<i>DARE COUNTY</i>				
Manteo	Sharrow	US 64/US 264	Harriot St	Patty Ln
County	Greenway	NC 12	Park Dr (Avon)	Eagle Pass Rd
Buxton	Bicycle Lane, Restripe	NC 12	Crooked Ridge Trl	Lighthouse Rd
<i>GATES COUNTY</i>				
County	Paved Shoulder	US 158	Maple St	Acorn Hill Rd/ Folly Rd
Gatesville	Bicycle Lane, Stripe	Main St	Court St	Town Edge
Gatesville	Bicycle Lane, Stripe	Main St	Gatesville Elementary School	Maple St
<i>HYDE COUNTY</i>				
County	Signed Route	NC 45/Oyster Creek Rd/ Juniper Bay Rd	US 264	Turnpike Rd at schools
County	Bicycle Lane, Restripe	US 264	W of school complex	NC 94
County	Paved Shoulder	US 264	NC 94	Golden St
<i>PASQUOTANK COUNTY</i>				
Elizabeth City	Greenway	Oak Stump Rd/ Ehringhaus St/Halstead Blvd	Cooper Ln	Roanoke Ave/ RR Crossing
Elizabeth City	Bike Boulevard	Church St	Hughes Blvd	Water St
Elizabeth City	Sharrow	Main St	Road St	Water St

Facility Location	Facility Type	Street Name	From	To
<i>PERQUIMANS COUNTY</i>				
Hertford	Greenway	Off Road/ Church St	King St	Shopping center S of US 17
Hertford	Bicycle Lane, Restripe	Church St	N of Albemarle Sound	US 17
Hertford	Bicycle Lane, Restripe	Harvey Point Rd	US 17	Commerce Dr
<i>TYRRELL COUNTY</i>				
Columbia	Greenway	US 64	Water St	La Keiser Dr
Columbia	Sharrow	Main St	Water St	Road St
Columbia	Bicycle Lane, Stripe	Main St	Road St	US 64
<i>WASHINGTON COUNTY</i>				
Creswell	Sharrow	Main St	Eighth St	Second St
Creswell	Sharrow	Eighth St	US 64	Main St
Plymouth	Sharrow	Washington St	Water St	RR N of US 64



## DEMONSTRATION PROJECT SELECTION

Twenty Demonstration Projects were selected from the recommended network for detailed analysis. The results of this analysis are presented on the following pages in summary exhibits. These exhibits are intended to illustrate how different recommended facilities might best be implemented in areas across the region. To meet that goal, segments were selected using a combination of the following inputs:

- Weighted score from prioritization,
- Geographic representation, and
- Facility type representation.

The result of this selection is a group of projects representing all subregions, counties, and municipalities of the region. These projects also cover a variety of facility types within each subregion. Projects are presented in random order by subregion. In combination with the Design Guidelines presented in Appendix D, these demonstration projects provide guidance on implementation of bike facilities across the region.

The following pages show planning level design concepts only. Project development will require local and NCDOT review and approval. Right-of-way costs are not included in cost estimates, since these must be negotiated at the time of implementation.



## DEMONSTRATION PROJECT EXHIBITS

### NORTH OF SOUND

Code	County	Location	Project Description	Page #
NS-A	Gates	Gatesville	Main Street Bike Lane	5-5
NS-B	Currituck	Moyock	Caratoke Highway Sidepath	5-6
NS-C	Chowan	Edenton	Broad Street Bike Lane/ Sharrow	5-7
NS-D	Pasquotank	Elizabeth City	Church Street Bike Boulevard	5-9
NS-E	Pasquotank	Elizabeth City	Ehringhaus Street Corridor Improvements	5-11
NS-F	Perquimans	Hertford	Hertford Greenway	5-13
NS-G	Perquimans	Hertford	Church Street Bike Lane/ Sharrow	5-14
NS-H	Camden	County	Dismal Swamp Greenway Extension	5-15

### SOUTH OF SOUND

Code	County	Location	Project Description	Page #
SS-A	Hyde	Engelhard	US 264 Bike Lane	5-16
SS-B	Tyrrell	Columbia	US 64 Sidepath	5-17
SS-C	Washington	Plymouth	US 64 Sidepath	5-18
SS-D	Washington	Plymouth	Water Street/Park Drive Sharrow/ Bike Lane	5-19

### OUTER BANKS

Code	County	Location	Project Description	Page #
OBX-A	Dare	Manteo	US 64 Sharrow/ Bike Lane	5-20
OBX-B	Dare	Nags Head/Kitty Hawk/Kill Devil Hills	US 158 Corridor Improvements	5-21
OBX-C	Dare	Buxton	NC 12 Sidepath/ Bike Lane	5-23
OBX-D	Dare	Duck	NC 12 Cycle Track	5-24
OBX-E	Dare	Nags Head	Memorial Avenue Bike Boulevard	5-25
OBX-F	Currituck	Corolla	Lighthouse Drive Signed Route	5-27
OBX-G	Dare	Southern Shores	Dogwood Trail Bike Boulevard	5-28
OBX-H	Dare	County	Colington Road Cycle Track	5-29



### A: MAIN STREET- GATESVILLE

Main Street in Gatesville is a wide corridor with non-delineated—and largely underutilized—on-street parking. The parallel parking spaces are mainly used by the funeral home. Numerous homes front the corridor and have individual driveways. The recommended improvement is to restripe the corridor to add bicycle lanes, which could occur without changing the existing curb and gutter.

**Extents and Facility Type:** Gatesville Elementary School to Town limits: Bicycle Lane (Stripe)

**Length:** 0.9 miles

**Traffic Volumes:** Up to 3,200 AADT (Average Annual Daily Traffic)

**Overview and Purpose:** Main Street serves various municipal and civic uses and provides access to the downtown area and Gatesville Elementary. The width of the travel lanes and excess on-street parking could be redistributed to bicyclists through a low-cost restriping exercise. Two options are presented in the photosimulations below. The first option removes parking from both sides of the street and adds buffered bicycle lanes. The second option consolidates the parking to the southbound side to provide room for bicycle lanes. The second option requires narrow (9') travel lanes. Community input and feedback from NCDOT is needed to determine whether parking is necessary between Maple Street and Court Street.

**Planning Level Cost Estimate:** \$198,000 (assumes the full removal of on-street parking as shown in Option A).







## B: CARATOKE HIGHWAY- MOYOCK

NC 168, known as Caratoke Highway, is an important route between North Carolina and Virginia, and an evacuation route for the Outer Banks. The highway is also the primary route within the small town of Moyock. Currently, NC 168 is not suitable for bicycle travel due to high traffic volumes, speeding vehicles, and a lack of bicycle facilities. The recommended treatment is a sidepath along the highway with intersection improvements at Camellia Road.

**Extents and Facility Type:** Shingle Landing Road to Powells Lane: Sidepath

**Length:** 1.3 miles

**Traffic Volumes:** Up to 21,000 AADT

**Overview and Purpose:** The sidepath is recommended to the south, with special considerations at Camellia Drive. Issues and constraints include limited right-of-way, utilities, numerous driveway conflicts,

and a stream crossing that will require a bridge and guardrail. Paved shoulders and a multi-use trail near Moyock Elementary School will complete the local network.

**Planning Level Cost Estimate:** \$981,250 (excludes cost of secondary multi-use trail north of school; excludes paved shoulder improvements).





### *C: BROAD STREET- EDENTON*

Broad Street is one of the main entrances into historic Edenton and provides access to the downtown area, waterfront, and a variety of civic and retail uses. The corridor transitions from a more suburban four-lane section north of Church Street to an urban section with on-street parking. The corridor is also heavily traveled by local bicyclists. The recommended treatments are bicycle lanes or sharrows combined with streetscape and parking improvements.

*Extents and Facility Type:* Water Street to Church Street: Sharrow; Church Street to Virginia Avenue: Bicycle Lane (Road Diet); Virginia Avenue to Oakum Street: Bicycle Lane (Stripe)

*Length:* 1.3 miles

*Traffic Volumes:* Up to 7,800 AADT

*Overview and Purpose:* The purpose of this project is to blend improvements to the bicycle network with an enhanced gateway to the historic district. A recommended road diet would reduce the four-lane section north of Church Street to a two-lane divided section with bicycle lanes. South of Church Street, sharrows are recommended to enhance the awareness of motorists to bicycle traffic and to help direct bicyclists to the safest area of the travel lane. The safety of bicyclists would be further enhanced with back-in angled parking, which provides motorists with better vision of bicyclists and pedestrians as they exit a parking space.

*Planning Level Cost Estimate:* \$346,438 (restripe includes 0.3 miles of conversion to back-in angle parking; excludes cost of landscaped median for potential 2-lane divided road diet; excludes improvements to side streets).







## Broad Street - Downtown Segment

Complete road diet  
4-lane section to 2-lane divided  
with bicycle lanes



Paint sharrows



Install bicycle  
activation signal



Install high visibility crosswalks  
throughout corridor

Consider converting on-street parking  
to back-in angle parking.  
Further study and business engagement required.



Paint sharrows



Install bicycle  
activation signal



Paint sharrows



#### **D: CHURCH STREET - ELIZABETH CITY**

Church Street is a parallel route to Ehringhaus Street and Main Street. It connects the waterfront and downtown Elizabeth City with Hughes Boulevard (US 17 Business) by traveling through established residential areas and the historic district. Given the safety concerns for bicycle travel on Ehringhaus Street, Church Street was identified as a candidate for a bicycle boulevard.

**Extents and Facility Type:** Hughes Boulevard to Water Street: Bicycle Boulevard

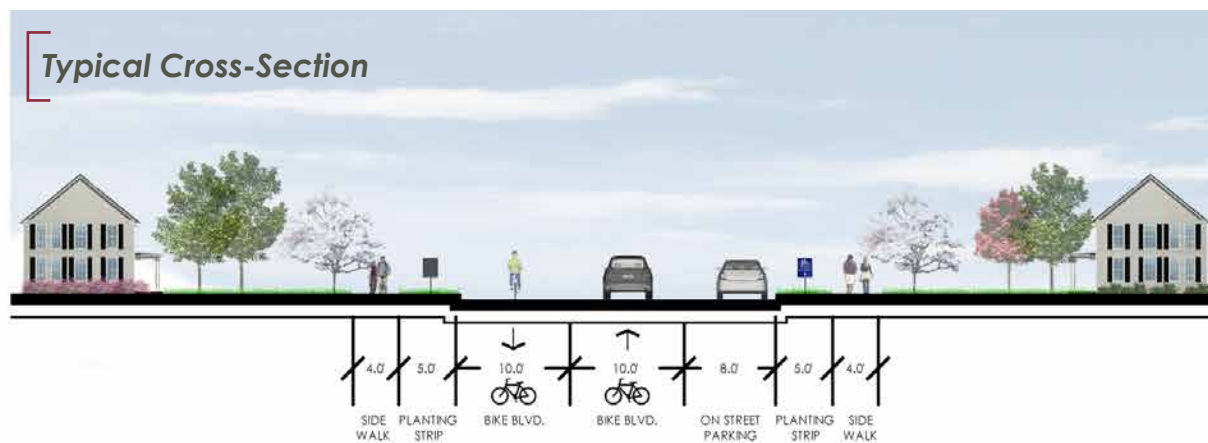
**Length:** 1.3 miles

**Traffic Volumes:** No Data

**Overview and Purpose:** The recommended bicycle boulevard would make Church Street more attractive and visible for bicyclists while minimizing the travel speeds of motor vehicles. Signage would direct

bicyclists from Ehringhaus Street and other roads to the corridor. Improvements at intersections such as mini traffic circles can help slow traffic and emphasize the priority of bicycle travel on Church Street. Issues and constraints include a narrow cross section (especially east of Road Street), in-street stormwater drains, numerous driveways, and non-delineated parallel parking. The bicycle boulevard could be enhanced by striping parking on one side. The exhibit shows potential plans for signage and pavement markings and identifies locations where traffic calming circles are appropriate. The signage plan also indicates destination points to increase accessibility.

**Planning Level Cost Estimate:** \$146,740









### *E: EHRLINGHAUS STREET - ELIZABETH CITY*

More than 20,000 vehicles per day travel Ehringhaus along its trek from downtown to US 17 and points west. The heavily commercialized corridor typically is a five-lane section with extensive driveway cuts, heavy traffic volumes, and large amounts of turning traffic. These features combine to make the corridor inhospitable to bicycle traffic and in need of improvements.

*Extents and Facility Type:* Hughes Boulevard to Water Street: Corridor Improvements

*Length:* 2.0 miles

*Traffic Volumes:* Up to 20,000 AADT

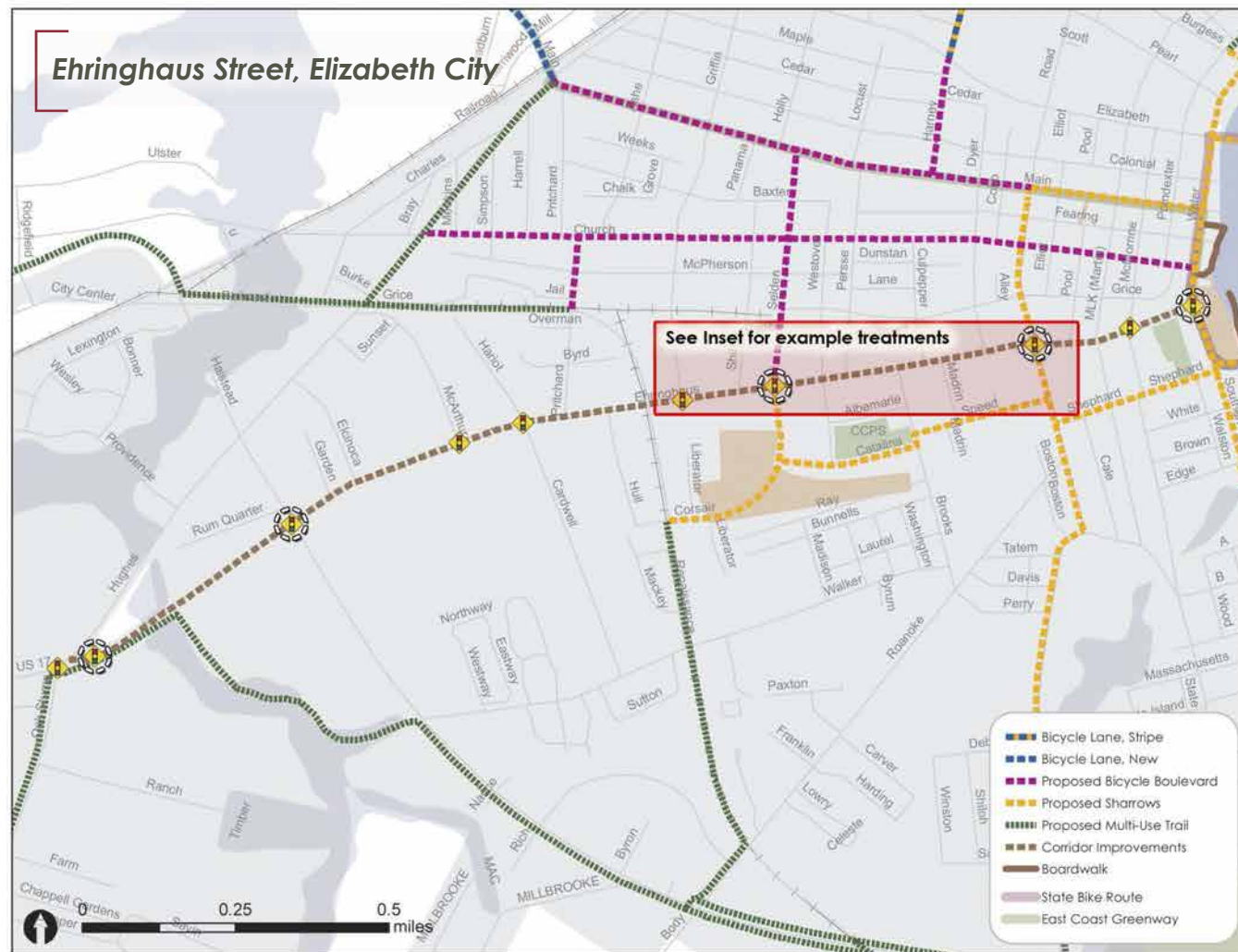
*Overview and Purpose:* Many cyclist crashes have occurred along this corridor, demonstrating the need for bicycle safety improvements. The complexity of the land use and transportation dynamics along the two-mile corridor are beyond the scope of a regional bicycle plan. As a result, a transportation and land use corridor study is needed to consider how redevelopment and strategic enhancements can improve multimodal operations. Throughout the full length of the corridor, appropriate improvements may include restriping for wide outside lanes, consolidating driveways, installing a plantable median, intersection enhancements, and signage. The exhibit at right describes best practices for access management including an inset that shows a simplified representation of potential treatments. Improvements to Ehringhaus Street do not negate the

need for the adoption of Church Street as a bicycle boulevard. Each of these two roadways will attract different cyclist types.

*Planning Level Cost Estimate:* TBD (based on outcome of corridor-based land use and transportation study)



## Ehringhaus Street, Elizabeth City



### Best Practices Toolbox

#### Travelway Improvements

- Conduct a land use/transportation corridor study
- Restripe for wide outside lanes
  - Complete by narrowing two-way left turn lane during resurfacing
- Construct planted median in accordance with corridor study
- Develop and adhere to acceptable spacing standards
- Identify specific locations for left-over crossings and cross access
- Explore opportunities for depressed medians with rain gardens
- Coordinate traffic signals
- Install Share the Road signs



#### Intersection Enhancements

- Implement bicycle activation at key crossings (e.g. Selden St, Road St, Water St)
- Construct high visibility crosswalks
- Install pedestrian countdown signals
- Ensure advance warning of bicycle crossing (e.g. bicycle boulevard sign at Selden St)



#### Site Access Treatments

- Consolidate driveways through redevelopment
- Relocate driveways away from intersection (minimum 100')
- Implement cross access and backdoor access (especially in locations with a non-traversable median)
- Ensure proper "throat" length for driveways

#### Land Use Considerations

- Create land use policies and regulations that distribute local traffic
- Address common issues such as separation of uses and single access points
- Develop an overlay district to help implement recommendations from the corridor study





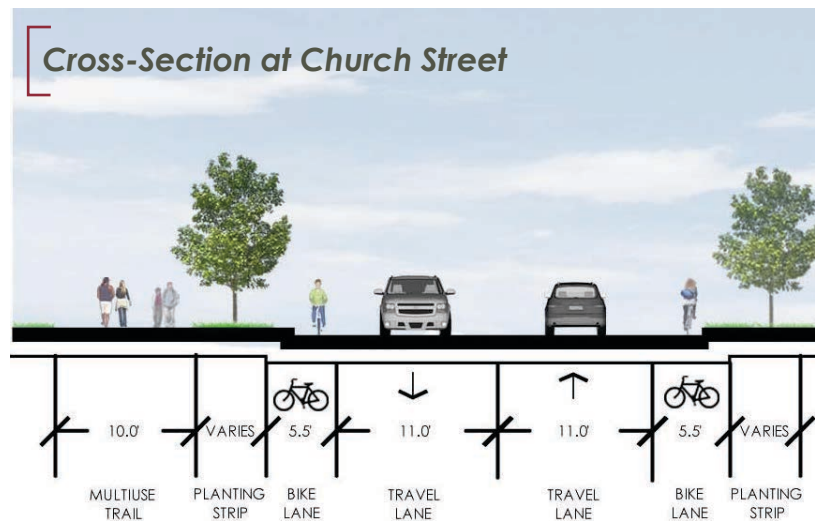
### F: GREENWAY - HERTFORD

The Perquimans County Recreation Center on the banks of the Perquimans River is a significant community resource. To encourage an active lifestyle and to provide safe travel separated from traffic between the recreation center and downtown, a series of multi-use trails are recommended. These trails include greenways on independent alignments and sidepaths along Church Street.

**Extents and Facility Type:** King Street to Shopping Center south of US 17: Greenway

**Length:** 2.4 miles

**Traffic Volumes:** Not Applicable



**Overview and Purpose:** The recommended network of multi-use trails will connect the heart of Hertford, including Perquimans County High School, with the community facilities at the Perquimans County Recreation Center. The network maximizes exposure to the Perquimans River east of US 17. West of US 17, the trail forms a sidepath along Church Street over the bridge just south of downtown before turning west and following the creekbed.

Right-of-way acquisition will be required along the creekbed between Church Street and King Street. Right-of-way along Church Street typically is 60 feet, though it expands to approximately 150 feet from White Street south across the bridge. Design challenges include limited right-of-way and driveway conflicts approaching US 17. The segment parallel to US 17 between Harvey Point Road and the shopping center will require special attention due to shoulder slope and setback requirements from the travel lanes. As an alternative, placement of the multi-use trail outside the existing right-of-way adjacent to the commercial property may be preferable.

The exhibit at left provides a cross-section view on Church Street of the sidepath along the corridor with bicycle lanes.

**Planning Level Cost Estimate:** \$1,131,250 (excludes loop trail to water or connection to recreation center; significant water crossing not included in cost estimate; additional contingency added to account for construction hardships).



**Overview and Purpose:** Over the past decade, the Town of Hertford has seen renewed interest in development southeast of US 17. Connecting this growth (including commercial and industrial properties such as the Food Lion, residences, and a county park) to the historic downtown is a priority. The recommended on-street improvements offer cost-effective solutions that could be coupled with multi-use trails to provide adequate facilities for all users. The exhibit focuses on improvements at the intersection of Church Street/Harvey Point Road and US 17 to show how the various facilities will interact. Constraints include limited right-of-way, the proximity of utilities, drainage/flooding concerns, and bridge crossings. In addition to the recommended facilities, additional signage is needed to indicate the route to the Perquimans County Recreation Center.

### **G: CHURCH STREET - HERTFORD**

Church Street provides the southern gateway entrance to the historic downtown area from US 17. Southeast of US 17, Harvey Point Road connects the core of the town with the Perquimans County Recreation Center and industrial park. To facilitate the safe on-street travel of bicyclists across the Town, a series of sharrows and bicycle lanes are recommended. The preferred treatment varies based on the existing cross section and character of the road.

#### **Extents and Facility Type:**

Church Street - Phelps Street to Winfall Boulevard: Sharrow, Grubb Street to Phelps Street: Bicycle Lane (Restripe), Grubb Street to White Street: Sharrow, White Street to South of Creek Bridge: Bicycle Lane (Restripe), South of Creek Bridge to US 17: Bicycle Lane (Restripe); Harvey Point Road - US 17 to

Commerce Drive: Bicycle Lane (Restripe)

**Length:** 2.4 miles

**Traffic Volumes:** Up to 4,800 AADT

**Planning Level Cost Estimate:** \$317,513





### *H: GREENWAY - DISMAL SWAMP*

**Extents and Facility Type:** Dismal Swamp Canal Welcome Center to Virginia state line: Greenway

**Length:** 3.5 miles

**Traffic Volumes:** Up to 11,000 AADT (US 17)

**Purpose and Need:** The Dismal Swamp Canal Trail Extension is a regionally significant greenway that will connect the existing Dismal Swamp Canal Trail to the Virginia state line, running parallel between US 17 and the Dismal Swamp Canal. A feasibility study with 30% design plans was completed in 2011 for this segment. A separate project would extend the trail in Virginia 1.6 miles north from the state line to link with an 8.3-mile segment of existing trail that connects to Dominion Boulevard in Chesapeake.

**Background and History:** Construction on the existing 3-mile trail began in 2001. From the trail's southern terminus at NC 343, a 5-foot paved shoulder along NC 343 and Mullen Road provides access to South Mills. A feasibility study of the trail extension was completed in 2011. The study included a full survey from the Virginia line to the Welcome Center. Based on the survey, a route was mapped and 30% design documents developed.

**Design Status:** The route was designed to minimize tree removal while maintaining a safe buffer between the trail and travel lanes on US 17. At the Welcome Center, the trail meanders between the canal and the existing sidewalk to join the existing trailhead at its northern terminus. The proposed trail lies within NCDOT right-of-way and easement from the Welcome Center.

At the Welcome Center, the route travels between the parking area and the Dismal Swamp Canal until it joins the existing trail.

### *Environmental Concerns*

Minimizing environmental impacts to the historic Dismal Swamp Canal and the surrounding area was a key consideration for the trail design developed as part of the feasibility study. The study notes that an Environmental Assessment (EA) will be required due to the trail's proximity to the historic canal, the presence of endangered species in the area, and the placement of the trail on park property. In addition to minimizing the removal of vegetation, the trail design also warrants minimal grading and does not require retaining walls.

### *Next Steps*

The extension of the Dismal Swamp Canal Trail will add a critical link of what could become a 16.5-mile segment of greenway along the banks of the historic Dismal Swamp Canal. With assistance from the State of Virginia, the completed greenway will connect the Chesapeake area of Virginia to the Great Dismal Swamp Welcome Center and the Village of South Mills in North Carolina. With the right-of-way obtained and 30% design plan in hand, local stakeholders should continue to seek funding for environmental documentation, full design, and construction.

**Planning Level Cost Estimate:** \$1.6 million (from the Dismal Canal Trail Extension final report)



### A: US 264 - ENGELHARD

US 264 carries up to 2,300 vehicles through the small fishing community of Engelhard on an average day. Despite being a rural outpost, Engelhard offers numerous community activity centers, including retail stores, a hotel, banks, and restaurants. The community also hosts a popular seafood festival each spring. The recommended treatment takes advantage of the wide 32' cross section and creates bicycle lanes through a striping exercise. A small bridge over Far Creek on the eastern edge of the recommended corridor is a constraint.

**Extents and Facility Type:** Golden Street to Golden Street: Bicycle Lane (Stripe)

**Length:** 0.2 miles

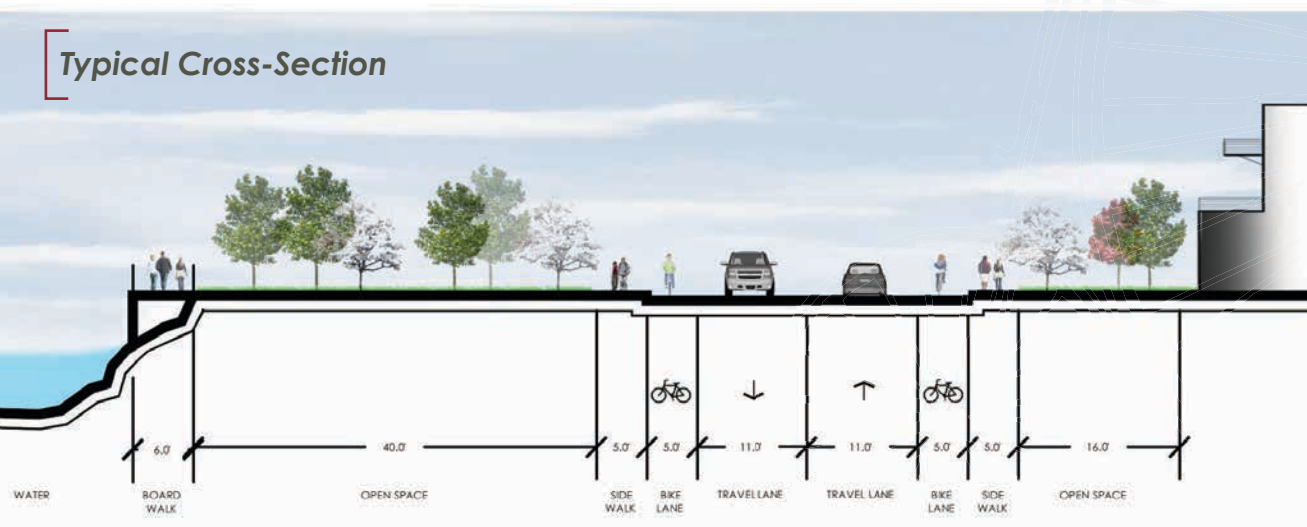
**Traffic Volumes:** 900 - 1,100 AADT

**Overview and Purpose:** While pedestrians are accommodated with sidewalks and a boardwalk in Engelhard, bicyclists do not have a dedicated facility. The width of US 264 through the unincorporated community is sufficient to allow dedicated bicycle lanes through a low-cost striping exercise. The resulting facility will narrow the travel lanes to discourage speeding, further improving safety for bicyclists. The exhibit includes a cross section and photosimulation at the western edge of the proposed bicycle lane near the East Carolina Bank offices. The cross section also shows the existing boardwalk.

**Planning Level Cost Estimate:** \$6,600



Before



After



### *B: SIDEPATH - COLUMBIA*

Columbia, the Hyde County seat on the banks of the Scuppernon River, sits halfway between Plymouth and Manteo. As the county seat, it accommodates numerous civic uses, including Columbia Middle School and county services. Columbia has a high rate of bicycle use due to its small, relatively compact town design and lower income profile. The recommended sidepath will provide a safer option for bicyclists traveling along US 64 between downtown and the town's largest shopping center.

**Extents and Facility Type:** Water Street to LaKeiser Drive: Sidepath

**Length:** 0.8 miles

**Traffic Volumes:** Up to 8,600 AADT

**Overview and Purpose:** A sidewalk currently exists where the sidepath is recommended. The sidewalk should be widened to form a multi-use sidepath. The eastern terminus of the proposed

sidepath is the Food Lion shopping center near LaKeiser Drive. From there, users can enjoy a dedicated facility on the westbound side of US 64 to the banks of the Scuppernon River. Construction of the sidepath will require consideration for right-of-way constraints, utilities close to roadway, and major intersection crossings. The exhibit highlights the segment between Road Street and Main Street, showing the interaction of the proposed sidepath

with a variety of on-street facilities (sharrows on Fonsoe and Road Streets and bicycle lanes on Main Street).

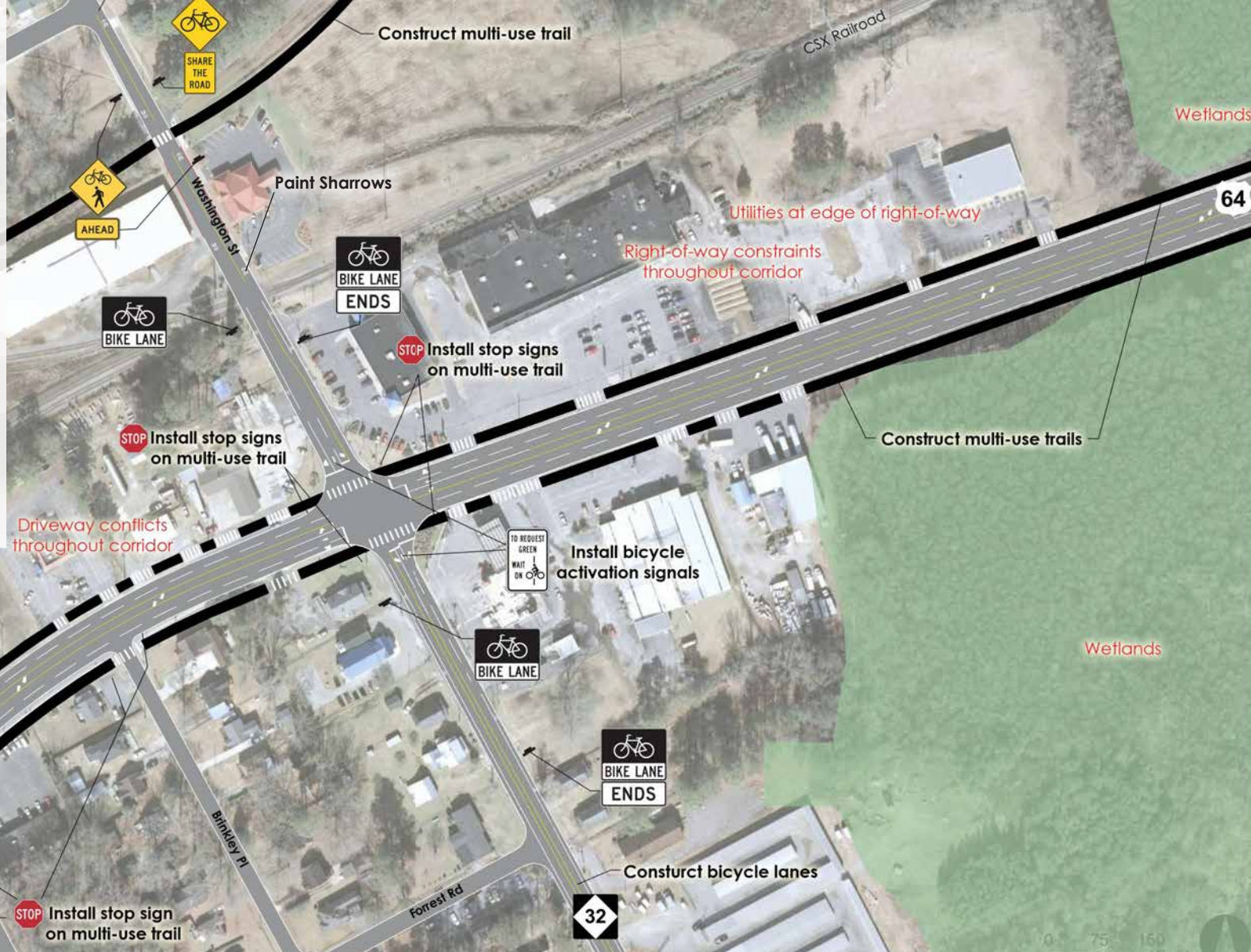
**Planning Level Cost Estimate:** \$845,000 (excludes improvements to side streets, including Main Street)



### C: SIDEPATH - PLYMOUTH

With traffic volumes on US 64 exceeding 21,000 vehicles per day and a community that takes to the street on bicycle for everyday trips, creating safe bicycling options in Plymouth is a critical concern. US 64 provides local access to Washington County Hospital, several shopping centers, and numerous restaurants. The recommended sidepaths on US 64 between West Avenue and Main Street form the spine of an expanded on- and off-street bicycle network in Plymouth.

*Extents and Facility Type:* West Avenue to Main Street: Sidepath



*Length:* 1.9 miles

*Traffic Volumes:* Up to 21,000 AADT

*Overview and Purpose:* The key connection along the corridor is the Food Lion near Washington County hospital. Given the high traffic volumes on US 64, concerns for speeding traffic, and limited signalized crossing opportunities, dual sidepaths

are recommended. Sidepaths along both sides of the road will allow bicyclists and pedestrians to travel the full extent of the corridor and minimize the need for crossing at unsignalized locations. Design constraints include driveway conflicts, right-of-way constraints, and a lack of offset utilities. The exhibit shows a detailed view of the intersection of US 64 and NC 32. It highlights the numerous driveway

conflicts and shows supplemental facilities on NC 32 (sharrows to the north and bicycle lanes to the south of the railroad).

*Planning Level Cost Estimate:* \$2,786,000 (excludes multi-use trail (rail-to-trail conversion) north of US 64; excludes improvements to side streets; significant hardships expected).





### *D: WATER STREET/PARK DRIVE - PLYMOUTH*

Bicycling activity in Plymouth was observed to be among the highest in the 10-county region. The downtown area boasts numerous activity centers and destinations of interest to bicyclists, including retail and civic uses typical of a small downtown as well as a bicycle shop, two schools, a hospital and the waterfront bicycle shop. When combined with the local demand for bicycling, these activity centers establish the area as a priority. The recommended network of on-street facilities in the downtown area includes bicycle lanes and sharrows depending on the existing cross section of the street.

*Extents and Facility Type:* Park Drive/Martin Lane - Madison Street to Main Street: Bicycle Lane (Restripe); Water Street - Main Street to Madison Street: Sharrow

*Length:* 0.9 miles

*Traffic Volumes:* No Data

*Overview and Purpose:* Using a combination of bicycle lanes and sharrows, the recommended treatments in Plymouth will create a continuous bicycle corridor through downtown. These improvements can be realized through a cost-effective striping exercise. The exhibits show a pair of photosimulations that illustrate existing and proposed conditions. At Park Drive near the Port O' Plymouth Museum bicycle lanes and a centerline are added to the wide 32' cross-section. On Water Street in the heart of downtown, sharrows are recommended to direct bicyclists to the proper placement in the lane, a particularly important improvement due to the presence of parallel parking. It should be noted that drainage issues on Water Street may preclude striping bicycle lanes in that section, and coordination is needed with NCDOT.

*Planning Level Cost Estimate:* \$18,975

**Water St. Before**



**Water St. After**



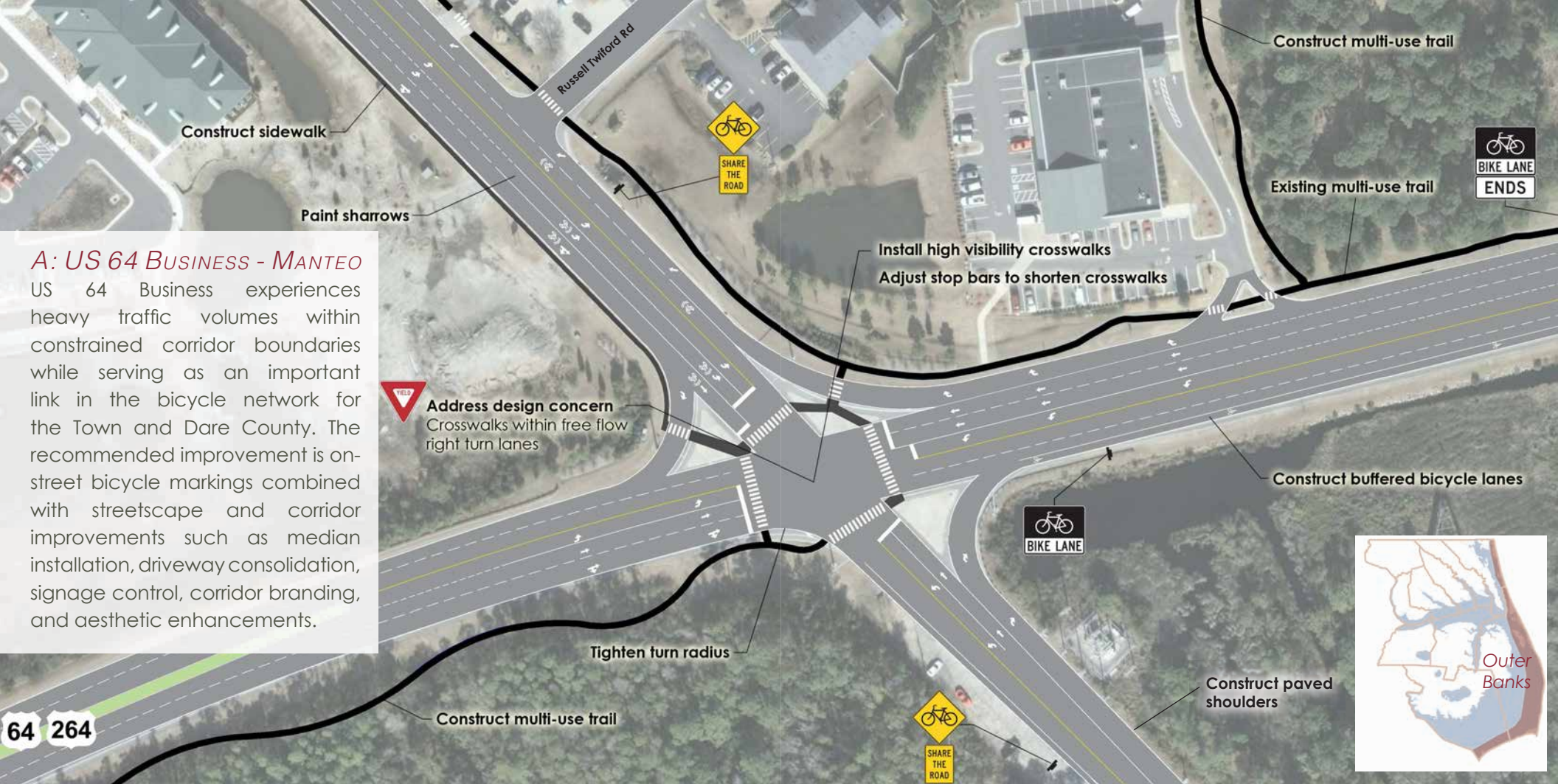
**Park Dr. Before**



**Park Dr. After**







### A: US 64 BUSINESS - MANTEO

US 64 Business experiences heavy traffic volumes within constrained corridor boundaries while serving as an important link in the bicycle network for the Town and Dare County. The recommended improvement is on-street bicycle markings combined with streetscape and corridor improvements such as median installation, driveway consolidation, signage control, corridor branding, and aesthetic enhancements.

### Extents and Facility Type

Harriot Street to Patty Lane: Sharrows; Patty Lane to US 64/US 264: Sharrows (or Bicycle Lane Restripe)

**Length:** 1.4 miles

**Traffic Volumes:** Up to 17,000 AADT

**Overview and Purpose:** US 64 Business provides the spine for the commercial, cultural, and recreational heart of Manteo. Key connections include three schools (Manteo High School, Dare County Alternative High School, and Manteo

Elementary School), College of the Albemarle Dare campus, Dare County Library, Roanoke Island Festival Park, civic buildings, and a local bicycle shop. The striping exercise represents a low cost opportunity to raise awareness to the presence of bicyclists along this route. Streetscape improvements will provide predictability to vehicular traffic, minimize conflicts between cyclists and motor vehicles, and enhance the visual appeal of the corridor. Improvements must occur within the existing boundaries of the

corridor, as corridor regulations prohibit changes to the sidewalks and street trees. The exhibit focuses on improvements to the intersection of US 64/US 264 and US 64 Business.

**Planning Level Cost Estimate:** \$42,550 (excludes multi-use trail along US 64/264).



### *B: US 158 - KITTY HAWK/KILL DEVIL HILLS/NAGS HEAD*

US 158 bears the weight of local access and regional mobility. Locally, the corridor serves as the commercial and residential lifeline for Kitty Hawk, Kill Devil Hills, and Nags Head. It also provides critical mobility for regional trips and during evacuations. US 158 is designated as a boulevard in need of upgrade as part of the state's Strategic Highway Network. Several issues make the corridor dangerous for bicycle travel: high traffic volumes, unpredictable automobile movements, an inconsistent bicycle network, and limited safe crossing opportunities.

*Extents and Facility Type:* Byrd Street (Kitty Hawk) to Washington-Baum Bridge (Nags Head): Corridor Improvements

*Length:* 18.3 miles

*Traffic Volumes:* Up to 27,000 AADT

*Overview and Purpose:* US 158 provides access to numerous activity centers (e.g. the Wright Brothers National Memorial and Jockey's Ridge State Park) as well as the majority of the beach's commercial properties and residences. Many cyclist crashes have occurred along the corridor, indicating a need to address bicycle safety. A comprehensive corridor study is needed to understand fully the existing conditions, future concerns for multimodal travel, and potential countermeasures. The likely outcome of the

corridor study would be an engineering approach toward filling gaps in the existing sidepath, adding non-traversable medians, consolidating driveways, and improving intersections. The exhibit describes best practices for access management including an inset that highlights issues and best practices in action for a roadway segment representative of the corridor at large. The recommended corridor study could be funded through a joint effort between the municipalities and the RPO.

*Planning Level Cost Estimate:* TBD based on outcome of corridor-based land use and transportation study.



## US 158, Outer Banks

See Inset for example treatments

-  Bicycle Lane, Restripe
-  Bicycle Lane, New
-  Buffered Bike Lane, New
-  Proposed Paved Shoulders
-  Proposed Bicycle Boulevard
-  Proposed Sharrows
-  Proposed Signed Route
-  Proposed Multi-Use Trail
-  Corridor Improvements
-  Paved Multi-Use Trail
-  Boardwalk
-  Unpaved Multi-Use Trail
-  Bicycle Lane
-  Paved Shoulder
-  Signed Route



Traffic Signal



Intersection



Driveway

### Inset Legend



Access (Good example)



Access (Improvement Opportunity)



B = Backdoor Access



S = Side Street Access



C = Cross Access (between parcels)

## Best Practices Toolbox

### Travelway Improvements

- Conduct a land use/transportation corridor study
- Identify locations to divert bicycle traffic to parallel routes
- Identify gaps in the sidepath and ways to complete the network
- Construct planted median in accordance with corridor study
  - Develop and adhere to acceptable spacing standards
  - Identify specific locations for left-over crossings and cross access
  - Explore opportunities for depressed medians with rain gardens
- Coordinate traffic signals
- Install Share the Road signs



### Intersection Enhancements

- Develop engineered solutions for intersection treatments
- Implement bicycle activation at key crossings (e.g. Dogwood Rd, Fifth St, Ocean Bay Blvd, Barnes St)
- Construct high visibility crosswalks
- Install pedestrian countdown signals
- Ensure advance warning of bicycle crossings



### Site Access Treatments

- Consolidate driveways through redevelopment
- Relocate driveways away from intersection (minimum 100')
- Implement cross access and backdoor access where appropriate (especially in locations with a non-traversable median)
- Ensure proper "throat" length for driveways

### Land Use Considerations

- Create land use policies and regulations that distribute local traffic (coordinate among municipalities)
- Address common issues such as separation of uses and single access points
- Develop an overlay district to help implement recommendations from the corridor study

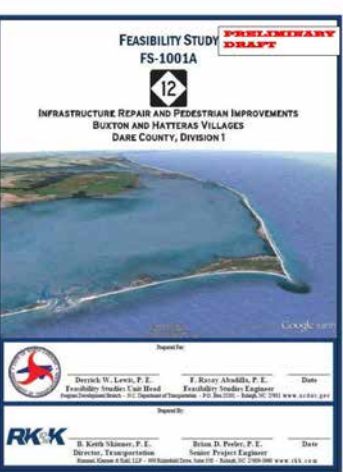
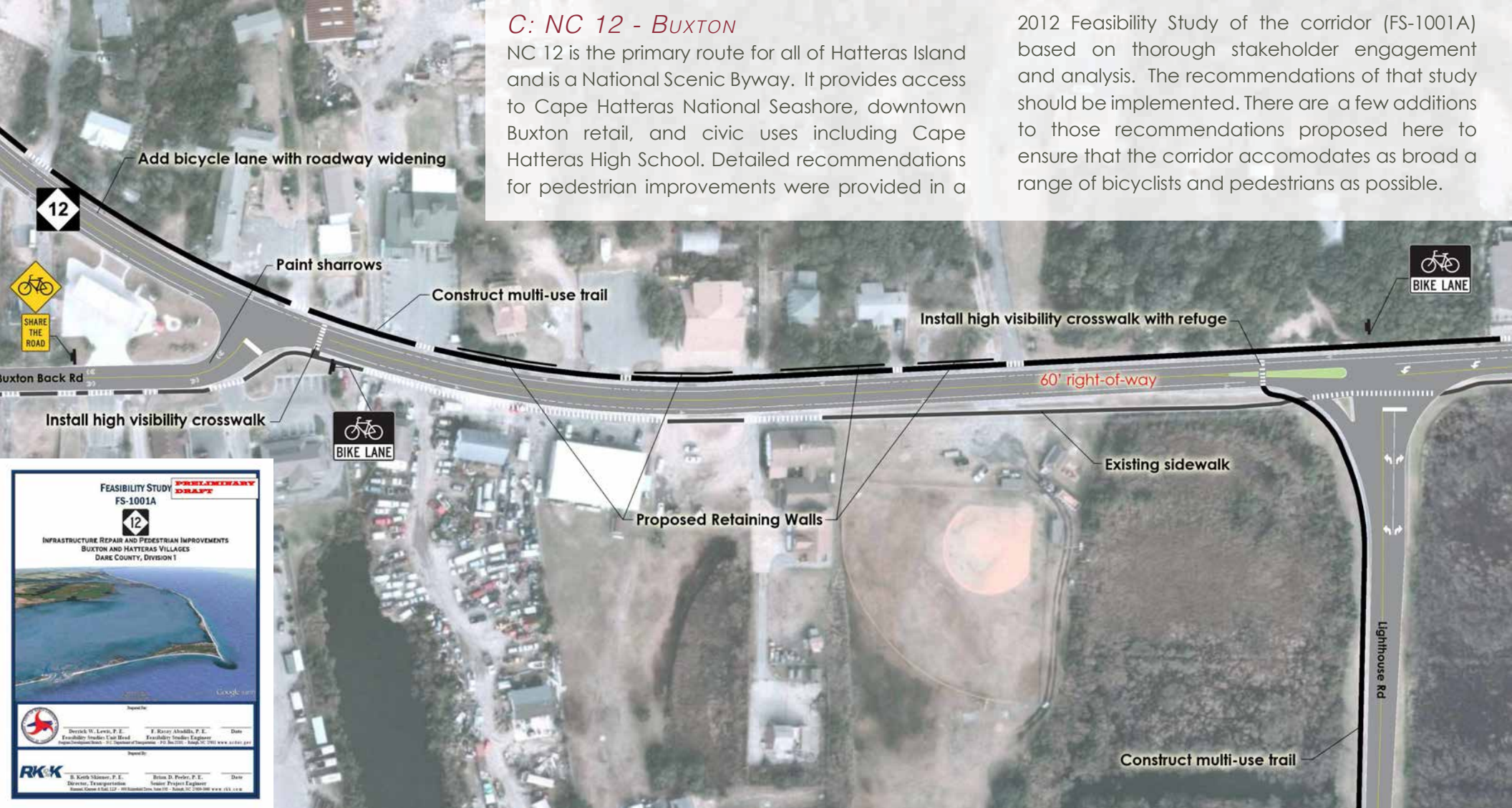




### C: NC 12 - BUXTON

NC 12 is the primary route for all of Hatteras Island and is a National Scenic Byway. It provides access to Cape Hatteras National Seashore, downtown Buxton retail, and civic uses including Cape Hatteras High School. Detailed recommendations for pedestrian improvements were provided in a

2012 Feasibility Study of the corridor (FS-1001A) based on thorough stakeholder engagement and analysis. The recommendations of that study should be implemented. There are a few additions to those recommendations proposed here to ensure that the corridor accommodates as broad a range of bicyclists and pedestrians as possible.



**Extents and Facility Type:** Buxton Back Road to Buxton Village border: Sidepath and Bicycle Lane (Restripe).

**Length:** 0.7 miles

**Traffic Volumes:** Up to 9,500 AADT

**Recommendations:** Feasibility Study 1001A recommends widening the travel lanes to 15' each, with 12' lanes, 3' paved shoulder for

cyclists, and 5' sidewalks indicated for both cyclists and pedestrians (therefore functioning as sidepaths). This plan recommends that 10' lanes be considered during design and implementation of this project to accommodate full 5' bike lanes that will attract more users. These bike lanes are especially important given the constrained right-of-way that prevents wider sidepaths. If right-of-way does allow it in any locations, the

sidepaths should be widened beyond 5' to better accommodate multiple user types.

**Planning Level Cost Estimate:** \$4,250,000 (from Feasibility Study 1001A).



### D: NC 12 - Duck

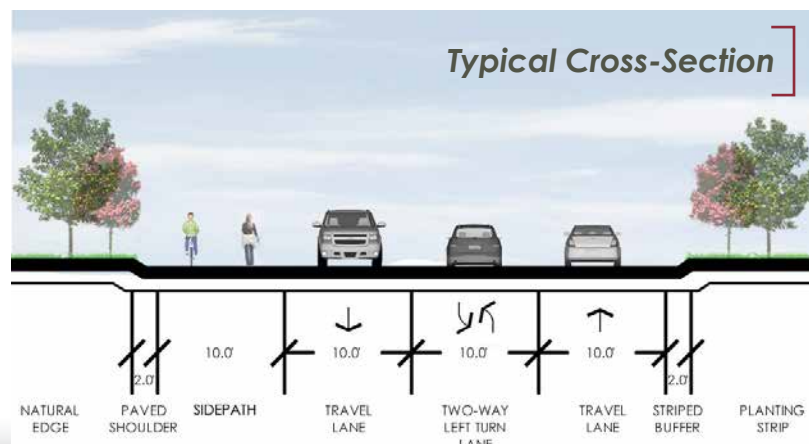
Over the past decade, the communities on NC 12 north of US 158 have made significant improvements to the bicycle and pedestrian network, including sidepaths and bicycle lanes. In Duck, the sidepath dissolves into a pair of buffered paved shoulders shared by pedestrians and cyclists. During the peak tourist season, these shared lanes are highly congested. The recommended treatment links the sidepaths at either end of town by consolidating the paved shoulders into an on-street, buffered multi-use sidepath on the northbound side of the road.

**Extents and Facility Type:** North of Barrier Island Station to existing trail south of Scarborough Lane: Sidepath

**Length:** 1.1 miles

**Traffic Volumes:** Up to 10,000 AADT

**Overview and Purpose:** The sidepaths on either side of town transition to bicycle lanes and create crossing concerns. The existing design also fails to provide a comfortable environment for all users.



The recommended improvement shifts the current buffered bike lanes/shared paths to the northbound side of the road, creating a multi-use trail along the roadbed that matches the existing sidepaths at the town edges. The treatment is largely a restriping exercise within the existing pavement, though additional shoulder may be required in some locations. Bollards are recommended to alert motorists of the potential presence of bicyclists and pedestrians. Other barriers were considered but ultimately not selected because of their cost and impact on stormwater flow.

Design considerations should include intersection and driveway breaks, limited right-of-way, and the constrained cross-section at the northern end. Bicycle- and pedestrian-friendly crossings at intersections and destination points also should be emphasized. The exhibit shows a photosimulation and cross section of the proposed treatment.

**Planning Level Cost Estimate:** \$316,250





### *E: MEMORIAL AVENUE - NAGS HEAD*

Memorial Avenue is a parallel route to US 158 and NC 12 in Nags Head. The 2.1-mile corridor mostly traverses a residential area with individual driveway access throughout its extents. An emerging gallery district exists near Gallery Row and Driftwood Street. Because US 158 is not well suited for bicycle travel, bicyclists should be encouraged to use Memorial Avenue. The recommended bicycle boulevard would make the route more attractive and visible for bicyclists while attempting to minimize cut-through vehicular traffic. Memorial Avenue is discontinued for one block, so the bicycle boulevard diverts to a signed route at Bladen Street.

*Extents and Facility Type:* Eighth Street to Hollowell Street: Bicycle Boulevard

*Length:* 2.1 miles

*Traffic Volumes:* No Data

*Overview and Purpose:* The Memorial Avenue Bicycle Boulevard is designed to make the route an attractive alternative to bicyclists. The intent is to encourage bicycle travel along Memorial Avenue while discouraging through trips of excessive speeds by automobiles. The conversion requires new signage, pavement markings, and improved intersections. The exhibit shows potential plans for signage and pavement markings while also identifying locations where stop signs along Memorial Avenue should be

oriented to the side streets and where intersection should be retrofitted with traffic calming features. The signage plan also indicates destination points to increase accessibility. Future plans for the Gallery District should include the bicycle boulevard concept.

*Planning Level Cost Estimate:* \$199,788 (assumes improvements to Memorial Avenue and Barnes Street as shown in exhibit)



## Memorial Avenue, Nags Head

### Gallery District

### Gallery District

### Bicycle Boulevard

### Bicycle Boulevard

### Traffic Calming Circle Examples



- Grocery Store
- Local Destination

- School

- Proposed Bicycle Boulevard
- Proposed Signed Route
- Proposed Multi-Use Trail
- Corridor Improvements
- Paved Multi-Use Trail
- Paved Shoulder
- Signed Route
- State Bike Route

- Wetland
- State Conservation Land
- Other Conservation Land
- Municipal Boundary

- Traffic calming circle
- Relocate stop signs from Memorial Avenue to cross street

- Bike Boulevard pavement marking

- Bike route sign with directional arrows where appropriate

### Street Sign Concepts



**F: LIGHTHOUSE DRIVE - COROLLA**

Lighthouse Drive nearly stretches the full length of Corolla and provides a parallel option to NC 12. The facility is a low volume residential street extending 3.6 miles from north to south. The corridor is suitable for a signed bicycle route, which typically is designated along residential streets with lower traffic volumes and where additional roadway width is not possible or warranted.

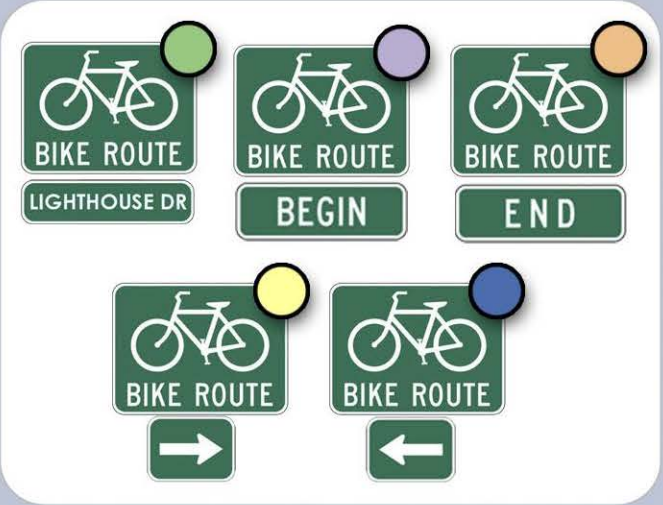
**Extents and Facility Type:** Shad Street, Lighthouse Drive, and Albacore Street: Signed Route

**Length:** 3.6 miles

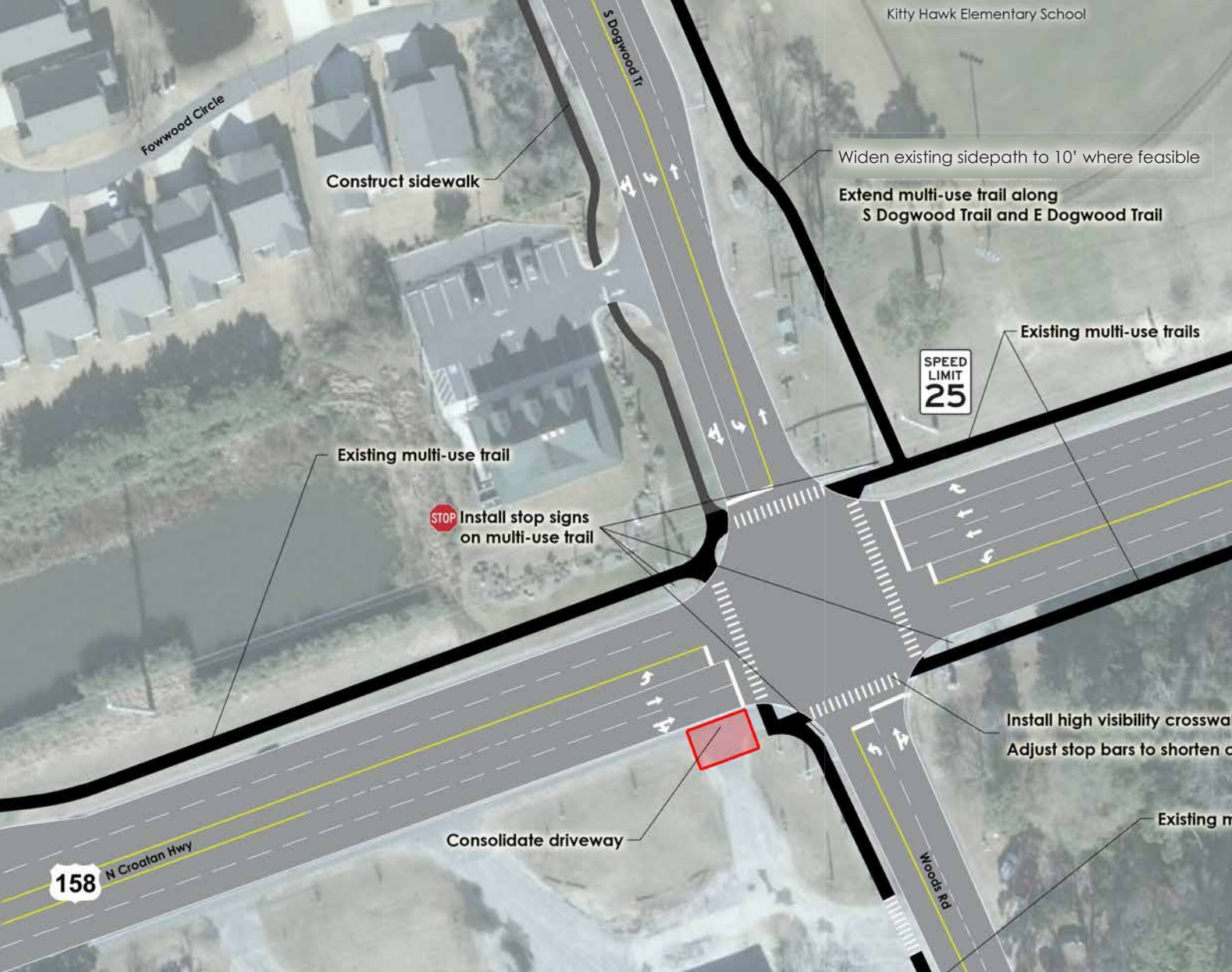
**Traffic Volumes:** No Data

**Overview and Purpose:** Lighthouse Road is a low volume corridor near the beach that is conducive to additional bicycle traffic. However, signage is needed to direct cyclists to this corridor from NC 12. Concerns along the route include residential uses with numerous driveways, poor drainage, trashcans in the roadway, and limited right-of-way. However, as a low volume, low speed corridor, bicyclists should be able to blend with traffic. The exhibit shows standard bike route signs with directional arrows where necessary. This signage can be designed in accordance with Corolla's 2013 wayfinding project.

**Planning Level Cost Estimate:** \$9,504







## G: DOGWOOD TRAIL - SOUTHERN SHORES

South Dogwood Trail and East Dogwood Trail create a 3.3-mile parallel route to NC 12 through Southern Shores and bordering the Duck Woods Country Club. The corridor is an attractive alternative for north and southbound bicyclists given its lower traffic volumes in comparison to NC 12. The recommended construction of a sidepath is intended to facilitate safer bicycle travel north of US 158.

*Extents and Facility Type:* US 158/Croatan Highway to Ocean Boulevard: Sidepath

*Length:* 3.3 miles

*Traffic Volumes:* No Data

*Overview and Purpose:* An existing sidepath extends nearly one mile north from the intersection of South Dogwood Trail and US 158/Croatan Highway to just beyond Ginguite Trail. The completion of a sidepath along Dogwood Trail would require widening (if feasible - the current

path is functionally a sidewalk) and extending the existing path an additional 2.3 miles. Existing right-of-way should be sufficient, though construction likely would require the removal of trees and shrubbery. Design constraints include two narrow bridges (one on South Dogwood Trail 180 feet north of Fairway Drive and one on East Dogwood

Trail 350 feet east of its terminus with South Dogwood Trail) and driveway conflicts. For the Regional Bicycle Plan, special consideration was given to the intersection of Dogwood Trail and US 158. The exhibit illustrates these improvements.

*Planning Level Cost Estimate:* \$2,366,000



### *H: COLINGTON ROAD - DARE COUNTY*

Colington Road is often cited as a critical—and overlooked—corridor on the Outer Banks. More than 8,000 residents in the Colington area depend on the road to reach US 158. NCDOT was exploring options to widen the corridor as of spring 2013, which includes a few alternatives for bicycle facilities. This plan's recommended treatment is a multi-use sidepath on the westbound side of the corridor.

*Extents and Facility Type:* Kill Devil Hills to End of Colington Drive: Sidepath

*Length:* 3.9 miles

*Traffic Volumes:* No Data

*Overview and Purpose:* Many bicyclists feel more comfortable being separated from traffic. A delineated sidepath on Colington Road as shown in the photosimulation would establish a dedicated

facility on the westbound side of the road for both bicyclists and pedestrians. The residents of Colington Road have expressed their desire for a fully separated facility, and this recommendation aims to create as much separation as possible given the corridor's constraints. Issues and constraints include significantly constrained right-of-way, sharp curves, wetlands, driveway openings, bridge crossings, and poor drainage. These constraints are detailed in the exhibit and would require community involvement during planning and design.

If the constraints associated with this recommendation are not overcome in time for near-term roadway work, paved shoulders should be provided at a minimum as a temporary measure.

*Planning Level Cost Estimate:* \$5,265,000 (Additional contingency added to account for construction hardships)



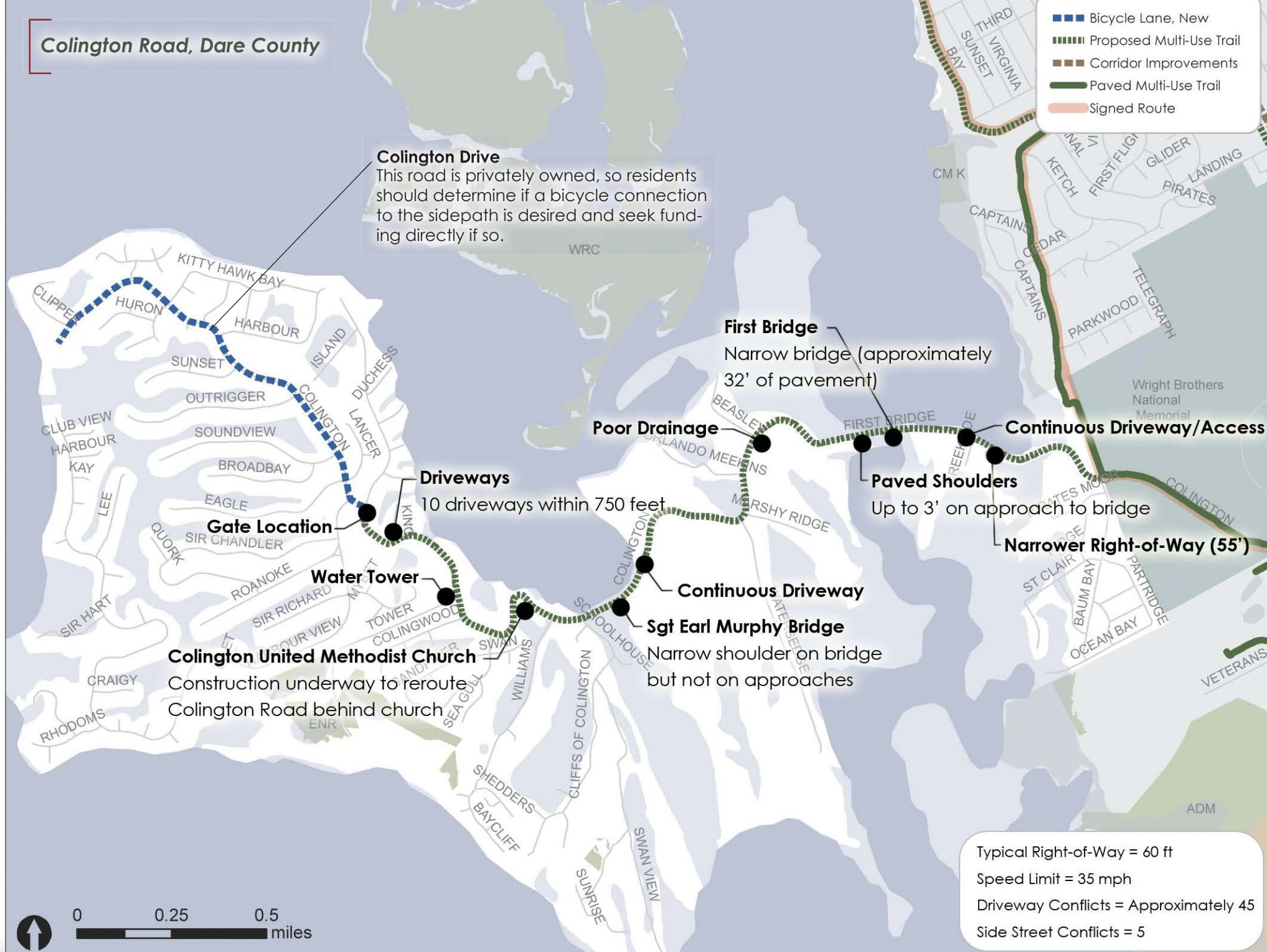


## Colington Road, Dare County

### Colington Drive

This road is privately owned, so residents should determine if a bicycle connection to the sidepath is desired and seek funding directly if so.

- Bicycle Lane, New
- Proposed Multi-Use Trail
- Corridor Improvements
- Paved Multi-Use Trail
- Signed Route





Sidepath construction along US 158 in Nags Head, NC





# Chapter 6

## Programs and Policies

### OVERVIEW

Infrastructure alone will not expand bicycling in the Albemarle Region. Programs and policies are additional critical elements that encourage and support bicycling activity. The development of a more bicycle-friendly culture requires diverse efforts throughout a given region, and the Albemarle Region has many local, regional, and national resources from which to draw. This section identifies opportunities and resources for bicycle programs and policies.

### PROGRAMS INTRODUCTION

Targeted education, encouragement, enforcement, and evaluation strategies improve residents' health, safety, and their ability to incorporate bicycling into everyday life. Consequently, they support the development and use of physical infrastructure. Visitors to the Albemarle region will also benefit from the implementation of such programs, which will target all potential cyclists and motorists. A program may be presented as a campaign, on-going initiative, or one-time event, depending on its purpose. In essence, these different efforts market bicycling to the general public and ensure the maximum return on investment in bicycling facilities in the form of increased mode

shift to bicycling.

This section provides recommendations in each of the four "E" categories - Education, Enforcement, Encouragement, and Evaluation - that will support the goals of the Albemarle Regional Bicycle Plan. (Engineering, the fifth "E", is addressed through the infrastructure recommendations of Chapter Four.) These initiatives can be undertaken by local agencies, regional organizations, community organizations, or by any combination of partnerships between such agencies and organizations. Program recommendations were developed with the guidance of the project's Steering Committee and were based on the following inputs:

- knowledge about existing programs in the region;
- the Vision, Goals, and Objectives for this plan; and
- stated community needs and concerns (as communicated through public outreach and engagement activities and discussions at Steering Committee meetings).

### Chapter Contents

*Overview*

*Programs*

*Introduction*

*Program*

*Recommendations*

*Policies*

*Camden*

*County, North*

*Carolina Unified*

*Development*

*Ordinance Review*

### **EDUCATION**

Providing educational opportunities is critical for increasing bicycling across the Albemarle region. Education programs should span all age groups, cultures, abilities, and population groups, and they should include motorists as well as current and potential cyclists. The focus of an educational campaign can range from information about the rights and responsibilities of road users to tips for safe behavior; from awareness of the area-wide benefits of bicycling to technical trainings for local agency staff. Educational programs for decision-makers, such as engineering and planning staff, raise the level of local expertise. They develop the skill sets needed to design and construct state of the art bikeways, walkways, and greenways for the short- and long-term future of the bicycling environment at the local and regional levels.

### **ENCOURAGEMENT**

Encouragement programs are critical for promoting and increasing bicycling. These programs should address all ages, abilities, and user groups including school age children, young adults, college students, working adults, and seniors. They should also address both recreational and utilitarian cycling.

According to a 2008 survey by the National Highway Traffic Safety Administration (NHTSA), “Seventy-one percent of Americans said they would like

to bicycle more than they do now.” As bicycle infrastructure improvements are made, communities in the Albemarle region must simultaneously develop targeted strategies for encouraging bicycling and communicate information about safe and inviting places to bicycle. Encouragement programs that promote transportation and recreation choices and healthy, active lifestyles will help to develop a more bicycle-friendly region.

### **ENFORCEMENT & EVALUATION**

According to the Alliance for Biking and Walking, North Carolina ranks 41st out of the 50 states for pedestrian safety and 44th for bicycling safety. Enforcement and evaluation initiatives are critical to ensure that both motorists and bicyclists are obeying the laws and that facilities are consistently monitored and maintained. Both initiatives serve as a means to educate and protect all users. The goal of enforcement is for bicyclists and motorists to recognize and respect each other's rights on the roadway. In many cases, officers and citizens do not fully understand state and local laws for motorists and bicyclists, making targeted education an important component of every enforcement effort. Enforcement programs improve bicyclists' safety and perceptions of safety.



## PROGRAM RECOMMENDATIONS

Each program recommendation presented in this section includes the following information:

- the “E” categories (Education, Enforcement, Encouragement, and Evaluation) that the program supports,
- the purpose of the program,
- a description of the basic approach, and
- key partners for implementation.

### SAFE ROUTES TO SCHOOL

**“E” Categories:** Education, Encouragement

**Purpose:** Promote physical fitness and health by helping children walk and bicycle to school; improve school traffic safety through physical improvements and programs.

**Audience:** School-aged children and their parents; school administrators, faculty, and staff

**Partners:** School districts, parent-teacher associations, municipalities, health partners (Gates Partners for Health, Three Rivers Healthy Carolinians, Albemarle Regional Health Services), community members, local Eat Smart Move More Coalitions, Albemarle Rural Planning Organization (RPO)

Safe Routes to School programs use a “5 Es” approach (Engineering, Education, Encouragement,

Enforcement, and Evaluation) to improve safety and encourage children to walk and bicycle to school. The programs are usually run by a partnership of city government, teachers, school officials, parents, students, and neighbors.

**In a rural environment, a majority of school trips are too long for students to make the entire trip by bicycling. In these areas, the focus should be on creative efforts to help schoolchildren increase their physical activity in other ways.** This focus lends itself ideally to working with public health partners, who also see increasing youth physical activity as a major goal.

For example, in a Park and Bike campaign, children are dropped off at a pre-determined location near the school, such as a park, and then bicycle the remaining distance with parent volunteers or school staff. Park and Bike campaigns can reduce congestion and improve traffic safety near schools while increasing youth physical activity. Teachers also report that children who bike to school arrive awake and “ready to learn.” Likewise, a Safe Routes to Bus Stops program can help children safely access bus transportation by bicycling.

International Walk to School Day in October is an excellent annual event that offers all families and



Safe Routes To School  
International Walk to School Day



Photos from Safe Routes To School Program - Marin County, CA



children the opportunity to participate in healthy school transportation. Greenville, NC's Walk to School Day has one of the highest participation rates in the state and could be looked at as a model Walk to School Day event that promotes year-round physical activity. Walk to School Day does not have to be limited to encouraging children to walk; children who wish to bicycle to school can be encouraged to bike, and resources like bicycle-train chaperones can be made available. The campaign is led by an ongoing partnership between public health nonprofits, county school districts, PTAs, and other agencies.

**A major next step towards creating safer active travel opportunities for schoolchildren is to create a Safe Routes to School Plan for every elementary school in the Albemarle region.** This will necessarily be a coalition effort that may be eligible for grant funding through the North Carolina Department of Transportation's (NCDOT) Safe Routes to School program. (Note: Because of the uncertain outlook for this federally-funded program, it is recommended that other regional and local funding sources be considered as well. For a full list of potential funding sources, see Appendix E.)

Sample Programs:

- Partners for Active Living Walk to School Day

Program (Spartanburg, SC): <http://www.active-living.org/Walk-to-School-Day.html>

- Atlanta Charter Middle School Safe Routes Travel Plan (Atlanta, GA): <http://www.atlantachartermiddle.com/content/safe-routes-school.php>
- Marin County National Model Program: <http://www.saferoutestoschools.org/index.shtml>
- Walking School Bus and Park and Walk Programs (Windsor, VT): <http://www.saferoutesinfo.org/data-central/success-stories/windsor-vermont-parent-volunteers-lead-walking-school-buses-forward>
- Ira B. Jones School Walking to School Program (Asheville, NC): <http://www.saferoutesinfo.org/data-central/success-stories/asheville-north-carolina-encouraging-walking-and-wheeling-school-wide>

### *OPEN STREETS EVENTS (CICLOVIAS)*

**"E" Category:** Encouragement

**Purpose:** Encourage bicycling in a community by periodically closing a street to automobile traffic and creating a safe and inviting place for cyclists of all abilities to bike.

**Audience:** General public, tourists, local communities

**Partners:** Municipal and County Parks and Recreation Departments, Police Departments, Cycle Speedway,



River City Cycling Club, other cycling clubs, tourism and business groups (Currituck County Visitors Center, Greater Tyrrell County Chamber of Commerce, Outer Banks Visitors Bureau, Tyrrell County Ecotourism Committee), local merchants/business leaders

Open street events have many names: Sunday Parkways, Ciclovias, Summer Streets, and Sunday Streets. The events are periodic street “openings” (i.e., “open” to users besides cars), usually on Sundays, that create a temporary park open to the public for walking, bicycling, dancing, hula-hooping, roller-skating, and other non-motorized activities. They have been very successful internationally and are rapidly becoming popular in the United States. Open street events promote health by creating a safe and attractive space for physical activity and social contact, are cost-effective compared to new parks for the same purpose, and are generally well-attended. Events can be held in all communities in the Albemarle region as weekly events or one-time occasions.

#### Resources:

- The Open Streets Project <http://openstreetsproject.org/>
- Portland Sunday Parkways: <http://www.portlandonline.com/Transportation/index.cfm?c=46103>
  - » <http://www.streetfilms.org/portlands-sunday-parkways/> (video)

## *BICYCLING TOURS AND MAPS*

**“E” Category:** Encouragement

**Purpose:** Encourage biking by highlighting bicycling routes and destinations.

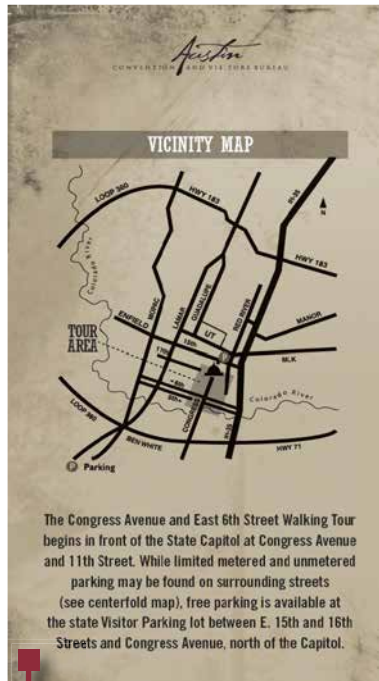
**Audience:** General public, tourists

**Partners:** County and municipal planners and GIS technicians, businesses, local advocates and tourism agencies (Tyrrell County Ecotourism Committee), Chambers of Commerce (Greater Tyrrell County Chamber of Commerce, Outer Banks Visitors Bureau, Currituck County Visitors Center), Albemarle RPO, Cycle Speedway, River City Cycling Club, other cycling groups

One of the most effective ways of encouraging people to bike is through the use of guided tours, marked tour routes, or brochure guides describing enjoyable routes and destinations for bicycling. One regional map should be developed for each of the subregions studied in the Albemarle Regional Bicycle Plan to show the location of existing safe and enjoyable routes for bicycling. Ideally, each community subregion would collaborate to help the RPO develop the subregional maps, which would be supplemented by more detailed local maps of communities in the region. Maps should be printed as needed and actively distributed to residents and visitors; they should also be updated on a regular basis as new facilities are



Open Streets event  
- New York City



Historic Walking Tours - Austin, TX

implemented (every five years or less).

As a next step, local partners in each subregion could collaborate to create one or more guided tour routes based on popular local themes, such as local history, arts and crafts, agriculture, etc. Live tours should be hosted by knowledgeable tour guides (annually or more frequently as demand permits) and publicized widely. The tour routes should be preserved in a brochure and a self-guided (e.g., iPod-based) tour as well so that people can participate even if they are unable to attend the live, guided tour. For example, the residents and merchants in and around the “Gallery Row” area in Nags Head could develop, participate in, and market a tour of their neighborhood area.

Area universities, agencies, merchants, and historical societies may be willing to support this effort by helping with historic and cultural research; some may also be willing to supply local information and images to be used in tour materials. Local merchants along the tour route would likely be able to help publicize and market the schedule for the guided tours and the resources for the self-guided tours.

Sample Guided Walks and Maps:

- Des Moines (IA) Region Trails Map: [http://www.dsmbikecollective.org/dmbcfiles/maps/DM\\_Complete.pdf](http://www.dsmbikecollective.org/dmbcfiles/maps/DM_Complete.pdf)
- Wilsonville (OR) Walking Route Maps: <http://www.ridesmart.com/Index.aspx?page=190>

[ridesmart.com/Index.aspx?page=190](http://www.ridesmart.com/Index.aspx?page=190)

- Bedford County (PA) Walking Tours: <http://www.visitbedfordcounty.com/walkingtours.html>
- Austin (TX) Historic Walking Tours: [http://www.austintexas.org/visitors/plan\\_your\\_trip/historic\\_walking\\_tours](http://www.austintexas.org/visitors/plan_your_trip/historic_walking_tours)
- Charleston (SC) Route Book: <http://coastalcyclists.org/maps/routebooksample.pdf> (sample route)

### *BICYCLE NEEDS CHECKLIST*

**“E” Categories:** Enforcement/Evaluation

**Purpose:** Promote the importance of integrating bicycle facilities into the design phase of projects.

**Audience:** Developers, Chambers of Commerce, RPO staff, county staff, municipal staff

**Partners:** RPO staff, county staff, municipal staff

Each municipality in the Albemarle region should create a bicycle needs checklist as an additional phase in the project design and site plan review process. A bicycle needs checklist would ensure full participation and timely review by planning and engineering staff during the development of new projects that have the potential to benefit cyclists. The checklist would include bicycle-related amenities, such as bicycle parking, at intermodal facilities and any existing or future park & ride facilities. There are many examples of checklists available online in the



form of “Complete Streets” checklists, and there is an opportunity for incorporating a bicycle needs checklist into the review process for new development or redevelopment projects in each community.

Elements from the example checklists below should be considered by each community in the region:

- [http://www.seattle.gov/transportation/compSt\\_how.htm](http://www.seattle.gov/transportation/compSt_how.htm)
- [http://www.mtc.ca.gov/planning/bicyclespedestrians/routine\\_accommodations.htm](http://www.mtc.ca.gov/planning/bicyclespedestrians/routine_accommodations.htm)
- [www.state.nj.us/transportation/capital/pd/documents/CompleteStreetsChecklist.doc](http://www.state.nj.us/transportation/capital/pd/documents/CompleteStreetsChecklist.doc)

### *RURAL BICYCLE TOURISM OPPORTUNITY ANALYSIS*

**“E” Categories:** Education, Encouragement

**Purpose:** Create and promote opportunities for bicycle-oriented tourism; support communities as they seek to define themselves as a good place for bicycle tourism.

**Audience:** Bicycle tourists, visitors who enjoy recreational cycling

**Partners:** Municipalities, tourism agencies (Tyrrell County Ecotourism Committee), Chambers of Commerce (Greater Tyrrell County Chamber of Commerce, Outer Banks Visitors Bureau, Currituck

County Visitors Center), other business groups

More and more rural communities are looking to tourism as a priority within their economic development plans, and cycle tourism is a popular and growing niche. Rural communities often have unique assets to offer visitors as bicyclists seek open spaces, lightly traveled roads, and the intimate experience that only small towns can provide. Efficiently identifying opportunities and creating targeted marketing plans can help a rural town or county become a bicycling destination and reap the benefits of this low-impact, sustainable tourism segment.

Interested communities and organizations in the Albemarle region should convene a working group to complete an opportunity analysis and action plan for fostering cycle tourism. The working group should start by educating themselves about the market sector (what cycle tourists want; submarkets within the overall niche and how they differ; demographics of cycle tourists) and develop a shared understanding of the benefits of bicycle tourism to communities. Next, the group should analyze current assets, current challenges, potential improvements, and current and potential partners. The presence of inns or bed and breakfasts could be an asset to the development of this program as connections between lodging and destinations would be important to the success of this program.



Rural Tourism  
- Bike/Run Central Texas

An action plan should be created to prioritize efforts that will make the biggest difference, followed by a media outreach strategy to market the region to potential bicycle tourists.

Sample program: Copperas Cove (TX) Bike/Run Central Texas: <http://copperascove.com/bike-run/>

### *PROFESSIONAL DEVELOPMENT COURSES*

**“E” Categories:** Education, Enforcement, Evaluation

**Purpose:** Educate and train planners and engineers on bicycle facility design and policy issues.

**Audience:** Professionals in planning, engineering, landscape architecture, etc.

**Partners:** Albemarle RPO, municipal and county staff, NCDOT division offices, NCDOT Division of Bicycle and Pedestrian Transportation (DBPT)

Professional development courses provide training to transportation and other professionals who may not have extensive experience or training in bicycle facilities. This can be a successful way to institutionalize knowledge of bicycle facility design

and create an agency culture that values bicycling. Potential topics include the following:

- Pedestrian and bicycle facilities standards – Manual on Uniform Traffic Control Devices (MUTCD), American Association of State Highway and Transportation Officials' (AASHTO) Guide for the Development of Bicycle Facilities, and National Association of City Transportation Officials' (NACTO) Urban Bikeways Design Guide;
- Americans with Disabilities Act (ADA) compliance for transportation facilities – Public Right of Way Accessibility Guidelines (PROWAG), ADA Transition Plans, liability issues, etc.;
- Complete intersections, including operations, lighting, planning, accessibility, etc.;
- Complete Streets – Implementing the policy;
- Greenway and path crossings;
- Pedestrian facilities – Planning, design, and implementation; and
- Working with law enforcement on traffic safety campaigns.

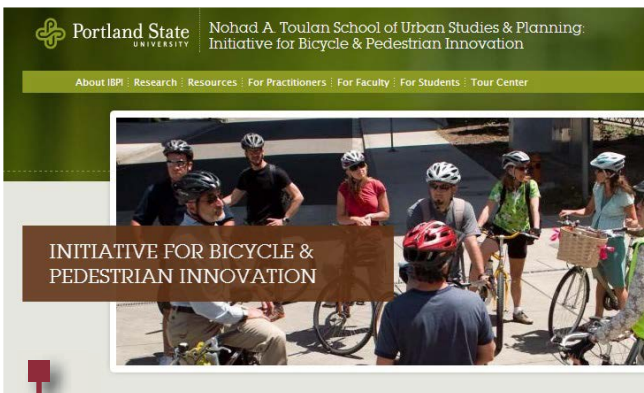
Sample program: Institute for Bicycle and Pedestrian Innovation: <http://www.ibpi.usp.pdx.edu/>

### *FACILITY INSPECTION AND MAINTENANCE*

**“E” Categories:** Enforcement/Evaluation

**Purpose:** Promote the importance of maintaining safe facilities for all users.

**Partners:** RPO staff, county staff, municipal staff, engineering departments



Historic Walking Tours  
- Austin, TX



Setting and maintaining minimum condition standards for acceptable bicycle facility conditions will enable all users to use the facilities safely. The communities in the Albemarle region should meet and collaborate to establish a minimum set of standards for maintenance of bikeways, including replacing worn pavement markings and damaged signs, sweeping away debris, repaving streets, and repairing potholes. Each community should set up a hotline to efficiently collect information regarding problematic facilities. In the short term, facility inspection and hotline response should be incorporated into the duties of existing Code Enforcement staff, but additional staff may be necessary to adequately perform these duties in the future.

Resource:

- [http://www.bicyclinginfo.org/bikesafe/case\\_studies/casestudy.cfm?CS\\_NUM=403](http://www.bicyclinginfo.org/bikesafe/case_studies/casestudy.cfm?CS_NUM=403)

### *CONSISTENT WAYFINDING SIGNAGE PROGRAM*

**“E” Categories:** Education, Encouragement

**Purpose:** Encourage bicycling to popular destinations; educate residents and visitors on the locations of key destinations in each community.

**Audience:** General public

**Partners:** Albemarle RPO, State and local parks and recreation agencies and departments, municipalities,

OBX Pedestrian and Bicycle Safety Coalition, River City Cycling club, Cycle Speedway, other cycling clubs, local merchants

The Albemarle region should develop and install standardized, branded wayfinding signs to support the circulation of cyclists within each community, and cyclists making connections between communities in the region.

Wayfinding signage enhances resident and visitor orientation. A clear wayfinding system should support the character of the region and contribute to economic development by indicating key destinations, restaurants, and entertainment venues. Directional signage targeted for use by motor vehicle drivers, pedestrians, and cyclists will complete a multimodal legibility package.

Materials for signage should reflect the character of the entire region with local customization as desired, be designed through collaboration with all communities, and be selected for longevity and ease of maintenance.

### *CYCLING SKILLS TRAINING*

**“E” Categories:** Education, Encouragement

**Purpose:** Educate children, teenagers and adults on safe bicycling skills; encourage bicycling.

**Audience:** General public



Wayfinding in Delaware

**Partners:** Municipal and County Parks and Recreation departments, OBX Pedestrian and Bicycle Safety Coalition, River City Cycling club, Cycle Speedway, other cycling clubs

**Most bicyclists do not receive any training on safe bicycling practices, the rules of the road, and bicycle handling skills. Cycling skills courses can address this education gap.** The most common program is the League of American Bicyclist's course series (including Traffic Skills 101, Traffic Skills 201, and Commuting), taught by League Certified Instructors (LCIs). There are currently over 50 LCIs in North Carolina (the updated list can be found here: <http://www.bikeleague.org/programs/education/> ).

Courses cover bicycle safety checks, fixing a flat, on-bike skills, crash avoidance techniques, and traffic negotiation. **At least one course per year in each county in the Albemarle region would be an excellent starting place.**

Materials for the League of American Bicyclists courses must be purchased and courses often require a fee for participation in order to cover costs. However, Albemarle RPO and its partners may choose to seek sponsorships to defer costs and offer courses at no expense to the student. Communities could also choose to offer scholarships to a select number of participants. This may reduce barriers to participation and increase the diversity of the audience.

Bicycle education courses can be supplemented with a media campaign describing the rights and responsibilities of bicyclists. Palmetto Cycling Coalition, located in South Carolina, showcases a "Safe Streets Save Lives" campaign that offers free resources for communities seeking to educate residents about safe bicycling practices, including professionally developed Public Service Announcements.

Sample programs:

- CAN-bike, Canada: <http://www.toronto.ca/cycling/canbike/canbike.htm>
- League of American Bicyclists, USA: <http://bikeleague.org/programs/education/courses.php>
- Safe Streets Save Lives: [www.safestreetssavelives.org](http://www.safestreetssavelives.org)

### *WALK AND BIKE FOR HEALTH CAMPAIGN*

**"E" Category:** Encouragement

**Purpose:** Increase physical activity.

**Audience:** General public

**Partners:** Public health agencies and departments (North Carolina Department of Health and Human Services, Albemarle Regional Health Services, Gates Partners for Health, Healthy Carolinians of the Albemarle, Three Rivers Healthy Carolinians), Eat Smart Move More Coalition, Municipal Parks and



League of American Bicyclists  
training course



Recreation departments, hospitals and private health professionals

Bicycling for transportation is still challenging in many parts of the Albemarle region, as described in Chapter 3: Needs Assessment. For that reason, encouraging people to bicycle for health and recreation may be a more realistic starting place for communities, rather than directly encouraging non-motorized commuting. Numerous regional partners, particularly in the health arena, could assist with developing and implementing a Walk and Bike for Health campaign.

Sample programs:

- Find Thirty. It's Not a Big Exercise® is an Australian marketing campaign aimed at increasing the amount of moderate-intensity physical activity that is incorporated into the daily lives of Australians. The program targets adults and health professionals to receive information on the benefits of a healthy lifestyle. The Find Thirty campaign uses a professional and regularly updated website, television advertisements, and events to promote their cause of increasing daily exercise. More information: <http://www.find30.com.au/>
- Let's Move® is an U.S. marketing campaign aimed at improving national rates of obesity by providing common sense programs and resources for parents, children, schools, and others. Launched by the first lady, the program includes

a “Get Active” campaign to promote healthier lifestyles through fun, exciting, and challenging opportunities for increased physical activity. More information: <http://www.letsmove.gov/get-active>

### *POLICE OFFICER BICYCLE TRAINING*

**“E” Categories:** Education, Encouragement, Enforcement

**Purpose:** Educate law enforcement officers on bicycle laws and safety. Encourage officers to pursue bicycle training and encourage officers to issue citations to motorists and non-motorists for violations of bicycle laws, increasing the enforcement of laws pertaining to bicyclists.

**Audience:** Police officers

**Partners:** Municipalities and counties, police and sheriff's departments, OBX Pedestrian and Bicycle Safety Coalition

Most law enforcement professionals do not receive training specific to bicycle laws or safety. Police education courses can help officers improve public safety and enforce existing laws more effectively by providing them with the training they need. These courses should include comprehensive information about laws and statutes pertaining to bicycling; information about common crash types and causes; prevention and enforcement techniques against the

most serious offenses; and options for enforcement and education (e.g., when a citation vs. warning should be issued, diversion class options, and safety materials that can be handed out during a traffic stop or public event).



Image from Wisconsin Pedestrian and Bicycle Law Enforcement Training website

**It is suggested that the first training be hosted by the Nags Head Police Department, with support from the OBX Pedestrian and Bicycle Safety Coalition,** but invitations should be extended to all law enforcement professionals in the Albemarle region. After the first program, the training should be offered annually, hosted in different communities each year. OBX Pedestrian and Bicycle Safety Coalition and local bicycle clubs may serve as key partners in providing clarification of North Carolina laws as they relates to bicyclists.

Sample program:

- The Wisconsin Pedestrian and Bicycle Law Enforcement Training Course includes curriculum on how bicycle and pedestrian crashes happen, laws relating to walking and bicycling, effective enforcement, crash reporting, best practices, etc. The course is open to all law enforcement entities for a fee, which covers instruction and materials. More information: <http://www.bicyclinginfo.org/enforcement/training.cfm>

### ***BICYCLE LAW CITATION AND WAIVER PROGRAM***

**“E” Categories:** Education, Encouragement, Enforcement

**Purpose:** Encourage officers to issue citations to bicyclists in violation of bicycle laws, enforce bicycle laws, educate bicyclists on bicycle laws, and encourage safe bicycling practices with the appropriate equipment and accessories.

**Audience:** Bicyclists, police officers

**Partners:** Municipalities and counties, police and sheriff's departments, OBX Pedestrian and Bicycle Safety Coalition

A “first time offense citation waiver program” should be considered for a pilot program by Police Departments on the Outer Banks. If a bicyclist is observed without the legal equipment and accessories for bicycling, a citation should be issued to the offending cyclist. The cyclist would purchase the necessary equipment or accessory (helmet, reflector, light, etc.) and present the item, a receipt of sale, and the citation to the Dare County Clerk of Courts Office. The Clerk's Office would waive the citation fee if it was the first violation by the cyclist.

This program could be expanded to include violations of “rules of the road” for safe bicycling. If a bicyclist is observed bicycling on sidewalks or not bicycling



properly with the flow of automobile traffic, a citation should be issued to the offending cyclist. The cyclist would have an option to participate in a bicycling safety education course to have the citation fee waived. Once they have completed a bicycling safety education course, the cyclist would present their citation, along with their certificate of course completion to the Dare County Clerk of Courts Office. The Clerk's Office would waive the citation fee if it was the first violation by the cyclist.

If the pilot program is successful in the Outer Banks communities, other municipalities and counties in the Albemarle region should adopt the program.

### ***"WATCH FOR ME NC" CAMPAIGN***

**"E" Categories:** Education, Encouragement, Enforcement

**Purpose:** To improve pedestrian safety by influencing the behaviors of drivers and pedestrians through safety messaging and enforcement.

**Audience:** Pedestrians, cyclists, motorists, law enforcement officers

**Partners:** NCDOT, Albemarle RPO, municipalities and counties

The "Watch For Me NC" campaign is intended to improve pedestrian safety by influencing the behaviors of drivers and pedestrians through safety

messaging and enforcement. The program first targeted the Triangle region of North Carolina. The effort was launched in 2012 through Transportation Enhancement funding provided by the NCDOT and federal funds from the NHTSA. The bicycle component was funded and expanded in 2013.

A pilot version of this program occurred on the Outer Banks in May, 2013 in partnership with the OBX Pedestrian and Bicycle Safety Coalition. It is recommended that the pilot be expanded into a regional program similar to the Triangle's campaign. The Albemarle RPO should request that NCDOT hosts an informational workshop for local officials and staff, and provides a "toolkit" of materials for implementing the program locally across the entire region. Each municipality and county in the Albemarle region should request funding for program development and guidance for utilizing local staff and resources to bolster the program. Bicyclists' safety, rights and etiquette, along with street crossing rules, traffic signal messages and meanings, and how to follow and obey pavement markings should be taught to children and adolescents to increase their safety and reduce automobile-bicycle crashes in the region.

Resource:

- NCDOT Watch for Me NC: <http://www.watchformenc.org/about/>



Watch For Me NC Campaign

## REGIONAL WALK BIKE WEBSITE

**“E” Category:** Education

**Purpose:** Make walking and bicycling information easier to find by providing resources, maps, safety information, events, group listings, and more in one central place.

**Audience:** General public

**Partners:** Albemarle RPO, municipalities and counties, local advisory committees (BPACs), Cycle Speedway, River City Cycling Club, other cycling clubs

Many current and potential bicyclists do not know where to turn to find out about bicycling laws, events, maps, tips, and groups. The Albemarle RPO should launch a regional walking and bicycling “one-stop shopping” website that includes:

- A list of all walking and bicycling groups, including clubs, racing teams, and advocacy groups;
- Information about the specific committees that discuss walking, bicycling, and trail issues (including how to get involved, meeting times and dates, agendas and minutes, etc.);
- Information about current projects and how to get involved (e.g., public meetings, comment

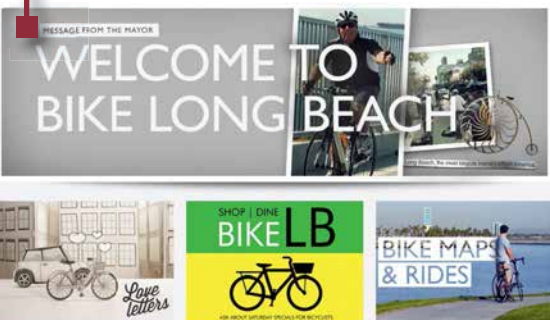
periods);

- Maps and brochures (e.g., links to online maps and brochures, where to find in person, and how to request mailed materials);
- Links to laws and statutes relating to bicycling;
- Information about bicycling events (e.g., rides, classes, volunteer opportunities) and an events calendar;
- A list of local bike shops, including phone numbers and addresses; and
- Relevant contact information for the public.

A one-stop bike website will not be difficult to set up, but it will only be successful if the site is both easy to use and updated regularly. All website content should be reviewed regularly for accuracy. If a Regional Bicycle and Pedestrian Advisory Committee is formed, the RPO should consider adding a standing agenda item for BPAC meetings to discuss the website in order to hear about new content that should be added or out-of-date content that should be updated or removed.

Sample website: Bike Long Beach (CA): <http://www.bikelongbeach.org/>

Long Beach area  
bike website





## ACHIEVE BICYCLE-FRIENDLY COMMUNITY STATUS

**“E” Categories:** Education, Encouragement, Enforcement

**Purpose:** Recognize accomplishments towards improving bicycling conditions.

**Audience:** Elected officials, media

**Partners:** Albemarle RPO, municipalities and counties, Cycle Speedway, River City Cycling Club, other cycling clubs, advisory committees (BPACs)

The League of American Bicyclists has a well-respected Bicycle-Friendly Communities (BFC) award program. The League recognizes four tiers of bicycle-friendly communities: bronze, silver, gold, and platinum. Communities fill out a detailed application that covers bike-related facilities, plans, education efforts, promotion initiatives, and evaluation work that has been completed by the jurisdiction. The award is designed to recognize progress that has been made, as well as assist communities in identifying priority projects to improve bicycling conditions. Receiving the award is a media-worthy event, and may give elected officials the opportunity to receive media coverage for the positive work they are doing. The Pedestrian and Bicycle Information Center recently launched a sister program for Walk Friendly Communities (WFC) that has recognized 11 communities around the

nation.

The RPO should work with towns and cities in the region to assess their readiness to apply for WFC and/or BFC designation, and encourage them to apply. The application can be completed by local agency staff with the support of the RPO, particularly if a Bicycle and Pedestrian Advisory Committee is formed.

More information:

- Bicycle Friendly Communities Program: <http://www.bicyclefriendlycommunities.org>
- Walk Friendly Communities Program: <http://www.walkfriendly.org/>

## COMMUNICATE MAINTENANCE SCHEDULES

**“E” Categories:** Enforcement/Evaluation

**Purpose:** Integrate bicycle facilities into future roadway projects.

**Audience:** NCDOT, municipal and county planning and engineering staff

**Partners:** NCDOT, RPO staff, municipal and county staff

Municipalities in the Albemarle region should each request that their NCDOT Division office provide early notification to planning and engineering staff of maintenance and restriping schedules. Local planning



Bicycle Friendly Communities Program

and engineering staff should facilitate annual meetings to be held when updated maintenance and restriping schedules are released to allow for face to face conversations between local staff and NCDOT Division staff. This information would allow the municipalities an opportunity to provide input regarding their bicycle facility needs and support accommodation measures, such as restriping to include bicycle lanes and other relevant markings.

### *AUTOMATED SPEED ENFORCEMENT DEVICES AND SYSTEMS*

**“E” Category:** Enforcement

**Purpose:** Create safer roadways for all user groups.

**Audience:** Motorists and law enforcement officers

**Partners:** RPO staff, municipal and county staff, police departments

Automated speed enforcement devices and systems can be an effective tool for managing speed and reducing speed related crashes. Some devices record and visibly display vehicle speed, and other devices capture a real-time photo of traffic. Most devices use radar and motorists with a radar detector in their vehicle will be alerted of the presence of the radar. This program would change motorists' behavior by encouraging safe, responsible driving, staying alert, and obeying the posted speed limit.

The Albemarle RPO should encourage each municipality in the region to install permanent, fixed photo speed enforcement devices. If these are too expensive to consider, mobile photo speed units may be a more viable option.

Resource:

- FHWA resource: [http://safety.fhwa.dot.gov/ped\\_bike/legis\\_guide/rpts\\_cnsgs/pedrpt\\_0808/chap\\_4.cfm](http://safety.fhwa.dot.gov/ped_bike/legis_guide/rpts_cnsgs/pedrpt_0808/chap_4.cfm)

### *POSITIVE MEDIA CAMPAIGN*

**“E” Categories:** Education, Encouragement

**Purpose:** Normalize/humanize the image of bicycling in the region.

**Audience:** General public

**Partners:** OBX Pedestrian and Bicycle Safety Coalition, Cycle Speedway, River City Cycling Club, other cycling clubs, local merchants/business leaders, municipal and county staff

Often the general public thinks of negative stereotypes when they hear about “cyclists.” A media campaign that shows a wide range of ordinary residents using their bicycles for a variety of purposes will help break down those stereotypes and raise awareness of bicycling and geniality towards people who ride bicycles. One excellent example is the “I Ride” campaign from the



Community Cycling Center in Portland, Oregon. They have created well-photographed posters showing people in a wide variety of ages, races, body types, and with a wide variety of bicycle types, and each person has been invited to complete the sentence “I ride \_\_\_\_.” The images are being distributed as bus stop and bus bench ads, as well as online.

In the Albemarle region, the “I ride” slogan may be considered, or another equally humanizing slogan could be created. The effort could be spearheaded by a variety of groups, from public agencies to nonprofits to volunteers. Health partners may be interested in funding and/or implementing this campaign. Donated media placement should be sought for print media and other public installations (such as benches, transit media options, billboards, or other locations).

A good photographer should be engaged, and opportunities for people to be photographed should be created (such as at public bicycling events). Key community members should be invited to participate as well, particularly if they are well-known.

More information on the Portland “I Ride” Campaign can be found at: <http://www.communitycyclingcenter.org/index.php/introducing-the-i-ride-bicycling-campaign/>

### *OTHER KEY PARTNERS TO CONSIDER FOR IMPLEMENTATION OF BICYCLE PROGRAMS*

- *Incorporated towns and cities in the Albemarle region* – Towns and cities are important parties in initiating and supporting programmatic efforts.
- *Any local walking/bicycling/trails committees* – Communities with existing Bicycle, Pedestrian, or Trails/Greenways Committees can help coordinate efforts and may be able to connect needs with interested volunteers.
- *Public health agencies and nonprofits* – Public health professionals can help to implement and evaluate recommendations that will help residents increase daily physical activity.
- *Major employers and universities* – The Albemarle region has several employers who are very engaged in bicycle-related issues.
- *Local police departments and county sheriff's offices* – Law enforcement professionals can help support safety campaigns through strategic enforcement and educational events.
- *School districts* – School districts and schools are natural partners for Safe Routes to School efforts as well as for education programs related to student safety.
- *Parent Teacher Associations (PTAs)* – PTAs can be effective partners in implementing Safe Routes to School efforts and other school-oriented traffic safety initiatives.

- *Parks and Recreation* – Parks and Recreation departments are natural partners for public events and classes such as organized walks.
- *YMCA, Boys and Girls Clubs, and other youth-oriented service providers* – These groups can partner on programs that benefit children.
- *Cycling clubs* – Clubs may be able to provide volunteer support for bicycling programs.
- *Chambers of commerce, business improvement districts, downtown development associations* – These groups may be interested in supporting initiatives that bring residents and visitors to the downtowns and business districts.
- *Economic and tourism development organizations* – These groups may be interested in supporting initiatives that bring visitors to the region.
- *Senior centers and retirement communities* – More

and more organizations that work with seniors are interested in projects that help their clients live active, healthy lives.

- *Hospitals and private health professionals* – Private sector partners with an interest in promoting health and wellness can serve as local champions and funders of education and awareness campaigns.



Cycle North Carolina is a well-attended event each Spring and Fall, often coming through the region. This presents a great programmatic and economic opportunity for the Albemarle Region.





## POLICIES

Bicycling needs must be considered within the context of the transportation and land use system. Based upon the region's numerous local and county land use and transportation plans, it's clear that enhancing quality of life and preserving community character is an important issue for many of the region's stakeholders. To do so requires paying attention not only to the design of the region's thoroughfares, but also to the quality of development in a manner that preserves the region's great asset: natural beauty.

Widening roadways to accommodate high volumes of motor vehicle traffic within settled areas negatively impacts local livability. As a response to peak hour congestion, the widening of roadways is typically an exercise in futility because drivers who previously avoided the congestion typically absorb the excess capacity very quickly. This phenomenon is known as "induced traffic" and it underscores that widening is too often an ineffective, expensive, and unsustainable approach to transportation planning. It also makes cycling and walking less safe.

To reduce congestion and to improve safety and community character requires investment in public transit, bikeways, sidewalks and land use patterns that put a variety of destinations and services within close proximity. Through the statewide adoption of a Complete Streets Policy, and by working to advance

Context-Sensitive Solutions (CSS), the North Carolina Department of Transportation is becoming a willing partner to those communities desiring a transportation system that reinforces community character, rather than eroding it. With this in mind, the following policy objectives and associated strategies aim to improve the underlying land use and transportation conditions that fundamentally promote bicycle use at the regional and local level. Such policies:

- Recognize the interrelationship between land use decisions (planning and development) and transportation decisions.
- Reinforce basic urban design principles that result in development of visually pleasing districts, neighborhoods, and corridors supportive of bicycling and walking.
- Improve the balance of protected rural areas and vibrant village, town, and city environments that make the Albemarle region special.

Policy recommendations are organized in tabular form and calibrated to the 10-county's regional Settlement Types, as defined in Chapter 2. Following this table is example guidance for a specific ordinance document, the Camden County, North Carolina Unified Development Ordinance



Natural



Farmland



Hamlet



Village



Town



City



Beach District

## 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.	●	●	●	●	●	●	●
Coordinate with NCDOT Context Sensitive Solutions and the Complete Streets Policy along and across state roadways.	●	●	●	●	●	●	●
Require new development to minimize driveway access 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.				●	●	●	●
Consider adding bicycle racks to Inter-County Public Transit Authority's bus service.				●	●	●	●
Supplement subdivision regulations with context-appropriate block size and thoroughfare connectivity standards.			●	●	●	●	●





Natural



Farmland



Hamlet



Village



Town



City



Beach District

## 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.	•	•	•	•	•	•	•
Use this Albemarle Regional Bikeways Plan to guide future planning, design, and implementation of bicycle infrastructure in conjunction with other local and regional planning and development projects.	•	•	•	•	•	•	•
Utilize additional bikeway and countermeasure treatment types as appropriate to enhance safe cycling.			•	•	•	•	•
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, local entities to enhance the safety and visibility of the regional bicycle network by implementing appropriate safety and wayfinding signage improvements.	•	•	•	•	•	•	•



Natural



Farmland



Hamlet



Village



Town



City



Beach District

## Environmental Protection

**Objective: Protect natural land by directing public infrastructure spending and private development to areas where they will have the greatest social and economic benefit and the least environmental impact and transportation cost.**

Establish a regional Transfer of Development Rights (TDR) program and/or support existing or new conservation easement, land trusts, and other tools to preserve the region's rural and working landscapes.	●	●								
Protect regional wetlands, wetland buffers, floodways, floodplains, aquifer recharge areas, woodland, productive farmland, wildlife habitat and important scenic views by disallowing new development along certain scenic roadways.	●	●								
Help property owners maintain the agricultural use of their land through a regional tax relief or land valuation mechanisms calibrated to agricultural production value, as opposed to its commercial or residential real estate value.		●								
Avoid the location of public facilities (schools, government offices etc.) within Natural or Farmland areas.	●	●								





Natural



Farmland



Hamlet



Village



Town



City



Beach District

## Environmental Protection Continued

To protect regional open space, enhance environmental health, and increase recreational opportunities, establish Hamlet, Village, Town, City, and Beach District areas as regional (TDR) "receiving areas."

Encourage local municipalities to identify and maintain a permanent rural "green" preserve around the Hamlet, Village, Town, and City areas with a focus on improving and protecting ecological areas.

Encourage the protection, preservation and enhancement of riparian corridors within new development and the redevelopment of existing, underutilized parcels to maximize public access, connectivity, and recreational bicycling.

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Beach District

## Regional Growth

**Objective:** Direct public infrastructure spending and private development to developed areas where the greatest social and economic benefit can be realized with the least environmental and transportation costs.

Ensure that adequate public services, infrastructure, and facilities are available or funded prior to approval of new development to ensure that the cost is not unnecessarily burdensome to existing residents.					●		●		●		●		●
If adequate public facilities are not available, require new development of a certain size to fund its proportional share of infrastructure costs.					●		●		●		●		●
Encourage county and local governments to replace used-based zoning code with form-based zoning, especially within existing or proposed residential neighborhoods and mixed-use main street / commercial corridors.							●		●		●		●
Prioritize application processing and/or create other financial incentives for projects within previously developed areas or areas regulated by form-based codes zoning.							●		●		●		●





Natural



Farmland



Hamlet



Village



Town



City



Beach District

Regional Growth Continued												
Wherever practical, incentivize land devoted to surface parking lots to be developed into more productive uses.												
Encourage and support the evolution of auto-oriented, strip-style commercial development into mixed-use activity centers that support a more walkable and bicycle-friendly environment.												
Encourage Albemarle region counties and local municipalities to evaluate the strength of proposed development projects through the creation of a Smart Growth Scorecard, as developed in Camden County.												

## **ORDINANCE REVIEW**

Given the large number of jurisdictions in the Albemarle region, policy recommendations for ordinances are provided through an evaluation of a specific ordinance within the region. Camden County, North Carolina's Unified Development Ordinance was selected because of its current support of bicycle-friendly land use and transportation patterns. The following review of this ordinance serves as an example that can be applied to other jurisdictions in the region.

### **CAMDEN COUNTY, NORTH CAROLINA UNIFIED DEVELOPMENT ORDINANCE REVIEW**

In 2003, mounting residential growth pressure inspired Camden County to enact a moratorium on new subdivisions. This temporary hold on development provided an opportunity for the County's leadership and citizens to create a needed unified governance structure (2006) to handle the issues of growth comprehensively. Shortly thereafter, the County began to adopt "smart growth" land use and transportation policies, including the development of a Smart Growth Scorecard (2007 checklist tool to evaluate development proposals in Camden County).

Today, Camden County has become a leader within the Albemarle region for developing plans

and policies seeking to accommodate new growth, support multi-modal transportation options, create a better jobs-housing balance, and protect the area's largely rural character. A road map to meeting these goals is laid out in the County's recently completed 2035 Comprehensive Plan.

However, an analysis of the Camden County's Chapter 151 Unified Development Ordinance reveals a clear disconnect between the aspirations of the 2035 Plan and existing land use and transportation policies. The following section briefly summarizes the strengths and weaknesses of Chapter 151 and offers additional land use, transportation, and village design policy recommendations to support the County's goals, including the improvement of bicycling conditions.

### **KEY STRENGTHS**

The intent of Chapter 151 is to strengthen village and country settings, including allowing rural roads to keep their character and village streets to more easily accommodate pedestrians and bicyclists.

### **Land Use**

- The Community Core District (CCD) District zone encourages slightly more dense, mixed-use development to occur in strategic areas (Shiloh, Camden Courthouse, South Mills) with the intent of creating clustered, walkable places similar in scale and pattern to the classic "American village."



- Natural and farmland preservation is a key part of Chapter 151; Camden County recently created Voluntary Agricultural Districts, which allow property owners to opt-in to a system valuing land at current value, rather than its speculative residential or commercial value. This helps protect the farming, horticulture, and forestry land that comprises a majority of Camden County and gives the area its unique character.

### *Transportation*

- Chapter 151 mandates sidewalks, curbs, and gutter on both sides of the street in the CCD District and allows on-street parking, which facilitates pedestrian-oriented village design.
- Chapter 151 includes street connectivity, block size, or complete street design provisions. These components are particularly important in the Neighborhood Commercial District (NCD),
- Chapter 151 includes the provision of bikeway facilities.
- Chapter 151 includes the provision of bicycle parking facilities.

### *KEY WEAKNESSES*

Chapter 151 contains numerous land use and transportation provisions that will ultimately limit the achievement of the County's vision for growth, as developed in the 2035 Comprehensive Plan.

### *Land Use/ Urban Design*

- Existing FAR/lot coverage requirements (0.5) in the CCD district are too low and will make it difficult to achieve the desired "American village" feel.
- 25' minimum setback distance for CCD is inappropriate for a village center. The desired pedestrian and bicycle-friendly "feeling" of a vibrant mixed-use village, as discussed in the 2035 Plan, will not be created as desired.
- Planned Unit Development (PUD) zoning category offers the County flexibility at the outset for larger commercial or residential projects, but ultimately yield unpredictable results between each application. The proposed Plantation project, a PUD example, offers an appropriate mix of density of uses but falls short with a poor urban design pattern that is less a walkable village and more suburban sprawl. Also, when market conditions continue to change, the conditions of PUDs make it difficult to meet new transportation and land use demands.

### *Transportation*

- Despite the goal to increase access – by all modes – Chapter 151's street standards generally prioritize driving and limit access to new development. The result is a still further disconnected land use pattern and subdivision arrangement that does not enable the smart growth goals espoused in the 2035 Comprehensive Plan. To the extent

practicable, driveway access to collector streets shall be minimized to facilitate the free flow of traffic and avoid traffic hazards.

- Chapter 151 does not provide shared parking allowances among complementary adjacent uses, which would reduce the expense, environmental impacts, and bicycle and pedestrian un-friendly characteristics inherent to surface parking.

### *KEY RECOMMENDATIONS*

The following key recommendations are intended to prioritize land use, transportation, and village design patterns that reinforce smart growth and transportation choices, especially within intended growth areas (Shiloh, Camden Courthouse, South Mills). The coordination of these elements plays a critical role in supporting active transportation and should be considered critical to the long-term success of making bicycling safe and pleasurable in not just Camden, but the whole Albemarle region.

#### *Land Use*

- To more effectively meet the land use and transportation goals set forth in the Camden County 2035 Comprehensive Plan, a form-based code that manages the coordination of zoning, subdivision regulations, village design, basic architectural standards, and transportation design should be considered, especially in areas

currently zoned RCD-1, RCD-2, CCD, and NCD.

- Planned Unit Development (PUD) zoning should be removed and replaced with a form-based code that is equally as flexible while also offering more predictability from application to application and can respond more easily to changing market conditions.
- In conjunction with Voluntary Agricultural Districts, the County might also consider creating a regional Transfer-of-Development Rights (TDR) program to further incentivize the development of priority investment areas where growth and services can be concentrated (Shiloh, Camden Courthouse, South Mills).
- Replace 25' minimum setback distance for CCD District with a 10' maximum; encourage zero lot line setbacks at the most pedestrian-oriented locations.
- Increase existing FAR/lot coverage requirements in the CCD district to better achieve the desired mixed-use "New England" or classic "American village" character.
- Fast-track the permitting and approval process for those projects that score above a certain Smart Growth Checklist threshold. Density bonuses and other incentives should also be considered.
- Ensure public investment and civic life anchors like schools, municipal buildings, courthouses,



and the like are located within core village areas and not removed from priority investment areas (Shiloh, Camden Courthouse, South Mills).

### *Transportation*

- Work with the County departments and the NCDOT to utilize multimodal level of service analysis when conducting traffic volume/demand studies for future development and population growth.
- Work with County departments and the NCDOT to integrate “Complete Streets” design standards into transportation/public works standards and/or requirements.
- Develop street connectivity standards that promote small blocks within larger mixed-use developments or within established village areas.
- Streamline automobile parking requirements so that spaces may be shared amongst complementary uses (daytime vs. nighttime)
- Consider implementing parking maximum requirements within CCD/NCD/PUD areas so that the cost of new development is reduced and other modes of transportation in village centers is encouraged.
- Require non-motorized transportation facilities and connectivity standards within subdivision, requirements for CCD, NCD, PUD, R-1, and R-2

areas.

- Develop bicycle parking requirements and standards for all areas zoned as CCD, NCD, and at all civic sites (schools, churches, hospitals, municipal facilities, etc.).



North end of NC 12, Corolla





# Chapter Seven

## Implementation

### OVERVIEW

This plan's infrastructure, program, and policy recommendations provide the framework for making the Albemarle region "a Bicycle Destination for the World." Successful implementation of these recommendations will require a consistent, coordinated effort by the Albemarle RPO, NCDOT, counties, municipalities, private partners, stakeholders, and advocates in the region. In order to monitor implementation success, an evaluation component is essential. Measuring performance over time will allow the region to gauge success in providing quality bicycle transportation and recreation choices. It will also provide a mechanism for making informed decisions and efficient investments in the future.

This chapter details priority action steps for the region. The actions steps presented do not cover every individual infrastructure, policy, and program recommendation of this plan. Rather, they call out priority items within each of these categories in order to provide guidance for moving forward on the most important items. For each action step, a lead agency, potential support agencies, and time frame for completion are suggested.

### KEY FIRST STEPS

The first step toward implementation is the **adoption of this plan**. All member counties and municipalities should adopt this plan as the guiding document for improving bicycle transportation and recreation in the region. Having an adopted plan is helpful in securing funding from federal, state, and private agencies.

The second step is the **formation of a BPAC (Bicycle and Pedestrian Advisory Committee)**. The BPAC could start largely with the members of the Bicycle Plan Steering Committee. The BPAC should also have representation from active pedestrians and commuting and recreational cyclists, and should champion the recommendations of this Plan. The BPAC should continue to provide a communications link between the citizens of the community, local governments, and the Albemarle Commission. They should meet at least quarterly, and be tasked with assisting in community outreach, marketing, and educational activities recommended by this Plan. Due to the size of the region, the BPAC may choose to divide into three subgroups to match the subregions of this study.

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*Overview*

*Key First Steps*

*Administrative Structure*

*Action Steps*

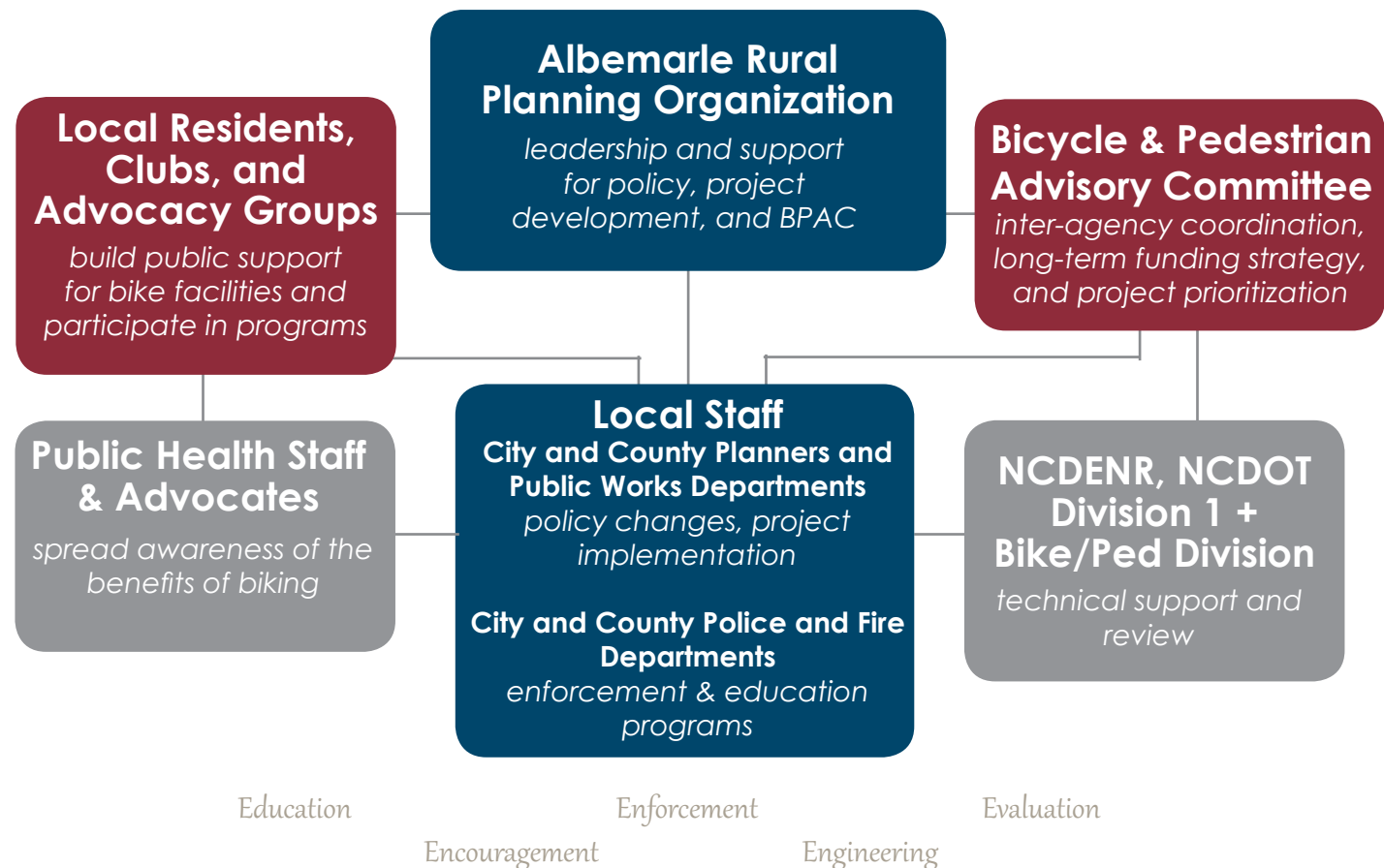
*Performance Measures*

*Funding Strategy*



## ADMINISTRATIVE STRUCTURE

The figure below presents an organizational structure for plan implementation. All of the groups and agencies shown in this figure will be necessary to successfully implement the extensive program, policy, and infrastructure recommendations of the Plan.



## ACTION STEPS

Task	Lead Agency	Support	Details	Phase
<i>PRESENTATIONS AND ADOPTIONS</i>				
Present plan to Albemarle Commission	Albemarle Rural Planning Organization (ARPO)	Project Consultant	Present the plan to the Albemarle Commission for approval and adoption.	Short Term (2013)
Approve and adopt this plan - Municipalities	Municipal Planners	ARPO/Project Consultant	Through adoption, the plan becomes a legitimate planning document of each municipality. Adoption shows that the city or town has been part of a successful, supported planning process and is a partner in implementation. It is key to securing funding from NCDOT and other state and federal agencies.	Short Term (2013)
Approve and adopt this plan - Counties	County Planners	ARPO/Project Consultant	Through adoption, the plan becomes a legitimate planning document of each County. Adoption shows that the County has been part of a successful, supported planning process and are partners in implementation. It is key to securing funding from NCDOT and other state and federal agencies.	Short Term (2013)
Involve media to spread word to public and elected officials.	ARPO	Municipal and County Planners; Advocates	ARPO should utilize the media to announce the adoption of the bicycle plan. Media includes local newspapers, websites, and local television. When significant trails and facilities are constructed, the media should be notified in order to spread the word to the public. This will help build upon successes.	Short Term (2013)
<i>LOCAL AND REGIONAL COORDINATION</i>				
Establish Albemarle Bicycle and Pedestrian Advisory Committee (BPAC)	Regional Bicycle Plan Committee	ARPO	An ongoing regional entity focused on bicycle issues will be instrumental to the implementation of this plan and promotion of biking in the Albemarle region. This group should initially be formed of interested members of this plan's committee, and meet semi-annually to share implementation successes and challenges and track progress. The group can be divided into meaningful subcommittees such as policy, program, infrastructure, and evaluation groups.	Short Term (2013)
Set up regional Walk Bike website	BPAC	ARPO	Set up a website providing information to residents and tourists on bicycling in the region. To begin, the website can include this plan and the brochure map produced by it.	Short Term (2013-2014)
Add information on the location of amenities to the Walk Bike website	BPAC	ARPO, Municipal and County Planners	Gather the locations of bike parking, restrooms, and water fountains along bike routes and communicate it on the regional website. A public input form could help to crowdsource this data.	Continuous/Ongoing

## ACTION STEPS CONTINUED

Task	Lead Agency	Support	Details	Phase
Schedule semi-annual project development meetings with NCDOT	ARPO	NCDOT Division 1; Municipal and County Planners	Many projects recommended in this plan could be developed as part of a roadway reconstruction, widening, or resurfacing project. ARPO should work with NCDOT to ensure that upcoming roadway reconstruction projects, including TIP projects, incorporate the bicycle improvements recommended in this plan. Further, this plan's recommendations should become an input into the development of the resurfacing schedule - roadways with bicycle recommendations should become higher relative priorities for resurfacing or widening than other roadways.	Short Term (2013-2014)
Discuss bridge policy application with NCDOT	ARPO	NCDOT Division 1, Municipal and County Planners	During one of the project meetings above, confirm that all bridges along roadways that permit bicycles will be accommodated with bike facilities in any bridge replacement or repair project (where feasible during repair projects). Identify bridges along the proposed network with insufficient handrails and work to install bicycle-safe handrails on those bridges in accordance with NCDOT's bridge policy.	Short Term (2013-2014)
<b>EVALUATION AND DATABASES</b>				
Establish central holding place for bicycle facility database	ARPO	Municipal and County Planners	Each municipality and county should continue to update a GIS bicycle database as new facilities come online and new crash data is published. This data should periodically be shared with the ARPO for maintenance of a central database. This central database can also serve communities of the region without the resources to maintain GIS data.	Continuous/Ongoing
Publish Annual Performance Report	BPAC	ARPO, Municipal and County Planners	Publish an annual report to provide an update on progress made during that year to advance bicycle transportation in the Albemarle region. ARPO should lead this effort, with support and content development provided by local staff. This report will provide an objective measurement of progress.	Annually
Develop bicycle count program	ARPO	Municipal and County Planners	A key method to evaluate bicycle activity and needs is to conduct professional counts. Counts should be recorded in the annual performance report and coordinated with NCDOT's Division of Bicycle & Pedestrian Transportation.	Annually
Online form for bicycle facility request	ARPO	Municipal and County Planners	Provide a web-based service that allows residents to report hazards, such as debris in a shoulder or trail, and request new bicycle facilities and connections. Requests should be collected and communicated to planners within the relevant jurisdiction, and used to update this plan in the future. The web-site should be linked to municipal and county websites.	Short Term (2013-2014)



## ACTION STEPS CONTINUED

Task	Lead Agency	Support	Details	Phase
Update this plan	ARPO	BPAC	Update this plan after five years to reflect implementation progress, unexpected challenges, and changes to the regional landscape.	Mid-Term (2018)

### INFRASTRUCTURE IMPROVEMENTS

Identify and secure funding sources for priority project implementation	Municipal and County Planners	ARPO, BPAC	Multiple funding sources should be sought. Appendix E contains a wide variety of funding opportunities.	Short Term (2013-2014)
Complete priority projects	Municipal and County Planners, ARPO	NCDOT, NCDENR, NCD-PR, NPS	Build priority projects identified in this plan (Submit bicycle projects to State TIP, add bicycle projects to local CIP lists)	Mid-Term (2015 - 2018)
Develop a long term funding strategy	Municipal and County Planners	ARPO, NCDOT, BPAC	To allow continued development of the overall system, capital funds for bicycle and pedestrian facility construction should be set aside every year, even if only for a small amount (small amounts of local funding can be matched to outside funding sources). Funding for an ongoing maintenance program should also be included in the county and town operating budgets. Multiple funding sources should be sought from federal, state, and health sources.	Short Term (2011-2012)

### PROGRAMS

Establish Safe Routes to School Program in Towns and Cities	School Districts	ARPO, BPAC, SRTS Program	Apply for Safe Routes to School funding for planning and implementation.	Short Term (2013-2014)
Apply for "Bicycle Friendly Community" designation by League of American Bicyclists	Municipalities	BPAC	Complete an application for the Bicycle Friendly Community designation.	Short Term (2013)
Hold first Police Officer Bicycle Training	Nags Head Police Department	Outer Banks Pedestrian and Bicycle Safety Coalition	Arrange initial training and invite police departments from around the region.	Short Term (2013)
Educate internal staff on bicycle and pedestrian-related issues.	Municipal and County Planners	ARPO, BPAC	Train relevant local government staff who play roles in implementation, design, construction, enforcement, and maintenance of roadways and bike facilities. Local staff should be familiar with the Regional Bicycle Plan.	Short Term (2013-2014)

## ACTION STEPS CONTINUED

Task	Lead Agency	Support	Details	Phase
Develop local hard copy and online bicycle maps and brochures	Municipal and County Planners	BPAC, Health staff and advocates	A hardcopy and online map displaying bicycle facilities, suggested bike routes, destinations, and educational materials will be useful for tourists and residents. Maps for individual communities can provide the level of detail needed for navigation and supplement the regional brochure that was developed along with this plan. These maps should be updated every 3-5 years.	Mid-Term (2015-2018)
Establish maintenance standards	BPAC	Municipal and County Staff	Establish minimum standards for maintenance of bikeways (replacement of pavement markings, sweeping of debris, etc) and encourage local staff to follow these standards and set up hotlines for reporting of issues.	Mid-Term (2015-2018)
Hold WatchForMe NC workshop in the region	NCDOT	RPO, Municipal and County Staff	Present the campaign to interested municipalities and counties with information on how to implement it locally.	Short Term (2013-2014)
Celebrate and promote Bike Month	BPAC	Municipal and County Planners, Health staff and advocates	Bike Month provides an opportunity to encourage new bicyclists in a group setting with entertainment, prizes, and media attention. Promote and expand Bike Month in May of 2014 and continue annually. Consider programs such as Ciclovias to generate interest (See Chapter 6 for more information).	Short Term (2013-2014)
<b>POLICIES</b>				
Incorporate this Regional Bicycle Plan's recommendations into long-range transportation and land use planning documents and local comprehensive plans.	ARPO	NCDOT, City and County Planners	Recommendations from this plan should become the starting point for the accommodation of bicycle facilities in future transportation and land use planning documents around the region	Ongoing
Revise Municipal and County Codes of Ordinances.	Municipal and County Planners	ARPO	Revise ordinances to better accommodate bicycle infrastructure and considerations. Use the policy recommendations and sample ordinance review in Chapter 6 as a guide for revisions.	Short Term (2013-2014)
Initiate regional Transfer of Development Rights program	ARPO	Municipal and County Planners	Establish a regional program to protect natural and working landscapes while encouraging appropriate development in population centers that supports bicycle transportation.	Long-Term (2019-2033)
Adopt form-based codes	Municipal Planners		Replace use-based zoning codes with form-based zoning in growing municipalities to support growth that will encourage and enable bicycle transportation.	Mid-Term (2015-2018)

## ACTION STEPS CONTINUED

Task	Lead Agency	Support	Details	Phase
Generate a model smart growth scorecard and bicycle needs checklist for use around the region	BPAC	ARPO, Municipal and County Planners	Develop these tools based on best practices and market to local staff for use in development review. Chapter 6 provides a sample bicycle needs checklist and Camden County's smart growth scorecard can act as a model.	Mid-Term (2015-2018)
Consider Complete Streets Policy	Municipal Planners	ARPO	The municipalities of the ARPO should consider Complete Streets policy guidance language to ensure commitment to developing roadways that accommodate all users.	Mid-Term (2015-2018)

## BICYCLE TOURISM ECONOMY

Create a bicycle tourism committee	ARPO, BPAC, Chambers of Commerce	Municipalities, Businesses, etc.	The cultivation of relationships among businesses, cycling groups, government agencies, NCDOT, local chambers of commerce, etc. is essential for creating and marketing a bicycle-friendly region. This group should prioritize steps to grow the bicycle tourism economy. See resource on 6-8.	Short Term (2013-2014)
Track return-on-investment measures	Department of Commerce, Chambers of Commerce	Municipalities, ARPO	Like the 2004 Outer Banks report, further measurement is needed to quantify the many economic benefits of bicycling and evaluate its success in the region.	Mid-Term (2015-2018)

## FURTHER STUDIES

Wayfinding signage program	BPAC	ARPO, Municipal and County Planners	Develop a cohesive wayfinding strategy for the region, incorporating the wayfinding recommendations of this plan, and seek funding sources for implementation across the region.	Mid-Term (2015-2018)
Ehringhaus Street	Elizabeth City	ARPO	Complete a combined transportation and land use study of the Ehringhaus Street corridor to address broad safety issues and improve the road for cycling.	Mid-Term (2015-2018)
US 158	Southern Shores, Nags Head, Kill Devil Hills, Kitty Hawk	ARPO	Complete a corridor study of US 158 to identify design solutions that work for all users of the corridor and improve its aesthetic.	Mid-Term (2015-2018)
Hatteras Island to Ocracoke Island Ferry	Dare County	ARPO, BPAC	Complete a study examining bicycle and pedestrian access to this ferry.	Mid-Term (2015-2018)



## ACTION STEPS CONTINUED

Task	Lead Agency	Support	Details	Phase
Jennette's Pier/Whalebone Junction	Nags Head	DBPT, ARPO	Complete a study of the NC 12 sidepath's termination at this location. Consider a reduction in driveway access to reduce conflict locations and improve safety.	Mid-Term (2015-2018)
Speed Limit Reduction	Municipalities and Counties	DBPT, ARPO	Further study should be conducted locally to determine appropriate speed limit reduction locations.	Mid-Term (2015-2018)



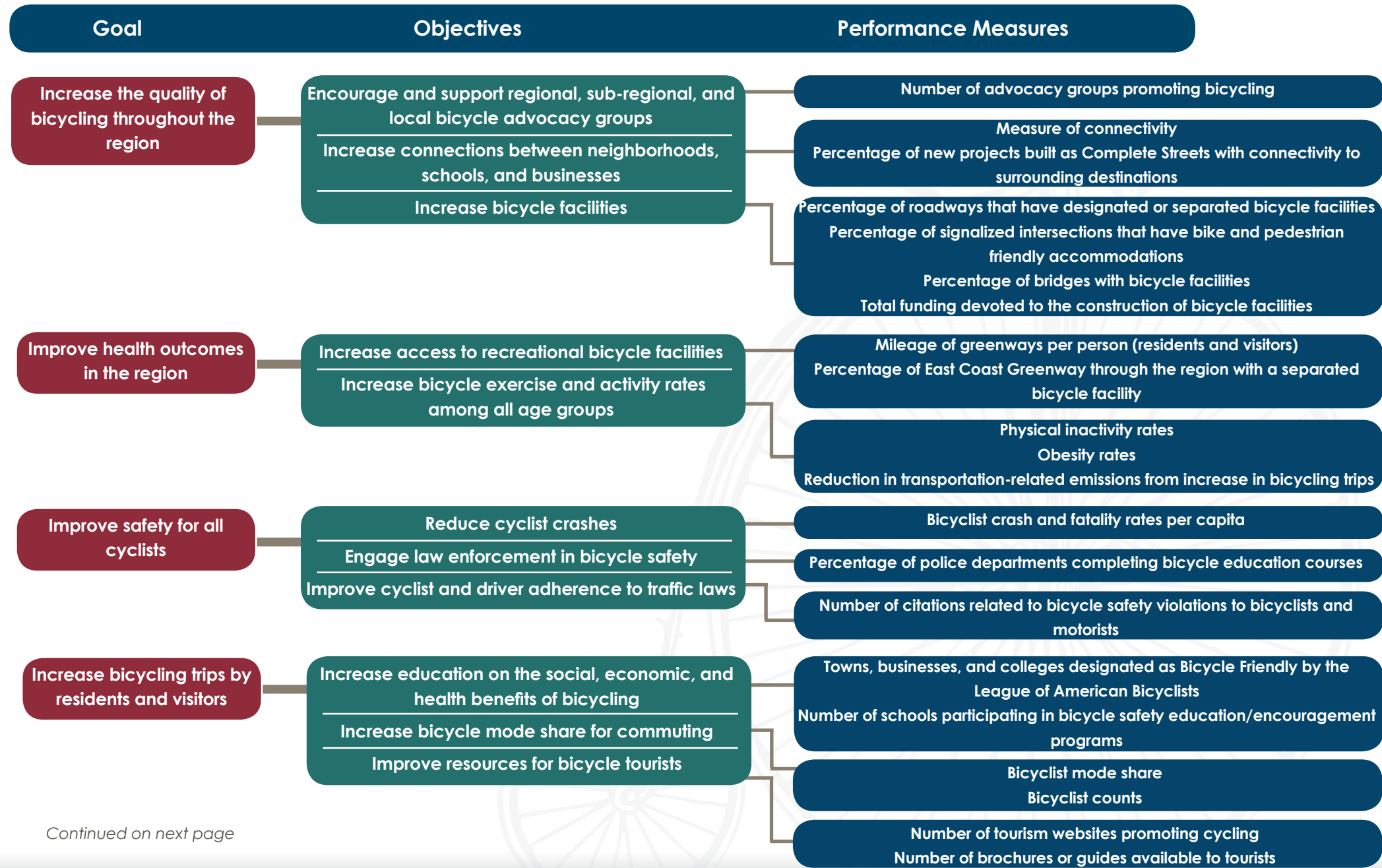
Automated and manual counts are effective ways to measure bicyclist use, characteristics, and behaviors.



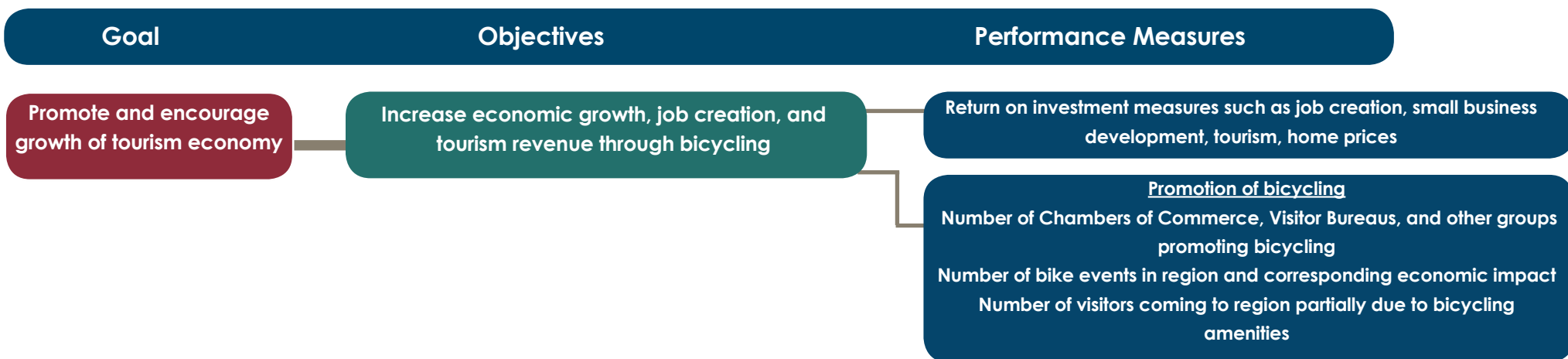
### PERFORMANCE MEASURES

As stated above, 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. The BPAC and RPO should together monitor progress against these measures and report that progress in an Annual Performance Report. Individual counties or municipalities may also be interested in tracking and reporting progress independently. The RPO or these individual entities may choose to set specific goals for each measure.



Continued on next page



## BICYCLE TOURISM

Bicycle tourism for economic development has been a priority of many regions in the United States for the past few decades. North Carolina developed the first statewide bicycle route system in 1974 geared towards scenic riding and created maps for those routes providing information on camping, lodging, and other destinations. At the time of this Albemarle Regional Bike Plan study, NCDOT was considering re-routing and re-branding the state bike route system as part of the WalkBikeNC Plan.

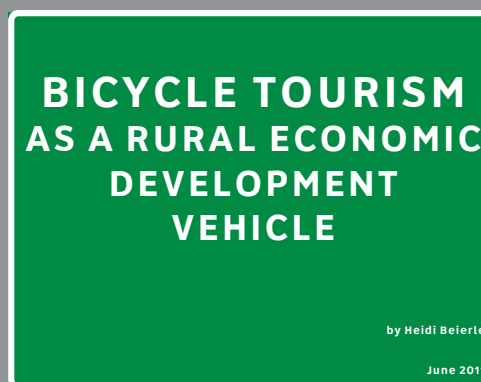
The 2011 Oregon-based report *Bicycle Tourism As a Rural Economic Development Vehicle* is a tremendous resource and provides unique insights into touring bicyclist needs, the economic benefits of bicycle tourism, and key steps for making a region more bicycle-friendly. Increasing bicycle tourism requires cooperation between businesses, cycling clubs, government

agencies, advocates, and local chambers of commerce. The report defines the steps towards bicycle tourism development and provides a menu of action steps at the state, regional, and local level.

The Albemarle Region is unique in its beautiful landscapes, villages, historic towns, waterfronts, and flat terrain, making it a prime candidate for bicycle tourism. Key marketing recommendations that are applicable to the Albemarle Region include:

- Market bicycle destinations and activities.
- Develop welcome signs for cycle tourists at gateways.
- Launch a Bed & Bike program for hotels to market themselves to cycle tourists.
- Organize a signature event for recreational cyclists (e.g. Cycle NC).
- Make bike maps, and distribute through tourism groups (Chambers of Commerce, visitor's centers, etc.).

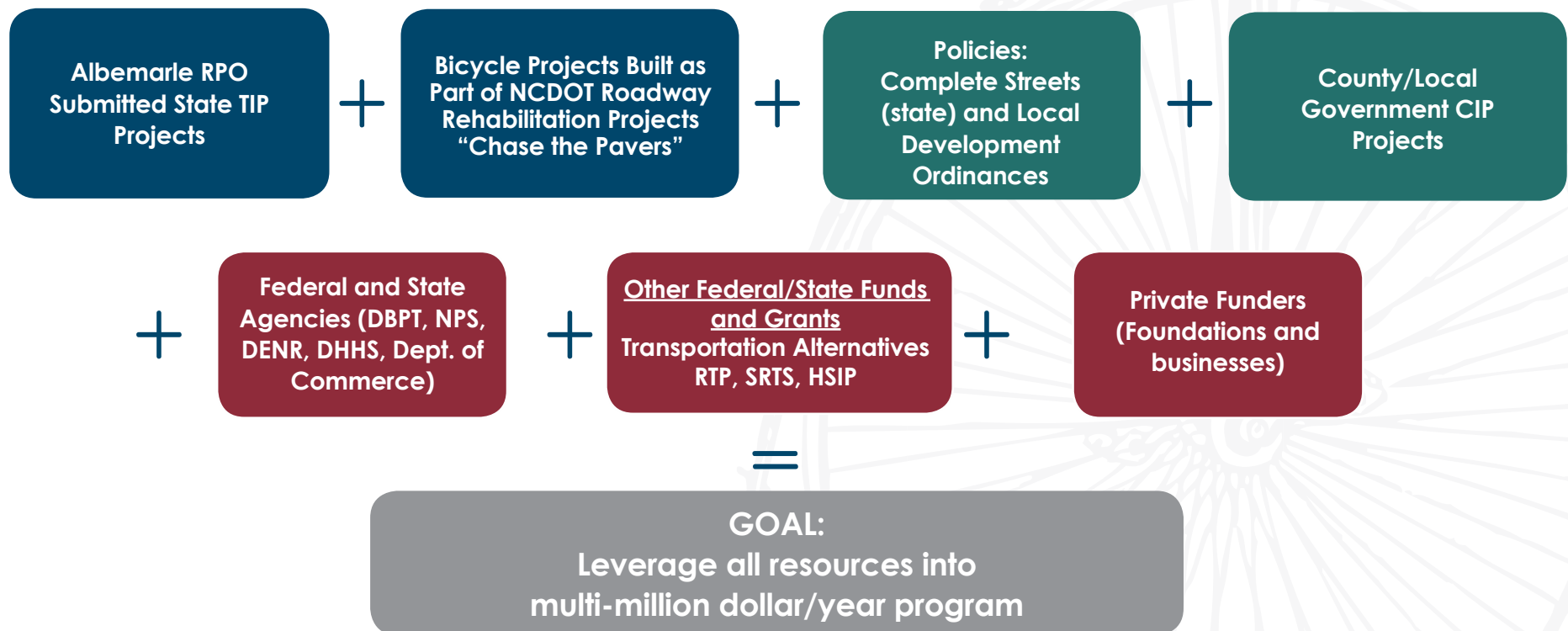
- Organize one or more historic bike rides, then make a brochure to distribute.
- Develop Websites (e.g. <http://www.routeverte.com/rv/index.php?page=home>).
- Enhance regional bike routes and wayfinding.
- Develop strategic bike parking and shelters.





## FUNDING STRATEGY

A combination of funding using federal, state, local, and private sources will be necessary to fully implement this plan. The figure below illustrates this combined funding strategy. Detailed information on specific funding options and their applicability to projects and geographies are provided in Appendix E: Funding.



CMAQ - Congestion Mitigation and Air Quality  
RTP - Recreational Trails Program

SRTS - Safe Routes to School  
CIP - Capital Improvement Program

HSIP - Highway Safety Improvement Program  
DBPT - Division of Bicycle and Pedestrian Transportation







# Appendix A

## Existing Conditions Analysis Summary

### ORGANIZATIONS & RESOURCES

The following organizations support bicycling in the Albemarle region by providing programs and resources. Organizations are summarized by their geographic reach: state, regional, or local.

#### STATE

##### *Eat Smart Move More NC*

Eat Smart Move More NC is a statewide coalition that promotes opportunities for healthy eating and physical activity in North Carolina. The group provides resources for local communities related to best practices and health statistics, as well as funding opportunities. In the Albemarle Region:

- The Dare County Department of Public Health and the Healthy Carolinians of the Outer Banks worked with local health care providers and the Outer Banks YMCA to replicate the ENERGIZE! Dare program. Health care providers referred children ages 10-18 who were at risk for Type 2 Diabetes to the program, which included a 12-week course at the YMCA.
- In Currituck and Gates Counties, a total of nine elementary schools participated in the Movin'

More Walking Club. During the 2011-2012 school year, schools competed to see who could walk the most miles. The walking clubs supported the schools' intention to pass physical activity policies requiring walking as part of the school day.

URL: <http://www.eatsmartmovemorenc.com/index.html>

##### *North Carolina Amateur Sports (NCAS)*

Founded in 1983, this 501c3 nonprofit organization promotes the spirit of amateur sports, physical fitness, and health to all ages and skill levels. NCAS hosts the Powerade State Games of North Carolina, Cycle North Carolina, and Live Healthy North Carolina. The Powerade State Games include BMX, criterium, and mountain bike competitions.

URL: <http://www.ncsports.org/index.cfm>; <http://pag.ncsports.org/>; <http://www.livehealthynorthcarolina.org/>; <http://cnc.ncsports.org/>

##### *North Carolina Department of Health and Human Services (NCDHHS)*

North Carolina's Department of Health and Human Services offers a Statewide Health Promotion Program that supports community-based initiatives that improve health by reducing the prevalence of chronic

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#### *Roadway Data Collection Results*



diseases. Program funds are distributed through local health departments in the state and are targeted at community programs that create policy and environmental changes related to physical inactivity, poor diet and/or tobacco use. Three specialists provide technical assistance and consultation to Health Promotion Coordinators located in local health departments across the state. The Program has also developed an integrated evaluation system in Access® that evaluates progress made in local communities towards policy and environmental changes.

The Division of Public Health of NCDHHS houses Healthy Carolinians. This program provides technical assistance and guides the development of health assessment reports around the state, which are conducted locally. The Division also assists in the development of a Community Health Assessment for each county in the state.

URL: <http://www.ncdhhs.gov/index.htm> and <http://www.healthycarolinians.org/default.aspx>

#### *North Carolina Department of Transportation (NCDOT)*

The official website of NCDOT provides numerous resources for traveling by bicycle. Links to bicycle club websites, links to bicycle shops, tips for bicycling, and announcements for special events are all included on the site. Information about both road and mountain

biking is provided, as well as state, regional, and local route maps.

URL: <http://www.ncdot.gov/bikeped/bicycle/>

#### *REGION/COUNTY*

##### *Albemarle Regional Health Services*

Serving the communities of Pasquotank, Perquimans, Camden, Chowan, Currituck, Bertie, and Gates, Albermarle Regional Health Services is dedicated to disease prevention and the promotion of a healthy environment to reduce morbidity, mortality, and disability. The group is a partner with Healthy Carolinians of the Albemarle, Three Rivers Healthy Carolinians, and Gates Partners for Health.

URL: <http://www.arhs-nc.org/>

##### *Currituck County Visitors Center*

The Currituck County Visitors Center promotes bicycling as an activity for residents and visitors. The organization's website discusses bicycle friendly roads in the county, suggests various areas for riding based on bicycling ability and preference, and offers information about where to pick up bicycle route maps.

URL: <http://www.visitcurrituck.com/bicyclingatthebeaches.aspx>

### *Gates Partners for Health*

Gates Partners for Health (GP4H) is a network of agencies and citizens dedicated to improving the health and quality of life of people of all ages within the Gates County community. Priorities of GP4H are divided into three major focus areas: physical activity and nutrition, chronic disease, and injury prevention. The committees consist of representation from local agencies, faith communities, and interested citizens.

URL: <http://www.arhs-nc.org/services/health/promotion/carolinians/gp4h/>

### *Greater Tyrrell County Chamber of Commerce*

The Tyrrell County Chamber of Commerce promoted biking on its website. The Hiking, Biking & Camping webpage of the site notes that maps and trail descriptions are available at the county's Visitors Center.

URL: <http://www.visittyrrellcounty.com/thingstodo/HikingBiking.htm>

### *Healthy Carolinians of the Albemarle*

Healthy Carolinians of the Albemarle (HCOTA) is a community-based network of agencies and citizens dedicated to improving the quality of life through health and wellness. Its main focus is to eliminate health disparities across the four counties of: Camden, Currituck, Pasquotank, and Perquimans, by addressing their emerging health trends. HCOTA has two subcommittees: The Action to Benefit Chronic

Disease (ABCD) subcommittee, and the Albemarle Fitness and Nutrition Council (AFNC) subcommittee.

URL: <http://www.arhs-nc.org/services/health/promotion/carolinians/hcota/>

### *Outer Banks Visitors Bureau*

The Outer Banks Visitors Bureau promotes bicycling as a tourism activity along the Outer Banks' 105 miles of beaches. Additionally, the bureau's website discusses bicycle friendly roads in the region and offers tips related to bicycling safety and etiquette.

URL: <http://www.outerbanks.org/outerbanks-biking/>

### *Three Rivers Healthy Carolinians*

Three Rivers Healthy Carolinians (TRHC) is a community-based network dedicated to improving the quality of life for all residents in Bertie and Chowan Counties. The TRHC partnership continues to strive to identify the populations of Bertie and Chowan counties with health disparities and respond to their specific needs. TRHC is recognized as a NC Governor's Task Force Partnership and is divided into three subcommittees: Chronic Disease Management, Fitness and Wellness, and Maternal and Child Health.

URL: <http://www.arhs-nc.org/services/health/promotion/carolinians/trhc/>

### *Tyrrell County Ecotourism Committee*

The Tyrrell County Ecotourism Committee is a subcommittee of the Tyrrell County Tourism Authority.

Involving local, state, and federal government agencies, as well as nonprofit organizations and local business owners, the Ecotourism Committee works to promote and protect the county's vast natural resources through tourism. Biking is promoted on the committee's website, which also offers helpful links and bike route information.

URL: <http://www.ecotourismnc.org/>

### *LOCAL Bicycle Shops and Rentals*

The Albemarle region is home to numerous bicycle stores and bicycle rental companies. These businesses represent an existing bicycling economy and potential partners in advocacy and program development. Local bicycle sales and rental businesses included the following as of fall 2012:

- Ocean Atlantic Rentals – <http://www.oceanatlanticrentals.com/>
- Duck Village Outfitters - <http://www.mydvo.com/Outer%20Banks%20Bike%20Rentals.html>
- Kill Devil Hills Cycle – N/a
- Kitty Hawk Cycle Company - <http://www.kittyhawkcyclecompany.com/>
- Cycle Gallery & Fitness - <http://www.thecyclegallery.com/>
- Bike Barn Inc. - <http://www.ncbeaches.com/OuterBanks/KillDevilHills/Services/VacationSuppliesRentals/BikeBarn/>

- Just for the Beach Rentals - <http://justforthebeach.com/store/Outer-Banks-Bike-Rentals/>

### *Cycle Speedway*

Cycle Speedway is a bicycle racing program for youth ages 6 to 17. Founded in 1990, the program is located in Chowan County and is a 501 C-3 non-profit organization. Cycle Speedway has two tracks for bicycle racing competition and recreational activities.

URL: [http://www.chowancounty-nc.gov/index.asp?Type=B\\_BASIC&SEC=%7BD146BEA1-9C89-4E1C-AD1F-4F0D3EDBB773%7D](http://www.chowancounty-nc.gov/index.asp?Type=B_BASIC&SEC=%7BD146BEA1-9C89-4E1C-AD1F-4F0D3EDBB773%7D)

### *River City Cycling Club*

The River City Cycling Club is based in Elizabeth City and serves as a bicycling advocacy group for the Northeast region of NC. The Club supports and promotes active and safe bicycling and provides funds to local charities supporting youth-related activities through fundraising events such as the annual TarWheel Century. Bike rides and bike routes are available on the club's website.

URL: <http://www.rivercitycyclingclub.com/>

### *Wheels of Dare*

Wheels of Dare was a bicycling club based in Dare County and serving the Outer Banks region. The website address associated with the group is no longer active, and the current status of the group is unclear.



## *EXISTING PLANS*

Throughout the Albemarle region, a number of plans and studies have been developed that address bicycling conditions in the area and provide recommendations for improvement. Together, these documents contain numerous existing recommendations that provided a starting point for the Albemarle Regional Bicycle Plan. The purpose of each plan and relevance of its recommendations to this plan are summarized below by subregion.

### *REGION*

#### *2008 Albemarle RC&D Area Plan (2008-2013)*

Purpose & Relevance: The Albemarle RC&D five-year Area Plan was developed by the Council with public input from across the ten-county area. The Area Plan identifies changes in needs and opportunities that have occurred since 2002 and presents recommendations. No bike/trail/greenway recommendations were made.

### *NORTH OF SOUND SUBREGION*

#### *2003 Chowan County & Edenton Greenway and Open Space Plan*

Purpose & Relevance: The governments of Chowan County and the Town of Edenton partnered together to create the Greenways and Open Space Plan as a guide for developing a system of trails and protected areas in their community.

#### *Edenton Pedestrian Plan (2009)*

Purpose/Relevance: The Edenton Pedestrian Plan was developed as a guide for decision makers at the local and state levels to use as site and street improvements are made within Edenton's planning jurisdiction. The plan identifies sidewalk deficiencies, prioritizes solutions, and recommends short- and long-term sidewalk investments. The plan also discusses greenways, referencing back to Edenton's 2003 Greenway and Open Space Plan. It specifically identifies the Downtown Corridor Pilot Greenway Project as a top priority.

#### *2006 Great Dismal Swamp National Wildlife Refuge Comprehensive Conservation Plan*

Purpose & Relevance: The purpose of developing a CCP is to provide refuge managers with a 15-year strategy for achieving refuge purposes and contributing toward the mission of the National Wildlife Refuge System, consistent with sound principles of fish and wildlife science, conservation, legal mandates, and Service policies. In addition to outlining broad management direction on conserving wildlife and habitats, a CCP identifies wildlife-dependent recreational opportunities available to the public, including opportunities for hunting, fishing, wildlife observation and photography, and environmental education and interpretation. No bike/trail/greenway recommendations were made.

#### *2010 Hertford Pedestrian Plan*

Purpose & Relevance: The plan is a tool to create a more pedestrian-friendly atmosphere through recommended programs, policies, projects, and plans. The plan also provides a description of priorities, partnerships, cost estimates, and funding sources to help the town implement its recommendations.

#### *2012 South Mills Small Area Plan*

Purpose & Relevance: This plan is a guide for the implementation of planning initiatives to take advantage of all that South Mills has to offer. The recommended planning initiatives can assist South Mills in maintaining its historic and cultural uniqueness. A relevant recommendation in this plan is the extension of the Dismal Swamp Trail into the core of South Mills.

#### *US 17 Corridor Master Plan*

Purpose & Relevance: The US 17 Corridor Master Plan in Camden County represents an important opportunity for the future growth and development within the County and surrounding region. The Corridor stretches for approximately 7.0 miles from South Mills to the Virginia State Line along US Highway 17. This Corridor Plan, once adopted by Camden County will serve as the blueprint for the potential use of the land and its design characteristics for years to come. Typically, a corridor plan addresses

the specific land uses and character of the development that will occur in the area beyond the pavement; and it defines how pavement and right-of-way improvements should be designed to best support these land use and character goals. Additional nonroadway elements that are addressed in corridor plans include bicycle lanes, sidewalks, landscaping, street lighting, drainage, signage, and utilities. Relevant goals include: build a community character that is felt at the pedestrian level, provide for multiple modes of transportation - cars, buses, bikes and walking

#### *Camden County 2035 Comprehensive Plan (2012)*

Purpose/Relevance: The Comprehensive Plan is a blueprint that provides guidance as to where and how Camden County will grow in the next 20 years. The directives included in the document will guide daily decision-making, development approvals, and capital investment decisions that will shape the county in future years.

#### *Camden County CTP (2012)*

No draft plan available; draft bicycle facility recommendations were obtained in GIS form.

#### *Currituck County CTP (2012)*

Purpose/Relevance: The Currituck County Comprehensive Transportation Plan (CTP) covers transportation needs through 2035. Modes of

transportation evaluated as part of this plan include: highway, public transportation and rail, bicycle, and pedestrian.

#### *2004 Gates County Core Land Use Plan Update*

Purpose/Relevance: The Gates County 2003-2004 CAMA Core Land Use Plan Update builds from the County's current land use plan and considers concepts from similar plans developed by neighboring and/or similar jurisdictions. The Update was organized according to the outline in the Coastal Area Management Act (CAMA) Technical Manual for land use planning. No bike/trail/greenway recommendations were made.

#### *2008 County/Edenton Land Use Plan*

Purpose/Relevance: In order to promote the public interest in the land development process, the North Carolina Coastal Area Management Act (CAMA) requires that local governments prepare, adopt, and keep current a land use plan. The land use plan is intended to provide a framework that will guide local governmental officials as they make day-to-day and long-range decisions that affect land development. The land use plan will also be used by state and federal agencies in making project consistency, project funding, and CAMA permit decisions. Relevant information on page 15 includes the "area of local concern policy: Support greenway and bike

paths as recommended by the 2003 Greenway Plan"

#### *2010 Perquimans County CAMA Core Land Use Plan Update*

Purpose/Relevance: The Perquimans County CAMA Core Land Use Plan Update 2005-2006 seeks to help position Perquimans County, as well as Hertford and Winfall, to continue a proactive stance toward land use planning. This Update builds from the County's current land use plan and considers concepts from a similar plan developed by Hertford. The Update was organized according to the outline in the Coastal Area Management Act (CAMA) Technical Manual for land use planning and 2002 State LUP guidelines. This plan offers support for the development of bike/trail/greenway facilities.

#### *2012 Pasquotank County / Elizabeth City Core Land Use Plan Update*

Purpose/Relevance: In order to promote the public interest in the land development process, the North Carolina Coastal Area Management Act (CAMA) requires that local governments prepare, adopt, and keep current a land use plan. The land use plan is intended to provide a framework that will guide local governmental officials as they make day-to-day and long-range decisions that affect land development. The land use plan will also be used by state and federal agencies in making project consistency, project funding, and CAMA permit decisions. This



plan offers support for the development of bike/trail/greenway facilities.

#### *2011 Dismal Canal Trail Extension, Camden County, NC*

Purpose/Relevance: This report, prepared by McGill Associates, provides 30% design documents to assist the Albemarle Commission, Camden County, the City of Chesapeake and all other stake holders with the implementation of the section of trail that extends south from the Virginia state line to the Dismal Swamp Visitor's Center. The trail would extend + 3.3 miles south from the state line, running parallel and in between US Highway 17 and the Dismal Swamp Canal to the existing pedestrian trail at the south end of the visitors center parking area.

Relevant information includes, "The 10 foot wide asphalt trail begins at the southern end of the visitor's center and meanders 3 miles through a wooded area between the canal and the highway, ending at NC 343. A 5-foot wide highway extension provides access to the Village of South Mills via NC 343 and Mullen Road, terminating at the drawbridge over the canal. The City of Chesapeake initiated the construction of the trail located in Virginia when US Highway 17 was relocated to the east of the existing roadway. After the completion of the new roadway in November, 2005, the old roadway was closed to vehicular traffic and was master planned as a multi-

use trail from Dominion Boulevard south to the North Carolina border. In April of 2006 the northern 8.3 miles of the trail was opened for recreational use including hiking, biking, and equestrian use."

#### *SOUTH OF SOUND SUBREGION 2010 Columbia Pedestrian Plan*

Purpose & Relevance: The plan is a tool to create a more pedestrian-friendly atmosphere through recommended programs, policies, and projects. The plan also provides detailed descriptions of priority projects, including multi-use trail connections, as well as potential funding sources to help the town implement its recommendations.

#### *Hyde County CTP (2012)*

Purpose/Relevance: The Hyde County Comprehensive Transportation Plan (CTP) covers transportation needs through 2035. Modes of transportation evaluated as part of this plan include: highway, public transportation and rail, bicycle, and pedestrian. Specific bicycle recommendations include adding wide paved shoulders to several roads to improve safety for bicyclists and motorists. Multi-use paths and trails are also recommended for pedestrian and bicyclist use.

#### *Tyrell County CTP (2012)*

Purpose/Relevance: Tyrrell County Comprehensive Transportation Plan (CTP), which includes the town of Columbia, is a long range multi-modal transportation

plan that covers transportation needs through 2035. Modes of transportation evaluated as part of this plan include: highway, public transportation, bicycle, and pedestrian. The plan recommends adding 5-foot shoulders to several roads within the county, as well as bike lanes and wide outside lanes.

### *OUTER BANKS SUBREGION*

#### *2003 Manteo 20 Year Plan Update*

Purpose & Relevance: The students of NC State University, in partnership with Town staff and appointed Officials, developed this 20-year plan to guide development decisions in Manteo. The plan offered an opportunity and toolkit for the Town to update its outdated zoning code to be consistent with the recommendations of the plan and to prepare for anticipated growth over the next 20 years. Specific, relevant objectives of this plan include:

- Establish design guidelines for Manteo
- Provide a network of pedestrian and bicycle trails allowing access to all parts of the Town and island.

#### *2007 Manteo Land Use Plan*

Purpose/Relevance: The planning process for Manteo's 2007 CAMA Land Use Plan Update has both reinforced long-held community values and goals and revealed new challenges and strategies for the Town to pursue. The key issues today revolve around growth. Manteo's infrastructure,

the wastewater treatment plant in particular, has limited capacity remaining. At the same time, Manteo residents are more focused than ever on resource protection, from preserving wetlands to improving water quality. Bike/trail/greenway policy recommendations were made.

#### *2004 Case Study of the Northern OBX: Economic Impacts of Investments in Bicycle Facilities*

Purpose & Relevance: The study was conducted by the Institute for Transportation Research and Education (ITRE) at North Carolina State University. Researchers surveyed bicyclists riding on the bicycle facilities – paths and wide paved shoulders – and also obtained data from self-administered surveys of tourists at three visitors' centers in the region. The study found that the economic impact of bicycling visitors is significant. A conservative estimate of the annual economic impact is \$60 million, with 1,400 jobs created/supported per year. This compares favorably to the estimated \$6.7 million of federal, state and local funds used to construct the special bicycle facilities in the area.

#### *2004 Kill Devil Hills Recreational Facilities Plan Update*

Purpose & Relevance: The major focuses of the 2004 Update are the identification of needed improvements to existing facilities at existing sites and

the establishment of manageable and effective maintenance routines. The 2004 Update also includes several general recommendations which will assist the Town to: better manage and program resources and facilities; continue the process of planning for existing and new facilities and sites; and, identify and evaluate additional recreational opportunities and sites as they emerge.

#### *2004 Roanoke Island Transportation Plan*

Purpose & Relevance: The plan examines the existing and future influences on the transportation system of Roanoke Island over the next 20 years. A relevant goal of this project is to enhance the transportation network for a more bicycle & pedestrian friendly environment.

#### *2005 Southern Shores Long Range Planning Report*

Purpose & Relevance: Since 1980, Southern Shore's permanent residents have climbed from 520 to 2,500 in the year 2005, nearly a 500 percent rise. This brings new challenges and new opportunities; more homes and more people, more traffic, evacuation needs during natural disasters, fires and increased crime to name just a few. This places greater stresses on our roads, utilities, education, volunteers, social services, town administration, fire department, law enforcement, and emergency medical services, as well as waterways, beaches and forests. The Long

Range Planning Report serves as a guideline for the ongoing operations of Southern Shores.

#### *2008 Nags Head Beach Cottage Row Historic District Plan*

Purpose & Relevance: This plan strives to preserve the existing historical architecture and character in the Beach Cottage Row Historic District by executing a zoning overlay district. No bike/trail/greenway recommendations were made.

#### *2012 Nags Head Parks and Recreation Plan*

Purpose/Relevance: The plan evaluates the Town's current recreational facilities, identifies the recreational needs of all ages, and recommends actions for the Town to consider into the future. Relevant goals include, create pedestrian and bicycle connectivity throughout the Town of Nags Head.

#### *2005 Duck Land Use Plan*

Purpose/Relevance: On May 1, 2002, Duck officially incorporated. The Duck 2003-2004 CAMA CORE Land Use Plan is the Town's first independent land use plan. Before this effort, Duck had been included in land use plans developed by Dare County. The Plan was organized according to the outline in the Coastal Area Management Act (CAMA) Technical Manual for land use planning. Relevant information includes enhancements to the existing Duck Trail.



### *2008 Dare County Land Use Plan Update*

Purpose/Relevance: The State of North Carolina requires all local governments located within the twenty-county coastal region to prepare and periodically update land use plans for use in the review and issuance of CAMA major permit applications and federal consistency reviews. The type of land use plan required is based primarily on the growth rate and population of a county/ municipality. Using these factors, Dare County is required to prepare a “core” plan. The land use plan must contain a vision statement and general objectives for the community, policies and implementation strategies to support the vision statement and objectives, demographic information and population projections, and associated maps of existing land use patterns and desired future land use patterns. This plan offers support for the development of bike/trail/greenway facilities.

### *2010 Nags Head Land Use Plan Update*

Purpose/Relevance: The Nags Head Land Use Plan Update builds from the Town's current land use plan and considered concepts from similar plans developed by neighboring and/or similar jurisdictions. The Plan was organized according to the outline in the Coastal Area Management Act (CAMA) Technical Manual for land use planning. This plan offers support for the development of bike/trail/greenway facilities.

### *2012 Southern Shores CAMA Land Use Plan Update*

Purpose/Relevance: The Southern Shores CAMA Land Use Plan was prepared in accordance with 15A North Carolina Administrative Code (NCAC) 07B and 07 L and the DCM guidance document, entitled “Technical Manual for Land Use Planning.” The planning effort involved collecting and analyzing data on the economy, population, land use, land suitability, and natural systems of Southern Shores and other data available for the study area. The Plan addresses issues pertaining to future land use and development and natural resource protection. Relevant information includes, “Bicycle paths and walkways are located along some of the Town's streets, NC 158 and NC 12. These pathways are used by large numbers of Town residents and visitors. Southern Shores wants to maintain, expand and connect the multi-use path system throughout the Town. This convenient multi-use pathway system will encourage and support a variety of recreational activities and promote health for the Town's citizens and visitors. It is Town policy that when a Town street must be replaced or upgraded, consideration will be given to potential upgrades to maintain or improve pedestrian and bicyclists safety. Although not associated with the multi-use/bike paths, improvements have been made to several crosswalks along NC12. These crosswalks connect the

multi-use/bike path along NC 12 to beach access paths (some improved, some un-improved). The safety of these crosswalks is being evaluated. The goal is to make pedestrian access to the beach as safe as possible."

*2012 Dare County Open House Report, ARPO*

Purpose/Relevance: This report summarizes the Dare County Comprehensive Transportation Plan Open Houses that were held in April, 2012. The open houses invited residents to help identify ways to improve the transportation system, in this case the bicycle and pedestrian network. Relevant information includes: "Pedestrian/bicycle facility (8 miles) through Rodanthe, Waves and Salvo: The path will be continuous, on the sound side, and will run west of NC 12, with a five-foot grass buffer from the road, through the unincorporated villages of Rodanthe, Waves, and Salvo. In areas where there is not sufficient right of way to provide the grass buffer, there will be constructed curb and gutter to provide a vertical separation. Bridges used for the project will be of the prefabricated variety." Other Bike/trail/greenway policy recommendations were made by residents.

*NC 12 Improvement Feasibility Study FS-1001A, NCDOT*

Purpose/Relevance: This study evaluates proposed infrastructure and pedestrian improvements along

NC 12 in Buxton and Hatteras Villages, Dare County. The improvement project originated with the Outer Banks National Scenic Byway Committee in their Off-Road Pathways Plan for Hatteras Island Villages (August 2006) and their Corridor Management Plan (December 2008). The project includes curb-and-gutter and sidewalk installation and resurfacing and widening of the roadway. The study makes a recommendation to resurface and widen NC12 to 15-foot travel lanes, with 2.5 foot curb and gutter and 5-foot concrete sidewalks on both sides elevated on 10-foot berms.

*Ped/Bike Road Safety Audit of Duck Trail and NC 12 (Duck Rd.), Town of Duck*

Purpose/Relevance: The purpose of the 2009 road safety audit was to identify safety issues that might be contributing to pedestrian and bicycle collision risks and to identify recommendations to alleviate these issues. The study identified 11 potential safety issues for pedestrians and bicyclists; frequent wrong-way travel by bicyclists on the shoulder was the most critical issue identified. The town wishes to promote walking and bicycling as modes of travel and improve safety for all road users. Recommendations to accomplish this include installing bike route signage along NC12 that directs cyclists to Duck Trail and elevating the multi-use trail near crossings to improve visibility.

## *BICYCLING TRANSPORTATION DEMAND AND BENEFITS*

Bicycling is gaining new interest from communities across the United States after decades of neglect when most attention focused on motor vehicle transportation. As fuel prices rise, making short trips by bicycling instead of by car makes sense. However, due to low existing levels of use and funding, bicycling faces an uphill battle to prove its utility as a viable, efficient mode of transportation. Many of bicycling's greatest strengths, such as creating attractive, livable streetscapes and increasing community health through exercise, are not accounted for when evaluating transportation projects. Similarly, many of the external social costs of driving, such as traffic congestion, crashes, and climate change from greenhouse gas emissions, are not sufficiently weighted. Quantifying these factors demonstrates the importance of bicycling transportation and helps compare its benefits with the costs of motor vehicle travel.

The benefits created by bicycling increase with use. For each additional mile traveled by bicycle instead of by car, about a pound of carbon dioxide emissions are prevented, less money is spent on gas, and a person gets a few minutes closer to reaching their recommended healthy levels of physical activity for the week. When bicycling becomes part of people's daily activity, these benefits add up to create a

healthier, more affordable community. To calculate the current benefits of bicycling transportation in the Albemarle region, the first step is to estimate existing levels of use.

### *ESTIMATING BICYCLING DEMAND*

User counts and user surveys are the two most commonly used tools for measuring bicycling activity. The following section describes the strengths and weaknesses of each of these tools, and presents a methodology for estimating activity across an entire community.

#### *User Counts*

User counts are typically conducted during peak travel hours, and capture levels of bicycling activity at a point along a street or path during a short time period. While user counts are helpful for comparing relative levels of use between one street and another, they do not fully capture the spectrum of bicycling activity happening across the community over the length of the year. Counts are well suited to studying where people bike, but do not provide answers to other important questions, such as:

- What destinations are people bicycling to, and where are they coming from?
- How far are they traveling?
- What is the purpose of their trip?
- How often do they make similar bicycling trips?
- How often do they make different kinds of



bicycling trips?

- Do other residents also make similar types of trips by bicycling, or do they typically travel by another mode?

Therefore, while user counts are a good tool for measuring bicycling at points of interest, user surveys are needed to estimate the overall role of bicycling in the transportation patterns of residents across the community.

### *User Surveys*

Transportation user surveys ask respondents about their recent or typical travel behavior, and sometimes ask about their perceptions of travel, e.g., their feeling of safety on a street. The American Community Survey (ACS), an ongoing survey conducted by the US Census Bureau, collects social, economic and demographic information from respondents, and includes a question on respondents' commute to work. Sampling over 250,000 households per month, the ACS is the largest survey that asks Americans about their transportation habits, and the most widely available source of bicycling data in communities. According to the 2006-2010 ACS<sup>1</sup>, about 0.4% of workers in the ten-county Albemarle region bicycle to work. This rate is known as commute mode share:

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<sup>1</sup> For communities with population similar to the Albemarle region, the Census Bureau recommends using 5-Year sample data sets for increased reliability. This report references 2006-2010 5-Year ACS data unless otherwise noted.

the number of people traveling to work by a certain mode of transportation as a percentage of all people commuting to work.

Although commute mode share data is able to capture wider information about bicycling than user counts alone, work commutes are just one type of trip. Albemarle residents make many other types of trips, such as going to school, visiting the doctor, or going shopping, by a variety of modes. Detailed household travel surveys can provide more information on travel patterns and help estimate the full spectrum of bicycling trips happening in the community.

Household travel surveys typically interview respondents by phone to complete a travel diary to record all trips made by the respondent during a recent 24-hour period. The survey also collects detailed information on the qualities of each trip, including trip purpose, time of day, duration, length, mode, and more. By collecting this data from a large sample of people across the population, household travel surveys can provide information on where, why, and how far people are bicycling for transportation. Though a recent local household travel survey is not available in the Albemarle region, national data from the 2009 National Household Travel Survey (NHTS 2009) are available to stand in to help estimate the number of other types of bicycling trips made in the area in addition to work trips.

### Estimating Overall Activity

Overall bicycling activity can be estimated by combining available local data such as ACS commute mode share with national trip purpose information from NHTS 2009. On average, 1.6 utilitarian bicycle trips are made for every bicycle-to-work trip in the United States (Figure 1). Trips that serve a necessary purpose are considered to be utilitarian trips, and do not include discretionary trips such as for recreation or exercise.

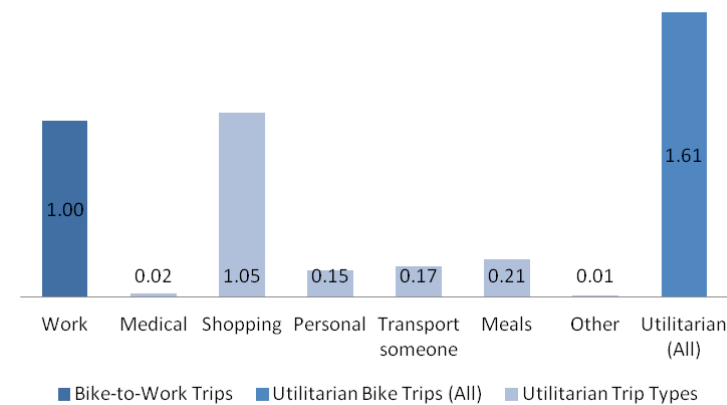


Figure 1. Ratio of Bicycle-To-Work Trips to Utilitarian Bicycle Trips (Source: NHTS 2009)

Student commute trips to school and college are estimated independently of ACS data, because the populations making those trips are substantially different from the employed workforce surveyed by

ACS. Because local university travel survey data is not available, national data on bicycling college trip mode share was used. National baseline K-8 school trip data from Safe Routes to School (SRTS) was used to estimate mode share for K-12 school trips.

For each type of trip, average trip distance and vehicle trip replacement multipliers are applied to estimate the total distance traveled by bicycling and resulting vehicle miles traveled (VMT) reduced. National average trip distance multipliers are sourced from NHTS and SRTS, ranging from 0.77 miles for a K-12 bike to school trip to 3.54 miles per adult bike commute trip. Vehicle trip replacement multipliers assume that for each bicycling trip, the chance of bicycling replacing another mode for that trip is equal to the mode share of that other mode. Vehicle trip replacement multipliers are calculated independently using the mode split for each trip purpose available. For example, commute trip mode split is used for commute vehicle trip replacement, and college trip mode split is used for college vehicle trip replacement. Single-occupancy vehicle trip equivalents are used to estimate VMT reduction; replaced carpool trips are weighted at 50% of replaced single-occupancy vehicle trips.

Figure 2 provides a visual depiction of the steps used to translate local and national transportation data into an annual estimate of the bicycling activity currently

happening in the Albemarle region.

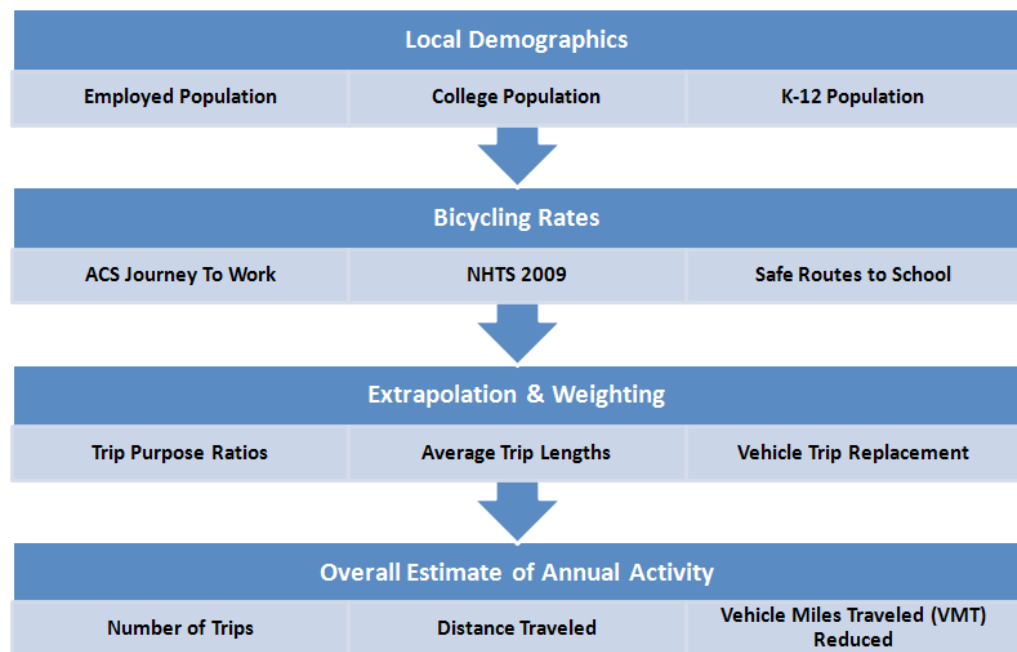


Figure 2. Albemarle Existing Bicycling Activity Estimate Methodology

### Key Findings Related to Existing Demand

Census tract level ACS data was the primary source for estimating existing levels of bicycling activity around the Albemarle region. Using ACS, NHTS, and Safe Routes to School data sources, it is estimated that approximately 800,000 miles of trips in the ten-county area that could be made by car are now being made by bicycling annually.

### ESTIMATING BICYCLING BENEFITS

Benefits of bicycling are based on the number of regular active transportation users and miles traveled developed in the overall demand estimate. Numerous studies have estimated the dollar value of the benefits of bicycling such as reduced pollution from the reduction of vehicle travel, improved health from increased physical activity, and other benefits (see Table 2). Using figures from these studies, overall levels of bicycling transportation activity can be expressed in terms of their dollar value to local residents and the social benefits to the community at large.

### Key Findings Related to Existing Benefits

Although current levels of bicycling around Albemarle are slightly below national averages, active transportation returns significant benefits to the region and local residents in the form of improved air quality, reduced transportation costs, and improved health. Existing rates of bicycling transportation generate an estimated \$1 million in annual benefits to the Albemarle region.

Bicycling rates vary from place to place around the ten-county Albemarle region. Currently, Hyde County residents bike to work at the highest rate compared to other areas in the community, with an estimated 1.6% bicycle mode share. Table 4 compares the estimated benefits of bicycling transportation across the region by county.



Table 1. Bicycling Demand Estimation and VMT References - Demand/Activity Multipliers

TRIP PURPOSE EXTRAPOLATION		
<b>Commute Trip Mode Share</b>	<b>College Trip Mode Share</b>	<b>K-12 Trip Mode Share</b>
Bike: 0.4%	Bike: 1.7%	Bike: 1.0%
ACS 2006-10 (varies by location)	NHTS 2009 (used region wide)	SRTS Baseline, 2009 (used region wide)
<b>Utilitarian Trip Multiplier</b>		
Bike: 1.6%	NHTS 2009 (used region wide)	

ANNUAL TRIP EXTRAPOLATION		
<b>Annual Work Days</b>	<b>Annual College Class Days</b>	<b>Annual K-12 School Days</b>
251	149	180
261 Weekdays - 10 Federal holidays	Coll. of the Albemarle 2012-13 Calendar	ECS, North Carolina State Minimum

In addition to utilitarian transportation purposes, Albemarle area residents make many bicycling trips for social and recreational purposes. While these trips may not necessarily replace vehicle trips and therefore are not included in the transportation benefits tables above, social and recreational bicycling activity contributes to the livability of the region. Albemarle residents make an estimated 600,000 social or recreational bicycling trips annually.

#### *Potential Future Benefits*

The Albemarle region is taking steps to improve the

accessibility, safety and quality of the bicycling environment, and the implementation of this plan will lay the groundwork for higher levels of active transportation and greater recognition in the future. Analysis of current bicycling benefits show how active transportation is a boon to the health and economy of the region. Investing in improvements to bicycling transportation networks could create even greater annual benefits.

Communities awarded by the League of American Bicyclists' Bicycle Friendly Communities (BFC) program

ANNUAL VEHICLE TRIPS REPLACED (SOV EQUIVALENT)		
<b>Commute Vehicle Trip Replacement</b>	<b>College Vehicle Trip Replacement</b>	<b>K-12 Vehicle Trip Replacement</b>
Bike: 84.5%	Bike: 81.5%	Bike: 42.6%
ACS 2006-10 (varies by location)	NHTS 2009 (used region wide)	SRTS Baseline, 2009 (used region wide)

ANNUAL VEHICLE MILES TRAVELED REDUCED		
<b>Commute Trip Distance</b>	<b>College Trip Distance</b>	<b>K-12 Trip Distance</b>
Bike: 3.54	Bike: 2.09	Bike: 0.77
NHTS 2009	NHTS 2009	SRTS Baseline, 2009 (used region wide)
<b>Utilitarian Trip Distance</b>		
Bike: 1.89	NHTS 2009	

Table 2. Bicycling Transportation Benefits References - Benefits Multiplier

Reduced Emissions	Lb/ VMT	Reduced Emissions Costs	\$/ton	Reduced Externalities	\$/ VMT
Hydrocarbons	0.00300	Volatile Organic Compounds	\$1,700	Traffic Congestion	\$0.05
Particulate Matter	0.00002	Particulate Matter	\$168,000	Vehicle Crashes	\$0.36
Nitrous Oxides	0.00209	Nitrous Oxides	\$4,000	AAA, 2008	
Carbon Monoxide	0.02734	Carbon Monoxide	n/a		
Carbon Dioxide	0.81351	Carbon Dioxide	\$36.03	Road Maintenance Costs	\$0.15
EPA, 2007		EPA, 2007		Kitamura, Zhao & Gubby, 1989	

Physically Inactivity Rate	%	Reduced Healthcare Costs	\$/Year	Vehicle Operating Costs	\$/ VMT
North Carolina	24.5%	Savings/Newly Active Person	\$585.97	Operational Std. Mileage Rate	\$0.56
2010 BRFSS (CDC)		Wang, McDonald et al, 2012		IRS, 2012	

Table 3. Estimated Annual Benefits of Bicycling Transportation

Area	Total Monetized Benefit
Annual VMT Reduced	837,000
<b>Air Quality</b>	
CO2 Emissions Reduced (pounds)	681,000
Other Vehicle Emissions Reduced (pounds)	27,000
Total Vehicle Emissions Costs Reduced	\$79,000
<b>Social Benefits</b>	
Reduced Traffic Congestion Costs	\$42,000
Reduced Vehicle Crash Costs	\$301,000
Reduced Road Maintenance Costs	\$126,000
<b>Individual Benefits</b>	
Household Vehicle Operation Cost Savings	\$465,000
Health Care Cost Savings from Physical Activity	\$61,000
<b>Total Benefits:</b>	<b>\$1,074,000</b>

Table 4. Estimated Annual Benefits of Bicycling Transportation by County

County	Bicycle Mode Share	CO2 Emissions Reduced (lbs)	Other Emissions Reduced (lbs)	Reduced Crash and Congestion Costs	Reduced Road Maintenance Costs	Household Transportation Cost Savings	Health Care Cost Savings from Physical Activity	Total Monetized Benefits
Camden	0%	5,600	200	\$2,800	\$1,000	\$3,800	\$1,300	\$9,700
Chowan	0.07%	17,200	700	\$8,700	\$3,200	\$11,700	\$2,800	\$33,400
Currituck	0.2%	64,900	2,600	\$32,700	\$12,000	\$44,300	\$5,800	\$103,100
Dare	0.6%	251,700	10,000	\$126,800	\$46,400	\$171,700	\$18,200	\$385,300
Gates	0%	5,000	200	\$2,500	\$900	\$3,400	\$1,000	\$11,200
Hyde	1.6%	61,400	2,400	\$31,000	\$11,300	\$41,900	\$5,000	\$94,600
Pasquotank	0.4%	179,900	7,200	\$90,600	\$33,200	\$122,700	\$18,200	\$283,400
Perquimans	0%	7,600	300	\$3,900	\$1,400	\$5,200	\$2,100	\$19,100
Tyrrell	0%	1,300	100	\$700	\$200	\$900	\$300	\$3,000
Washington	0.8%	86,600	3,500	\$43,600	\$16,000	\$59,100	\$6,700	\$131,000
<b>Total</b>	<b>0.4%</b>	<b>681,000</b>	<b>27,000</b>	<b>\$343,000</b>	<b>\$126,000</b>	<b>\$465,000</b>	<b>\$15,000</b>	<b>\$1,074,000</b>

provide a valuable reference point for setting goals and creating a vision for what role bicycling transportation could play in the Albemarle region in the future. The League awards BFC designation on a scale from Bronze to Diamond to cities and counties that have made significant strides to improve the bicycling environment. The League of American Bicyclists reports that BFC-awarded cities have experienced 80% growth in bicycling activity between 2000 and 2011.

Future growth in Albemarle bicycling rates would generate economic, environmental, and health benefits greater than the current estimate of \$1 million in annual benefits to the region. In a scenario where bicycling rates increase to levels found in Silver-level Bicycle Friendly Communities, local benefits from bicycling could reach more than \$8 million per year. Table 5 provides examples of the monetized annual benefits of bicycling in the Albemarle region at increased rates.

The potential benefits of increased bicycling rates in the Albemarle region make a strong case for increased investment in active transportation infrastructure. The new bicycling facilities proposed in this plan will become valuable assets that will increase the health, affordability, and livability of the Albemarle region.

Table 5. Potential Annual Benefits of Increased Bicycling in the Albemarle region

Bicycle Commute Mode Share	Current 0.4%	US Average 0.5%	Silver BFC Average 2.8%
Annual VMT Reduced	837,000	1,180,000	6,630,000
<b>Air Quality</b>			
CO2 Emissions Reduced (pounds)	681,000	960,000	5,390,000
Other Vehicle Emissions Reduced (pounds)	27,000	40,000	210,000
Total Vehicle Emissions Costs Reduced	\$79,000	\$110,000	\$630,000
<b>Social Benefits</b>			
Reduced Traffic Congestion Costs	\$42,000	\$60,000	\$330,000
Reduced Vehicle Crash Costs	\$301,000	\$430,000	\$2,380,000
Reduced Road Maintenance Costs	\$126,000	\$180,000	\$1,000,000
<b>Individual Benefits</b>			
Household Vehicle Operation Cost Savings	\$465,000	\$660,000	\$3,680,000
Health Care Cost Savings from Physical Activity	\$61,000	\$90,000	\$480,000
<b>Total Benefits:</b>	<b>\$1,074,000</b>	<b>\$1,530,000</b>	<b>\$8,500,000</b>

Note: Estimates reflect conceptual benefits that would be generated at given mode shares as if they existed in the Albemarle region today. Values are not discounted and do not reflect future demographic growth, cost changes, or other multiplier changes.

## TOURISM BICYCLING ACTIVITY IN THE ALBEMARLE REGION

### VISITATION

Many visitors to the Albemarle region experience local attractions by bicycling, especially the ocean beaches and National Parks of the Outer Banks. Three National Parks in the Outer Banks attract approximately 3 million visitors annually (see Table 6).



In total, as many as 5 million people may visit Dare County every year.

Table 6. National Park Visitation on the Outer Banks<sup>2</sup>

Park	2007	2008	2009	2010	2011	Five-Year Average
Cape Hatteras NS	2,237,378	2,146,392	2,282,543	2,193,292	1,960,711	2,164,063
Fort Raleigh NHS	321,717	311,751	338,212	305,711	282,134	311,905
Wright Brothers NMEM	494,331	527,721	476,291	476,200	445,455	484,000
<b>Total</b>	<b>3,053,426</b>	<b>2,985,864</b>	<b>3,097,046</b>	<b>2,975,203</b>	<b>2,688,300</b>	<b>2,959,968</b>

### IMPORTANCE OF BICYCLING

A yearlong study of visitors from 2005-2006 found that over a third of Outer Banks visitors hiked or biked during their trip, especially during the spring when nearly half of all visitors took advantage of pleasant weather for hiking and bicycling<sup>3</sup>.

An Outer Banks visitor satisfaction study conducted by North Carolina State University in 2011 gathered feedback from several visitors noting bike riding and the availability of rental bikes as among the best features of their trip<sup>4</sup>. Bicycle rentals are available

<sup>2</sup> NPS Annual Recreation Visits Report for 2006 to 2011, <https://irma.nps.gov/Stats/SSRSReports/System%20Wide%20Reports/5%20Year%20Annual%20Report%20By%20Park>.

<sup>3</sup> 2005-2006 Year Long Visitor Profile, [http://www.outerbanks.org/media/843352/2005\\_2006\\_year\\_long\\_visitor\\_profile.pdf](http://www.outerbanks.org/media/843352/2005_2006_year_long_visitor_profile.pdf).

<sup>4</sup> 2011 Outer Banks, North Carolina Visitor Appraisal,

at numerous local businesses along the Outer Banks. However, the study also found that visitors cited transportation among the lowest performing factors that affected their enjoyment of their visit. At least one survey respondent responded that additional bike lanes could have improved their enjoyment of the Outer Banks, with one visitor expressing that "needing a car to get around" was a drawback to their visit.

### ECONOMIC IMPACT

NDCOT and NCSU completed landmark study of the economic impact of bicycling in the Outer Banks in 2004, concluding that bicycle tourism generated \$60 million in economic impact each year, supporting 1,400 jobs<sup>5</sup>. Approximately 17% of visitors reported bicycling while on the Outer Banks, totaling an estimated 680,000 people annually. The study also gathered detailed feedback from bicycling visitors, over three quarters of whom said they thought the Outer Banks should build additional bicycle lanes and paths. Since then, new efforts have supported bicycle tourism in the area, including the detailed Dare County bicycle map published by NCDOT in 2005, and new or upgraded bicycling facilities, such as the new paved Ocracoke multi-use path.

[http://www.outerbanks.org/media/892145/2011\\_visitor\\_satisfaction\\_and\\_preference\\_research\\_-\\_ncsu\\_study.pdf](http://www.outerbanks.org/media/892145/2011_visitor_satisfaction_and_preference_research_-_ncsu_study.pdf).

<sup>5</sup> The Economic Impact of Investments in Bicycle Facilities, NCDOT, [http://www.ncdot.gov/bikeped/download/bikeped\\_research\\_EIAoverview.pdf](http://www.ncdot.gov/bikeped/download/bikeped_research_EIAoverview.pdf).

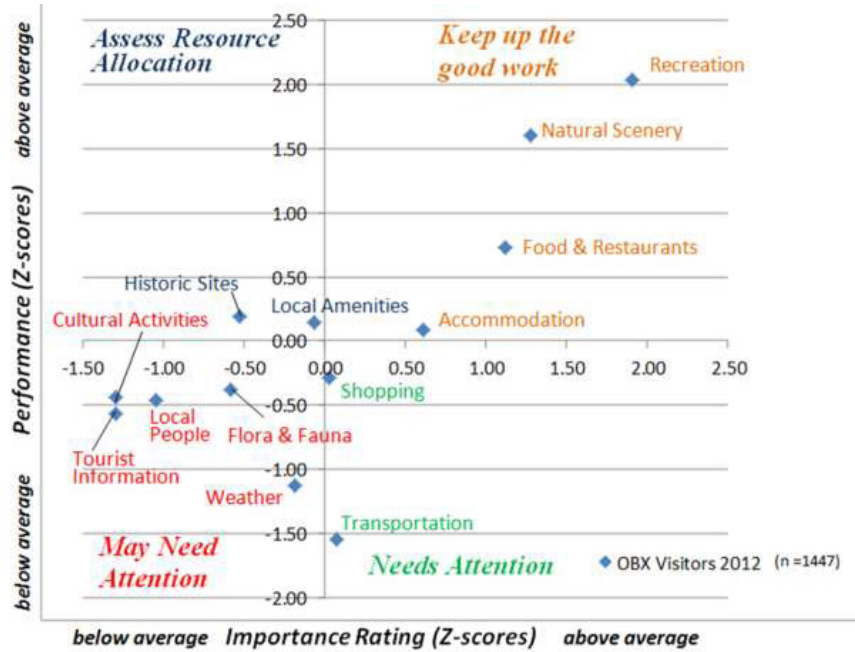


Figure 3. Satisfaction Survey of Visitors to the Outer Banks Transportation (Source: 2011 Outer Banks, North Carolina Visitor Appraisal).

While recent visitor surveys and studies have not captured the same depth of information on bicycling activity across the Albemarle region, the growing popularity of bicycling combined with increased tourism activity has likely increased the economic impact of bicycling over the last 8 years. Extrapolating the results of the 2004 study to account for overall tourism growth, relative increased interest in bicycling, and adjusting for inflation, the annual economic impact of bicycle tourism in the Albemarle region

Table 7. Estimated Economic Impact of Bicycle Tourism based on 2004 NCDOT Study

Data Point	2004	2012	Note
Total Visitors	4,000,000 <sup>6</sup>	4,500,000	Midrange estimate for total 2012 visitors; may be as high as 5 million.
United States Bicycle Commute Rate	0.45%	0.56%	National bicycle commuting rate used as a proxy to estimate likely relative increase in interest in bicycling among all visitors. <sup>7</sup>
Bicycle Tourism Visitors (as % of total)	17% <sup>8</sup>	21%	Assumes relative increase of bicycling activity among visitors similar to national rates, approximately 25% (see above).
Bicycle Tourism Visitors	680,000 <sup>9</sup>	955,000	Applied relative increase of bicycling activity among visitors (see above).
Inflation	\$1.00	\$1.22	Assumes bicycle visitors consumed similar goods and services in 2012 as were documented in 2004, and that prices increased similar to the overall Consumer Price Index. <sup>10</sup>
<b>Annual Economic Impact</b>	<b>\$60,000,000 <sup>11</sup></b>	<b>\$103,000,000</b>	<b>In 2004 and 2012 dollars, respectively.</b>

could be as high as \$100 million per year.

<sup>6</sup>The Economic Impact of Investments in Bicycle Facilities, NCDOT, [http://www.ncdot.gov/bikeped/download/bikeped\\_research\\_EIAoverview.pdf](http://www.ncdot.gov/bikeped/download/bikeped_research_EIAoverview.pdf).

<sup>7</sup>American Community Survey, 2006 & 2011 1-Year Sample, B08301 (nearest available data years to 2004 & 2012).

<sup>8</sup>The Economic Impact of Investments in Bicycle Facilities, NCDOT, [http://www.ncdot.gov/bikeped/download/bikeped\\_research\\_EIAoverview.pdf](http://www.ncdot.gov/bikeped/download/bikeped_research_EIAoverview.pdf).

<sup>9</sup>Ibid.

<sup>10</sup>Bureau of Labor CPI Inflation Calculator, 2004-2012, [http://www.bls.gov/data/inflation\\_calculator.htm](http://www.bls.gov/data/inflation_calculator.htm).

<sup>11</sup>The Economic Impact of Investments in Bicycle Facilities, NCDOT, [http://www.ncdot.gov/bikeped/download/bikeped\\_research\\_EIAoverview.pdf](http://www.ncdot.gov/bikeped/download/bikeped_research_EIAoverview.pdf)

## ROADWAY DATA COLLECTION RESULTS

As a starting point for the infrastructure recommendations of this plan, data on roadway characteristics was collected across the Albemarle region. That data is summarized in the following table.

### NORTH OF SOUND SUBREGION

#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
1	Hwy 94/32 Bridge	-	45/55	2	N	12, 12	-	-	4, 4	-	32	Edenton/ Mainland	Wall 2 ft, 4 in. Very windy; trucks; Beautiful
2	NC 32	Water to Poplar Neck	-	2	N	12, 12	-	-	0.5, 0.5	-	25	-	Room to widen shoulder
3	NC 94 Soundside	NC 32 to Yeopim	45/55	2	N	10, 10	-	-	1, 1	-	22	Airport	Scenic, not much traffic. Ditches an issue - classic ditch and utility. Some intermittent shoulder
4	Yeopim/32	Soundside to Edenton boundary	45/55	2	N	10, 11, 11, 10 at new bridge. 11, 11	-	-	10, 10 (new bridge). 1,1	-	42 at bridge	-	Beautiful river; Speed changes to 35 at Old Hertford into town
6	Yeopim/32	Just E of Jackson to RR	35	2	N	16, 16	-	-	-	2,2	32 + 4 gutter	Edenton	Easy stripe. Edenton - Many low inc. peds/bikes
7	Broad	Water to 32	20	2	N	-	-	Y	-	-	-	Water, businesses	Calm, diagonal on street parking. Sharrow. Could consider intersection treatments
8	Broad	32 to Freemason	35	4	N	12.5, 10, 10, 12.5	-	N	-	2,2	45 + 4 gutter	-	Bike Lane Road diet. Cars speeding at 4 lane section
10	Broad	Freemason	35	4	N	9.5, 10.5, 10.5, 9.5	-	N	-	2,2	40 + 4 gutter	Schools, Residential	"
11	Broad	32 to Oakum	35	2	N	18, 18	-	?	-	no gutter	36	-	Easy stripe. Some traffic loss after 32
12	Oakum	Park to Freemason	35	3	Y	11, 10, 11	-	N	-	2,2	32 + 4 gutter	Schools, Residential	Much less traffic than Broad. Is turn lane really needed?



#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
13	Oakum	Freemason to Church	35	2	N	12, 12	-	?	-	2,2	24 + 4 gutter	Residential, water	Reduce speed limit. Bike detector loop at Church light.
14	Oakum	Church to water	25	2	N	10, 10	-	N	-	N	20	Residential, water	-
15	Granville	Water to Carteret	35	2	N	12, 12	-	N	-	N	24	-	Reduce speed limit. Children playing sign. Bike detector loop at Queen
16	Granville	Carteret to Cemetery	35	2	N	19, 18.5	-	N	-	1.5, 1.5	37.5 + 3 gutter	Residential	Greenway opportunity
17	Granville	Cemetery to 32	35	2	N	Narrows	-	-	-	-	-	-	-
18	Broad	RR to Food Lion	45	2	N	12.5, 12.5	-	N	2,2	-	29 edge of pavement	Food Lion	Fair amount of traffic
19	Broad	Oakum to RR	35	3	Y	Wide	-	N	-	-	-	-	-
20	Coke	Blade to Tyler	35	2	N	17, 17	-	N	-	2	34 + 4 gutter	Food Lion, elementary school	Sharrows on Blade. Low traffic. 2-way cycle track possible on east side. Need good bike/ped xing of Coke at Blade and perhaps Tyler
22	Queen	Granville to Creek	25	2	N	13, 13	-	N	-	2	26 + 4 gutter	Commercial / Residential	Part of state bike route
23	Queen	Creek to Terry Ave	25/ 35/45	3	Y	14, 10, 14	-	N	-	2	38 + 4 gutter	Commercial / Residential	-
24	MLK	Granville to Vance	35	2	N	12, 12	-	N	-	2	24 + 4 gutter	Apartments, downtown	Connect to apts. Not quite wide enough for bike lanes
25	Emperor Landing	Queen to Tiptoe	45/55	2	N	9, 9	N	N	N	N	18	Southbound route	Not much traffic. Pretty corridor
26	Tiptoe	Emperor Landing to Macedonia	45	2	N	9, 9	-	-	-	-	18	-	-
27	Macedonia	Tiptoe to Chambers Ferry	45	2	N	10, 10	-	-	-	-	20	-	-
28	Ch Ferry/ Morristown	Macedonia to 32	45?	2	N	9, 9	-	-	-	-	18	-	Winding rural
29	Rocky Hock	32 to RH Creek	45?	2	N	9, 9	-	-	-	-	18	-	Small bridges generally good w/ speed

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#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
30	RH Creek	RH to Riverby Farm	-	2	N	9, 9	-	-	-	-	18	-	Lots of cotton!
31	Riverby Farm	RH Creek to Harris Landing	-	2	N	9, 9	-	-	-	-	18	-	Why not include Harris Landing? Large chicken coops smell. 15' wide road
32	Harris Landing	Riverby Farm to Tynch Town Rd	-	2	N	8, 8	-	-	-	-	16	-	-
33	Tynch Town	At H. Landing	45	2	N	9, 9	-	-	-	-	18	-	-
34	Gum Pond	Tynch Town to RH Landing	45	2	N	8.5, 8.5	-	-	-	-	17	-	No traffic throughout
35	RH Landing	Gum Pond to River	45	2	N	9, 9	-	-	0.5, 0.5	-	19	-	-
36	River	RH Landing to RH Rd	45	2	N	9.5, 9.5	-	-	0.5, 0.5	-	20	-	Cotton everywhere
37	RH Rd	At River Rd	45/55	2	N	9.5, 9.5	-	-	0.5, 0.5	-	20	-	"
38	Dillard's Mill Rd	RH to Wingfield	45/55	2	N	9, 9	-	-	0.5, 0.5	-	19	-	"
39	Wingfield	At DM Rd	45	2	N	8.5, 8.5	-	-	0.5, 0.5	-	18	-	Scenic Wingfield farm
40	DM Rd	Wingfield to Cannons Ferry	45/55	2	N	9, 9	-	-	N	-	18	-	"
41	Cannons Ferry	At DM Rd	45	2	N	10, 10	-	-	N	-	20	-	Civil war trail
42	Catherine Creek	Welch to Carters	45	2	N	9, 9	-	-	-	-	18	-	"
43	NC 37	Carters to Town boundary	55	2	N	11, 11	-	-	1, 1	-	24	-	Notable increase in traffic
44	Main	Town boundary to Court	20/35	2	N	16.5, 16.5	N	N	-	2, 2	33 + 4 gutter	Downtown, park	Stripe easily
45	Main	Court to US 158 Business	20/35	2	N	8, 10, 10, 8	N	Probably, no cars at 4 pm	-	2, 2	36 + 4 gutter	Downtown, school	Ready to go unless parking is an issue

#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
46	Main	US 158 Business to School	20/35	2	N	16.5, 16.5	N	N	N	2,2	33 + 4 gutter	Dollar General, downtown, school	Consider buffered bike lanes
47	US 158 Bus	DT to US 158	45	2	N	12, 12	N	N	N	-	24	-	Multi-use sidepath tough w/ ditches up against power poles and agriculture other side
48	US 158	US 158 Bus eastbound to Acorn Hill	55	2	N	11, 11	-	-	-	1,1	22 + 2 gutter	From downtown Gatesville to schools, comm. center, state park	Recently resurfaced. Multi-use side path. Otherwise bike lane in future widening.
49	US 158	Acorn Hill to County Line	55	2	N	11, 11	-	-	3.5, 3.5	-	29	-	Wet all around. 2-3 easements to 158
50	US 158	At County Line	55	2	N	11.5, 11.5	-	-	-	1,1	23 + 2 gutter	-	"
51	Yeopim/ Burnt Mill	Haughton to Snug Harbor	45/55	2	N	8.5, 8.5	-	-	N	-	Ranging 17 to 19	-	Pretty road, no traffic. Long term paved shoulder w/ resurfacing
52	Edenton	Ballahack to near King	35/45	3	Y	10, 12, 10	-	-	-	2,2	32 + 4 gutter	High school, Res	Too narrow for on-road. Could remove turn lane but probably needed at school. No SW, so side path will be good
53	Edenton	King to Grubb	35	2	N	15, 15	-	-	-	No	30	-	Cars too fast. Will connect to school.
54	Dobbs	Edenton to RR	25	2	N	14.75, 14.75	-	N	-	-	29.5	"	Narrow. No measurement taken
55	Dobbs	RR to Woodland	25	2	N	14.75, 14.75	-	N	-	2,1	29.5 + 3 gutter	Hertford Grammar School	Calm, wide, easy stripe
56	Dobbs	Woodland to End	25	No stripe	N	-	-	-	-	-	-	School, social services	Calm, two options: nothing or bike boulevard/sharrow
57	Dobbs	Edenton to Church	35	2	N	20, 20	-	Signed for none; some cars parked	-	N	40	"	Reduce speed limit. Add bike detector loop on Dobbs?



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#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
58	Harvey Pt	Ocean/17 to N Commerce	55	3	Y	11, 10, 11	-	-	3.5, 3.5	N	39	Food Lion	Reduce speed limit. Need ped xing improvement at 17. Enter turn lane not really needed until Food Lion + intersection.
59	Harvey Pt	N Commerce to Newbold White	55	2	N	10.5, 10.5	N	N	3-4 each side	N	21 + varying shoulder	-	widen paved shoulder to be consistent, some sections of narrower shoulder
60	Church	17 to near creek	35	3	Y	9.5, 11, 9.5	N	N	N	2,2	30 + 4 gutter	Food Lion & towards downtown	Part of East Coast Greenway
61	Church	B/W 3 lane + bridge	35	2	N	13, 13	N	N	N	2,2	26 + 4 gutter	Downtown	Tough. Only 26, could do 3   10   10   3 (gutterpan included). Maybe sharrow best
62	Church	Creek bridge	35	2	N	14, 14	N	N	N	N	28	Downtown	"
63	Church	Creek Bridge to White	35	2	N	15.5, 15.5	N	N	N	2,2	31 + 4 gutter	Downtown	width tapers closer to bridge
64	Church	White to Market	35	2	N	13, 18 (on street parking)	N	Y one side	N	2,2	31 + 4 gutter	Downtown	On street parking on one side (wide side); shift to sharrow
65	Church	Market	25	2	N	-	N	Y both sides	N	N	30	Downtown	calm, on street parking full both sides downtown
66	Grubb	Church to Kenyon	35	2	N	13, 17	N	N	N	2,2	30 + 4 gutter	Downtown, park	Lower speed limit; 13 & 17 foot lanes; this evens out and varies some, but generally 30 ft
67	Church	Grubb to Bridge	25	2	N	15, 15	N	N	N	N	30	Downtown	At bridge, narrows - add signage
68	Winfall	Church to Yates	45	2	N	12, 11.5	N	N	3.5, 3.5	N	30.5	Winfall	-
69	Winfall	Yates to Main	45	2	N	12.5, 12.5	N	N	1-2; varies	N	25 + varying shoulder	-	3 lanes at school w/ no paved shoulder. Enough space to add paved shoulder or restripe there.
70	Belvidere	School + beyond to King	35/55	2	N	11, 11	N	N	very little	N	22	-	-

#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
71	Belvidere/ Main	King to 2 Mile Desert Rd	35	2	N	16, 15.5	N	N	N	2,2	31.5 + 4 gutter	-	-
72	Main	2 Mile Desert Rd to Winfall	35	2	N	Narrower for short section	N	N	-	2,2	-	-	-
73	Main	Winfall to Bembury	35	2	N	14.5, 14.5	N	N	N	2,2	29 + 4 gutter	Winfall	-
74	Riverside	Agavar to	25	2	N	16, 16	-	N	-	C + G no pan	36	Downtown, parks, areas south	On street parking is allowed & would be an issue. If parking is kept, sharrow
75	Pearlree	Salem to	35	2	N	16.5, 16.5	-	Y, some cars	-	2,2	33 + 4 gutter	Elem. school, housing development	Short stretch from school to end of housing development
76	Church	Persse to Highway	25	2	N	18, 18	-	Yes, both sides	N	N	36	-	Considerable amount of traffic and on street parking; several cyclists. Lower speed limit to 20. Diversers, bulbouts, sharrows; Is Church St. route?
77	Main	Selden to Road	25	2	N	7, 9, 9	-	7	-	Gutter, no pan	25	Culpepper Inn, residential	Low traffic, pretty narrow
78	Main	Road to Water	25	2	N	-	-	Y	-	-	-	-	Downtown setting, sharrow w/ on street parking
79	Harney	158 to Bell	25	2	N	16, 16	-	People are parking	-	2,2	32 + 4 gutter	housing dev.	No light at 158 which is a problem
80	Bell	Harney to Wilson	25	2	N	-	-	-	-	-	-	-	Residential, low volume, narrow
81	Wilson	Bell to Broad	25	2	N	-	-	Some parking	-	-	-	-	Residential, low volume
82	Broad	Wilson to Poindexter	25	2	N	19, 20	-	some parking	-	none	39	-	-
83	Parkview	Magnolia to (close to) Park	35	3	Y	10.5, 11, 10.5	-	N	N	2,2	32 + 4 gutter	-	Schools, back of Eliz. State. Southern fromdowntown to Eliz. State not enough width/ROW for BL's, and fair amount of traffic

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#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
84	Edgewood	Parkview to NC 34	35	2	N	20, 20	-	N	N	N	40	Food Lion	Some traffic calming, reduce to 25. 40' almost to NC 34. Sidepath down to 40' section. Need high-visibility crosswalk at Parkview xing.

*SOUTH OF SOUND SUBREGION*

#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
1	Water St	Monroe/ Madison	25	2	N	12', 12'	-	8'	-	-	40'	Main downtown area	Street lights. Bulb outs, better crosswalks at intersection could improve this street
2	Water St	Madison/ End	-	2	N	16', 16'	-	-	-	2', 2'	32' + 4' gutter	Sidewalk with lights on E side	Entrance to Rail Switch Nature Trail - planned trail on old rail bed
3	Main St	Water/ Rankin	25	2	N	12', 12'	-	-	-	Curb, no pan	24'	Sidewalks	-
4	Main St	Rankin/ Crescent	-	3	Y	13', 12', 14'	-	-	-	2', 2'	39' + 4' gutter	-	-
6	Main St	Crescent / Mackeys	-	3	Y	10' 9", 10' 9", 10' 9"	-	-	-	2', 2'	32' 3" + 4' gutter	Historic Neighborhood	-
7	Main St	Mackeys/ End	35	2	N	9' 6" , 9' 6"	-	-	-	-	19'	-	Share the road signs
8	Mackeys	Main/ 45	45	2	N	10' 6", 10' 6"	-	-	2' 6", 3' 6"	-	27'	-	Some debris/growth in shoulder; spotty shoulder on both sides
9	45/308	Mackeys/ Bridge	55	2	N	12', 12'	-	-	2', 2'	-	28'	-	Share the road signs,
10	45 Bridge	-	-	2	N	10-12' lanes	-	-	1' (not measured)	-	22-28'	-	Short railing, narrow sidewalk
11	Hampton Rd	Main/ Riverside	-	2	N	-	-	-	-	-	-	-	Comfortable neighborhood road
12	Monroe	-	-	2	N	12', 12'	-	-	-	Curb to 4th	24' + 4' gutter	-	-



#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
13	Washington	Main to South	-	2	N	12' 9", 12' 9"	-	-	-	2' 6", 2' 6"	35' 6" + 5' gutter	-	-
14	Washington	Water/ Main	-	2	N	13' 6", 13' 6"	-	Parallel and angled	-	-	46'	-	-
15	Alden/Golf	-	20	2	N	-	-	-	-	-	-	-	Quiet residential streets
16	Wilson	-	35	2	N	10' 6", 10' 6"	-	-	1' 6", 1' 6"	-	24'	-	Spotty Shoulders
17	64	-	-	5	Y	-	-	-	-	Curb & gutter	-	-	-
18	Long Ridge	-	-	2	N	10' 3", 10' 3"	-	-	Minimal (6")	-	21' 6"	-	-
19	Morrattock	-	-	2	N	-	-	-	Minimal	-	-	-	Dropoff for drainage
20	NC 32	-	45/55	2	N	12', 12'	-	-	Spotty (6")	-	24' +	-	-
21	NC 45	S of 64	45	2	N	10', 10'	-	-	Minimal (6")	-	20' +	Pretty, rural	Low traffic, comfortable
22	NC 45	N of 64	-	2	N	12', 12'	-	-	2', 2'	-	28'	Tree lined, attractive	-
23	Mackeys	E of 45	55	2	N	10' 6", 10' 6"	-	-	-	-	21'	Mackey's Ferry	Quiet
24	Woodlawn	-	-	2	N	9' 6", 9' 2"	-	-	Minimal	-	19'	Roper	-
25	Mackeys Ferry Rd	Mackeys to the water	35	2	N	-	-	-	-	-	-	-	Quiet
26	32/64	Mackeys/ Roper	55	2	N	10' 8", 10' 8"	-	-	Minimal	-	21' 4"	-	Quiet
27	32/64	Buncombe/ Railroad	45	2	N	12', 12'	-	-	3', 3'	-	30'	-	-
28	Railroad	64 to School	-	2	N	10' 3", 10' 3"	-	-	-	-	22'	-	-
29	Buncombe	-	-	2	N	11', 11'	-	8' on N side	-	-	30'	-	-
30	Newlands	Roper to Pettigrew	55/45	2	N	11' 3", 11' 3"	-	-	-	-	22' 6"	-	Quiet; some sections boring (no sightlines past trees)
31	Lake Shore	-	-	2	N	-	-	-	-	-	17'	-	Pretty road
32	Cherry	-	55	2	N	9', 9'	-	-	1' (varies)	-	20'	-	-
33	Mt Tabor/ Back Rd	-	-	2	N	9' 2", 9' 2"	-	-	9", 9"	-	19' 10"	-	Rough Road in some places
34	Meadow	-	45/55	2	N	-	-	-	-	-	-	-	Share the road signs; also Rough Rd

*Albemarle Regional Bicycle Plan*

#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
35	Main St	Seventh	20	2	N	13' 6", 13' 6"	-	-	-	2', 2'	37' + 4' gutter	-	-
36	Main St	Sixth	-	2	N	13', 13'	-	15' 6" angled, 7' parallel	-	2', 2'	48' 6" + 4' gutter	-	-
37	64	6th / 8th	-	2	N	10' 6", 11' 4"	-	-	3' 6" (varies)	-	21' 10" + shoulder	-	-
38	94	64/ 32	55	2	N	10' 7", 10' 7"	-	-	Varied shoulder	-	24' +	-	-
39	Davenport Forks	Jones White to end	45	2	N	10', 10'	-	-	-	-	20'	-	-
40	264	64/ N of Point Peter	55	2	N	9'11", 10'4"	-	-	6-9" (varies)	-	21' 9"	-	Recently resurfaced; feels remote
41	264	N of Point Peter/ Bayview	55	2	N	9'10", 10'2"	-	-	Minimal, overgrown	-	21' 4"	-	Not resurfaced, Point Peter unpaved, Mountain biking opportunities on unpaved refuge roads
42	264	Bayview/ Swamp	55	2	N	10' 1", 10' 6"	-	-	Minimal, overgrown	-	22' 2"	-	Share the road sign
43	Bayview Dr	264/ End	35/25	2	N	8' 11", 8' 11"	-	-	-	-	19' 1"	Trading Post, Waterfront, Baseball Fields	Rough pavement, residential
44	264	S of Bayview/ N of Swamp	45	2	N	-	-	-	-	-	-	-	-
45	264	N of Swamp/ S of Swamp	35	2	N	4', 11', 11', 4'	-	-	Shoulder varies thru town	-	30'	Engelhard	-
46	264	S of Swamp/ Engelhard	35	2	N	3', 12', 12', 3'	-	-	3'	-	36'	Gibbs Store	-
47	264	Engelhard/ Golden	35	2	N	15, 17	-	-	-	2', 2'	32' + 4' gutter	-	-
48	264	Town Edge/ Around Curve	45/ 55	2	N	11' 6", 11' 6"	-	-	-	-	23'	-	-
49	94	264/ North Lake	45	2	N	10' 6", 10' 6"	-	-	-	-	21'	Campground, Mattamuskeet Lodge, Wildlife viewing	Clearance on E side is 28' 6"

#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
50	North Lake	94/ 264	55	2	N	9' 6", 9' 6"	-	-	Shoulder varies	-	19' 4"	-	-
51	Parallel Rd in Fairfield	-	25	2	N	8' 1", 8' 1"	-	-	-	-	16' 2"	-	-
52	Piney woods	94	55	2	N	8' 4", 8' 4"	-	-	Sporadic Shoulder	-	16' 10"	Campground	-
53	264	Matt Schools/94	45	3	Y	11'3", 12'9", 11'	-	-	-	-	35'	Schools	-
54	Juniper Bay	264/	45	2	N	9'10", 11'	-	-	Shoulder varies	-	20' 8"	-	Ditch next to road
55	Arch	Juniper Bay/	-	2	N	9'6", 9'6"	-	-	-	-	19'	-	-
56	Quarter	Arch	-	2	N	9'4", 9'4"	-	-	-	-	18', 8"	-	-
57	Main St	-	35	2	N	10', 10'	-	-	-	-	20'	-	-
58	45	Into Swan Quarter	35	2	N	10', 10'	-	-	-	-	20'	-	-
59	94	Lake Matt	55	2	N	10' 6", 10' 6"	-	-	Shoulder varies	-	21'	-	-
60	Broad	64/ Main	20	2	N	13, 15	-	13' angled ea side	-	-	52'	-	Add hi vis crosswalks, planted wider sidewalk buffer
61	Main St	Water/ 2nd	25	2	N	-	-	Parallel on S side	-	Curb & gutter	33'	-	Scenic Byway
62	Main St	2nd/ Road	25	2	N	12, 12	-	-	-	-	-	-	-
63	Main St	Road/ 64	25	2	N	17', 17'	-	-	-	1', 1'	34' + 2' gutter	-	-
64	Road	64/ Main	-	2	N	10' 6", 10' 6"	-	-	-	1' 6", 1' 6"	21' + 3' gutter	-	-
65	64	Main/ Bridge	-	5	Y	12', 11' 5", 12' 4", 11'10", 11' 8"	-	-	-	-	59'	-	-
66	Elem School	-	-	2	N	8' 10", 8'10"	-	-	-	-	17' 11"	-	-
67	La Kaiser	-	35	2	N	10' 10", 10'	-	-	-	1 side w/ SW	20' 10"	-	-
68	Fonsoe	-	-	2	N	11', 10'	-	9' on 1 side	-	2', 2'	34' + 4' gutter	-	-



*Albemarle Regional Bicycle Plan*

#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
69	94	64/ Elem School	-	2	N	15' 7" ea	-	-	-	1' 9", 1' 9"	31' 2" + 3' 6" gutter	-	-
70	Bodwell	-	35	2	N	-	-	-	-	-	-	-	Pleasant, Residential, shaded
71	Newlands	Bodwell/ Fork Creek	-	2	N	-	-	-	-	-	-	-	-
72	Road St	-	45	2	N	-	-	W side	-	C & G	-	Tyrell County Visitor's Center	-
73	Soundside	-	55	2	N	-	-	-	-	-	17' 6"	-	-
74	64	-	-	2	N	11' 1"	-	-	-	1' 5", 1' 5"	22' 2" + 2' 10" gutter	-	-
75	Bodie Island Rd	To lighthouse	15	2	N	-	-	-	Small shoulder	-	-	-	-
76	Hwy 12	Nags Head/ south	45/55	2	N	11' 4", 11' 4"	-	-	4' 9"	-	31' 9"	-	Very comfortable; wide shoulder
77	Hwy 12 Bridge	Pea Island	-	2	N	-	-	-	Narrow	-	-	-	Sidewalk/short railing
78	Hwy 12	Mirlo Beach	45	2	N	11', 11'	-	-	3' 3", 3' 9"	-	30'	-	Sand in shoulder; peds/ bikes share in Mirlo Beach
79	Harbor Dr	Avon	-	2	N	11' 10", 11' 10"	-	-	-	-	23' 8"	-	-
80	Hwy 12	at Harbor Dr	-	2	N	12' 2", 12' 3"	-	-	3'	-	30' 6"	-	-
81	Hwy 12	Ocracoke Ferry/ Tryyard Creek	55	2	N	12', 12'	-	-	No	-	26'	-	-
82	Hwy 12	Tryyard Creek/ Island Creek	-	2	N	12', 12'	-	-	3'	-	30'	Beach Access on E Side	-
83	Hwy 12	Island Creek/ Town Edge	-	2	N	12', 12', 10' sidepath	-	-	3', 3' 4"	-	40'	-	-
84	Irvin Garish Hwy	At Town Edge	25	2	N	5', 11' 7", 11' 11", 5'	-	-	4'	-	39' 2"	-	Nice bike lanes
85	Irvin Garish Hwy	At Silver Lark	20	2	N	11' 6", 13'	-	-	4', 1' 6"	-	30'	-	Need sand maintenance on shoulder; driveway access management, landscaping/green streets to address flooding

#	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
86	Irvin Garish Hwy	Silver Lark/ Museum	20	2	N	-	-	-	-	-	18' 5"	-	3' 2" sidewalk
87	Neighborhood Road	-	20	2	N	-	-	-	-	-	16' 4"	-	Main issue is drainage
88	Hwy 12	Hatteras/ Eagle Pass	25	2	N	10' 3", 11' 2"	-	-	2' (varies)	-	21' 5"	-	Driveway access management necessary
89	Hwy 12	Eagle Pass/ Edge	35	2	N	11' 3", 11' 3"	-	-	3'	-	29' 6"	-	-
	Eagle Pass	-	35	2	N	9' 10", 9' 10"	-	-	Minimal	-	20' 6"	-	12' to power lines from road edge
	Hwy 12	At Buxton schools	-	3	Y	12' 3", 12' 7", 12' 3"	-	-	3' 6"	-	44'	-	-
	Buxton Back Rd	-	25	2	N	-	-	-	Minimal	-	19'	-	5' sidewalk on E side
	Lighthouse	-	35	2	N	11' 6", 11' 6"	-	-	-	-	23'	-	-
	NC 12	At Buxton	35	2	N	11' 6", 11' 6"	-	-	3' (varies)	-	23' + varied shoulder	-	Debris in shoulder
	NC 12	Avon	45	2	N	12', 12'	-	-	3' 6"	-	31'	-	-

OUTER BANKS SUBREGION

City	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
Duck	NC 12	At Cadwall	45	2	N	11'0", 10'4"	-	-	5'4", 2'	-	28' 8"	Residential	-
Duck	NC 12	-	45	2	N	11'0", 10'4"	-	-	12', 7'	-	40' 4"	Residential	-
Duck	NC 12	Station Bay	35	2	N	10'8", 10'8"	-	-	2', 2'	-	25'4"	Residential	-
Duck	NC 12	Mallard	35	2	N	11', 10'8"	-	-	2', 2'	-	25'8"	Residential	-
Duck	NC 12	Post office	35	2	y	9'6", 9'6"	-	-	5', 6'	-	30'	Residential	Buffer between road travel lane and path
Duck	NC 12	Olde Duck	35	2	y	10'10", 10'8"	-	-	6', 6' with 2' buffers	-	37'6"	Residential	-
Southern Shores	Dogwood Trail Rd	Kitty Hawk Rd	-	-	N	12', 12'	14'	-	-	-	38'	School/ neighborhoods	-
Southern Shores	Dogwood Trail Rd	-	25	2	N	13', 20'	3'	3'6"	-	-	39'6"	-	-
Southern Shores	Dogwood Trail Rd	-	25	2	N	15', 19'	-	-	4'	-	38'	-	-
Southern Shores	NC 12	At Dogwood	45	2	Y	-	-	-	-	-	38'	-	-
Southern Shores	NC 12	At Skyline	-	-	N	10'10", 10'10"	8' 8"	-	2', 1'6'	-	33'10"	-	Pedestrian refuge island at crossing
Kill Devil Hills	NC 12	At Atlantic	35	2	N	9'6", 9'6"	-	-	7', 6'	-	32'	-	Beach Access, Atlantic crosses 158, crossing treatments needed
Kill Devil Hills	6th Avenue	At Baum	25	2	N	9' , 9'6"	-	-	Minimal	-	19'6"	-	Widen trail, reduce buffer width
Kill Devil Hills	Veterans Trail	-	-	-	N	10'	-	-	-	-	10'	-	Divided asphalt trail around high school property, connects to Apt complex
Kill Devil Hills	NC 12	At Third	-	-	N	9'10", 9'10"	-	-	3'6", 3'6"	-	26' 8"	-	Side path is wide shoulder and not buffered. Consider speed limit reduction in this area.
Kill Devil Hills	NC 12	At Eighth	35	2	Y	9'10", 9'4"	9'2"	-	6', 6'6"	-	40' 10"	-	-

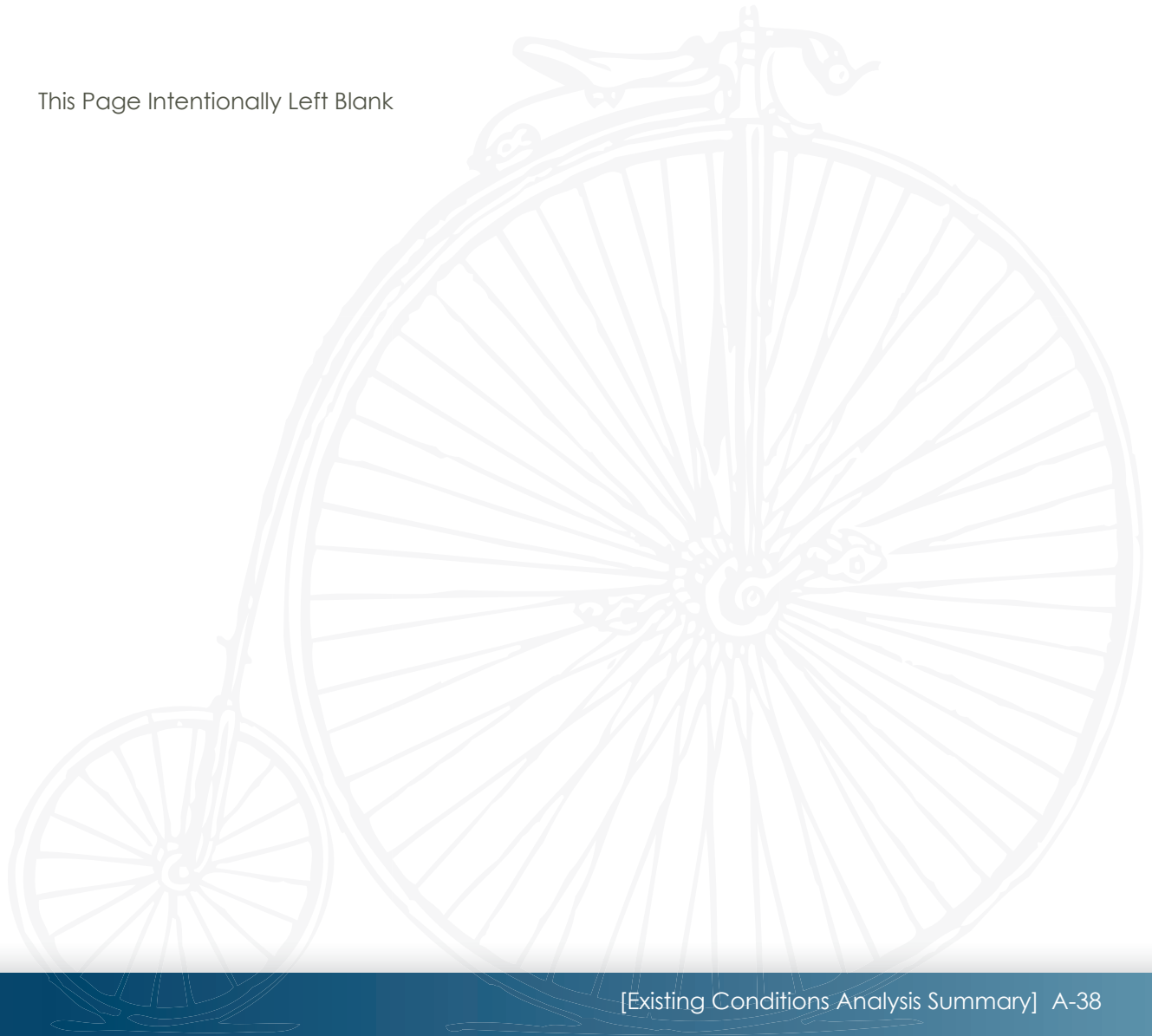


City	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
Manteo	US 64 / 264	At Croatan Sound	-	-	-	-	-	-	-	-	-	-	7'6" sidepath
Manteo	US 64 / 264	At Freedmen's Colony Rd	-	-	-	-	-	-	-	-	-	-	7'6" sidepath
Southern Shores	Ocean Road/NC 12	Near Southern Shores Realty	45	3	Y	10'4", 10'6", 10'8"	9'6"	-	6", 2'	-	43'6"	Commercial areas	-
Southern Shores	Juniper Rd	-	25	2	N	-	-	-	-	-	19'6"	Residential / school	Same rec's as Dogwood Trail Rd
Kitty Hawk	Wright Brother Memorial Bridge		55	4	N	12'2", 12', 12', 11' 6"	-	-	7'6", 2'	-	57' 2"	-	-
Currituck	158 / Caratoke	From bridge to Aydlett	55	5	Y	11', 11'6", 12', 11' 10"	10'10"	-	2'6", 2'6"	-	62'2"	-	-
Currituck	Aydlett	At 158	50	2	N	10'10", 9'9"	-	-	6", 1'6"	-	22'7"	-	-
Currituck	Aydlett	Griggs Elem.	35	2	N	9', 8'10"	-	-	Minimal	-	18'8"	School/ neighborhoods	-
Currituck	Macedonia Church	At Aydlett	45	2	N	8'10", 8'10"	-	-	Minimal	-	18'8"	-	-
Currituck	Walnut Island	At Caratoke		-	-	-	-	-	-	-	-	-	Crossing treatments needed
Kitty Hawk	Kitty Hawk	At Moor Shore	35	2	N	10', 11'6"	-	-	5', 3'6"	-	30"	-	-
Kitty Hawk	Moor Shore	Kitty Hawk	25	2	N	-	-	-	-	-	15'	-	-
Kitty Hawk	Poor Ridge	-	35	2	N	8'2", 8'	-	-	6"	-	17'	-	-
Kitty Hawk	Lindbergh	-	25	2	N	-	-	-	-	-	20'	-	-
Kitty Hawk	Eckner	-	25	2	N	9', 9'	-	-	1'6", 0	-	19'6"	-	-
Kitty Hawk	Eckner	At 158	25	2	N	-	-	-	-	-	20'9"	-	-
Kitty Hawk	Starfish	At Beach Road	35	2	N	10'4", 10'	-	-	2'6", 2'6"	-	25'4"	-	-

*Albemarle Regional Bicycle Plan*

City	Roadway	Segment (to/from)	Speed Limit	# of Lanes	Turn Lane	Lane Width (ft)	Median Island (ft)	On Street Parking (ft)	Paved Shoulder (ft)	Gutter Pan (ft)	Total Corridor Width (ft)	Destinations	Notes
Kitty Hawk	Moor Shore	Kitty Hawk to Beacon	25	2	N	-	-	-	-	-	-	-	-
Manteo	Airport Rd	At US 264/64	35	2	N	9', 9'	-	-	Minimal	-	19'	-	-
Manteo	Sir Walter Raleigh	Entire length	20	2	N	11'2", 12'	-	-	-	2', 2'	24'+ 4' gutter	-	-
Manteo	US 64	At Patty	35	2	Y	13'6", 13'8"	11'	-	-	2', 2'	38'2" + 4' gutter	-	5' sidewalks
Manteo	US 64	Just west of bridge	55	4	-	12', 12', 11'6", 12'	5'	-	4'6" shoulder, 5'6" bike lane w/ 2' buffer	-	64'6"	-	-

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# Appendix B

## Public Input

### OVERVIEW

In order to gain local knowledge and input, a public outreach component was included as an essential part of planning efforts for the Albemarle Regional Bicycle Plan. Public input was gathered through several different means including the following: steering committee meetings, six public workshops, comment forms, listserves, and online efforts (website, Facebook, online map, and an online version of the comment form). This offered the residents of the Albemarle region the opportunity to contribute to the Bicycle Plan's development.

### STEERING COMMITTEE

Steering committee meetings were held throughout the planning process with representatives from counties, municipalities, NCDOT, health agencies, and advocacy groups. The group established visions and goals for the plan, identified areas of need in the Albemarle region, and reviewed the plan. Input from the committee is reflected throughout the recommendations of this planning document.

### Chapter Contents

*Overview*

*Steering Committee*

*Local Meetings*

*Public Events*

*Online Outreach*

*Comment Form*





## **LOCAL MEETINGS**

Six meetings with local officials were conducted in October 2012 to gain further insight into existing conditions and inform preliminary recommendations. These meetings took place in the following locations:

- Duck Town Hall, Duck, NC
- Dare County Government Complex, Manteo, NC (2 separate meetings held here consecutively)
- Columbia Municipal Building, Columbia, NC
- Albemarle Commission, Hertford, NC
- Gardner Municipal Building, Elizabeth City, NC

Meetings were attended by officials from throughout the Albemarle Regional including: Currituck County, Dare County, Washington County, Gates County, Pasquotank County, Camden County Duck, Southern

Shores, Kill Devil Hills, Kitty Hawk, Nags Head, Manteo, Hatteras, Columbia, Plymouth, Edenton, Elizabeth City, Pettigrew State Park, Merchant's Millpond State Park, and Dismal Swamp State Park.

Input was taken in the form of map mark-ups, written comments, question and answer sessions, and discussion between local officials and consultant staff from Alta/Greenways.





## PUBLIC EVENTS

Six public events were attended during the planning process. The first three took place in October 2012 at the following community events:

- Elizabeth City Downtown Waterfront Market
- Scuppernong River Festival, Columbia
- Outer Banks Seafood Festival, Nags Head

The project team set up an informational booth at all three events in order to engage as many community members as possible. Preliminary input was gathered from residents to assist in the development of draft recommendations for the Plan. Approximately 250 people stopped by the informational booths.

The second three public events attended took place in May 2013 at the following events:

- Elizabeth City Potato Festival
- Englehard Seafood Festival
- Kill Devil Hills Relay For Life

Draft Plan recommendations were presented in map form at these events. Residents responded to these draft recommendations by providing feedback and discussion of proposed bicycle facilities. At all public events, input was taken in the form of map mark-ups, written comments, and discussion between residents, consultant staff from Alta/Greenways, and RPO staff. Additionally, a hard copy public comment form was developed and distributed for hand written responses during both sets of meetings.



## ONLINE OUTREACH

Information was provided to the public on a project website, through Facebook, an online map, and an online survey. The project website kept the public updated on the planning process, provided a link to the online comment form and other resources, and provided access to the Draft Plan for review.



The Facebook page served to update the community on upcoming events in addition to providing links to the online comment form and the project website.






## COMMENT FORM

A comment form was developed for the Albemarle Region RPO during this process and made available in both hardcopy and online form. The comment form was available online for approximately nine months. To maximize the responses to the online form, the web address was distributed at the public meetings, to local interest groups, in newsletters, in newspaper service announcements, on the website and project




Facebook page, and on flyers throughout the region. **302** persons completed the comment form.

The comment form results from over 300 respondents shown on the following pages have been tabulated to provide insight into local residents' opinions and values.

### 1. How do you rate present bicycling conditions in the Albemarle Sound region? (please select one)





	Response Percent	Response Count
Excellent 	3.7%	11
Fair 	44.7%	132
Poor 	51.5%	152
	answered question	295
	skipped question	7

### 2. How important to you is improving biking conditions in the Albemarle Sound region? (please select one)



	Response Percent	Response Count
Very important 	81.8%	243
Somewhat important 	15.5%	46
Not important 	2.7%	8
	answered question	297
	skipped question	5










### 3. How often do you bike now? (please select one)











		Response Percent	Response Count
never		11.1%	33
few times per month		46.6%	138
few times per week		32.4%	96
5+ times per week		9.8%	29
answered question			296
skipped question			6

### 4. Would you bike more often if more bicycle lanes, trails, and safe roadway crossings were provided for bicyclists?

		Response Percent	Response Count
Yes		92.9%	274
No		7.1%	21
answered question			295
skipped question			7

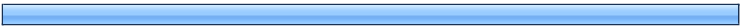
















**5. How do you feel drivers in your area typically behave around bicyclists? (please choose all that apply)**

		Response Percent	Response Count
Courteous, yield, and give bicyclists space		22.7%	66
Drive too fast		52.2%	152
<b>Pass bicyclists too closely</b>		<b>67.0%</b>	<b>195</b>
Tolerate bicyclists not following rules of the road		22.0%	64
Harass bicyclists		11.0%	32
Fail to yield to bicyclists crossing a street		24.7%	72
Other (please specify)		12.0%	35
		<b>answered question</b>	<b>291</b>
		<b>skipped question</b>	<b>11</b>



6. How do you feel bicyclists in your area typically behave? (please choose all that apply)			
		Response Percent	Response Count
Courteous, obeying all traffic laws		32.6%	94
Cycle in the roadway the opposing direction as vehicles		31.3%	90
<b>Fail to comply with traffic laws</b>		<b>39.9%</b>	<b>115</b>
Ride too slowly		5.6%	16
Are young and/or inexperienced		33.3%	96
Multiple cyclists ride abreast in the same travel lane		32.6%	94
Behave rudely		7.3%	21
Don't signal turns or stops		37.5%	108
Ride on the sidewalks		25.0%	72
Ride at night without lights		33.3%	96
answered question			<b>288</b>
skipped question			<b>14</b>









## 7. What factors discourage biking? (please choose all that apply)

		Response Percent	Response Count
Lack of bicycle lanes, shoulders, or paths		87.8%	253
Narrow lanes		63.2%	182
High-speed traffic		62.8%	181
Traffic volume		56.9%	164
Inconsiderate motorists		39.2%	113
Lack of bicycle parking		17.7%	51
Lack of showers and lockers at workplace		3.8%	11
Criminal activity		5.2%	15
Loose gravel or potholes		30.2%	87
Crossing busy roads		40.3%	116
Poor lighting		23.3%	67
Drainage grates		6.9%	20
Other travel modes are safer or more comfortable		13.9%	40
Hills		2.1%	6
Physical ability		4.9%	14
Travel time or distance		9.7%	28
Other (please specify)		6.6%	19
answered question			288
skipped question			14








### 8. Should public funds be used to improve bicycling facilities?

		Response Percent	Response Count
Yes		92.2%	260
No		7.8%	22
answered question			282
skipped question			20

### 9. Which types of funds should be used for bicycle infrastructure improvements? (please choose all that apply)













		Response Percent	Response Count
Local foundation or nonprofit		53.4%	150
Capital improvements bond or other financing strategy		55.2%	155
Existing local taxes		56.2%	158
New local taxes		13.2%	37
State and federal grants		75.4%	212
Other (please specify)		7.8%	22
answered question			281
skipped question			21

# 10. For what purposes do you bike most now? (choose all that apply)

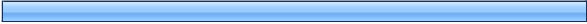
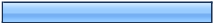

		Response Percent	Response Count
Fitness or recreation		94.6%	264
Transportation to work		12.5%	35
Transportation to school		2.5%	7
Travel to grocery store, shops, etc		25.4%	71
Social opportunities		25.8%	72
To limit automobile use		22.2%	62
Other (please specify)		6.8%	19
answered question			279
skipped question			23





11. What bicycling destinations would you most like to get to? (please choose all that apply).

		Response Percent	Response Count
Place of work		25.1%	68
School		7.0%	19
College/University		3.7%	10
Restaurants		38.7%	105
Public Transportation		3.0%	8
Shopping		43.2%	117
Parks		55.0%	149
Entertainment		31.7%	86
<b>Trails and greenways</b>		<b>74.5%</b>	<b>202</b>
Libraries or recreation centers		32.5%	88
The beach		55.7%	151
Other (please specify)		14.4%	39
		<b>answered question</b>	<b>271</b>
		<b>skipped question</b>	<b>31</b>

### 12. What type of bicycle facility do you prefer? (please choose one)

		Response Percent	Response Count
Bicycle path (separate from roadway)		69.7%	191
Bicycle lane or paved shoulder (separated space within roadway)		24.8%	68
Neighborhood road with lighter traffic		5.5%	15
answered question			274
skipped question			28

### 13. Which one of the following types of bicycle facilities should be a priority in this Plan? (please choose one)

		Response Percent	Response Count
Long-distance, regional, tourism/recreational bicycle facility		42.2%	114
Shorter-distance, local, utilitarian bicycle facilities		57.8%	156
answered question			270
skipped question			32

14. What do you think are the top roadway corridors most needing bicycle improvements?

NC 12 - 116

US 158 - 42

Colington Road - 21

US 17 - 16

Halstead/Weeksville - 15

NC 94 - 9

Dogwood Trail - 8

US 264 - 8

NC 343 (Camden area) - 7

Road Street (Elizabeth City) - 5

Bay Drive - 5

Highway 32 - 4

Ehringhaus - 4

Downtown Edenton - 3

15. What do you think are the top intersections most needing bicycle improvements? (Example response: Smith Ave. & 1st Avenue)

Colington and US 158 - 12

Albacore and NC 12 - 11

NC 12 and US 158 KH - 7

US 158 and Woods - 5

Halstead (random) - 5

Church/Harvey Point Road, US 17, Hertford - 4

NC 12 and US 158 (Whalebone Junction) - 4

US 158 and Juniper - 3














US 64 and Broad - 3

Kitty Hawk and US 158 - 3

US 158 and Walnut Island Road, Grandy - 2



**16. Which places need bicycle parking? (please choose all that apply)**

		Response Percent	Response Count
Place of work		24.5%	59
School		25.7%	62
College/University		19.1%	46
Grocery Store		53.9%	130
Restaurants		48.5%	117
Public Transportation		12.4%	30
Shopping		51.9%	125
Parks		54.4%	131
Entertainment		24.5%	59
Trails and Greenways		46.1%	111
Libraries/recreation centers		38.2%	92
<b>The beach</b>		<b>56.0%</b>	<b>135</b>
Other (please specify)		4.6%	11
		<b>answered question</b>	<b>241</b>
		<b>skipped question</b>	<b>61</b>









17. True or False. Counties and cities in the Albemarle region should require developers to construct biking and walking facilities with development.

		Response Percent	Response Count
True	<div><div></div></div>	89.7%	244
False	<div><div></div></div>	10.3%	28
answered question			272
skipped question			30

18. What is your zip code?



27927 - 66	27921 - 5
27949 - 34	27885 - 4
27909 - 31	27826 - 3
27948 - 29	27938 - 3
27954 - 9	27939 - 3
27959 - 9	27976 - 3
27925 - 8	Others (Total) - 33
27932 - 6	
27944 - 6	

## 19. Where do you live?








		Response Percent	Response Count
Gatesville		1.5%	4
Elizabeth City		11.9%	32
Edenton		2.2%	6
Plymouth		0.7%	2
Columbia		3.7%	10
Hertford/Winfall		2.2%	6
<b>Outer Banks</b>		<b>63.6%</b>	<b>171</b>
Other (please specify)		14.1%	38
		<b>answered question</b>	<b>269</b>
		<b>skipped question</b>	<b>33</b>



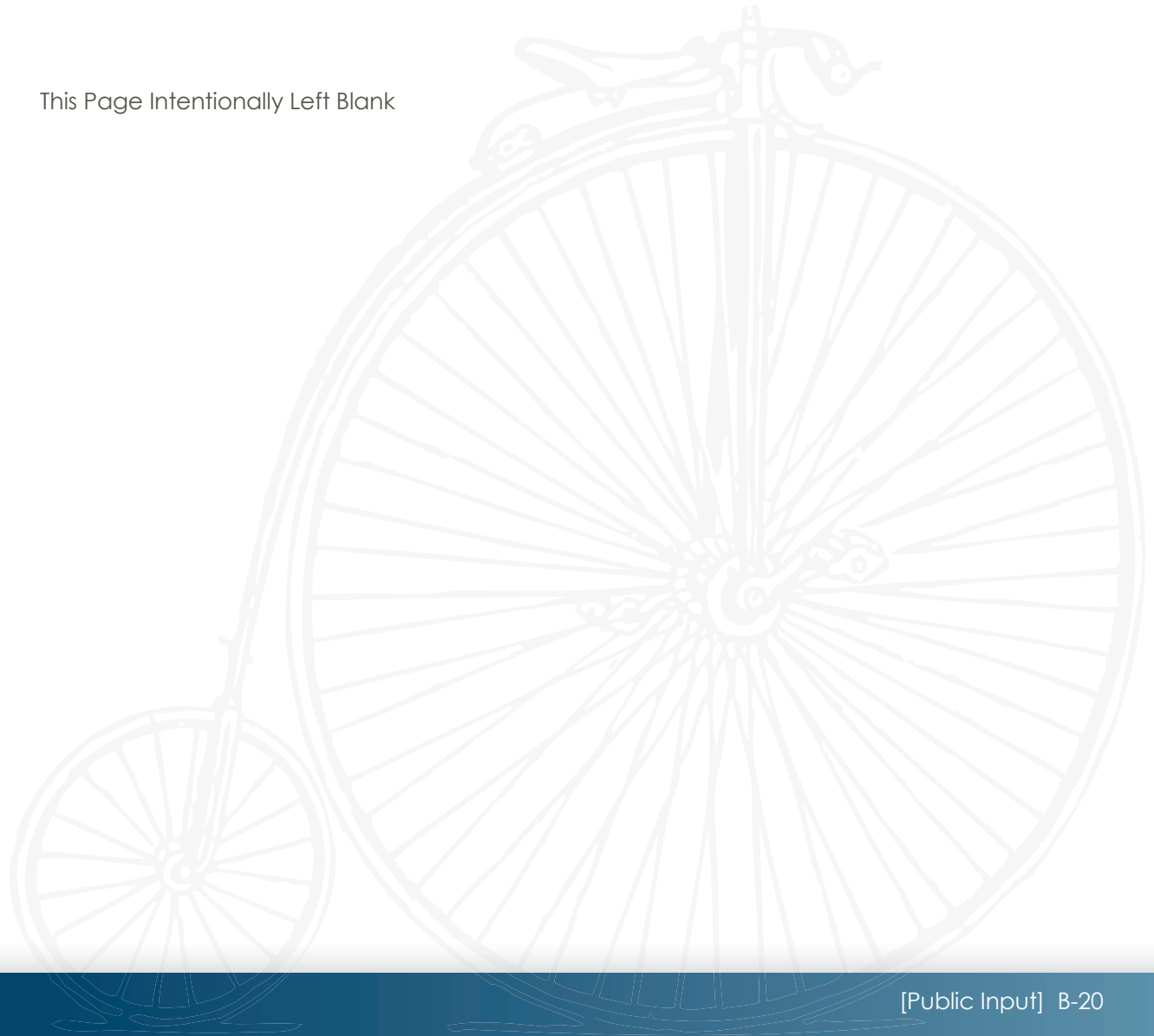
## 20. What is your gender?

		Response Percent	Response Count
M		46.7%	128
F		53.3%	146
answered question			274
skipped question			28

## 21. What is your age?

		Response Percent	Response Count
0-18		1.5%	4
19-25		2.2%	6
26-35		10.0%	27
36-45		18.5%	50
46-55		19.2%	52
56-65		31.0%	84
65 and older		17.7%	48
answered question			271
skipped question			31

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Twiford Street Multi-Use Path,  
Kitty Hawk





# Appendix C

## Prioritization Results

### Chapter Contents

Prioritization  
Results Table

Priority Project  
Cost Summary

Chapter Contents					Weight & Criteria													
Prioritization Results Table					5	4	4	4	4	4	4	4	4	4	4	3	3	Score
Priority Project Cost Summary					5	4	4	4	4	4	4	4	4	4	3	3	Score	
CAMDEN COUNTY																		
County	Paved Shoulder	US 158	Pasquotank County	NC 343	✓	✓	✓	✓	-	✓	-	-	✓	-	-	-	25	
County	Paved Shoulder	NC 343	Scotland Rd	158 W	✓	✓	✓	-	-	✓	-	-	✓	-	-	-	21	
County	Greenway	343 N/Mullen Dr	US 17	Main St	-	✓	✓	-	✓	-	-	-	✓	-	-	-	16	
County	Greenway	US 17	Virginia Border	Existing Trail	-	-	-	✓	✓	-	-	✓	-	-	-	-	12	
South Mills	Paved Shoulder	Main St	US 17	Mullen Dr	-	✓	✓	-	✓	-	-	-	-	-	-	-	12	
County	Paved Shoulder	Horseshoe Rd	Dismal Swamp State Park	Main St	-	✓	✓	✓	-	-	-	-	-	-	-	-	12	
County	Greenway	US 17	Morgans Corner Rd	Main St	-	✓	✓	-	-	-	-	-	-	-	-	-	8	
Dismal Swamp State Park	Greenway	N/A	Existing Trail	Horseshoe Rd	-	-	-	✓	✓	-	-	-	-	-	-	-	8	
County	Paved Shoulder	Joys Creek Rd	Main St	River Bridge Rd	-	✓	-	-	✓	-	-	-	-	-	-	-	8	
County	Paved Shoulder	River Bridge Rd/ Old Swamp Rd	Joys Creek Rd	Lilly Rd	-	-	-	-	-	-	-	-	✓	-	-	-	4	
County	Paved Shoulder	Morgans Corner Rd	Pasquotank County	US 17	-	-	-	-	-	-	-	-	-	-	-	-	0	
County	Paved Shoulder	Old Swamp Rd	Lilly Rd	Currituck County	-	-	-	-	-	-	-	-	-	-	-	-	0	

Weight & Criteria	Access to a school	Access to a higher-density residential area	Access to a higher-density commercial area	Access to a park or recreation center	Connects to an existing or funded trail	Serves low-income areas	Segment with reported bike crashes or alternative to a high-crash corridor	Higher relative feasibility (no acquisition required)	Top 1-5 "Most in need of improvement" (no comment form)	Top 6-10 "Most in need of improvement" (comment form)	Contains a Top 1-10 Intersection "Most in need of improvement"
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Location	Type	Street Name	From	To	5	4	4	4	4	4	4	4	4	4	3	3	Score
County	Paved Shoulder	McPherson Rd/ Sharon Church Rd/ Lilly Rd	Dismal Swamp Trail	Old Swamp Rd	-	-	-	-	-	-	-	-	-	-	-	-	0
<b>CHOWAN COUNTY</b>																	
Edenton	Bicycle Lane, Road Diet	Broad St	Church St	Virginia Rd	✓	✓	✓	-	-	✓	✓	✓	✓	-	✓		32
Edenton	Bicycle Lane, Road Diet	Virginia Rd	US 17	Broad St	-	✓	✓	-	-	✓	✓	✓	✓	-	✓		27
Edenton	Sharrow	Oakum St	Water St	Freemason St	✓	✓	✓	-	-	✓	✓	✓	-	-	-		25
Edenton	Bicycle Lane, Stripe	Broad St	Virginia Rd	Oakum St	-	✓	✓	-	-	✓	✓	✓	-	-	✓		23
Edenton	Bicycle Lane, Restripe	Oakum St	Freemason St	Park Ave	✓	✓	-	-	-	✓	✓	✓	-	-	-		21
Edenton	Sharrow	Park Ave	Broad St	Oakum St	✓	✓	✓	-	-	✓	-	✓	-	-	-		21
Edenton	Sharrow	Oakum St	Blades St	Broad St	✓	✓	✓	-	-	✓	-	✓	-	-	-		21
Edenton	Buffered Bike Lane, Stripe	Granville St	Carteret St	Cemetery St	-	✓	✓	-	-	✓	✓	✓	-	-	-		20
Edenton	Bicycle Lane, Stripe	Coke Ave	Blades St	Tyler Ln	-	✓	✓	✓	-	✓	-	✓	-	-	-		20
Edenton	Sharrow	Tyler Ln	Coke Ave	Old Hertford Rd	-	✓	✓	✓	-	✓	-	✓	-	-	-		20
Edenton	Sharrow	Church St	Broad St	Proposed Rail Trail	-	✓	✓	-	-	-	-	✓	✓	-	✓		19
Edenton	Sharrow	Hicks St	Proposed Trail E of Mark Dr	Broad St	✓	-	✓	-	-	✓	-	✓	-	-	-		17
Edenton	Sharrow	Blades St	Oakum St	Coke Ave	✓	✓	-	-	-	✓	-	✓	-	-	-		17
Edenton	Bicycle Lane, Restripe	Broad St	Paradise Rd	Railroad Tracks	-	✓	✓	-	-	✓	-	✓	-	-	-		16
Edenton	Sharrow	Queen St	Proposed Trail E of Dickinson St	Granville St	-	✓	✓	-	-	✓	-	✓	-	-	-		16
Edenton	Bicycle Lane, Restripe	Queen St	Roberts Rd	Proposed Trail E of Dickinson St	-	✓	✓	-	-	✓	-	✓	-	-	-		16

Location	Type	Street Name	From	To	Weight & Criteria												Score
					5	4	4	4	4	4	4	4	4	4	3	3	
Edenton	Sharrow	Dr Martin Luther King Jr Ave	Gramby St	Granville St	-	✓	-	-	-	✓	✓	✓	-	-	-	-	16
Edenton	Paved Shoulder	Church St/Yeopim Rd	Wood Ave	Soundside Rd	-	✓	✓	-	-	✓	-	-	✓	-	-	-	16
Edenton	Bike Boulevard	Granville St	Water St	Carteret St	-	✓	✓	-	-	✓	✓	-	-	-	-	-	16
Edenton	Greenway	Coke Ave	Tyler Ln	Soccer Fields	-	✓	✓	✓	-	✓	-	-	-	-	-	-	16
Edenton	Sharrow	Broad St	Water St	Church St	-	✓	✓	-	-	-	-	✓	-	-	-	✓	15
Edenton	Bicycle Lane, New	Oakum St	Park Ave	Blades St	✓	✓	-	-	-	✓	-	-	-	-	-	-	13
Edenton	Greenway	N/A	Queen St	Virginia Rd	-	✓	-	-	-	✓	✓	-	-	-	-	-	12
Edenton	Sharrow	Queen St	Granville St	Broad St	-	✓	✓	-	-	-	-	✓	-	-	-	-	12
Edenton	Sharrow	Water St	Granville St	Oakum St	-	✓	✓	-	-	-	-	✓	-	-	-	-	12
Edenton	Sharrow	King St	Oakum St	McMullen Ave	-	✓	✓	-	-	-	-	✓	-	-	-	-	12
Edenton	Greenway	Old Fish Hatchery Rd Open Space	Queen St	Loop	-	-	-	✓	-	✓	-	-	-	-	-	-	8
Edenton	Greenway	Virginia Rd	Virginia Rd & Granville St	Freemason Circle	-	-	-	-	-	✓	✓	-	-	-	-	-	8
Edenton	Greenway	Rail Trail	King St	Church St	-	✓	-	-	-	✓	-	-	-	-	-	-	8
Edenton	Sharrow	Paxton Ln	Old Hertford Rd	Proposed Loop Trail	-	-	-	-	-	✓	-	✓	-	-	-	-	8
County	Bicycle Lane, New	Queen St	Emperor Landing Rd	Roberts Rd	-	✓	-	-	-	✓	-	-	-	-	-	-	8
County	Paved Shoulder	Poplar Neck Rd/ Houghton Rd	Yeopim Rd	Long Bridge	-	✓	-	-	-	-	-	-	✓	-	-	-	8
Edenton	Bicycle Lane, New	Broad St	Railroad Tracks	Coke Ave	-	-	✓	-	-	✓	-	-	-	-	-	-	8
County	Paved Shoulder	Emperor Landing/ Tip Toe/Chambers Ferry/Morristown	Queen St	Virginia Rd	-	✓	-	✓	-	-	-	-	-	-	-	-	8



Weight & Criteria	Access to a school	Access to a higher-density residential area	Access to a higher-density commercial area	Access to a park or recreation center	Connects to an existing or funded trail	Serves low-income areas	Segment with reported bike crashes or alternative to a high-crash corridor	Higher relative feasibility (no acquisition required)	Top 1-5 "Most in need of improvement" (no comment form)	Top 6-10 "Most in need of improvement" from online comment form	Contains a Top 1-10 Intersection "Most in need of improvement"
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Location	Type	Street Name	From	To	5	4	4	4	4	4	4	4	4	4	3	3	Score
County	Paved Shoulder	Rock Hock/ Harris Landing/ Gumpond/River	Virginia Rd	Dillard's Mill Rd	-	✓	✓	-	-	-	-	-	-	-	-	-	8
County	Paved Shoulder	Soundside Rd	Yeopim Rd	Haughton Rd	-	-	✓	-	-	-	-	-	✓	-	-	-	8
Edenton	Greenway	Old Fish Hatchery Rd Open Space	Queen St	Boardwalk Trails	-	-	-	✓	-	✓	-	-	-	-	-	-	8
Edenton	Sharrow	Village Creek Dr	Church St	End of Road/ Proposed Trail	-	-	-	-	-	✓	-	✓	-	-	-	-	8
Edenton	Greenway	N/A	McMullan Ave	Proposed Trail	-	✓	✓	-	-	-	-	-	-	-	-	-	8
County	Greenway	N/A	Broad St	McMullan Ave	-	-	-	-	-	✓	-	-	-	-	-	-	4
Edenton	Greenway	N/A	Yeopim Rd	Water	-	-	-	-	-	✓	-	-	-	-	-	-	4
Edenton	Paved Shoulder	Broad St	Coke Ave	Peanut Dr	-	-	-	-	-	✓	-	-	-	-	-	-	4
County	Paved Shoulder	Dillard's Mill/ Wingfield/Cannons Ferry	Rocky Hock Rd	Gates County	-	✓	-	-	-	-	-	-	-	-	-	-	4
County	Paved Shoulder	US 17 Bridge	County Border	Queen St	-	-	-	-	-	✓	-	-	-	-	-	-	4
County	Paved Shoulder	Yeopim Rd/Burnt Mill Rd	Poplar Neck Rd	Perquimans County	-	-	-	-	-	-	-	-	-	-	-	-	0

*CURRITUCK COUNTY*

County	Paved Shoulder	US 158/Shortcut Rd	NC 343	Tulls Creek Rd	✓	✓	✓	-	-	✓	✓	-	✓	-	-	-	25
Corolla	Signed Route	Shad St/Lighthouse Dr/Albacore St	Ocean Trl	Ocean Trl	-	-	✓	✓	✓	-	✓	✓	-	-	✓	-	23
County	Paved Shoulder	Caratoke Hwy	Tulls Creek Rd	Shortcut Rd	✓	✓	-	-	-	✓	✓	-	✓	-	-	-	21
County	Paved Shoulder	Scotland Rd/ Shawboro Rd/ Caratoke Hwy	NC 343	Tulls Creek Rd	✓	✓	-	-	-	✓	✓	-	✓	-	-	-	21
County	Paved Shoulder	US 158/Caratoke Hwy	Tulls Creek Rd	Aydlett Rd	✓	-	✓	-	-	✓	✓	-	✓	-	-	-	21
Maple-Barco	Greenway	Shortcut Rd	Maple Rd	Caratoke Hwy	✓	-	✓	✓	-	✓	-	-	✓	-	-	-	21

Location	Type	Street Name	From	To	Weight & Criteria												Score
					5	4	4	4	4	4	4	4	4	4	3	3	
County	Greenway	Ocean Trl	Monteray Dr	Town of Duck	-	-	✓	-	✓	-	✓	-	✓	-	✓	-	19
County	Paved Shoulder	US 158/Caratoke Hwy	Poplar Branch Rd	US 158 Bridge	-	✓	✓	-	-	-	✓	-	✓	-	✓	-	19
County	Buffered Bike Lane, New	Aydlett Rd/Poplar Branch Rd	Caratoke Hwy	Caratoke Hwy	✓	✓	✓	-	-	-	✓	-	-	-	-	-	17
County	Buffered Bike Lane, New	Tulls Creek Rd	Old Tulls Creek Rd/ Sailfish St	Caratoke Hwy	-	✓	✓	-	-	✓	✓	-	-	-	-	-	16
Moyock	Paved Shoulder	Shingle Landing Rd/Tulls Creek Rd	Caratoke Hwy	Panther Landing Rd	✓	✓	✓	-	-	-	-	-	-	-	-	-	13
Corolla	Greenway	Corolla Village Rd	Currituck Beach Lighthouse	Ocean Trl	-	-	✓	✓	✓	-	-	-	-	-	-	-	12
Moyock	Greenway	Caratoke Hwy	South Mills Rd	Powells Ln	-	✓	✓	-	-	-	-	-	✓	-	-	-	12
Corolla	Greenway	Ocean Trl	Existing Greenway N of Herring St	Ocean Forest Ct	-	-	-	-	✓	-	-	-	✓	-	✓	-	11
Grandy	Greenway	Caratoke Hwy	Grandy Rd	Uncle Graham Rd	-	-	✓	-	-	-	-	-	✓	-	✓	-	11
Moyock	Greenway	Shingle Landing Rd/Tulls Creek Rd	Baxter Ln	Mack Jones Rd	✓	-	✓	-	-	-	-	-	-	-	-	-	9
Maple-Barco	Greenway	N/A	US 158/Shortcut Rd	Caratoke Hwy	-	-	-	✓	-	✓	-	-	-	-	-	-	8
County	Paved Shoulder	Caratoke Hwy	Virginia Border	Shingle Landing Rd	-	-	✓	-	-	-	-	-	✓	-	-	-	8
County	Paved Shoulder	Caratoke Hwy	Aydlett Rd	Poplar Branch Rd	-	-	✓	-	-	-	-	-	✓	-	-	-	8
Moyock	Paved Shoulder	Camellia Dr	South Mills Rd	Shingle Landing Rd	-	✓	✓	-	-	-	-	-	-	-	-	-	8
County	Paved Shoulder	Mid-Currituck Bridge	Caratoke Hwy	Ocean Trl	-	-	-	-	✓	-	-	-	-	-	-	-	4
County	Paved Shoulder	South Mills Rd	Camden County	Camellia Dr	-	✓	-	-	-	-	-	-	-	-	-	-	4
County	Paved Shoulder	Tulls Creek Rd	Panther Landings Rd	Old Tulls Creek Rd/ Sailfish St	-	-	-	-	-	-	-	-	-	-	-	-	0
<b>DARE COUNTY</b>																	
Manteo	Sharrow	US 64/US 264	Harriot St	Patty Ln	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	-	✓	36

Weight & Criteria	Access to a school	Access to a higher-density residential area	Access to a higher-density commercial area	Access to a park or recreation center	Connects to an existing or funded trail	Serves low-income areas	Segment with reported bike crashes or alternative to a high-crash corridor	Higher relative feasibility (no acquisition required)	Top 1-5 "Most in need of improvement" (no comment form)	Top 6-10 "Most in need of improvement" from online comment form	Contains a Top 1-10 Intersection "Most in need of improvement"
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Location	Type	Street Name	From	To	5	4	4	4	4	4	4	4	4	3	3	Score
County	Greenway	NC 12	Park Dr (Avon)	Eagle Pass Rd	✓	✓	✓	✓	✓	-	✓	-	✓	-	✓	32
County/Buxton	Bicycle Lane, Restripe	NC 12	Crooked Ridge Trl	Lighthouse Rd	✓	✓	✓	-	✓	-	✓	✓	✓	-	✓	32
Nags Head	Corridor Improvements	US 158/Croatan Hwy	Kill Devil Hills	Gray Eagle St	-	✓	✓	✓	✓	✓	✓	-	✓	-	✓	31
Kitty Hawk	Corridor Improvements	US 158/Croatan Hwy	Byrd St	Kill Devil Hills	✓	✓	✓	-	✓	-	✓	-	✓	-	✓	28
Nags Head	Greenway	US 158/Croatan Hwy	Blue Jay St	Gray Eagle St	-	-	✓	✓	✓	✓	✓	-	✓	-	✓	27
Kill Devil Hills	Greenway	US 158/Croatan Hwy	Kitty Hawk	Nags Head	-	✓	✓	✓	✓	-	✓	-	✓	-	✓	27
County	Bicycle Lane, Restripe	US 64/ US 264	Patty Ln	US 64/US 264	-	✓	-	-	✓	✓	✓	✓	✓	-	✓	27
Kill Devil Hills	Corridor Improvements	US 158/Croatan Hwy	Kitty Hawk	Nags Head	-	✓	✓	✓	✓	-	✓	-	✓	-	✓	27
Manteo	Bike Boulevard	Wingina/Budleigh/ Salty Dawg/ Greenville	US 64/US 264	US 64/US264	✓	✓	✓	-	✓	✓	✓	-	-	-	-	25
Southern Shores	Bike Boulevard	S Dogwood Trl	E Dogwoord Trl	US 158/Croatan Hwy	✓	✓	✓	-	✓	-	-	-	✓	-	✓	24
Duck	Cycle Track	NC 12/Duck Rd	N of Barrier Island Station	Existing Trail S of Scarborough Ln	-	-	✓	✓	✓	-	✓	-	✓	-	✓	23
County/Avon	Bicycle Lane, Restripe	NC 12	North End of Avon	South End of Avon	-	-	✓	-	✓	-	✓	✓	✓	-	✓	23
Nags Head	Bike Boulevard	Barnes St	End of Barnes St	NC 12	-	✓	✓	✓	✓	-	✓	-	-	-	-	20
Manteo	Sharrow	Sir Walter Raleigh St	Bideford St	Queen Elizabeth Ave	-	✓	✓	✓	-	✓	-	✓	-	-	-	20
Kitty Hawk	Signed Route	Bird St	Lindbergh Ave	NC 12	-	✓	-	✓	✓	-	✓	✓	-	-	-	20
Kill Devil Hills	Bike Boulevard	Fifth St	Bay Dr	NC 12	-	✓	✓	✓	✓	-	✓	-	-	-	-	20
Kill Devil Hills	Bike Boulevard	Martin St	Boundary St	NC 12	-	✓	✓	✓	✓	-	✓	-	-	-	-	20



Location	Type	Street Name	From	To	Weight & Criteria												Score
					5	4	4	4	4	4	4	4	4	4	3	3	
Manteo	Sharrow	Queen Elizabeth Ave	Anania Dare St	Fernando St	-	✓	✓	✓	✓	-	-	✓	-	-	-	-	20
Southern Shores	Signed Route	Chicahauk Trl/ Trinite Trl	End of Chicahauk Trl	US 158/Croatan Hwy	-	-	✓	-	✓	-	✓	✓	✓	-	-	✓	19
Kitty Hawk	Greenway	US 158/Croatan Hwy	Juniper Trl	Kill Devil Hills	-	✓	-	-	✓	-	✓	-	✓	-	-	✓	19
Duck	Greenway	NC 12/Duck Rd	N of Four Seasons Ln	E Dogwood Trl	-	✓	-	-	✓	-	✓	-	✓	-	-	✓	19
Nags Head	Greenway	US 158/Croatan Hwy	Gray Eagle St	West Shore Rd	-	-	-	✓	✓	✓	-	-	✓	-	-	✓	19
County/Buxton	Sharrow	Buxton Back Rd	NC 12	NC 12	✓	-	-	-	✓	-	✓	✓	-	-	-	-	17
Nags Head	Bike Boulevard	Memorial Ave	Eighth St	Bladen St	✓	✓	-	✓	-	-	✓	-	-	-	-	-	17
Kill Devil Hills	Sharrow	Sixth Ave	Baum St	Airstrip Rd	✓	✓	-	-	✓	-	-	✓	-	-	-	-	17
Southern Shores	Signed Route	E Dogwood Trl	S Dogwood Trl	Hillcrest Dr	-	✓	-	-	-	-	✓	✓	✓	-	-	-	16
County	Cycle Track	Colington Rd/ Colington Dr	Kill Devil Hills	End of Colington Dr	-	✓	-	✓	✓	-	-	-	✓	-	-	-	16
Nags Head	Signed Route	Epstein Dr	US 158/Croatan Hwy	NC 12	-	-	-	✓	✓	-	✓	✓	-	-	-	-	16
Kitty Hawk	Signed Route	Starfish Ln	Lindbergh Ave	NC 12	-	-	-	✓	✓	-	✓	✓	-	-	-	-	16
Kitty Hawk	Signed Route	Cameron St	Bay Dr	US 158/Croatan Hwy	-	✓	✓	-	✓	-	-	✓	-	-	-	-	16
Kill Devil Hills	Signed Route	Carolyn Dr/NC 12/ Eighth St	Memorial Blvd	Memorial Ave	-	-	-	✓	✓	-	✓	✓	-	-	-	-	16
Nags Head	Sharrow	Gray Eagle St	US 158/Croatan Hwy	NC 12	-	-	-	✓	✓	✓	-	✓	-	-	-	-	16
Nags Head	Signed Route	Hollowell St	US 158/Croatan Hwy	NC 12	-	-	-	✓	✓	-	✓	✓	-	-	-	-	16
County	Bicycle Lane, New	Colington Rd/ Colington Dr	Kill Devil Hills	End of Colington Dr	-	✓	-	✓	✓	-	-	-	✓	-	-	-	16
Kill Devil Hills	Greenway	Bay Dr	Avalon Dr	First St	-	✓	-	-	✓	-	✓	-	-	✓	-	-	15
Kill Devil Hills	Sharrow	Bay Dr	Nixonton St	Avalon Dr	-	✓	-	-	✓	-	-	✓	-	✓	-	-	15

Weight & Criteria	Access to a school	Access to a higher-density residential area	Access to a higher-density commercial area	Access to a park or recreation center	Connects to an existing or funded trail	Serves low-income areas	Segment with reported bike crashes or alternative to a high-crash corridor	Higher relative feasibility (no acquisition required)	Top 1-5 "Most in need of improvement" (no comment form)	Top 6-10 "Most in need of improvement" from online comment form	Contains a Top 1-10 Intersection "Most in need of improvement"
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Location	Type	Street Name	From	To	5	4	4	4	4	4	4	4	4	4	3	3	Score
County	Paved Shoulder	NC 345	US 64/US 264	End of NC 345	-	-	-	-	✓	✓	✓	-	-	✓	-	-	15
County	Paved Shoulder	Etheridge Rd/ Driftwood Dr	Driftwood St	US 64/264	-	✓	-	-	✓	✓	-	-	-	-	-	-	12
County	Paved Shoulder	US 264	Virginia Dare Memorial Bridge	Hyde County	-	-	✓	-	✓	✓	-	-	-	-	-	-	12
Southern Shores	Greenway	E Dogwood Trl	Hillcrest Dr	Ocean Blvd	-	-	-	-	✓	-	✓	-	✓	-	-	-	12
Kitty Hawk	Bike Boulevard	Lindbergh Ave	Byrd St	Starfish Ln	-	✓	-	✓	-	-	✓	-	-	-	-	-	12
County	Paved Shoulder	Wright Memorial Bridge			-	-	✓	-	✓	-	-	-	✓	-	-	-	12
Kill Devil Hills	Bike Boulevard	Memorial Blvd	Woodmere Ave	Carolyn Dr	-	✓	-	-	✓	-	✓	-	-	-	-	-	12
County	Signed Route	Burnside Rd	Payne Rd	Bideford St	-	✓	-	-	-	✓	-	✓	-	-	-	-	12
County	Paved Shoulder	Shipyard Rd	Manns Harbor Bridge	US 64/US 264	-	-	-	-	✓	✓	✓	-	-	-	-	-	12
Nags Head	Signed Route	Bladen St/ Wrightsville Ave/ Bainbridge St	Memorial Ave	Memorial Ave	-	-	-	✓	-	-	✓	✓	-	-	-	-	12
County/Manns Harbor	Greenway	US 64	Manns Harbor Bridge	Virginia Dare Memorial Bridge	-	-	-	-	✓	✓	✓	-	-	-	-	-	12
County/Hatteras	Sharrow	Marina Dr/North Point Rd	NC 12	Ferry Dock	-	-	✓	-	✓	-	-	✓	-	-	-	-	12
County	Greenway	Skyco Rd	Existing Trail N of US 64/US 264	NC 345	-	-	-	-	✓	✓	-	-	-	✓	-	-	11
County/Hatteras	Bicycle Lane, New	NC 12	Eagle Pass Rd	Eagle Pass Rd	-	-	-	-	✓	-	-	-	✓	-	✓	-	11
County	Bicycle Lane, New	NC 345	US 64/US 264	End of NC 345	-	-	-	-	-	✓	✓	-	-	✓	-	-	11
County	Greenway	N/A	Driftwood Dr	Joclar Ln	-	-	-	✓	-	✓	-	-	-	-	-	-	8
Cape Hatteras National Seashore	Greenway	Lighthouse Rd	NC 12	End of Road	-	-	-	✓	✓	-	-	-	-	-	-	-	8

					Weight & Criteria												
					Access to a school												
					Access to a higher-density residential area												
					Access to a higher-density commercial area												
					Access to a park or recreation center												
					Connects to a park or recreation funded trail												
					Serves low-income areas												
					segment with reported bike crashes or alternative to a high-crash corridor												
					Higher relative feasibility (no acquisition required)												
					Top 1-5 "Most in need of improvement" (no comment form)												
					Top 6-10 "Most in need of improvement" from online comment form												
					Contains a Top 1-10 Intersection												
					"Most in need of improvement"												
Location	Type	Street Name	From	To	5	4	4	4	4	4	4	4	4	4	3	3	Score
Cape Hatteras National Seashore	Greenway	NC 12	Campground Rd	Village of Avon	-	-	-	-	✓	-	-	-	✓	-	-	-	8
County	Greenway	US 64/264	Virginia Dare Memorial Bridge	Visitor Center Cir	-	-	-	-	✓	✓	-	-	-	-	-	-	8
County	Signed Route	Bayview Dr	US 264	End of Road	-	-	-	-	-	✓	-	✓	-	-	-	-	8
County	Buffered Bike Lane, New	US 64/US 264	NC 345	Pirates Way	-	-	-	-	✓	✓	-	-	-	-	-	-	8
Nags Head	Bike Boulevard	Memorial Ave	Wrightsville Ave	Hollowell St	-	-	-	✓	-	-	✓	-	-	-	-	-	8
Southern Shores	Signed Route	Sea Oats Ln	E Dogwood Trl	End of Sea Oats Ln	-	-	-	-	✓	-	-	✓	-	-	-	-	8
County	Greenway	Manns Harbor Bridge	Shipyard Ln	US 64/US 264	-	-	-	-	✓	✓	-	-	-	-	-	-	8
Kill Devil Hills	Greenway	Shay St/Bell Ave/ Pond Ave	Martin St	Park and Ride	-	✓	-	-	-	-	-	✓	-	-	-	-	8
County	Paved Shoulder	NC 12	Eagle Nest Bay	Oregon Inlet Bridge	-	-	-	-	✓	-	-	-	✓	-	-	-	8
Manteo	Greenway	N/A	Existing Boardwalk	Greenville St	-	-	-	-	✓	-	-	-	-	-	-	-	4
Manteo	Greenway	N/A	US 64/US264	Peninsula Dr	-	-	-	-	✓	-	-	-	-	-	-	-	4
Kitty Hawk	Greenway	Bay Dr	Tateway Rd	Existing Trail	-	-	-	-	✓	-	-	-	-	-	-	-	4
County/ Hatteras	Bicycle Lane, New	Eagle Pass Rd	NC 12	NC 12	-	-	-	-	✓	-	-	-	-	-	-	-	4
County	Paved Shoulder	Airport Rd	End of Road	US 64/US264	-	-	-	-	✓	-	-	-	-	-	-	-	4
County	Greenway	N/A	Viccars Ln	Fannin Mill Rd	-	-	-	-	-	✓	-	-	-	-	-	-	4
County	Greenway	US 64/264	Visitor Center Cir	NC 345	-	-	-	-	-	✓	-	-	-	-	-	-	4
Kill Devil Hills	Greenway	N/A	Sixth Ave	Sixth Ave	-	✓	-	-	-	-	-	-	-	-	-	-	4
County	Paved Shoulder	Payne Rd/Joclar Ln	End of Joclar Ln	Burnside Rd	-	-	-	-	-	✓	-	-	-	-	-	-	4
County	Paved Shoulder	US 64	Tyrrell County	US 264	-	-	-	-	-	-	✓	-	-	-	-	-	4



Weight & Criteria	Access to a school	Access to a higher-density residential area	Access to a higher-density commercial area	Access to a park or recreation center	Connects to an existing or funded trail	Serves low-income areas	Segment with reported bike crashes or alternative to a high-crash corridor	Higher relative feasibility (no acquisition required)	Top 1-5 "Most in need of improvement" (no comment form)	Top 6-10 "Most in need of improvement" from online comment form	Contains a Top 1-10 Intersection "Most in need of improvement"
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Location	Type	Street Name	From	To	5	4	4	4	4	4	4	4	4	3	3	Score
Kitty Hawk	Greenway	Moore Shore Rd	Kitty Hawk Rd	Beacon Dr	-	-	-	-	✓	-	-	-	-	-	-	4
Kill Devil Hills	Greenway	N/A	Blue Jay St	Martin St	-	-	-	-	-	-	-	-	-	-	-	0
<b>GATES COUNTY</b>																
County	Paved Shoulder	US 158	Maple St	Acorn Hill Rd/Folly Rd	✓	✓	✓	✓	-	✓	✓	-	✓	-	-	29
Gatesville	Bicycle Lane, Stripe	Main St	Court St	Town Edge	-	✓	✓	✓	✓	✓	-	✓	✓	-	-	28
Gatesville	Bicycle Lane, Stripe	Main St	Gatesville Elementary School	Maple St	✓	✓	-	-	✓	✓	-	✓	✓	-	-	25
County	Greenway	US 158	Maple St	Merchant Millpond State Park	✓	✓	✓	✓	-	✓	-	-	✓	-	-	25
County	Paved Shoulder	NC 37	Gates School Rd	Gatesville Elementary School	✓	✓	✓	-	-	✓	-	-	✓	-	-	21
County	Paved Shoulder	NC 32	US 158	T S Cooper Elementary School	✓	✓	✓	-	-	-	✓	-	✓	-	-	21
Gatesville	Buffered Bike Lane, Stripe	Main St	Maple St	Court St	-	✓	-	-	✓	✓	-	✓	✓	-	-	20
County	Paved Shoulder	NC 37/Carters Rd	Town Edge	Catherine Creek Rd	-	✓	✓	✓	-	✓	-	-	✓	-	-	20
County	Paved Shoulder	Gates Bank Rd/Willeyton Rd/Medical Center Rd	NC 37	US 158	-	✓	✓	-	-	✓	✓	-	-	-	-	16
County	Paved Shoulder	US 13/NC 137/Court St	County Border	Main St	-	✓	-	-	✓	✓	-	-	✓	-	-	16
Gatesville	Bicycle Lane, New	Maple St	Main St	Town Edge	-	✓	-	-	✓	✓	-	-	-	-	-	12
County	Paved Shoulder	NC 32/Folly/Acorn Hill/Sandy Cross/Hobbsville	Virginia Border	Carters Rd	-	✓	-	-	-	-	-	-	✓	-	-	8
County/Sunbury	Bicycle Lane, New	NC 32	US 158	Mobile Home Park N of St Paul Ln	-	✓	✓	-	-	-	-	-	-	-	-	8
County	Paved Shoulder	US 158	Folly Rd	Pasquotank County	-	-	-	-	-	-	-	-	✓	-	-	4

					Weight & Criteria												
					Access to a school												
					Access to a higher-density residential area												
					Access to a higher-density commercial area												
					Access to a park or recreation center												
					Connects to an existing or funded trail												
					Serves low-income areas												
					Segment with reported bike crashes or alternative to a high-acquisition feasibility (no Top 1-5 "Most in need of improvement" comment required)												
					Top 1-5 "Most in need of improvement" from online comment form												
					Top 6-10 "Most in need of improvement" from online comment form												
					Contains a Top 1-10 Intersection "Most in need of improvement"												
Location	Type	Street Name	From	To	5	4	4	4	4	4	4	4	4	4	3	3	Score
County	Paved Shoulder	Selwin Rd/Gliden Rd	Gates County	Perquimans County	-	-	-	-	-	-	-	-	-	✓	-	-	4
County	Paved Shoulder	Catherine Creek Rd	Carters Rd	Chowan County	-	-	-	-	-	-	-	-	-	-	-	-	0
County	Paved Shoulder	Spivey Rd	Hobbsville Rd	Chowan County	-	-	-	-	-	-	-	-	-	-	-	-	0
HYDE COUNTY																	
County	Signed Route	NC 45/Oyster Creek Rd/Juniper Bay Rd	US 264	Turnpike Rd at schools	✓	✓	✓	-	-	✓	✓	-	✓	-	-	-	25
County	Bicycle Lane, Restripe	US 264	W of school complex	NC 94	✓	✓	-	-	-	✓	-	✓	✓	-	-	-	21
County	Paved Shoulder	US 264	NC 94	Golden St	-	✓	-	-	✓	✓	✓	-	✓	-	-	-	20
County/ Engelhard	Bicycle Lane, Stripe	US 264	Golden St	Golden St	-	✓	✓	-	✓	✓	-	✓	-	-	-	-	20
Ocracoke	Bicycle Lane, Restripe	Irvin Garrish Hwy	Silver Lake Dr	Old Beach Rd	-	✓	✓	-	✓	-	✓	✓	-	-	-	-	20
County	Paved Shoulder	NC 94	Lake Rd	Tyrrell County	-	✓	✓	-	-	✓	-	-	✓	-	-	-	16
County	Paved Shoulder	US 264	Dare County	Golden St N of bridge in Engelhard	-	✓	-	-	✓	✓	-	-	✓	-	-	-	16
County	Greenway	NC 94	Lake Rd	US 264	-	-	-	✓	-	✓	-	-	✓	-	-	-	12
Ocracoke	Greenway	Silver Lake Dr	Pilottown Cir	Sarah Ellen Ln	-	✓	✓	-	-	-	✓	-	-	-	-	-	12
County	Paved Shoulder	Piney Woods Rd	NC 94	Turnpike Rd	-	✓	✓	-	-	✓	-	-	-	-	-	-	12
County	Paved Shoulder	US 264/Firetower Rd	County Border	Turnpike Rd	-	✓	✓	-	-	-	-	-	✓	-	-	-	12
County	Paved Shoulder	US 264	Turnpike Rd/Piney Woods Rd	Schools W of Juniper Bay Rd	✓	-	-	-	-	-	-	-	✓	-	-	-	9
County	Paved Shoulder	Lake Rd	NC 94	US 264	-	-	-	-	-	✓	-	-	-	-	-	-	4
County	Paved Shoulder	NC 45	Washington County	US 264	-	-	-	-	-	-	-	-	-	✓	-	-	4

Weight & Criteria	Access to a school	Access to a higher-density residential area	Access to a higher-density commercial area	Access to a park or recreation center	Connects to an existing or funded trail	Serves low-income areas	Segment with reported bike crashes or alternative to a high-crash corridor	Higher relative feasibility (no acquisition required)	Top 1-5 "Most in need of improvement" (no comment form)	Top 6-10 "Most in need of improvement" from online comment form	Contains a Top 1-10 Intersection "Most in need of improvement"
5	4	4	4	4	4	4	4	4	3	3	Score

## PASQUOTANK COUNTY

Elizabeth City	Greenway	Oak Stump Rd/ Ehringhaus St/ Halstead Blvd	Cooper Ln	Roanoke Ave/RR Crossing	✓	✓	✓	✓	-	✓	✓	-	✓	-	✓	32
Elizabeth City	Bike Boulevard	Church St	Hughes Blvd	Water St	-	✓	✓	✓	✓	✓	✓	-	-	-	-	24
Elizabeth City	Sharrow	Main St	Road St	Water St	-	✓	✓	✓	✓	-	✓	✓	-	-	-	24
Elizabeth City	Sharrow	Water St/Burgess St	Poindexter St/ Burgess St	Shephard St	-	✓	✓	✓	✓	✓	-	✓	-	-	-	24
Elizabeth City	Sharrow	Road St	Main St	Pearlree Rd	-	✓	✓	-	-	-	✓	✓	✓	-	-	20
Elizabeth City	Sharrow	US 158/Elizabeth St Bridge	Water St	Camden County	-	✓	✓	✓	-	✓	-	✓	-	-	-	20
Elizabeth City	Sharrow	Riverside Ave/ Raleigh St/Fairfax Ave/Rivershore Rd	Southern Ave	Parkview Dr	-	✓	-	✓	✓	-	✓	✓	-	-	-	20
Elizabeth City	Bicycle Lane, Stripe	Harney St	Bell St	Elizabeth St	-	✓	-	✓	-	✓	✓	✓	-	-	-	20
Elizabeth City	Greenway	Halstead Blvd	Roanoke Ave	River Rd	-	✓	✓	-	-	✓	✓	-	✓	-	-	20
Elizabeth City	Sharrow	Sixth St	Broad St	Ward St	-	✓	-	✓	-	✓	✓	✓	-	-	-	20
Elizabeth City	Greenway	Road St	Sixth St	Jennings Dr/YMCA	-	✓	-	✓	-	✓	✓	-	✓	-	-	20
Elizabeth City	Corridor Improvements	Ehringhaus St	Hughes Blvd	Water St	-	-	✓	✓	-	✓	✓	-	✓	-	-	20
Elizabeth City	Greenway	Rivershore Rd/River Rd	Parkview Dr	Weeksville Rd	✓	✓	-	✓	-	✓	-	-	-	-	-	17
Elizabeth City	Greenway	Pearlree Rd	Salem Dr	Halstead Blvd	✓	✓	-	-	-	✓	✓	-	-	-	-	17
Elizabeth City	Bike Boulevard	Main St	Hughes Blvd	Road St	-	✓	✓	-	-	✓	✓	-	-	-	-	16
Elizabeth City	Sharrow	Wilson St/Bell St	Broad St	Harney St	-	✓	✓	-	-	✓	-	✓	-	-	-	16
Elizabeth City	Bicycle Lane, New	Broad St	Wilson St	Poindexter St	-	✓	✓	-	-	✓	✓	-	-	-	-	16



Location	Type	Street Name	From	To	Weight & Criteria												Score
					5	4	4	4	4	4	4	4	4	3	3		
Elizabeth City	Buffered Bike Lane, Stripe	Edgewood Dr	Weeksville Rd	Parkview Dr	-	✓	✓	-	-	✓	-	✓	-	-	-	16	
Elizabeth City	Bike Boulevard	Harney St	Main St	Elizabeth St	-	✓	-	✓	-	✓	✓	-	-	-	-	16	
Elizabeth City	Sharrow	Corsair Cir	Ehringhaus St	RR Crossing	-	-	✓	✓	-	-	✓	✓	-	-	-	16	
Elizabeth City	Sharrow	Shephard St	Road St	Water St	-	✓	-	✓	-	-	✓	✓	-	-	-	16	
Elizabeth City	Sharrow	Peartree Rd	Road St	Salem Dr	✓	✓	-	-	-	-	-	✓	-	-	-	13	
Elizabeth City	Greenway	Southside St/ Railroad/Capital Trace	Halstead Blvd	Halstead Blvd/ Capital Trace	-	-	✓	✓	-	✓	-	-	-	-	-	12	
County	Bicycle Lane, New	Main St Ext	Forest Park Rd	Hughes Blvd/Main St	-	✓	-	-	-	✓	✓	-	-	-	-	12	
Elizabeth City	Greenway	Rail Trail	Halstead Blvd Ext	Pritchard St	-	✓	✓	-	-	✓	-	-	-	-	-	12	
Elizabeth City	Sharrow	Catalina Ave/ Brooks Ave/Speed St	Corsair Cir	Road St	-	-	-	✓	-	-	✓	✓	-	-	-	12	
Elizabeth City	Sharrow	Southern Ave	Shephard St	Witherspoon St	-	✓	-	✓	-	-	-	✓	-	-	-	12	
Elizabeth City	Bicycle Lane, New	Southern Ave/ Parkview Dr	Magnolia st	Edgewood Dr	✓	✓	-	-	-	-	-	-	-	✓	-	12	
Elizabeth City	Greenway	Poindexter St	Burgess St	N End of Poindexter St	-	✓	✓	-	-	✓	-	-	-	-	-	12	
Elizabeth City	Greenway	Hughes Blvd	RR Crossing S of Burle St	Main St	-	✓	✓	-	-	✓	-	-	-	-	-	12	
Elizabeth City	Greenway	Halstead Blvd	Rail Trail	US 17 Bypass	-	-	✓	-	-	-	-	-	✓	-	✓	11	
Elizabeth City	Sharrow	Parkview Dr	Park Dr	Rivershore Rd	-	✓	-	-	-	-	-	✓	-	✓	-	11	
Elizabeth City	Bike Boulevard	Selden St	Main St	Ehringhaus St	-	✓	✓	-	-	-	-	-	-	-	-	8	
Elizabeth City	Bicycle Lane, Road Diet	Southern Ave	Witherspoon St	Magnolia St	-	✓	-	-	-	-	-	✓	-	-	-	8	
County	Paved Shoulder	US 158	Gates County	Morgans Corner Rd	-	-	✓	-	-	-	-	-	✓	-	-	8	

Weight & Criteria	Access to a school	Access to a higher-density residential area	Access to a higher-density commercial area	Access to a park or recreation center	Connects to an existing or funded trail	Serves low-income areas	Segment with reported bike crashes or alternative to a high-crash corridor	Higher relative feasibility (no acquisition required)	Top 1-5 "Most in need of improvement" (no comment form)	Top 6-10 "Most in need of improvement" from online comment form	Contains a Top 1-10 Intersection "Most in need of improvement"
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Location	Type	Street Name	From	To	5	4	4	4	4	4	4	4	4	3	3	Score
County	Paved Shoulder	Halls Creek Rd/ Four Forks Rd/Pitts Chapel Rd	Perquimans County	Weeksville Rd	-	-	-	-	-	✓	✓	-	-	-	-	8
Elizabeth City	Bike Boulevard	Pritchard St	Church St	RR S of Jail Rd	-	✓	-	-	-	✓	-	-	-	-	-	8
County	Greenway	Weeksville Rd	Pitts Chapel Rd	US Coast Guard	-	-	-	-	-	✓	-	-	✓	-	-	8
Elizabeth City	Greenway	Rail Trail	Corsair Cir	Roanoke Ave	-	✓	✓	-	-	-	-	-	-	-	-	8
County	Paved Shoulder	Main St Ext	Forest Park Rd	Northside Rd	-	-	-	-	-	-	✓	-	-	-	-	4
County	Paved Shoulder	Northside Rd	Morgans Corner Rd	Main St Ext	-	-	✓	-	-	-	-	-	-	-	-	4
County	Paved Shoulder	Morgans Corner Rd	Northside Rd	Camden Cuonty	-	-	✓	-	-	-	-	-	-	-	-	4
County	Bicycle Lane, New	Forest Park Rd	Halstead Blvd	Main St Ext	-	-	-	-	-	-	-	-	-	-	-	0

## PERQUIMANS COUNTY

Hertford	Greenway	Off Road/Church St	King St	Shopping center S of US 17	✓	✓	✓	-	✓	✓	-	-	✓	-	✓	28
Hertford	Bicycle Lane, Restripe	Church St	N of Albemarle Sound	US 17	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	27
Hertford	Bicycle Lane, Restripe	Harvey Point Rd	US 17	Commerce Dr	-	✓	✓	-	✓	✓	-	✓	✓	-	✓	27
Hertford	Sharrow	Carolina St/Dobbs St	Grubb St/Carolina St	Edenton Road St	✓	✓	✓	-	-	✓	-	✓	-	-	-	21
Herford	Paved Shoulder	Catherine St	Main St	Yates Dr	✓	✓	✓	-	✓	✓	-	-	-	-	-	21
Hertford	Sharrow	Hyde Park St/ Jimmy Hunter Dr/ Ainsley Ave	Grubb St	S End of Ainsley Ave	✓	✓	✓	-	-	✓	-	✓	-	-	-	21
Hertford	Bicycle Lane, Stripe	Edenton Road St	Grubb St	King St	-	✓	✓	-	-	✓	-	✓	✓	-	-	20
Hertford	Bicycle Lane, Stripe	Dobbs St	Edenton Road St	Church St	-	✓	✓	-	-	✓	-	✓	✓	-	-	20

Location	Type	Street Name	From	To	Weight & Criteria												Score
					5	4	4	4	4	4	4	4	4	4	3	3	
Hertford	Sharrow	Church St	Grubb St	White St	-	✓	✓	-	-	✓	-	✓	✓	-	-	-	20
Hertford	Bicycle Lane, Stripe	Church St	Grubb St	Phelps St	-	✓	✓	-	-	✓	-	✓	✓	-	-	-	20
Hertford	Greenway	Off Road	US 17/Harvey Point Rd	Perquimans County Park	-	✓	✓	✓	✓	✓	-	-	-	-	-	-	20
Hertford	Sharrow	Church St	Phelps St	Winfall Blvd	-	✓	-	-	✓	✓	-	✓	✓	-	-	-	20
Hertford	Bicycle Lane, Stripe	Church St	White St	S of Albemarle Sound	-	✓	-	-	-	✓	-	✓	✓	-	-	-	16
Hertford	Bicycle Lane, Restripe	Grubb St	Kenyon Dr	Church St	-	✓	✓	-	-	✓	-	✓	-	-	-	-	16
Winfall	Bicycle Lane, Restripe	Main St	S of King Ave	Two Mile Desert Rd	-	✓	-	-	-	✓	-	✓	-	-	-	-	12
Winfall	Sharrow	Main St	Two Mile Desert Rd	Winfall Blvd	-	✓	-	-	-	✓	-	✓	-	-	-	-	12
Winfall	Bicycle Lane, Stripe	Main St	Winfall Blvd	Wiggins Rd	-	✓	-	-	-	✓	-	✓	-	-	-	-	12
County	Greenway	Broad St/Railroad	S of Peanut Dr	Dobbs St	-	✓	✓	-	-	✓	-	-	-	-	-	-	12
Winfall	Paved Shoulder	Creek Dr	Winfall Blvd	US 17	-	-	-	-	✓	✓	-	-	✓	-	-	-	12
Hertford	Sharrow	Gaston Dr	Wynne Fork Rd	Gaston Dr Bend	-	-	✓	-	-	✓	-	✓	-	-	-	-	12
Winfall	Paved Shoulder	Main St	W of Smith Rd	S of King Ave	✓	-	-	-	-	✓	-	-	-	-	-	-	9
Hertford	Paved Shoulder	Center Hill Hwy/Grubb St	Beech Springs Rd	Kenyon Dr	-	✓	✓	-	-	-	-	-	-	-	-	-	8
County	Paved Shoulder	New Hope Rd/Woodland Church Rd/Body Rd	US 17/Creek Dr	Pasquotank County	-	✓	-	-	-	✓	-	-	-	-	-	-	8
Hertford	Greenway	Off Road	Church St	Phillips St/Church St	-	-	✓	-	-	✓	-	-	-	-	-	-	8
County	Paved Shoulder	Belvidere Rd/Goodwin Mill Rd	Chowan County	Center Hill Hwy	-	-	-	-	-	-	-	-	✓	-	-	-	4



Weight & Criteria	Access to a school	Access to a higher-density residential area	Access to a higher-density commercial area	Access to a park or recreation center	Connects to an existing or funded trail	Serves low-income areas	Segment with reported bike crashes or alternative to a high-crash corridor	Higher relative feasibility (no acquisition required)	Top 1-5 "Most in need of improvement" comment form	Top 6-10 "Most in need of improvement" comment form	Contains a Top 1-10 Intersection "Most in need of improvement"
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Location	Type	Street Name	From	To	5	4	4	4	4	4	4	4	4	3	3	Score
County	Paved Shoulder	Pender Rd/Wynne Fork Rd/Harvey Point Rd	Burnt Mill Rd	Newbold White Rd	-	-	-	-	✓	-	-	-	-	-	-	4
Hertford	Greenway	Off Road	Gaston Dr	Ainsley Ave	-	-	-	-	-	✓	-	-	-	-	-	4
County	Paved Shoulder	Center Hill Hwy/Bear Swamp Rd/Snug Harbor Rd	Beech Springs Rd	Burnt Mill Rd	-	-	-	-	-	-	-	-	-	-	-	0
County	Paved Shoulder	Burnt Mill Rd	Chowan County	Snug Harbor Rd	-	-	-	-	-	-	-	-	-	-	-	0

## TYRRELL COUNTY

Columbia	Greenway	US 64	Water St	La Keiser Dr	-	✓	✓	✓	✓	✓	✓	-	✓	-	✓	31
Columbia	Sharrow	Main St	Water St	Road St	-	✓	✓	✓	✓	✓	✓	✓	-	-	-	28
Columbia	Bicycle Lane, Stripe	Main St	Road St	US 64	✓	✓	✓	-	-	✓	✓	✓	-	-	-	25
Columbia	Bicycle Lane, Stripe	NC 94	US 64	Elementary School Rd	-	✓	-	✓	-	✓	-	✓	✓	-	✓	23
Columbia	Sharrow	Broad St	Main St	US 64	-	✓	✓	✓	-	✓	-	✓	-	-	✓	23
Columbia	Sharrow	Road St	US 64	Cemetery Rd	-	✓	✓	-	-	✓	✓	✓	-	-	-	20
Columbia	Bicycle Lane, New	US 64 Bridge	US 64 W of Bridge	Water St	-	✓	-	✓	✓	✓	-	-	✓	-	-	20
Columbia	Greenway	NC 94	Elementary School Rd	Newlands Rd	-	✓	-	✓	-	✓	-	-	✓	-	-	16
Columbia	Greenway	Elementary School Rd	NC 94	La Keiser Dr	✓	✓	-	-	-	✓	-	-	-	-	-	13
Columbia	Paved Shoulder	La Keiser Dr	US 64	Elementary School Rd	✓	-	✓	-	-	✓	-	-	-	-	-	13
County	Paved Shoulder	NC 94	Hyde County	Elementary School Rd	-	✓	-	-	-	✓	-	-	✓	-	-	12

Location	Type	Street Name	From	To	Weight & Criteria												Score
					5	4	4	4	4	4	4	4	4	4	3	3	
County	Paved Shoulder	Soundside/New/ Ft Landing/ Newfoundland/ Old 64/US 64	Cemetery Rd	Dare County	-	✓	-	-	-	✓	-	-	✓	-	-	-	12
Columbia	Sharrow	Fonsoe St	Main St	Elementary School Rd	-	✓	-	-	-	✓	-	✓	-	-	-	-	12
County	Paved Shoulder	US 64	State Road 1110	Bridge W of Columbia	-	-	-	-	-	-	-	-	✓	-	-	-	4
County	Paved Shoulder	Albemarle Church Rd/Butler Rd	Washington County	US 64	-	-	-	-	-	✓	-	-	-	-	-	-	4
County	Paved Shoulder	Bodwell Rd/ Newlands Rd	Washington County	NC 94	-	-	-	-	-	-	-	-	-	-	-	-	0
WASHINGTON COUNTY																	
Creswell	Sharrow	Main St	Eighth St	Second St	✓	✓	-	✓	-	✓	✓	✓	-	-	-	-	25
Creswell	Sharrow	Eighth St	US 64	Main St	✓	-	✓	✓	✓	✓	-	✓	-	-	-	-	25
Plymouth	Sharrow	Washington st	Water St	RR N of US 64	-	✓	✓	✓	-	✓	✓	✓	-	-	-	-	24
Plymouth	Sharrow	Main St	Crescent Dr	Mackeys Rd	✓	✓	-	-	✓	✓	-	✓	-	-	-	-	21
Roper	Sharrow	Railroad st	NC 32	Mill Pond Rd	✓	✓	-	-	✓	-	✓	✓	-	-	-	-	21
Plymouth	Bicycle Lane, Stripe	Park Dr/Martin Ln	Madison St	Main St	-	✓	✓	✓	-	✓	-	✓	-	-	-	-	20
Plymouth	Greenway	US 64	West Ave	Main St	-	✓	✓	-	-	✓	✓	-	✓	-	-	-	20
Plymouth	Greenway	Rail Trail	Waterfront Park	Wilson St	✓	✓	-	✓	-	✓	-	-	-	-	-	-	17
County	Paved Shoulder	NC 45	County Border	US 64	✓	-	-	-	✓	-	✓	-	✓	-	-	-	17
Plymouth	Bicycle Lane, Restripe	Main St	Rankin Ln	Crescent Dr	✓	✓	-	-	-	✓	-	✓	-	-	-	-	17
Plymouth	Sharrow	Water St	Main St	Madison St	-	-	✓	✓	-	✓	-	✓	-	-	-	-	16
Plymouth	Signed Route	Main St/Alden Rd/ Golf Rd	Water St	Wilson St	-	✓	-	-	-	✓	✓	✓	-	-	-	-	16

Weight & Criteria	Access to a school	Access to a higher-density residential area	Access to a higher-density commercial area	Access to a park or recreation center	Connects to an existing or funded trail	Serves low-income areas	Segment with reported bike crashes or alternative to a high-crash corridor	Higher relative feasibility (no acquisition required)	Top 1-5 "Most in need of improvement" (no comment form)	Top 6-10 "Most in need of improvement" from online comment form	Contains a Top 1-10 Intersection "Most in need of improvement"
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Location	Type	Street Name	From	To	5	4	4	4	4	4	4	4	4	4	3	3	Score
Creswell	Sharrow	Sixth St	Main St	US 64	-	✓	-	-	✓	✓	-	✓	-	-	-	-	16
Plymouth	Sharrow	Main St	Water St	Rankin Ln	-	✓	✓	-	-	✓	-	✓	-	-	-	-	16
County	Greenway	US 64	Main St	NC 32	✓	✓	-	-	-	-	-	-	✓	-	-	-	13
County	Paved Shoulder	NC 32	US 64	Crossroad	-	-	✓	-	-	-	✓	-	✓	-	-	-	12
County	Paved Shoulder	Newland Rd/ Cherry Rd	NC 32	Main St	-	✓	-	-	✓	✓	-	-	-	-	-	-	12
County	Paved Shoulder	Scuppernon Rd/ Deep Creek Rd	NC 32	Tyrrell County	-	-	-	-	-	✓	✓	-	✓	-	-	-	12
Roper	Paved Shoulder	NC 32	Crossroad	Railroad St	-	✓	-	-	✓	-	-	-	✓	-	-	-	12
Plymouth	Bicycle Lane, Stripe	Main St	Mackeys Rd	US 64	-	✓	-	-	✓	-	-	✓	-	-	-	-	12
County	Paved Shoulder	Mackeys Rd	NC 45	NC 32 to Long Bridge	-	-	-	-	✓	-	✓	-	✓	-	-	-	12
Plymouth	Sharrow	Third St	Wilson St	Washington St	-	✓	-	-	-	✓	-	✓	-	-	-	-	12
Plymouth	Bicycle Lane, Road Diet	Wilson St	Brinkley Ave	Third St	-	✓	-	-	-	-	✓	✓	-	-	-	-	12
Plymouth	Signed Route	West Ave/ Roosevelt Ave	Wilson St	NC 32/Washington St	-	✓	✓	-	-	-	-	✓	-	-	-	-	12
County	Paved Shoulder	NC 32	Newland Rd	Mackeys Rd	-	-	-	-	✓	-	-	-	✓	-	-	-	8
County	Paved Shoulder	NC 32	NC 94	Long Bridge/ Chowan County	-	-	-	-	✓	-	-	-	✓	-	-	-	8
County	Paved Shoulder	Old Roper Rd/ NC 45	NC 32/Washington St	US 64	-	✓	-	-	-	-	-	-	✓	-	-	-	8
Roper	Sharrow	Buncombe St	Mill Pond Rd	Newland Rd	-	✓	-	-	-	-	-	✓	-	-	-	-	8
Roper	Paved Shoulder	Buncombe St	NC 32	Mill Pond Rd	-	✓	✓	-	-	-	-	-	-	-	-	-	8
Plymouth	Greenway	US 64	Long Ridge Rd	Wilson St Ext	-	✓	-	-	-	-	-	-	✓	-	-	-	8
Plymouth	Bicycle Lane, Stripe	Wilson St	N of West Ave	Brinkley Ave	-	✓	-	-	-	-	-	✓	-	-	-	-	8



Location	Type	Street Name	From	To	Weight & Criteria												Score
					5	4	4	4	4	4	4	4	4	4	3	3	
Plymouth	Bicycle Lane, New	Washington St	RR tracks N of US 64	Old Roper Rd	-	✓	-	-	-	✓	-	-	-	-	-	-	8
County	Paved Shoulder	NC 32/NC 45/ NC 99	Old Roper Rd	Hyde County	-	✓	-	-	-	-	-	-	-	✓	-	-	8
County	Paved Shoulder	Spruill Bridge Rd/ Thirty Ft Canal Rd/ Tom Pepper Rd	Second St/Main St	Tyrrell County	-	-	-	-	-	✓	-	-	-	-	-	-	4
Plymouth	Paved Shoulder	Wilson St Ext	US 64	N of West Ave	-	✓	-	-	-	-	-	-	-	-	-	-	4
County	Signed Route	Mackeys Ferry Rd	Mackeys Rd	End of Mackeys Ferry Rd	-	-	-	-	-	-	-	✓	-	-	-	-	4
County	Paved Shoulder	Long Ridge Rd	County Border	US 64	-	✓	-	-	-	-	-	-	-	-	-	-	4
County	Paved Shoulder	Old US 64	NC 32	Newland Rd	-	-	-	-	✓	-	-	-	-	-	-	-	4



## PRIORITY PROJECT COST SUMMARY

### UNIT COST ASSUMPTIONS

Facility Type	Unit Cost	Unit	Notes
Bicycle Lane (New Construction)	\$800,000	per mile	construction, pavement markings, signs
Bicycle Lane (Stripe)	\$30,000	per mile	pavement markings, signs
Bicycle Lane (Restripe)	\$200,000	per mile	stripe removal, restriping, pavement markings, signs
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile	difficult construction
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile	stripe removal, restriping, pavement markings, signs, bollards
Multi-Use Trail (New Construction)	\$600,000	per mile	10' path, simple construction, no difficult soils, bridges/ guardrail not included
Paved Shoulder (New Construction)	\$300,000	per mile	
Bicycle Route	\$2,400	per mile	signs, minor surface repair
Share the Road Signs (each)	\$250	each	signs
Bicycle Boulevard Signs (custom)	\$500	each	custom signs
Sharrow/Bike Boulevard Stencil (each)	\$175	each	pavement markings, signs
Sharrow/Bike Boulevard Stencil (per mile)	\$12,500	per mile	one sharrow every 150' in each direction
Bicycle Loop Detector	\$5,000	per intersection	
Traffic Calming Circle	\$35,000	each	
Refuge Island	\$10,000	each	
High Visibility Crosswalk	\$5,000	each	

Note:

- Right-of-way not included on new construction projects

## NORTH OF SOUND PRIORITY PROJECT COST SUMMARY

### A. Gatesville - Main Street Bike Lane

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile	0.9	\$180,000
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile		\$ -
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each		\$ -
Share the Road (per mile)				
Sharrow (each)	\$175	each		\$ -
Sharrow (per mile)	\$12,500	per mile		\$ -
Bicycle Loop Detector	\$5,000	per intersection		\$ -
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each		\$ -
Contingency	10%	percentage		\$18,000
			TOTAL	\$198,000

#### Notes:

- Assumes the full removal of on-street parking (option 1 exhibit)

### B. Moyock - Caratoke Highway Sidepath

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile	1.3	\$780,000
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each		\$ -
Share the Road (per mile)				
Sharrow (each)	\$175	each		\$ -
Sharrow (per mile)	\$12,500	per mile		\$ -
Bicycle Loop Detector	\$5,000	per intersection	1	\$5,000
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each		\$ -
Contingency	25%	percentage		\$196,250
			TOTAL	\$981,250

#### Notes:

- Excludes cost of secondary multi-use trail north of Moyock Elementary School
- Excludes paved shoulder improvements
- Additional contingency added to account for construction hardships



## NORTH OF SOUND PRIORITY PROJECT COST SUMMARY

### C. Edenton - Broad Street Bike Lane/Sharrow

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile	1.3	\$260,000
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile		\$ -
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each	10	\$2,500
Bicycle Boulevard Signs (custom)	\$500	each		
Sharrow/Bike Boulevard Stencil (each)	\$175	each		\$ -
Sharrow/Bike Boulevard Stencil (per mile)	\$12,500	per mile	0.3	\$3,750
Bicycle Loop Detector	\$5,000	per intersection	2	\$10,000
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each	5	\$25,000
Contingency	15%	percentage		\$45,188
			TOTAL	\$346,438

### D. Elizabeth City - Church Street Bike Boulevard

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile		\$ -
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each		\$ -
Bicycle Boulevard Signs (custom)	\$500	each	11	\$5,500
Sharrow/Bike Boulevard Stencil (each)	\$175	each	12	\$2,100
Sharrow/Bike Boulevard Stencil (per mile)	\$12,500	per mile		\$ -
Bicycle Loop Detector	\$5,000	per intersection	3	\$15,000
Traffic Calming Circle	\$35,000	each	3	\$105,000
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each		\$ -
Contingency	15%	percentage		\$19,140
			TOTAL	\$146,740

#### Notes:

- Restripe includes 0.3 miles of conversion to back-in angle parking
- Assumes one Share the Road sign in each direction per 1/4-mile
- Excludes cost of landscaped median for potential 2-lane divided road diet
- Excludes improvements to side streets

## NORTH OF SOUND PRIORITY PROJECT COST SUMMARY

### E. Elizabeth City - Ehringhaus Street Corridor Improvements

#### Notes:

- Cost TBD based on outcome of corridor-based land use and transportation study

### F. Hertford Greenway

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile	1.5	\$900,000
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each		\$ -
Bicycle Boulevard Signs (custom)	\$500	each		\$ -
Sharrow/Bike Boulevard Stencil (each)	\$175	each		\$ -
Sharrow/Bike Boulevard Stencil (per mile)	\$12,500	per mile		\$ -
Bicycle Loop Detector	\$5,000	per intersection		\$ -
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each	1	\$5,000
Contingency	25%	percentage		\$226,250
			TOTAL	\$1,131,250

#### Notes:

- Excludes loop trail to water or connection to recreation center
- Additional contingency added to account for construction hardships
- Significant water crossing not included in cost estimate
- High visibility crosswalk at US 17 also included in estimate for North of Sound G

## NORTH OF SOUND PRIORITY PROJECT COST SUMMARY

### G. Hertford - Church Street Bike Lane/Sharrow

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile	0.4	\$12,000
Bicycle Lane (Restripe)	\$200,000	per mile	1.1	\$220,000
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile		\$ -
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile	2.4	\$5,760
Share the Road (each)	\$250	each		\$ -
Bicycle Boulevard Signs (custom)	\$500	each		\$ -
Sharrow/Bike Boulevard Stencil (each)	\$175	each		\$ -
Sharrow/Bike Boulevard Stencil (per mile)	\$12,500	per mile	0.9	\$11,250
Bicycle Loop Detector	\$5,000	per intersection		\$ -
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each	1	\$5,000
Contingency	25%	percentage		\$63,503
			TOTAL	\$317,513

#### Notes:

- High visibility crosswalk at US 17 also included in estimate for North of Sound F

### H. Dismal Swamp Greenway Extension

#### Notes:

- Dismal Canal Trail Extension final report lists cost as \$1.6 million



## SOUTH OF SOUND PRIORITY PROJECT COST SUMMARY

### A. Engelhard - US 264 Bike Lane

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile	0.2	\$6,000
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile		\$ -
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each		\$ -
Share the Road (per mile)				
Sharrow (each)	\$175	each		\$ -
Sharrow (per mile)	\$12,500	per mile		\$ -
Bicycle Loop Detector	\$5,000	per intersection		\$ -
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each		\$ -
Contingency	10%	percentage		\$600
			TOTAL	\$6,600

### B. Columbia - US 64 Sidepath

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile	0.8	\$640,000
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile		\$ -
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each		\$ -
Share the Road (per mile)				
Sharrow (each)	\$175	each		\$ -
Sharrow (per mile)	\$12,500	per mile		\$ -
Bicycle Loop Detector	\$5,000	per intersection		\$ -
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each	2	\$10,000
Contingency	30%	percentage		\$195,000
			TOTAL	\$845,000

#### Notes:

- Excludes improvements to side streets, including Main Street

*SOUTH OF SOUND PRIORITY PROJECT COST SUMMARY*

*C. Plymouth- US 64 Sidepath*

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile	3.3	\$1,980,000
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each		\$ -
Bicycle Boulevard Signs (custom)	\$500	each		
Sharrow/Bike Boulevard Stencil (each)	\$175	each		\$ -
Sharrow/Bike Boulevard Stencil (per mile)	\$12,500	per mile		\$ -
Bicycle Loop Detector	\$5,000	per intersection	1	\$5,000
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each	1	\$5,000
Contingency	40%	percentage		\$796,000
			TOTAL	\$2,786,000

*D. Plymouth - Water Street/Park Drive Sharrow/Bike Lane*

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile	0.3	\$9,000
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile		\$ -
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each		\$ -
Bicycle Boulevard Signs (custom)	\$500	each		\$ -
Sharrow/Bike Boulevard Stencil (each)	\$175	each		\$ -
Sharrow/Bike Boulevard Stencil (per mile)	\$12,500	per mile	0.6	\$7,500
Bicycle Loop Detector	\$5,000	per intersection		\$ -
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each		\$ -
Contingency	15%	percentage		\$2,475
			TOTAL	\$18,975

Notes:

- Excludes multiuse trail (rail-to-trail conversion) north of US 64
- Excludes improvements to side streets
- Significant construction hardships expected

## OUTER BANKS PRIORITY PROJECT COST SUMMARY

### A. Manteo - US 64 Sharrow/Bike Lane

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile		\$ -
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each	8	\$2,000
Share the Road (per mile)				
Sharrow (each)	\$175	each		\$ -
Sharrow (per mile)	\$12,500	per mile	2	\$25,000
Bicycle Loop Detector	\$5,000	per intersection	1	\$5,000
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each	1	\$5,000
Contingency	15%	percentage		\$5,550
			TOTAL	\$42,550

#### Notes:

- Excludes multiuse trail along US 64/264

### B. Nags Head/Kitty Hawk/Kill Devil Hills - 158 Corridor Improvements

#### Notes:

- Cost TBD based on outcome of corridor-based land use and transportation study



## OUTER BANKS PRIORITY PROJECT COST SUMMARY

### C. Buxton - NC 12 Sidepath/ Bike Lane

Notes:

- \$4,250,000 cost assumed from NCDOT Feasibility Study 1001A

### D. Duck - NC 12 Sidepath

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile	1.1	\$275,000
Multi-Use Trail (Construction)	\$600,000	per mile		\$ -
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each		\$ -
Bicycle Boulevard Signs (custom)	\$500	each		\$ -
Sharrow/Bike Boulevard Stencil (each)	\$175	each		\$ -
Sharrow/Bike Boulevard Stencil (per mile)	\$12,500	per mile		\$ -
Bicycle Loop Detector	\$5,000	per intersection		\$ -
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each		\$ -
Contingency	15%	percentage		\$41,250
			TOTAL	\$316,250

Notes:

- Potential pedestrian improvements to be determined as part of the Town's pedestrian plan
- Shoulder improvement likely in some locations and not included in cost estimate

## OUTER BANKS PRIORITY PROJECT COST SUMMARY

### E. Nags Head - Memorial Avenue Bike Boulevard

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile		\$ -
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each		\$ -
Bicycle Boulevard Signs (custom)	\$500	each	8	\$4,000
Sharrow/Bike Boulevard Stencil (each)	\$175	each	15	\$2,625
Sharrow/Bike Boulevard Stencil (per mile)	\$12,500	per mile		\$ -
Bicycle Loop Detector	\$5,000	per intersection		\$ -
Traffic Calming Circle	\$35,000	each	5	\$175,000
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each		\$ -
Contingency	10%	percentage		\$18,163
			TOTAL	\$199,788

### F. Corolla - Lighthouse Drive Signed Route

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile		\$ -
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile	3.6	\$8,640
Share the Road (each)	\$250	each		\$ -
Bicycle Boulevard Signs (custom)	\$500	each		\$ -
Sharrow/Bike Boulevard Stencil (each)	\$175	each		\$ -
Sharrow/Bike Boulevard Stencil (per mile)	\$12,500	per mile		\$ -
Bicycle Loop Detector	\$5,000	per intersection		\$ -
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each		\$ -
Contingency	10%	percentage		\$864
			TOTAL	\$9,504

#### Notes:

- Assumes improvements to Memorial Ave and Barnes St as shown in exhibit

## OUTER BANKS PRIORITY PROJECT COST SUMMARY

### G. Southern Shores - Dogwood Trail Sidepath

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile		\$ -
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile	2.3	\$1,380,000
Multi-Use Trail (Widen existing sidewalk)	\$300,000	per mile	1	\$300,000
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each		\$ -
Bicycle Boulevard Signs (custom)	\$500	each		\$ -
Sharrow/Bike Boulevard Stencil (each)	\$175	each		\$ -
Sharrow/Bike Boulevard Stencil (per mile)	\$12,500	per mile		\$ -
Bicycle Loop Detector	\$5,000	per intersection	1	\$5,000
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each	1	\$5,000
Contingency	40%	percentage		\$676,000
			TOTAL	\$2,366,000

- Notes:
- Bicycle loop detector at US 158 and Dogwood Trail
  - Additional contingency added to account for construction hardships

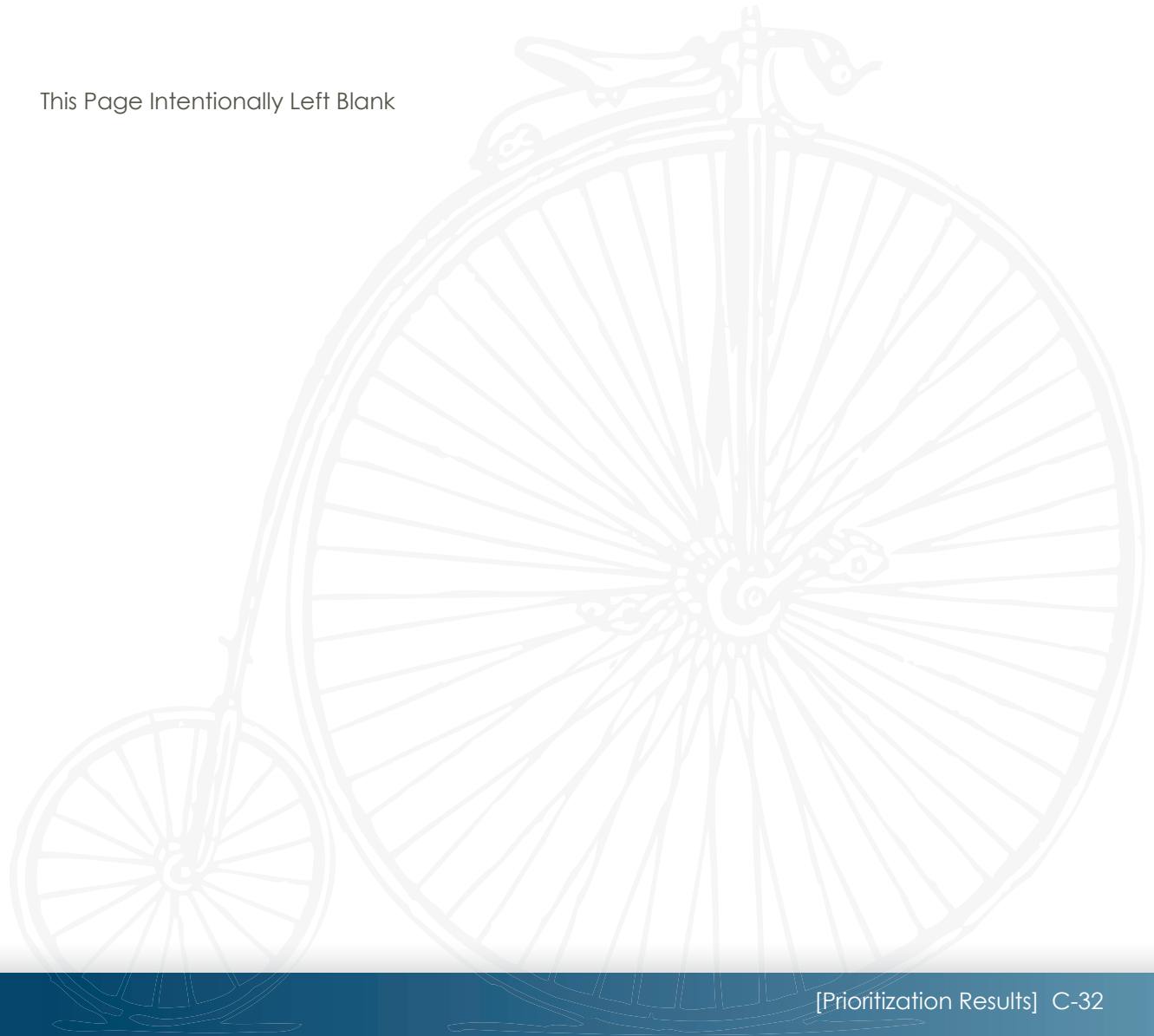
### H. Colington Road Sidepath

Facility	Unit Cost		Units	Total
Bicycle Lane (Construction)	\$800,000	per mile		\$ -
Bicycle Lane (Stripe)	\$30,000	per mile		\$ -
Bicycle Lane (Restripe)	\$200,000	per mile		\$ -
Constrained Multi-Use Trail Sidepath (New Construction)	\$1,000,000	per mile	3.9	\$3,900,000
Multi-Use Trail Sidepath (Restripe)	\$250,000	per mile		\$ -
Multi-Use Trail (Construction)	\$600,000	per mile		\$ -
Paved Shoulder (Construction)	\$300,000	per mile		\$ -
Bicycle Route (Signing)	\$2,400	per mile		\$ -
Share the Road (each)	\$250	each		\$ -
Bicycle Boulevard Signs (custom)	\$500	each		\$ -
Sharrow/Bike Boulevard Stencil (each)	\$175	each		\$ -
Sharrow/Bike Boulevard Stencil (per mile)	\$12,500	per mile		\$ -
Bicycle Loop Detector	\$5,000	per intersection		\$ -
Traffic Calming Circle	\$35,000	each		\$ -
Refuge Island	\$10,000	each		\$ -
High Visibility Crosswalk	\$5,000	each		\$ -
Contingency	35%	percentage		\$1,365,000
			TOTAL	\$5,265,000

- Notes:
- Additional contingency added to account for construction hardships



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# Appendix D

## Bicycle Design Guidelines

### INTRODUCTION

The sections that follow serve as a sampling of bikeway and trail design treatments and provide guidelines for their development. The guidelines are not, however, a substitute for a more thorough evaluation by a landscape architect or engineer during implementation. Some improvements may also require cooperation with the NCDOT for specific design solutions. The following standards and guidelines are referred to in this guide.

- The Federal Highway Administration's **Manual on Uniform Traffic Control Devices** (MUTCD) is the primary source for guidance on lane striping requirements, signal warrants, and recommended signage and pavement markings.
- American Association of State Highway and Transportation Officials (AASHTO) **Guide for the Development of Bicycle Facilities**, updated in June 2012 provides guidance on dimensions, use, and layout of specific bicycle facilities.
- The National Association of City Transportation Officials' (NACTO) 2012 **Urban Bikeway Design Guide** is the newest publication of nationally recognized bikeway design standards, and offers guidance on the current state of the practice

designs, including bicycle boulevards. All of the NACTO treatments are in use internationally and in many cities around the US. Not all treatments are correspondingly recognized in AASHTO or MUTCD as of August, 2013, however, so certain treatments may not be permitted on state roads. NCDOT currently adheres to AASHTO, MUTCD, and the Complete Streets Planning and Design Guidelines.

- Meeting the requirements of the Americans with Disabilities Act (ADA) is an important part of any bicycle facility project. The United States Access Board's proposed **Public Rights-of-Way Accessibility Guidelines** (PROWAG) and the **2010 ADA Standards for Accessible Design** (2010 Standards) contain standards and guidance for the construction of accessible facilities.
- The 2012 **NCDOT Complete Streets Planning and Design Guidelines** offer state-specific guidance on bicycle facilities and provide additional contextual guidance for appropriate application.

Should the national standards be revised in the future and result in discrepancies with this chapter, the national standards should prevail for all design decisions.

*The Pedestrian and Bicycle Information Center, NACTO, AASHTO, the MUTCD, nationally recognized bikeway standards, and other sources have all informed the content of this chapter.*

### Chapter Contents

*Introduction*

*Facility Continuum*

*Shared Roadways*

*Separated Bikeways*

*Bikeways at Intersections*

*Bridges*

*Signalized Intersections*

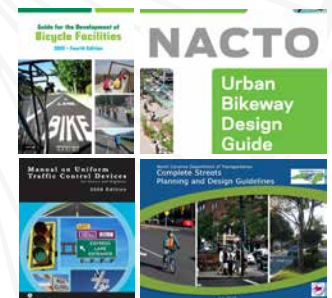
*Bikeway Signing*

*Retrofitting Existing Streets to Add Bikeways*

*Multi-Use Trails*

*Trail Crossings*

*Bikeway Support and Maintenance*

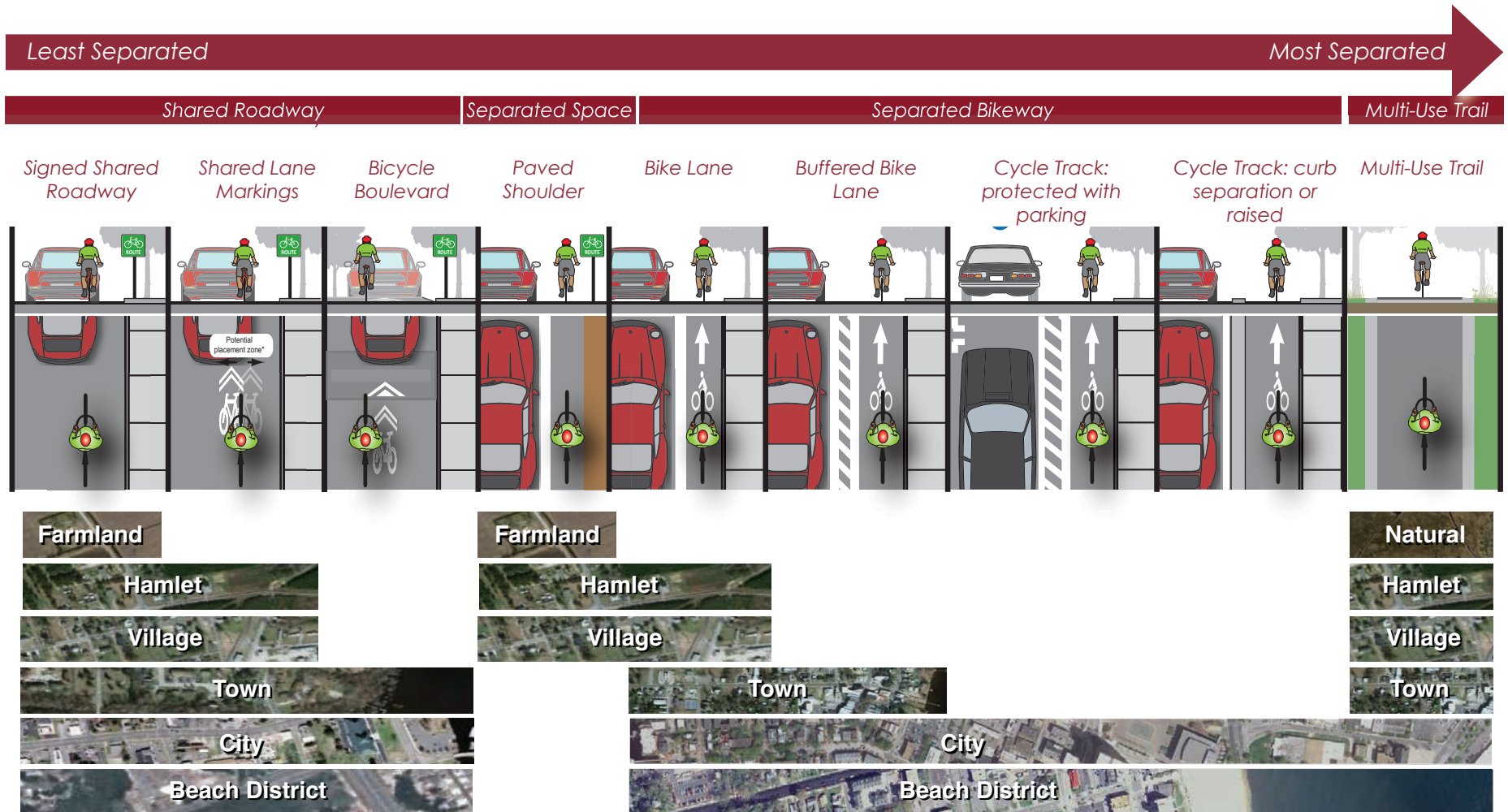




## FACILITY CONTINUUM

The following continuum illustrates the range of bicycle facilities commonly applicable to various settlement types in the Albemarle region. This continuum guided the facility recommendations of this plan and can be used to confirm and refine the recommendations for specific corridors as they are implemented. Engineering judgment, traffic studies, previous municipal planning efforts, community input, and local context should also be used to refine criteria

when developing bicycle facility recommendations for a particular street. In some corridors, it may be desirable to construct facilities to a higher level of treatment than those recommended in relevant planning documents in order to enhance user safety and comfort. In other cases, existing and/or future motor vehicle speeds and volumes may not justify the recommended level of separation, and a less intensive treatment may be acceptable.



## SHARED ROADWAYS

On shared roadways, bicyclists and motor vehicles use the same roadway space. These facilities are typically used on roads with low speeds and traffic volumes, however they can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

Shared roadways employ a large variety of treatments from simple signage and shared lane markings to more complex treatments including directional signage, traffic diverters, chicanes, chokers, and/or other traffic calming devices to reduce vehicle speeds or volumes.

### BICYCLE BOULEVARDS

Bicycle boulevards are a special class of shared roadways designed for a broad spectrum of bicyclists. They are low-volume local streets where motorists and bicyclists share the same travel lane. Treatments for bicycle boulevards are selected as necessary to create appropriate automobile volumes and speeds, and to provide safe crossing opportunities of busy streets.



Signed Shared Roadway



Marked Shared Roadway



Bicycle Boulevards



### Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs, and will need periodic replacement due to wear.

### Additional References and Guidelines

NCDOT. (2012). Complete Streets Planning and Design Guidelines. AASHTO. (2012). AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices.

## SIGNED SHARED ROADWAY

### Description

Signed Shared Roadways are facilities shared with motor vehicles. They are typically used on roads with low speeds and traffic volumes, however can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

### Guidance

Lane width varies depending on roadway configuration.

Bicycle Route signage (D11-1) should be applied at intervals frequent enough to keep bicyclists informed of changes in route direction and to remind motorists of the presence of bicyclists. Commonly, this includes placement at:

- Beginning or end of Bicycle Route.
- At major changes in direction or at intersections with other bicycle routes.
- At intervals along bicycle routes not to exceed ½ mile.



### Discussion

Signed Shared Roadways serve either to provide continuity with other bicycle facilities (usually bike lanes) or to designate preferred routes through high-demand corridors.

This configuration differs from a **Bicycle Boulevard** due to a lack of traffic calming, wayfinding, pavement markings and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.



## SHARED LANE MARKINGS

### Description

A marked shared roadway is a general purpose travel lane marked with shared lane markings (SLM) used to encourage bicycle travel and proper positioning within the lane. Shared lane markings are also called 'Sharrows'.

In constrained conditions, the SLMs are placed in the middle of the lane to discourage unsafe passing by motor vehicles. On a wide outside lane, the SLMs can be used to promote bicycle travel to the right of motor vehicles. In all conditions, SLMs should be placed outside of the door zone of parked cars.

### Guidance

- In constrained conditions, preferred placement is in the center of the travel lane to minimize wear and promote single file travel.
- Markings are generally not appropriate on streets that have a speed limit above 35 mph.
- Minimum placement of SLM marking centerline is 11 feet from edge of curb where on-street parking is present, 4 feet from edge of curb with no parking. If parking lane is wider than 7.5 feet, the SLM should be moved further out accordingly.

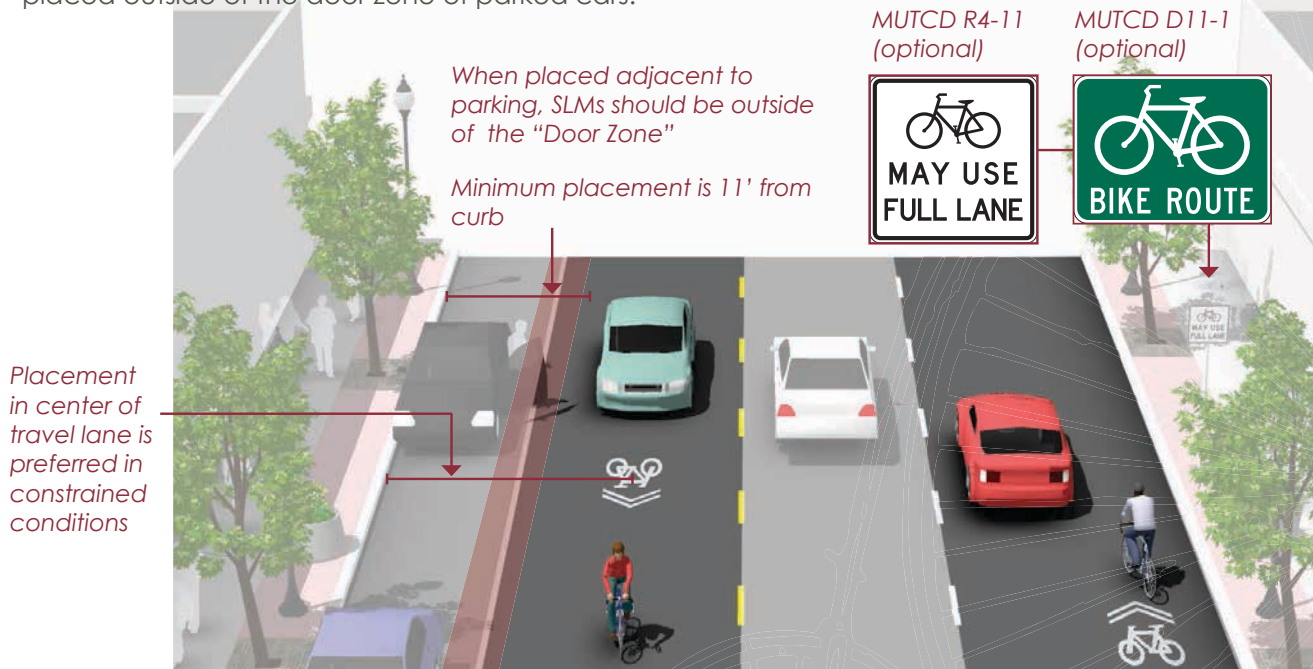


### Materials and Maintenance

Placing SLMs between vehicle tire tracks will increase the life of the markings and minimize the long-term cost of the treatment.

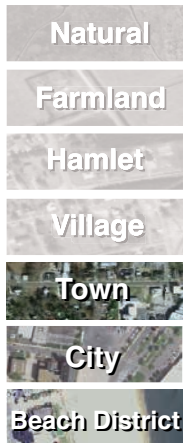
### Additional References and Guidelines

NCDOT. (2012). Complete Streets Planning and Design Guidelines. AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices. NACTO. (2012). Urban Bikeway Design Guide.



### Discussion

Bike Lanes should be considered on roadways with outside travel lanes wider than 15 feet, or where other lane narrowing or removal strategies may provide adequate road space. SLMs shall not be used on shoulders, in designated Bike Lanes, or to designate Bicycle Detection at signalized intersections. (MUTCD 9C.07).



## BICYCLE BOULEVARD

### Description

Bicycle boulevards are low-volume, low-speed streets modified to enhance bicyclist comfort by using treatments such as signage, pavement markings, traffic calming and/or traffic reduction, and intersection modifications. These treatments allow through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic.

*Signs and Pavement Markings identify the street as a bicycle priority route.*



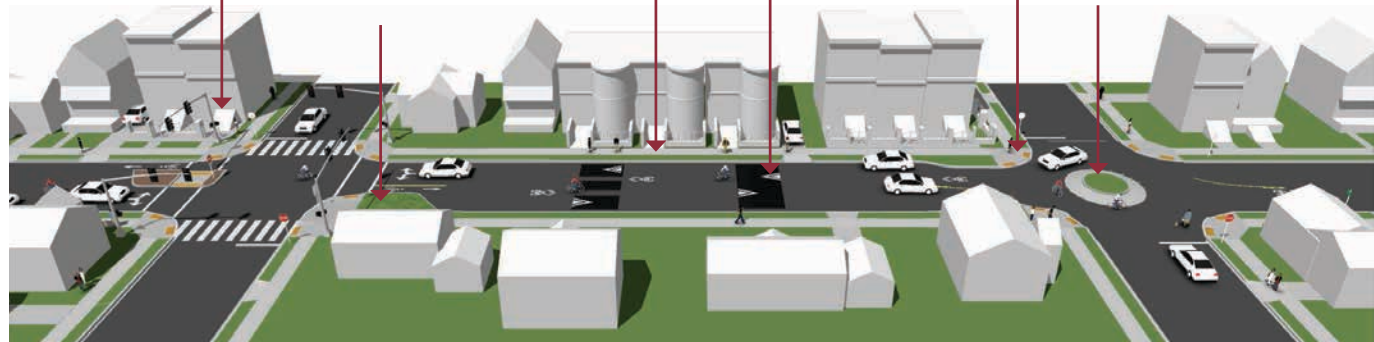
*Enhanced Crossings use signals, beacons, and road geometry to increase safety at major intersections.*

*Partial Closures and other volume management tools limit the number of cars traveling on the bicycle boulevard.*

*Speed Humps manage driver speed.*

*Curb Extensions shorten pedestrian crossing distance.*

*Mini Traffic Circles slow drivers in advance of intersections.*



### Discussion

Bicycle boulevard retrofits to local streets are typically located on streets without existing signalized accommodation at crossings of collector and arterial roadways. Without treatments for bicyclists, these intersections can become major barriers along the bicycle boulevard and compromise safety.

### Guidance

- Signs and pavement markings are the minimum treatments necessary to designate a street as a bicycle boulevard.
- Bicycle boulevards should have a maximum posted speed of 25 mph. Use traffic calming to maintain an 85th percentile speed below 22 mph.
- Implement volume control treatments based on the context of the bicycle boulevard, using engineering judgment. Target motor vehicle volumes range from 1,000 to 3,000 vehicles per day.
- Intersection crossings should be designed to enhance safety and minimize delay for bicyclists.

### Materials and Maintenance

Vegetation should be regularly trimmed to maintain visibility and attractiveness.

### Additional References and Guidelines

Alta Planning + Design and IBPL. (2009). Bicycle Boulevard Planning and Design Handbook.  
 BikeSafe. (No Date). Bicycle countermeasure selection system.  
 Ewing, Reid. (1999). Traffic Calming: State of the Practice.  
 Ewing, Reid and Brown, Steven. (2009). U.S. Traffic Calming Manual.

## SEPARATED BIKEWAYS

Designated exclusively for bicycle travel, separated bikeways are segregated from vehicle travel lanes by striping, and can include pavement stencils and other treatments. Separated bikeways are most appropriate on arterial and collector streets where higher traffic volumes and speeds warrant greater separation.

Separated bikeways can increase safety and promote proper riding by:

- Defining road space for bicyclists and motorists, reducing the possibility that motorists will stray into the bicyclists' path.
- Discouraging bicyclists from riding on the sidewalk.
- Reducing the incidence of wrong way riding.
- Reminding motorists that bicyclists have a right to the road.

## PAVED SHOULDERS

Roadways with paved, striped shoulders (4'+) wide enough for bicycle travel are suitable for bicycle travel in rural areas with low traffic volumes. Paved shoulders should be reconditioned into full bike lanes when a roadway is completed with curb and gutter. This type of treatment is not typical in urban areas and should only be used in cities or towns where constraints exist.

Longitudinal rumble strips in paved shoulders are difficult for cyclists to traverse and can prevent them from using the facility. Rumble strips are not recommended on shoulders along a bike network unless there is a minimum clear path of 4 ft from the rumble strip to the outside edge of a paved shoulder, or



**Bicycle Lanes**



**Buffered Bike Lanes**



**Cycle Tracks**

5 ft to the adjacent curb, guardrail, or other obstacle. In addition, periodic gaps in rumble strips should be provided to allow bicyclists to move across the rumble strip pattern as needed. Gaps should be 12' in length and spaced at intervals of 40 to 60 feet. For additional guidance, see AASHTO 4.5.2 *Rumble Strips*.





### Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

### Additional References and Guidelines

NCDOT. (2012). Complete Streets Planning and Design Guidelines.  
AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices.  
NACTO. (2012). Urban Bikeway Design Guide.

## BICYCLE LANES

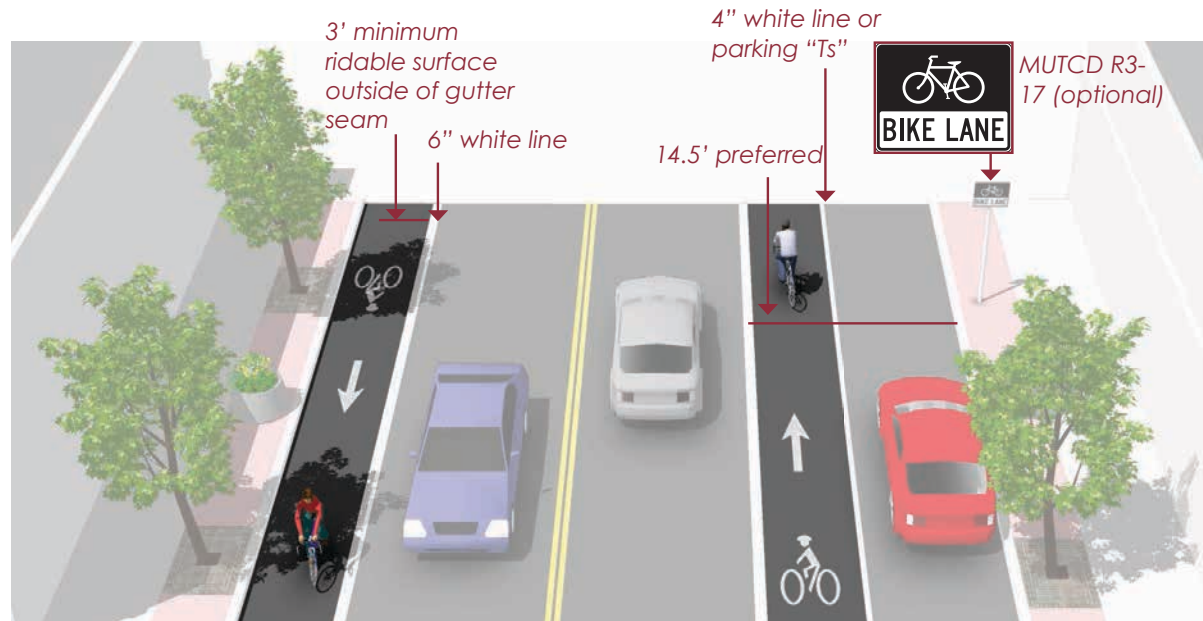
### Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is located adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge or parking lane.

Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway than if they are expected to share a lane with vehicles.

### Guidance

- 4 foot minimum when no curb and gutter is present.
- 5 foot minimum when adjacent to curb and gutter or 3 feet more than the gutter pan width if the gutter pan is wider than 2 feet.
- 14.5 foot preferred from curb face to edge of bike lane. (12 foot minimum).
- 7 foot maximum width for use adjacent to arterials with high travel speeds. Greater widths may encourage motor vehicle use of bike lane.
- Commercial driveways should be limited where bike lanes are installed.



### Discussion

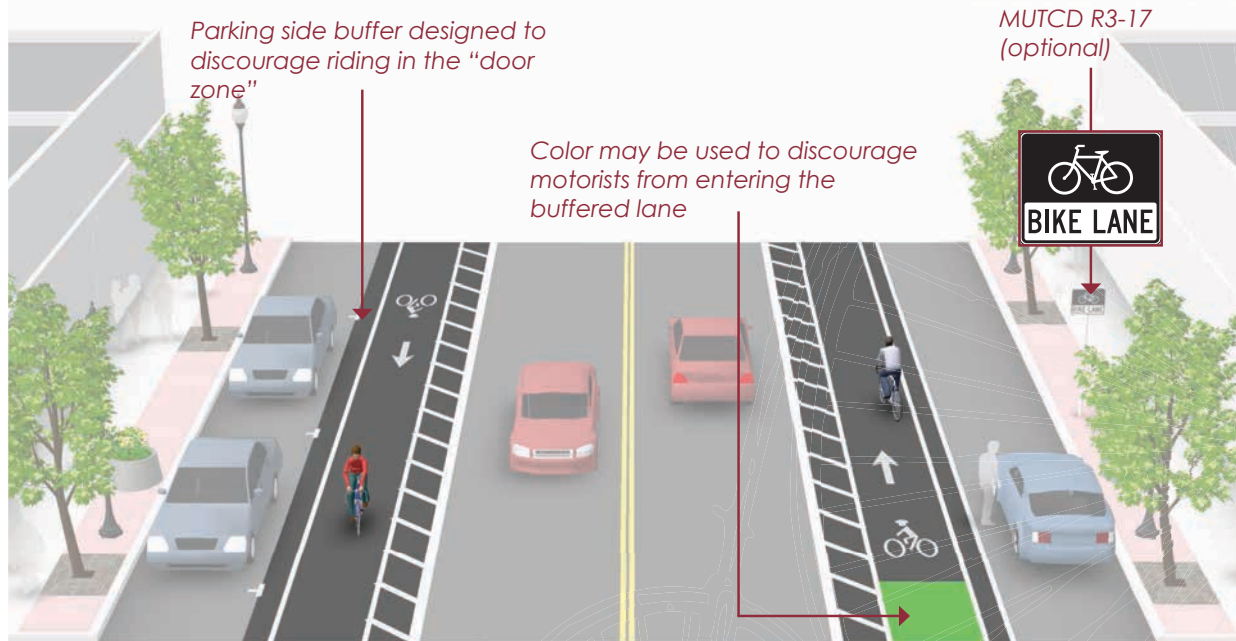
Wider bicycle lanes are desirable in certain situations such as on higher speed arterials (45 mph+) where use of a wider bicycle lane would increase separation between passing vehicles and bicyclists. Appropriate signing and stenciling is important with wide bicycle lanes to ensure motorists do not mistake the lane for a vehicle lane or parking lane. Consider **Buffered Bicycle Lanes** when further separation is desired.

## BUFFERED BICYCLE LANES

### Description

Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Buffered bike lanes are allowed as per MUTCD guidelines for buffered preferential lanes (section 3D-01).

Buffered bike lanes are designed to increase the space between the bike lane and the travel lane or parked cars. This treatment is appropriate for bike lanes on roadways with high motor vehicle traffic volumes and speed, adjacent to parking lanes, or a high volume of truck or oversized vehicle traffic.



### Discussion

Frequency of right turns by motor vehicles at major intersections should determine whether continuous or truncated buffer striping should be used approaching the intersection. Commonly configured as a buffer between the bicycle lane and motor vehicle travel lane, a parking side buffer may also be provided to help bicyclists avoid the 'door zone' of parked cars.

### Guidance

- Where bicyclist volumes are high or where bicyclist speed differentials are significant, the desired bicycle travel area width is 7 feet.
- Buffers should be at least 2 feet wide. If 3 feet or wider, mark with diagonal or chevron hatching. For clarity at driveways or minor street crossings, consider a dotted line for the inside buffer boundary where cars are expected to cross.

Natural

Farmland

Hamlet

Village

Town

City

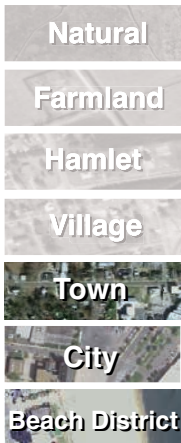
Beach District

### Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.  
FHWA. (2009). Manual on Uniform Traffic Control Devices. (3D-01)  
NACTO. (2012). Urban Bikeway Design Guide.



### Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

## BIKE LANE ADJACENT TO ON-STREET BACK-IN DIAGONAL PARKING

### Description

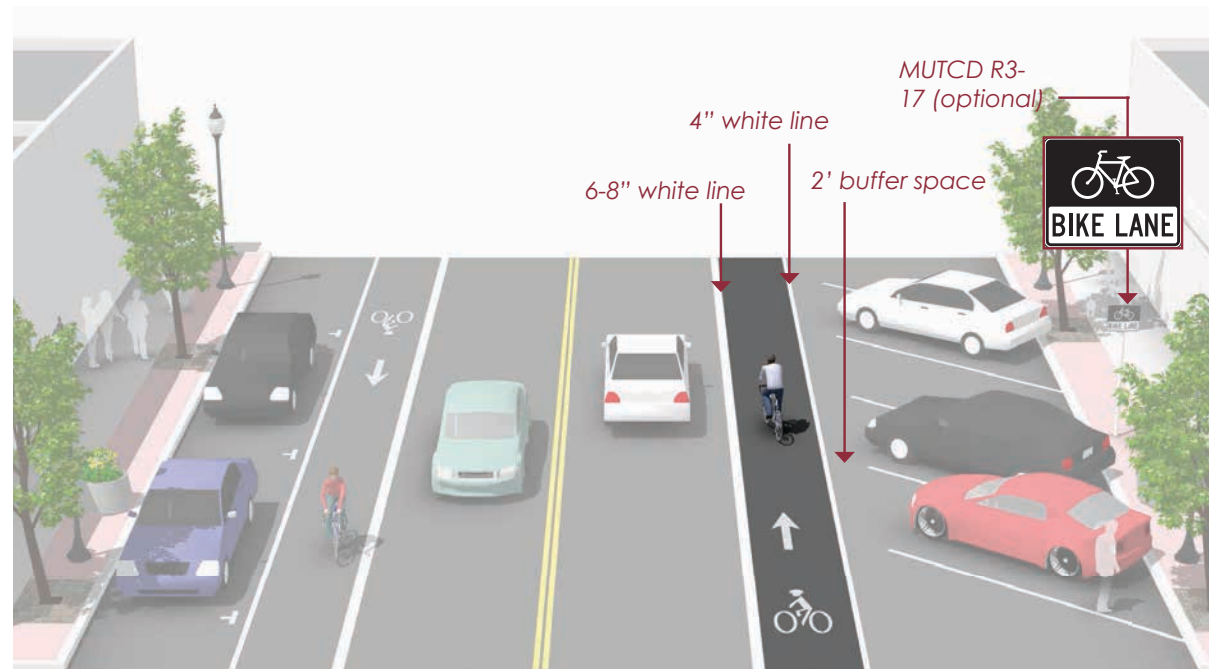
In certain areas with high parking demand such as urban commercial areas, diagonal parking can be used to increase parking supply.

Back-in diagonal parking improves sight distances between drivers and bicyclists when compared to conventional head-in diagonal parking. Back-in diagonal parking provides other benefits including loading and unloading of the trunk at the curb rather than in the street, passengers (including children) are directed by open doors towards the curb and there is no door conflict with bicyclists. While there

may be a learning curve for some drivers, back-in diagonal parking is typically an easier maneuver than conventional parallel parking.

### Guidance

- 5 foot minimum marked width of bike lane.
- Parking bays are sufficiently long to accommodate most vehicles (so vehicles do not block bike lane).



### Discussion

Conventional front-in diagonal parking is not compatible or recommended in conjunction with high levels of bicycle traffic or with the provision of bike lanes, as drivers backing out of conventional diagonal parking have limited visibility of approaching bicyclists.



## CYCLE TRACKS

### Description

A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. Cycle tracks have different forms but all share common elements—they provide space that is intended to be exclusively or primarily used by bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks.

Raised cycle tracks may be at the level of the adjacent sidewalk or set at an intermediate level between the roadway and sidewalk to separate the cycle track from the pedestrian area.

### Guidance

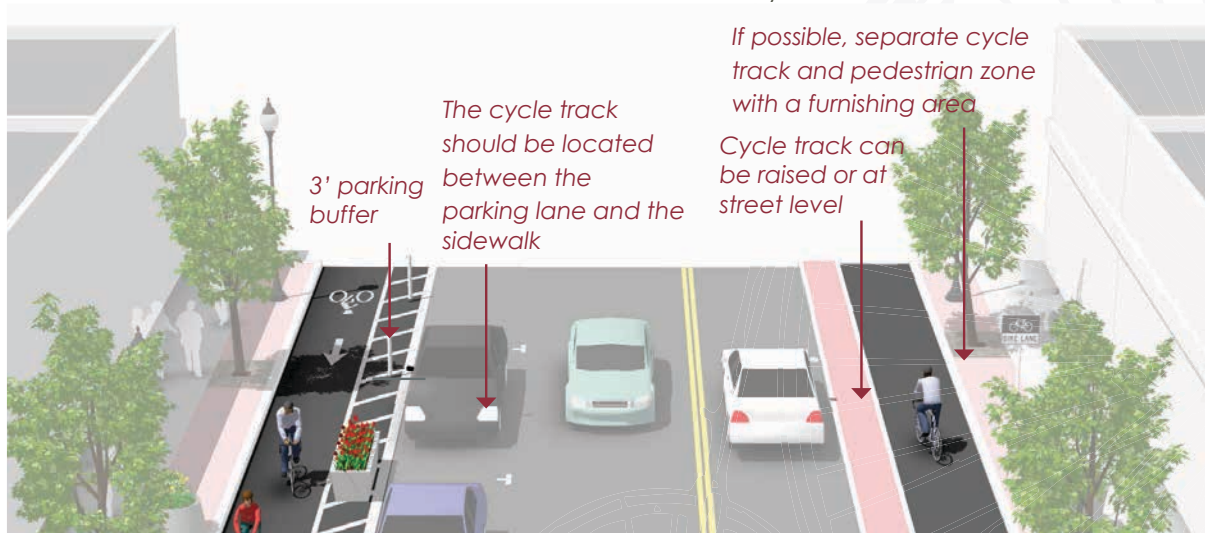
Cycle tracks should ideally be placed along streets with long blocks and few driveways or mid-block access points for motor vehicles.

#### One-Way Cycle Tracks

- 7 foot recommended minimum to allow passing. 5 foot minimum width in constrained locations.

#### Two-Way Cycle Tracks

- Cycle tracks located on one-way streets have fewer potential conflict areas than those on two-way streets.
- 12 foot recommended minimum for two-way facility. 8 foot minimum in constrained locations.



### Discussion

Special consideration should be given at transit stops to manage bicycle and pedestrian interactions. Driveways and minor street crossings are unique challenges to cycle track design. Parking should be prohibited within 30 feet of the intersection to improve visibility. Color, yield markings and "Yield to Bikes" signage should be used to identify the conflict area and clarify bicyclist right-of-way.

Natural

Farmland

Hamlet

Village

Town

City

Beach District

### Materials and Maintenance

In cities with winter climates, barrier separated and raised cycle tracks may require special equipment for snow removal.

### Additional References and Guidelines

NACTO. (2012). Urban Bikeway Design Guide.

## **BIKEWAYS AT INTERSECTIONS**

Intersections are junctions at which different modes of transportation meet and facilities overlap. An intersection facilitates the interchange between bicyclists, motorists, pedestrians and other modes in order to advance traffic flow in a safe and efficient manner. Designs for intersections with bicycle facilities should reduce conflict between bicyclists (and other vulnerable road users) and vehicles by heightening the level of visibility, denoting clear right-of-way and facilitating eye contact and awareness with other modes. Intersection treatments can improve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals.

The configuration of a safe intersection for bicyclists may include elements such as color, signage, medians, signal detection and pavement markings. Intersection design should take into consideration existing and anticipated bicyclist, pedestrian, and motorist movements. In all cases, the degree of mixing or separation between bicyclists and other modes is intended to reduce the risk of crashes and increase bicyclist comfort. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, whether bicycle facilities are intersecting, and the adjacent street function and land use.



## COLORED BIKE LANES IN CONFLICT AREAS

### Description

Colored pavement within a bicycle lane increases the visibility of the facility and reinforces priority of bicyclists in conflict areas.

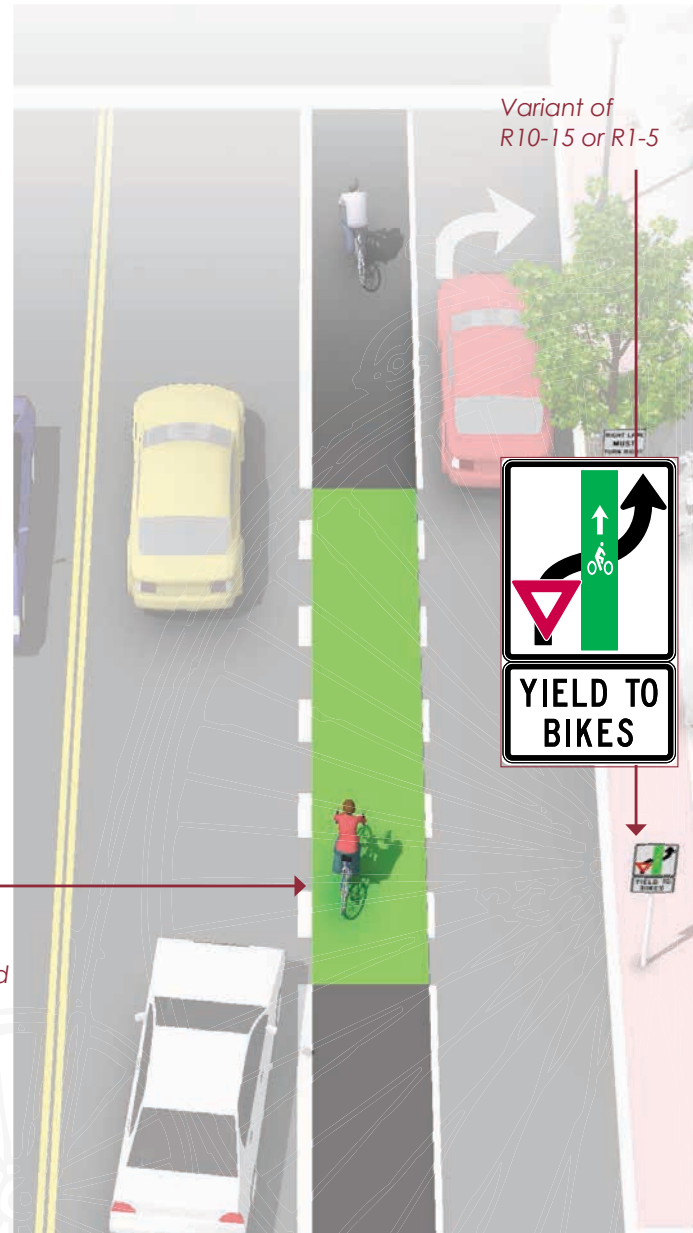
### Guidance

- Green colored pavement was given interim approval by the Federal Highways Administration in March 2011. See interim approval for specific color standards.
- The colored surface should be skid resistant and retro-reflective.
- A “Yield to Bikes” sign should be used at intersections or driveway crossings to reinforce that bicyclists have the right-of-way in colored bike lane areas.

### Discussion

Evaluations performed in Portland, OR, St. Petersburg, FL and Austin, TX found that significantly more motorists yielded to bicyclists and slowed or stopped before entering the conflict area after the application of the colored pavement when compared with an uncolored treatment.

Normal white dotted edge lines should define colored space



Natural

Farmland

Hamlet

Village

Town

City

Beach District

### Materials and Maintenance

Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

### Additional References and Guidelines

FHWA. (2011). Interim Approval (IA-14) has been granted. Requests to use green colored pavement need to comply with the provisions of Paragraphs 14 through 22 of Section 1A.10 NACTO. (2012). Urban Bikeway Design Guide.



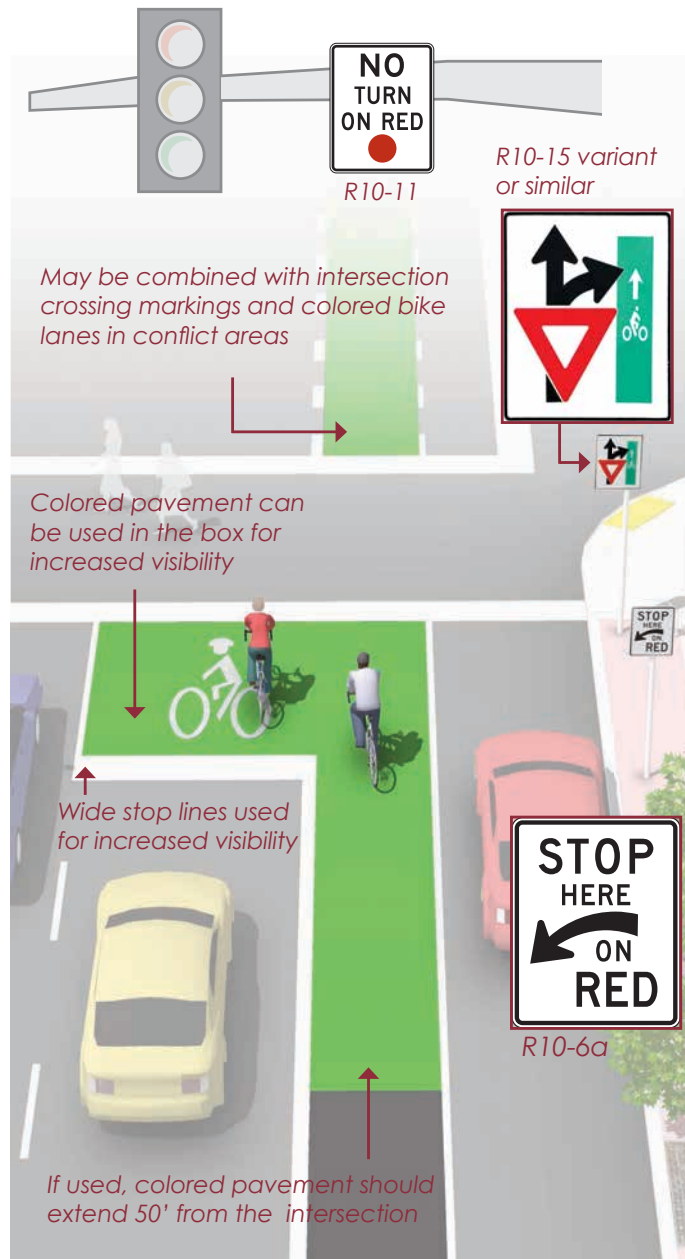


### Materials and Maintenance

Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

### Additional References and Guidelines

NCDOT. (2012). Complete Streets Planning and Design Guidelines.  
 NACTO. (2012). Urban Bikeway Design Guide.  
 FHWA. (2011). Interim Approval (IA-14) has been granted.



### BIKE BOXES

#### Description

A bike box is a designated area located at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible space to get in front of queuing motorized traffic during the red signal phase. Motor vehicles must queue behind the white stop line at the rear of the bike box.

#### Guidance

- 14' minimum depth
- A "No Turn on Red" (MUTCD R10-11) sign shall be installed overhead to prevent vehicles from entering the Bike Box.
- A "Stop Here on Red" sign should be post-mounted at the stop line to reinforce observance of the stop line.
- A "Yield to Bikes" sign should be post-mounted in advance of and in conjunction with an egress lane to reinforce that bicyclists have the right-of-way going through the intersection.
- An ingress lane should be used to provide access to the box.
- A supplemental "Wait Here" legend can be provided in advance of the stop bar to increase clarity to motorists.

#### Discussion

Bike boxes should be placed only at signalized intersections, and right turns on red shall be prohibited for motor vehicles. Bike boxes should be used in locations that have a large volume of bicyclists and are best utilized in central areas where traffic is usually moving more slowly. Prohibiting right turns on red improves safety for bicyclists yet does not significantly impede motor vehicle travel.

## BRIDGES

Bicycle facilities should be accommodated on all bridges along roadways where bikes are permitted. The absence of bicycle facilities on a roadway does not negate the need for bicycle facilities on a bridge along that roadway. Generally, bicycle lanes should be provided in urban and suburban areas and paved shoulders in rural areas. Bicycle facilities should be separated from pedestrian facilities (sidewalks) except where a multi-use path is provided. NCDOT's bridge policy requires a handrail of 54" where bicyclists will be riding next to the handrail.

On bridges over 0.5 miles in length and with speeds over 45 mph, a shared use path separated from traffic by a concrete barrier is recommended on both sides of the bridge.

On existing bridges, travel lanes should be narrowed where practical to provide a wider shoulder for cyclists. Widening of sidewalks to constitute a shared use path should also be considered, as well as the installation of a cantilever structure acting as a shared use path where the bridge structure supports such an addition.

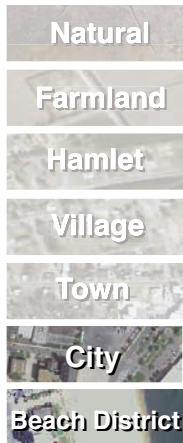
For additional guidance, see *AASHTO 4.12.3 Bridges, Viaducts, and Tunnels*.

## SIGNALIZED INTERSECTIONS

Signals and beacons facilitate bicyclist crossings of roadways. Flashing amber warning beacons can be utilized at unsignalized intersection crossings. Push buttons, signage, and pavement markings may be used to supplement these facilities for both bicyclists and motorists.

Determining which type of signal or beacon to use for a particular intersection depends on a variety of factors. These include speed limits, Average Daily Traffic (ADT), anticipated bicycle crossing traffic, and the configuration of planned or existing bicycle facilities. Signals may be necessary as part of the construction of a protected bicycle facility such as a cycle track with potential turning conflicts, or to decrease vehicle or pedestrian conflicts at major crossings. An intersection with bicycle signals may reduce stress and delays for a crossing bicyclist, and discourage illegal and unsafe crossing maneuvers.





### Materials and Maintenance

Depending on power supply, maintenance can be minimal. If solar power is used, RRFBs can run for years without issue.

### Additional References and Guidelines

NACTO. (2012). Urban Bikeway Design Guide.  
FHWA. (2009). Manual on Uniform Traffic Control Devices.  
FHWA. (2008). MUTCD - Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11)

## BEACONS FOR BIKEWAYS

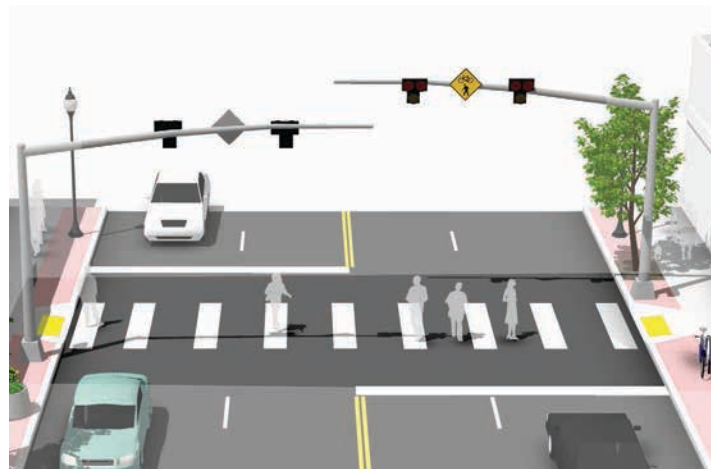
### Description

There are two primary crossing beacons available for use on bikeways:

**Active warning beacons** are user actuated illuminated devices designed to increase motor vehicle yielding compliance at crossings of multi lane or high volume roadways.

A **pedestrian hybrid beacon** consists of a signal-head with two red lenses over a single yellow lens on the major street, and pedestrian and/or bicycle signal heads for the minor street. There are no signal indications for motor vehicles on the minor street approaches.

*Pedestrian Hybrid Beacon*



*Midblock installation shown. May be configured at intersection crossings such as along bicycle boulevard routes.*

### Discussion

Rectangular rapid flash beacons have the highest compliance of all warning beacon enhancement options.

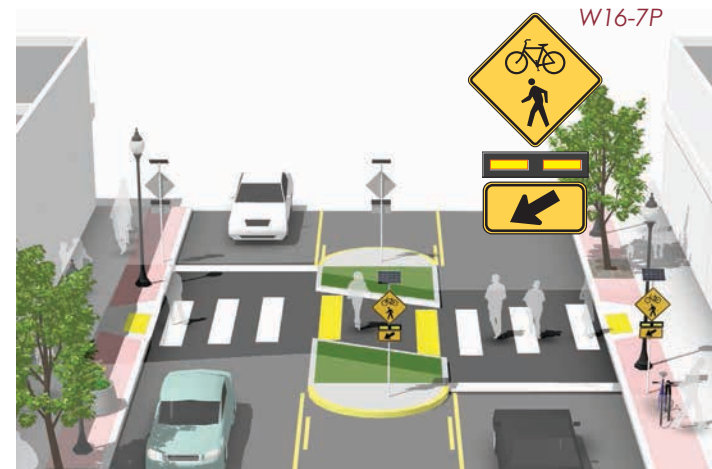
The hybrid beacon can significantly improve the operation of a bicycle route, particularly along Bicycle Boulevard corridors. Because of the low traffic volumes on these facilities, intersections with major roadways are often unsignalized, creating difficult and potentially unsafe crossing conditions for bicyclists.

### Guidance

- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs or traffic signals.
- Warning beacons shall initiate operation based on pedestrian or bicyclist actuation and shall cease operation at a predetermined time after actuation or, with passive detection, after the pedestrian or bicyclist clears the crosswalk.
- Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk.
- If installed within a signal system, signal engineers should evaluate the need for the hybrid beacon to be coordinated with other signals.

*Rectangular Rapid Flash Beacons (RRFB)*

W11-15,  
W16-7P





## BICYCLE DETECTION AND ACTUATION

### Description

#### Push Button Actuation

User-activated button mounted on a pole facing the street.

#### Loop Detectors

Bicycle-activated loop detectors are installed within the roadway to allow the presence of a bicycle to trigger a change in the traffic signal. This allows the bicyclist to stay within the lane of travel without having to maneuver to the side of the road to trigger a push button.

Loops that are sensitive enough to detect bicycles should be supplemented with pavement markings to instruct bicyclists how to trip them.

#### Video Detection Cameras

Video detection systems use digital image processing to detect a change in the image at a location. These systems can be calibrated to detect bicycles. Video camera system costs range from \$20,000 to \$25,000 per intersection.

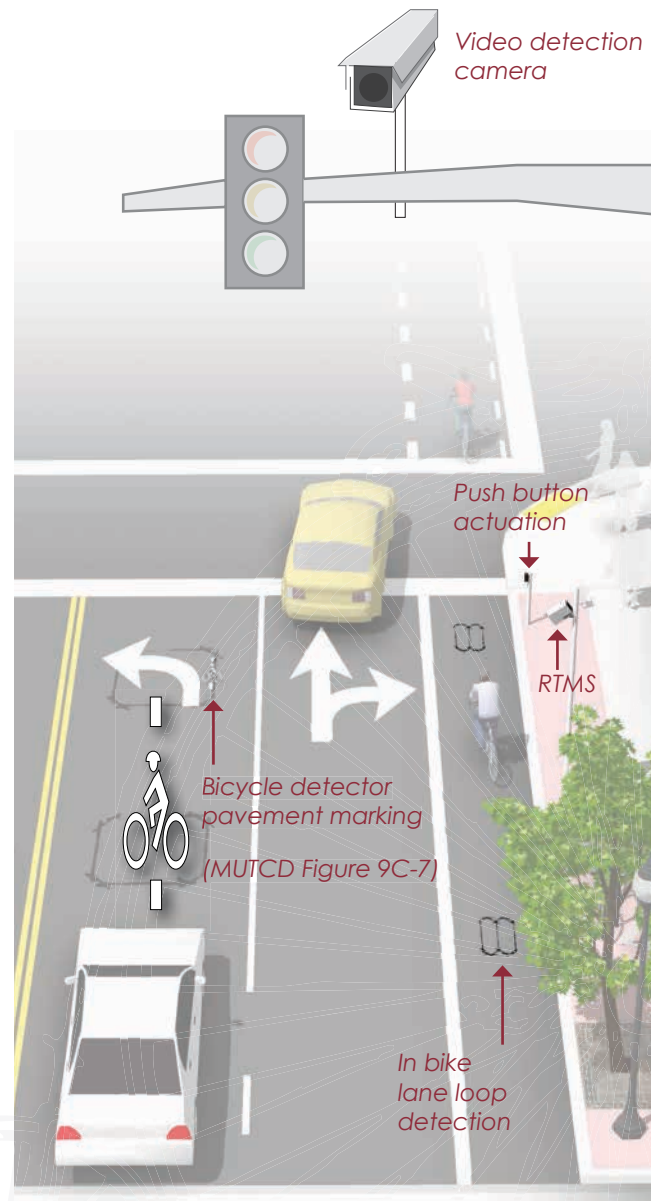
#### Remote Traffic Microwave Sensor Detection (RTMS)

RTMS is a system which uses frequency modulated continuous wave radio signals to detect objects in the roadway. This method marks the detected object with a time code to determine its distance from the sensor. The RTMS system is unaffected by temperature and lighting, which can affect standard video detection.

### Discussion

Proper bicycle detection should meet 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).

Bicycle loops and other detection mechanisms can also provide bicyclists with an extended green time before the light turns yellow so that bicyclists of all abilities can reach the far side of the intersection.



### Materials and Maintenance

Signal detection and actuation for bicyclists should be maintained with other traffic signal detection and roadway pavement markings.

### Additional References and Guidelines

- NCDOT. (2012). Complete Streets Planning and Design Guidelines.
- AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices.
- NACTO. (2012). Urban Bikeway Design Guide.

## **BIKEWAY SIGNING**

The ability to navigate through a city is informed by landmarks, natural features and other visual cues. Signs throughout the city should indicate to bicyclists:

- Direction of travel
- Location of destinations
- Travel time/distance to those destinations

These signs will increase users' comfort and accessibility to the bicycle systems.

Signage can serve both wayfinding and safety purposes including:

- Helping to familiarize users with the bicycle network
- Helping users identify the best routes to destinations
- Helping to address misperceptions about time and distance
- Helping overcome a “barrier to entry” for people who are not frequent bicyclists (e.g., “interested but concerned” bicyclists)

Bicycle wayfinding signs also visually cue motorists that they are driving along a bicycle route and should use caution. Signs are typically placed at key locations leading to and along bicycle routes, including the intersection of multiple routes. Too many road signs tend to clutter the right-of-way, and it is recommended that these signs be posted at a level most visible to bicyclists rather than per vehicle signage standards.



## REGULATORY SIGNS

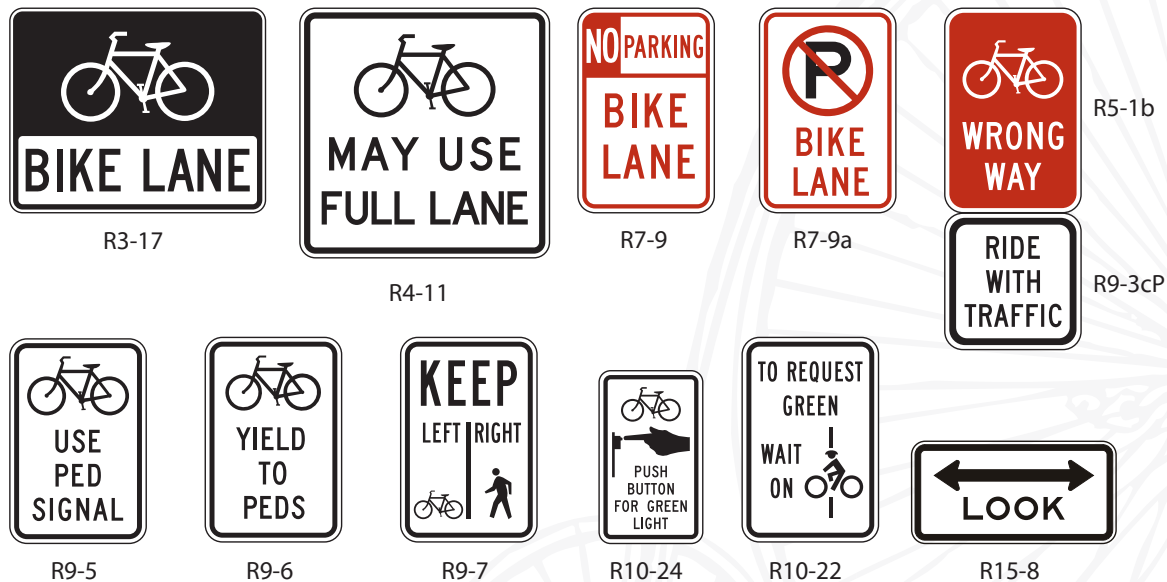
### Description

Regulatory signs give a direction that must be obeyed, and apply to intersection control, speed, vehicle movement and parking. They are usually rectangular or square with a white background and black, white or colored letters.

Regulatory signs with a red background are reserved for STOP, YIELD, DO NOT ENTER or WRONG WAY messages.

Red text indicates a restricted parking condition, and a circle with a line through it means the activity shown is not allowed.

### Common Bicycle-Oriented Regulatory Signs

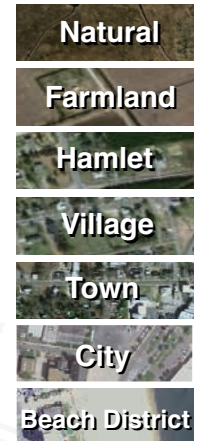


### Discussion

Signs for the exclusive use of bicyclists should be located so that other road users are not confused by them.

### Guidance

- Small-sized signs or plaques may be used for bicycle-only traffic applications, such as along shared use paths.
- See the MUTCD 9B for a detailed list of regulatory sign application and guidance.



### Materials and Maintenance

Maintenance needs for bicycle regulatory signs are similar to other signs and will need periodic replacement due to wear.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.





### Materials and Maintenance

Maintenance needs for bicycle warning signs are similar to other signs and will need periodic replacement due to wear.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation.

## WARNING SIGNS

### Description

Warning signs call attention to unexpected conditions on or adjacent to a street, and to situations that might not be readily apparent to road users. Warning signs alert users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations. They are usually diamond-shaped or square with a retroreflective yellow or fluorescent yellow-green background with black letters.

### Guidance

- Small-sized signs or plaques may be used for bicycle-only traffic applications, such as along shared use paths.
- See the MUTCD 9B for a detailed list of regulatory sign application and guidance.
- Fieldwork and engineering judgment are necessary to fine-tune the placement of signs.

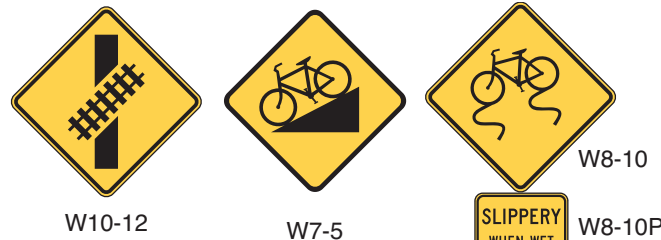


### Share the Road Sign

The sign serves to make motorists aware that bicyclists might be on the road, and that they have a legal right to use the roadway.

- The SHARE THE ROAD plaque (W16-P) shall not be used alone, and must be mounted below a W11-1 vehicular traffic warning sign.
- It is typically placed along roadways with high levels of bicycle usage but relatively hazardous conditions for bicyclists.
- The sign should not be used to designate a preferred bicycle route, but may be used along short sections of designated routes where traffic volumes are higher than desirable.

### Additional Bicycle-Oriented Warning Signs



### Bicycle Crossing Assembly



Additional warning signs are available to call attention to unexpected conditions for people riding bicycles, such as steep grades, rail crossings, and slippery conditions.

A Bicycle Crossing Assembly using a W11-1 and W16-7P arrow plaque may be used at the location of a bikeway crossing to warn other road users.

### Discussion

Installation of "Share the Road" signs is an ongoing process. Each new route system that is developed is assessed for "Share the Road" signing needs. Periodic field inspections of existing routes should identify areas where changing traffic conditions may warrant additional "Share the Road" signs. The mixing of standard yellow and fluorescent yellow-green backgrounds within a zone or area should be avoided.

## WAYFINDING SIGN TYPES

### Description

A bicycle wayfinding system consists of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes. There are three general types of wayfinding signs:

#### Confirmation Signs

- Indicate to bicyclists that they are on a designated bikeway. Make motorists aware of the bicycle route.
- Can include destinations and distance/time. Do not include arrows.



#### Turn Signs

- Indicate where a bikeway turns from one street onto another street. Can be used with pavement markings.
- Include destinations and arrows.

#### Decisions Signs

- Mark the junction of two or more bikeways.
- Inform bicyclists of the designated bike route to access key destinations.
- Destinations and arrows, distances and travel times are optional but recommended.



Natural

Farmland

Hamlet

Village

Town

City

Beach District

### Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

NACTO. (2012). Urban Bikeway Design Guide.

### Discussion

There is no standard color for bicycle wayfinding signage. Section 1A.12 of the MUTCD establishes the general meaning for signage colors. Green is the color used for directional guidance and is the most common color of bicycle wayfinding signage in the US, including those in the MUTCD.



## WAYFINDING SIGN PLACEMENT

### Guidance

Signs are typically placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes.

### Decisions Signs

Near-side of intersections in advance of a junction with another bicycle route.

### Confirmation Signs

Every ¼ to ½ mile on off-street facilities and every 2

to 3 blocks along on-street bicycle facilities, unless another type of sign is used (e.g., within 150 ft of a turn or decision sign). Should be placed soon after turns to confirm destination(s). Pavement markings can also act as confirmation that a bicyclist is on a preferred route.

### Turn Signs

Near-side of intersections where bike routes turn (e.g., where the street ceases to be a bicycle route or does not go through). Pavement markings can also indicate the need to turn to the bicyclist.

### Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

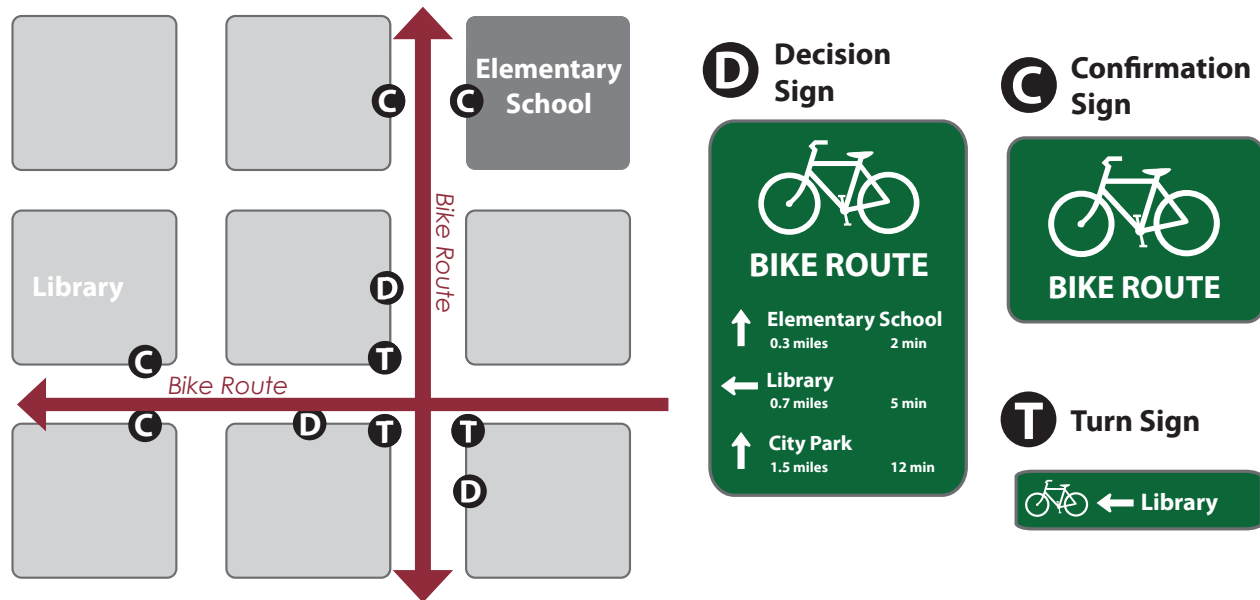
### Additional References and Guidelines

NCDOT. (2012). Complete Streets Planning and Design Guidelines.

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

NACTO. (2012). Urban Bikeway Design Guide.



### Discussion

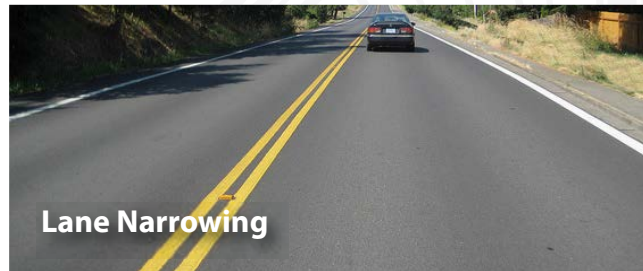
It can be useful to classify a list of destinations for inclusion on the signs based on their relative importance to users throughout the area. A particular destination's ranking in the hierarchy can be used to determine the physical distance from which the locations are signed. For example, primary destinations (such as the downtown area) may be included on signage up to five miles away. Secondary destinations (such as a transit station) may be included on signage up to two miles away. Tertiary destinations may be included on signage up to one mile away.

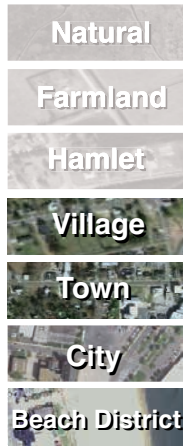


## RETROFITTING EXISTING STREETS TO ADD BIKEWAYS

Most major streets are characterized by conditions (e.g., high vehicle speeds and/or volumes) for which dedicated bike lanes are the most appropriate facility to accommodate safe and comfortable riding. Although opportunities to add bike lanes through roadway widening may exist in some locations, many major streets have physical and other constraints that would require street retrofit measures within existing curb-to-curb widths. As a result, much of the guidance provided in this section focuses on effectively reallocating existing street width through striping modifications to accommodate dedicated bike lanes.

Although largely intended for major streets, these measures may be appropriate for any roadway where bike lanes would be the best accommodation for bicyclists.





### Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

### Additional References and Guidelines

NCDOT. (2012). Complete Streets Planning and Design Guidelines.

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2010). Evaluation of Lane Reduction "Road Diet" Measures on Crashes.

## LANE RECONFIGURATION

### Description

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.

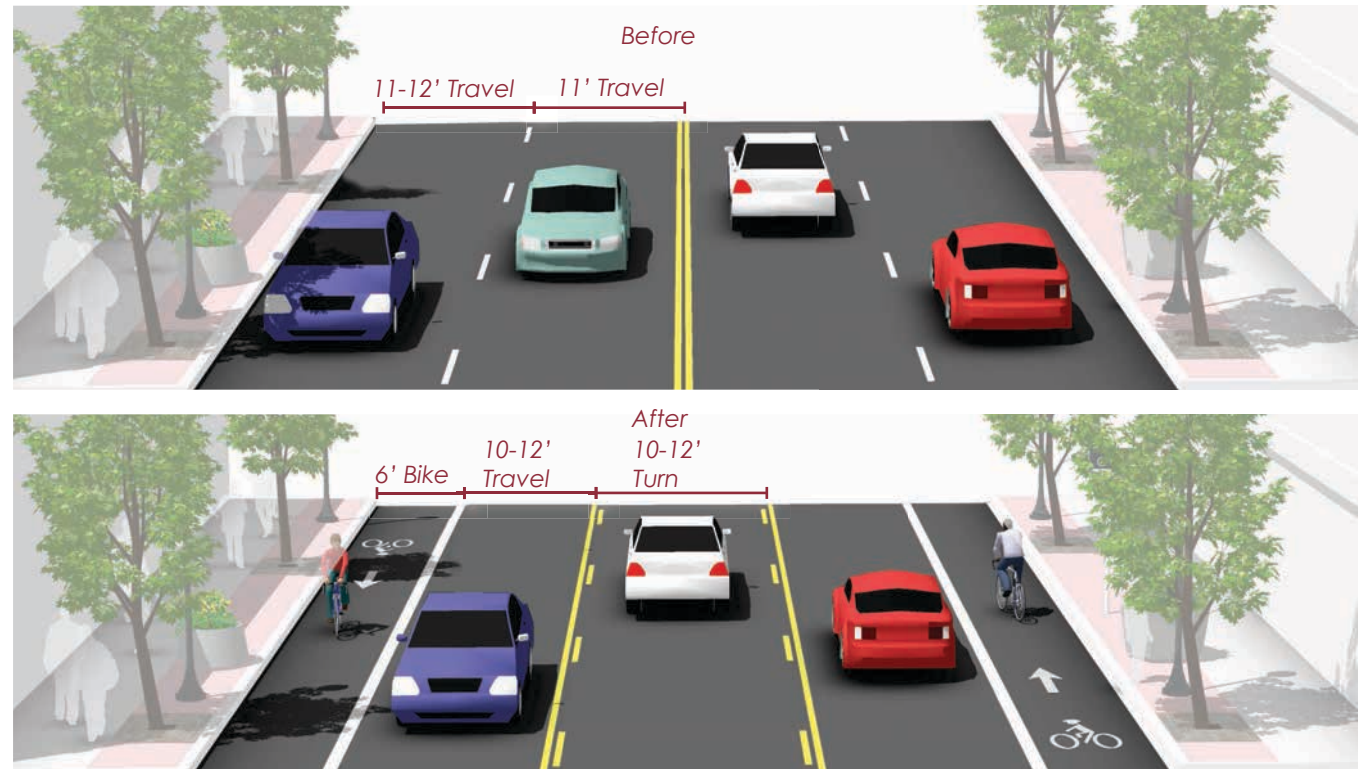
### Guidance

#### Vehicle lane width:

- Width depends on project. No narrowing may be needed if a lane is removed.

#### Bicycle lane width:

- Guidance on Bicycle Lanes applies to this treatment.



### Discussion

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.

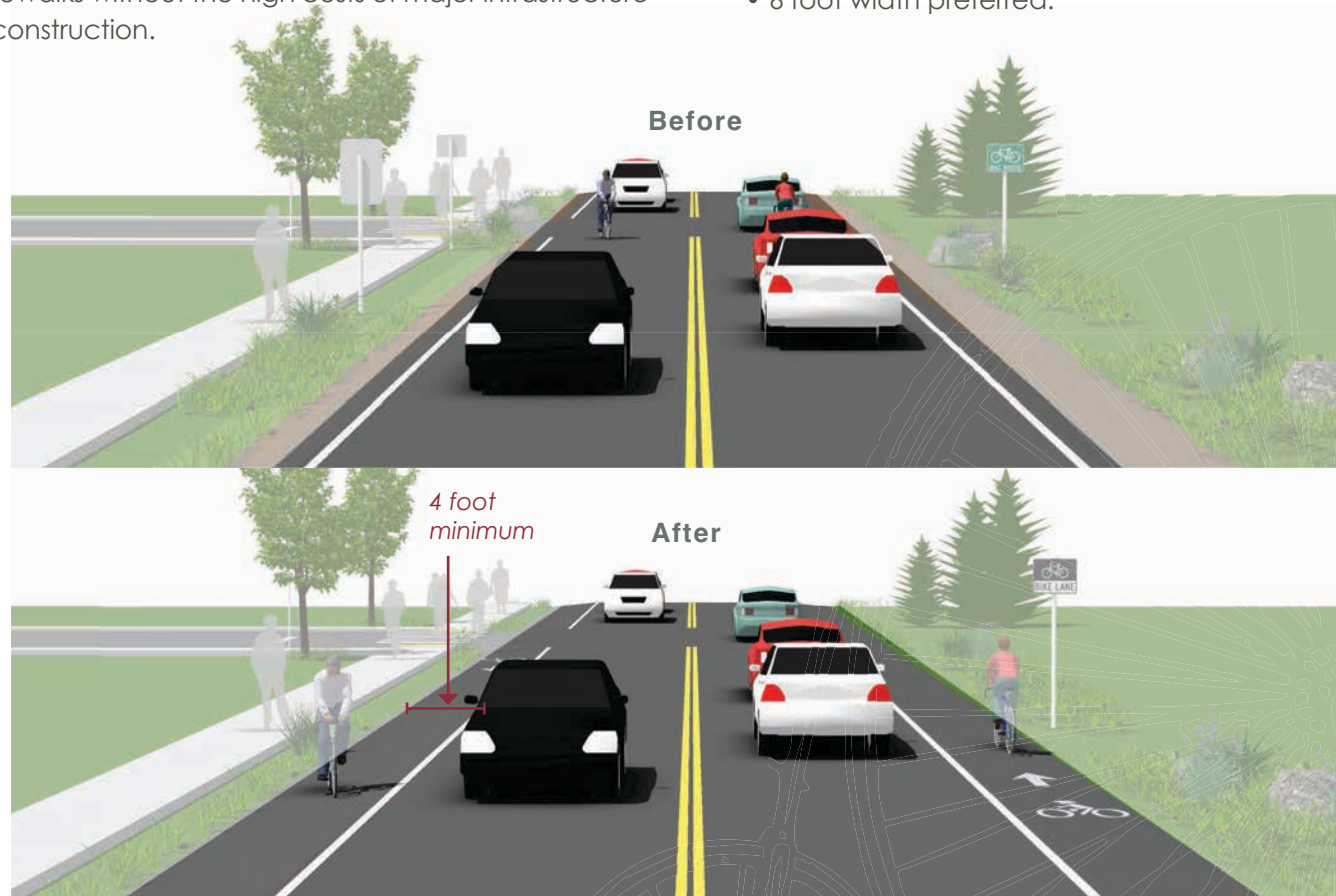
## ROADWAY WIDENING

### Description

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.

### Guidance

- Guidance on bicycle lanes applies to this treatment.
- 4 foot minimum width when no curb and gutter is present.
- 6 foot width preferred.



### Discussion

Roadway widening is most appropriate on roads lacking curbs, gutters and sidewalks.

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. In these situations, a minimum of 3 feet of operating space should be provided.

Natural

Farmland

Hamlet

Village

Town

City

Beach District

### Materials and Maintenance

The extended bicycle area should not contain any rough joints where bicyclists ride. Saw or grind a clean cut at the edge of the travel lane, or feather with a fine mix in a non-ridable area of the roadway.

### Additional References and Guidelines

NCDOT. (2012). Complete Streets Planning and Design Guidelines.

AASHTO. (2012). Guide for the Development of Bicycle Facilities.





### Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

### Additional References and Guidelines

NCDOT. (2012). Complete Streets Planning and Design Guidelines.

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

## LANE NARROWING

### Description

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. Most standards allow for the use of 11 foot and sometimes 10 foot wide travel lanes to create space for bike lanes.

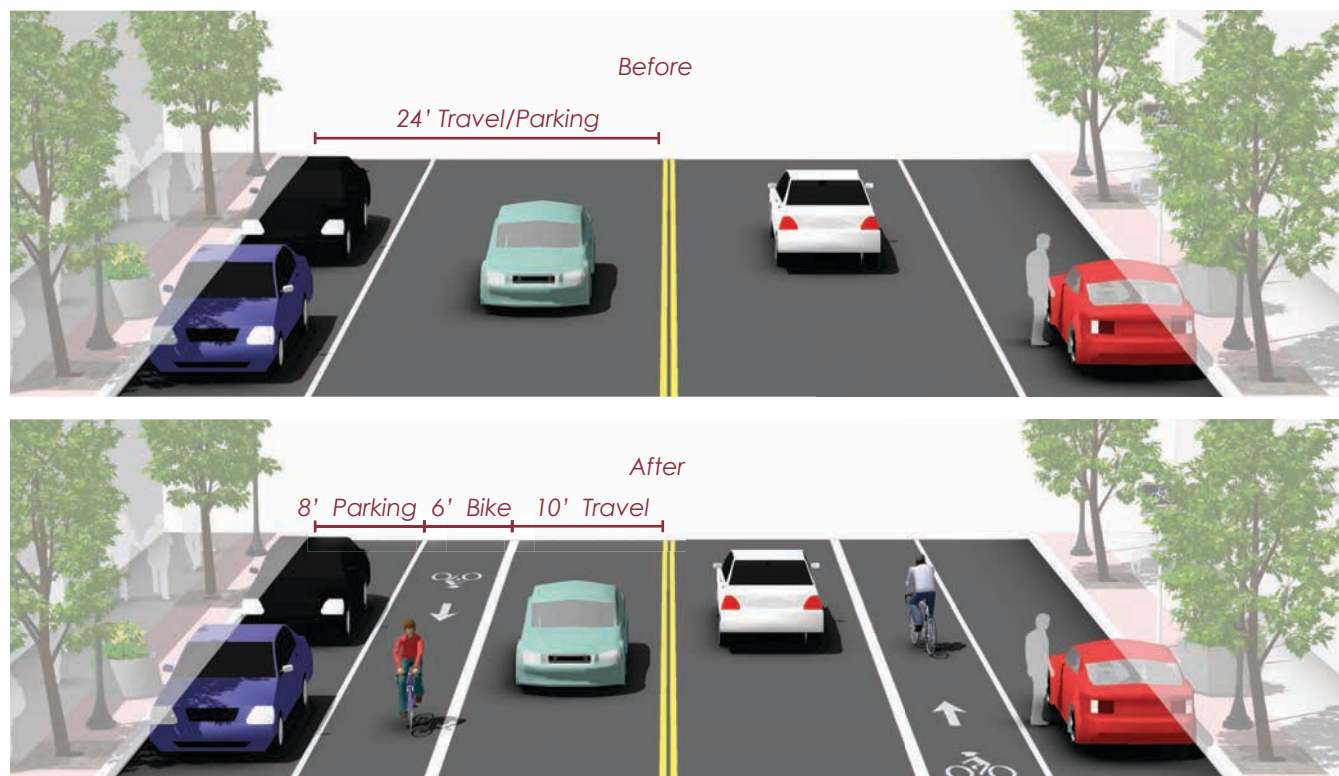
### Guidance

#### Vehicle lane width:

- Before: 10-15 feet
- After: 10-11 feet

#### Bicycle lane width:

- Guidance on Bicycle Lanes applies to this treatment.



### Discussion

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. AASHTO supports reduced width lanes in *A Policy on Geometric Design of Highways and Streets*: "On interrupted-flow operation conditions at low speeds (45 mph or less), narrow lane widths are normally adequate and have some advantages."

## MULTI-USE TRAILS

A multi-use trail (also known as a shared-use path) allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles. Path facilities can also include amenities such as lighting, signage, and fencing (where appropriate).

Key features of multi-use trails include:

- Frequent access points from the local road network.
- Directional signs to direct users to and from the path.
- A limited number of at-grade crossings with streets or driveways.
- Terminating the path where it is easily accessible to and from the street system.
- Separate treads for pedestrians and bicyclists when heavy use is expected.



## GENERAL DESIGN PRACTICES

### Description

Multi-use trails can provide a desirable facility, particularly for recreation, and users of all skill levels preferring separation from traffic. Bicycle paths should generally provide directional travel opportunities not provided by existing roadways.

### Guidance:

#### Width

- 10 feet is recommended as a minimum in most situations and will be adequate for moderate to heavy use. Given the environmental constraints of the Albemarle region, 8 feet may be used as a minimum in low traffic situations. In extremely constrained locations, a 5-foot wide facility may function as a multi-use trail.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users. A separate track (5' minimum) can be provided for pedestrian use.

#### Lateral Clearance

- A 2 foot or greater shoulder on both sides of the path should be provided. An additional foot of lateral clearance (total of 3') is required for the installation of signage or other furnishings.

#### Overhead Clearance

- Clearance to overhead obstructions should be 8 feet minimum, with 10 feet recommended.

#### Striping

- When striping is required, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.

### Discussion

The AASHTO Guide for the Development of Bicycle Facilities generally recommends against the development of Multi-use Trails along Roadways. Also known as "sidepaths", these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding when either entering or exiting the path.

*Terminate the path where it is easily accessible to and from the street system, preferably at a controlled intersection or at the beginning of a dead-end street.*



### Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

### Additional References and Guidelines

NCDOT. (2012). Complete Streets Planning and Design Guidelines.

AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices.

Flink, C. (1993). Greenways: A Guide To Planning Design And Development.



## MULTI-USE TRAILS ALONG ROADWAYS (SIDEPATHS)

### Description

A multi-use trail allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles.

Along roadways, these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding where bicyclists enter or leave the path.

The AASHTO Guide for the Development of Bicycle Facilities generally recommends against the development of shared-use paths directly adjacent to roadways. Where sidepaths are installed, driveway access should be limited to reduce potential conflicts at driveway crossings.

### Guidance

- 8 feet may be adequate width in corridors of environmental or ROW constraints but is best for low traffic situations.
- 10 feet is the recommended minimum in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users such as joggers, bicyclists, rollerbladers, and pedestrians. A separate track (5' minimum) can be provided for pedestrian use.
- Bicycle lanes should be provided as an alternate (more transportation-oriented) facility whenever possible.

### Discussion

When designing a bikeway network, the presence of a nearby or parallel path should not be used as a reason to not provide adequate shoulder or bicycle lane width on the roadway, as the on-street bicycle facility will generally be superior to the "sidepath" for experienced bicyclists and those who are cycling for transportation purposes.

*Pay special attention to the entrance/exit of the path as bicyclists may continue to travel on the wrong side of the street.*



Natural

Farmland

Hamlet

Village

Town

City

Beach District

### Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

### Additional References and Guidelines

NCDOT. (2012). Complete Streets Planning and Design Guidelines.

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

## TRAILS IN ABANDONED RAIL CORRIDORS

### Description

Commonly referred to as Rails-to-Trails or Rail-Trails, these projects convert vacated rail corridors into off-street paths. Rail corridors offer several advantages, including relatively direct routes between major destinations and generally flat terrain.

In some cases, rail owners may rail-bank their corridors as an alternative to a complete abandonment of the line, thus preserving the rail corridor for possible future use.

The railroad may form an agreement with any person, public or private, who would like to use the banked rail line as a trail or linear park until it is again needed for rail use.

### Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

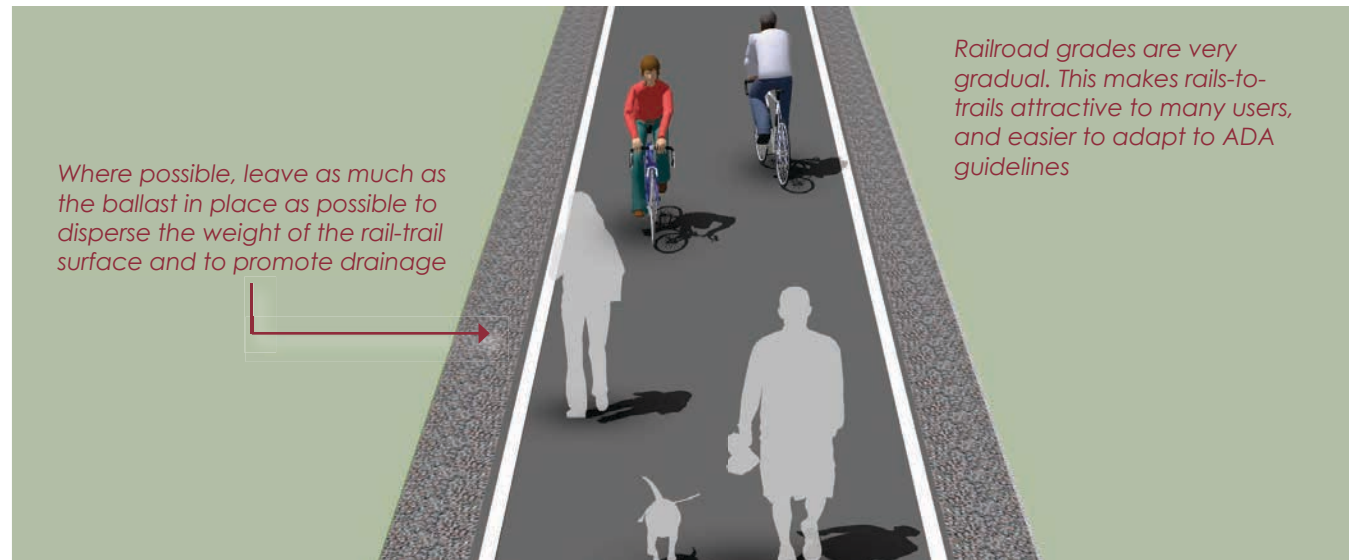
### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices. Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

### Guidance

Multi-use trails in abandoned rail corridors should meet or exceed general design practices. If additional width allows, wider paths and landscaping are desirable.

In full conversions of abandoned rail corridors, the sub-base, superstructure, drainage, bridges, and crossings are already established. Design becomes a matter of working with the existing infrastructure to meet the needs of a rail-trail.



### Discussion

It is often impractical and costly to add material to existing railroad bed fill slopes. This results in trails that meet minimum path widths, but often lack preferred shoulder and lateral clearance widths.

A structural engineer should evaluate existing railroad bridges for structural integrity to ensure they are capable of carrying the appropriate design loads.

## BOARDWALKS

### Description

Boardwalks are typically required when crossing wetlands or other poorly drained areas. They are usually constructed of wooden planks or recycled material planks that form the top layer of the boardwalk. The recycled material has gained popularity in recent years since it lasts much longer than wood, especially in wet conditions. A number of low-impact support systems are also available that reduce the disturbance within wetland areas to the greatest extent possible.

### Guidance

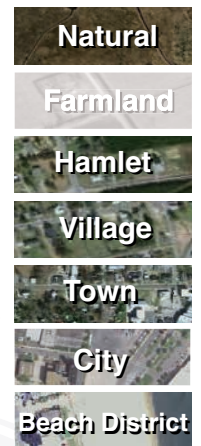
- Boardwalk width should be a minimum of 10 feet when no rail is used. A 12 foot width is preferred in areas with average anticipated use and whenever rails are used.
- When the height of a boardwalk exceeds 30", railings are required.



### Discussion

In general, building in wetlands is subject to regulations and should be avoided.

The foundation normally consists of wooden posts or auger piers (screw anchors). Screw anchors provide greater support and last much longer. If access by vehicles is desired, boardwalks should be designed to structurally support the weight of a small truck or a light-weight vehicle.



### Materials and Maintenance

Decking should be either non-toxic treated wood or recycled plastic. Cable rails are attractive and more visually transparent but may require maintenance to tighten the cables if the trail has snow storage requirements.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2001). Wetland Trail Design and Construction.



## **TRAIL CROSSINGS**

At-grade roadway crossings can create potential conflicts between path users and motorists, however, well-designed crossings can mitigate many operational issues and provide a higher degree of safety and comfort for path users. This is evidenced by the thousands of successful facilities around the United States with at-grade crossings. In most cases, at-grade path crossings can be properly designed to provide a reasonable degree of safety and can meet existing traffic and safety standards. Path facilities that cater to bicyclists can require additional considerations due to the higher travel speed of bicyclists versus pedestrians.

Consideration must be given to adequate warning distance based on vehicle speeds and line of sight, with the visibility of any signs absolutely critical. Directing the active attention of motorists to roadway signs may require additional alerting devices such as a flashing beacon, roadway striping or changes in pavement texture. Signing for path users may include a standard "STOP" or "YIELD" sign and pavement markings, possibly combined with other features such as bollards or a bend in the pathway to slow bicyclists. Care must be taken not to place too many signs at crossings lest they begin to lose their visual impact.



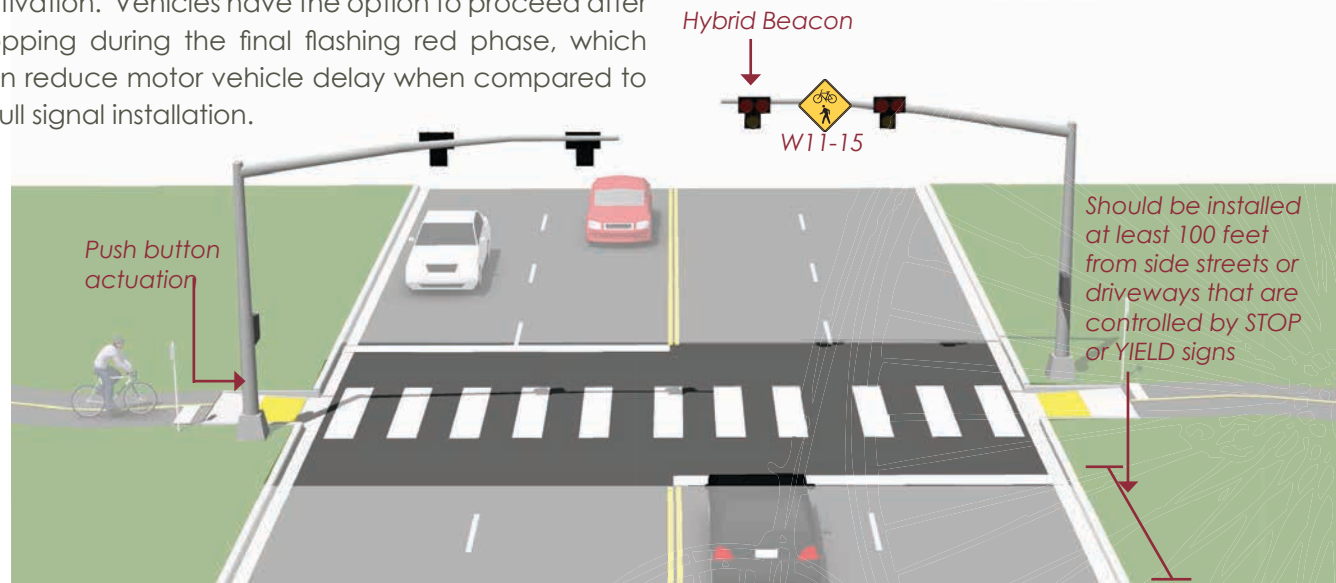
## SIGNALIZED/CONTROLLED CROSSINGS

### Description

Signalized crossings provide the most protection for crossing path users through the use of a red-signal indication to stop conflicting motor vehicle traffic. The two types of path signalization are full traffic signal control and hybrid signals.

A full traffic signal installation treats the path crossing as a conventional 4-way intersection and provides standard red-yellow-green traffic signal heads for all legs of the intersection.

Hybrid beacon installation (shown below) faces only cross motor vehicle traffic, stays dark when inactive, and uses a unique 'wig-wag' signal phase to indicate activation. Vehicles have the option to proceed after stopping during the final flashing red phase, which can reduce motor vehicle delay when compared to a full signal installation.



### Discussion

Shared-use path signals are normally activated by push buttons but may also be triggered by embedded loop, infrared, microwave or video detectors.

Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity and safety.

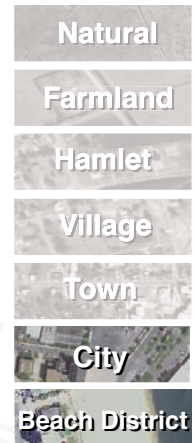
### Guidance

Hybrid beacons (illustrated here) may be installed without meeting traffic signal control warrants if roadway speed and volumes are excessive for comfortable path crossings.

Full traffic signal installations must meet MUTCD pedestrian, school or modified warrants. Additional guidance for signalized crossings:

- Located more than 300 feet from an existing signalized intersection
- Roadway travel speeds of 40 MPH and above
- Roadway ADT exceeds 15,000 vehicles

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### Materials and Maintenance

Hybrid beacons are subject to the same maintenance needs and requirements as standard traffic signals. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

### Additional References and Guidelines

NCDOT. (2012). Complete Streets Planning and Design Guidelines.  
FHWA. (2009). Manual on Uniform Traffic Control Devices.  
NACTO. (2012). Urban Bikeway Design Guide.



### Materials and Maintenance

Locate markings out of wheel tread when possible to minimize wear and maintenance costs.

### Additional References and Guidelines

NCDOT. (2012). Complete Streets Planning and Design Guidelines.

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

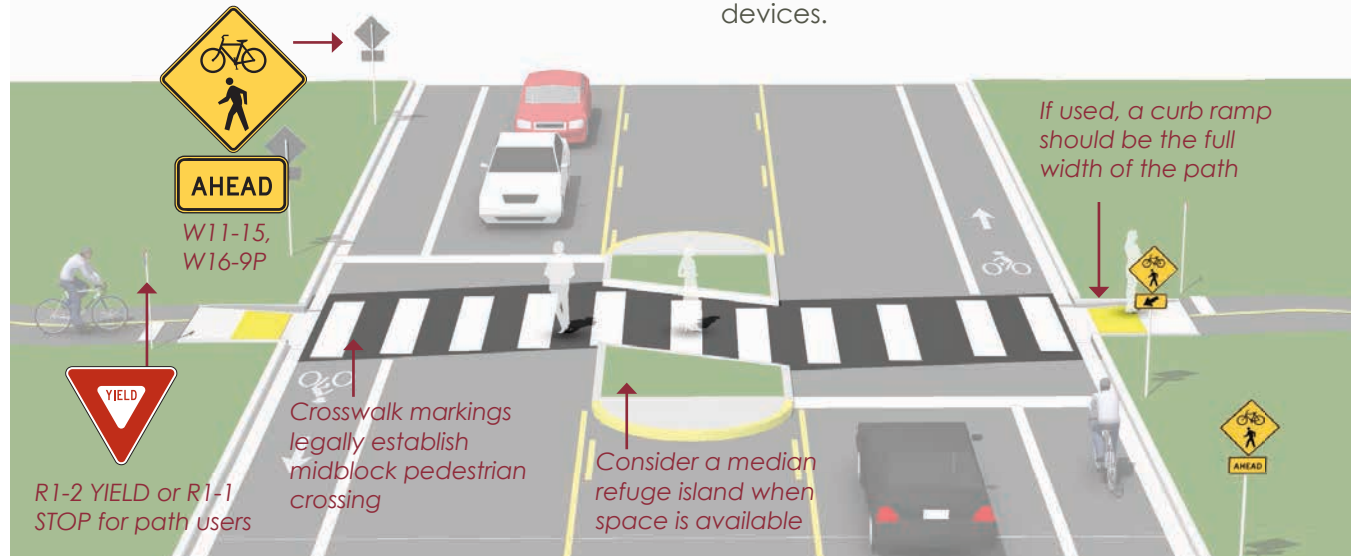
FHWA. (2002). Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations.

## UNSIGNALIZED MARKED CROSSINGS

### Description

A marked/unsignalized crossing typically consists of a marked crossing area, signage and other markings to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, pathway traffic, use patterns, vehicle speed, road type, road width, and other safety issues such as proximity to major attractions.

When space is available, using a median refuge island can improve user safety by providing pedestrians and bicyclists space to perform the safe crossing of one side of the street at a time.



### Discussion

Crosswalks alone will not make crossings safer, nor will crosswalks necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g. raised median, traffic signal, roadway narrowing, enhanced lighting, traffic-calming measures, curb extensions, etc.) as needed to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding which treatment to use.

### Guidance

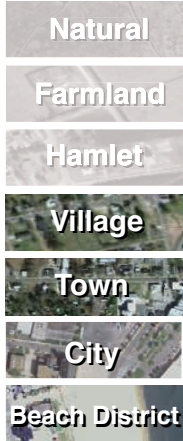
Refer to the FHWA report, "Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations" for specific volume and speed ranges where a marked crosswalk alone may be sufficient.

Where the speed limit exceeds 40 miles per hour, marked crosswalks alone should not be used at unsignalized locations.

Crosswalks should not be installed at locations that could present an increased risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices.







## LANDSCAPING

### Description

Bikeways can become inaccessible due to overgrown vegetation. All landscaping needs to be designed and maintained to ensure compatibility with the use of the bikeways. After a flood or major storm, bikeways should be checked along with other roads, and fallen trees or other debris should be removed promptly.



### Guidance

- Ensure that shoulder plants do not hang into or impede passage along bikeways
- After major damage incidents, remove fallen trees or other debris from bikeways as quickly as possible

## MAINTENANCE MANAGEMENT PLAN

### Description

Bikeway users need accommodation during construction and maintenance activities when bikeways may be closed or unavailable. Users must be warned of bikeway closures and given adequate detour information to bypass the closed section. Users should be warned through the use of standard signing approaching each affected section.



### Guidance

- Provide fire and police departments with map of system, along with access points to gates/bollards
- Enforce speed limits and other rules of the road
- Enforce all trespassing laws for people attempting to enter adjacent private properties
- Include information on alternate routes and dates of closure. Alternate routes should provide reasonable directness, equivalent traffic characteristics, and be signed.





## BICYCLE PARKING

### Description

Short-term bicycle parking is meant to accommodate visitors, customers, and others expected to depart within two hours. It should have an approved standard rack, appropriate location and placement, and weather protection. The Association for Pedestrian and Bicycle Professionals (APBP) recommends selecting a bicycle rack that:

- Supports the bicycle in at least two places, preventing it from falling over.
- Allows locking of the frame and one or both wheels with a U-lock.
- Is securely anchored to ground.
- Resists cutting, rusting and bending or deformation.

### Guidance

- 2' minimum from the curb face to avoid 'dooring.'
- Close to destinations; 50' maximum distance from main building entrance.
- Minimum clear distance of 6' should be provided between the bicycle rack and the property line.
- Should be highly visible from adjacent bicycle routes and pedestrian traffic.
- Locate racks in areas that cyclists are most likely to travel.

Natural

Farmland

Hamlet

Village

Town

City

Beach District



### Discussion

Where the placement of racks on sidewalks is not possible (due to narrow sidewalk width, sidewalk obstructions, street trees, etc.), bicycle parking can be provided in the street where on-street vehicle parking is allowed in the form of **on-street bicycle corrals**.

### Materials and Maintenance

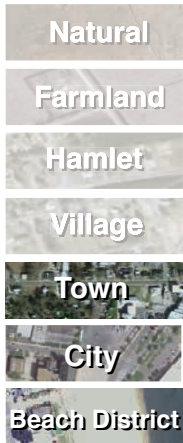
Use of proper anchors will prevent vandalism and theft. Racks and anchors should be regularly inspected for damage. Educate snow removal crews to avoid burying racks during winter months.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

APBP. (2010). Bicycle Parking Guide 2nd Edition.





### Materials and Maintenance

Regularly inspect the functioning of moving parts and enclosures. Change keys and access codes periodically to prevent access to unapproved users.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

APBP. (2010). Bicycle Parking Guide 2nd Edition.

## BICYCLE LOCKERS

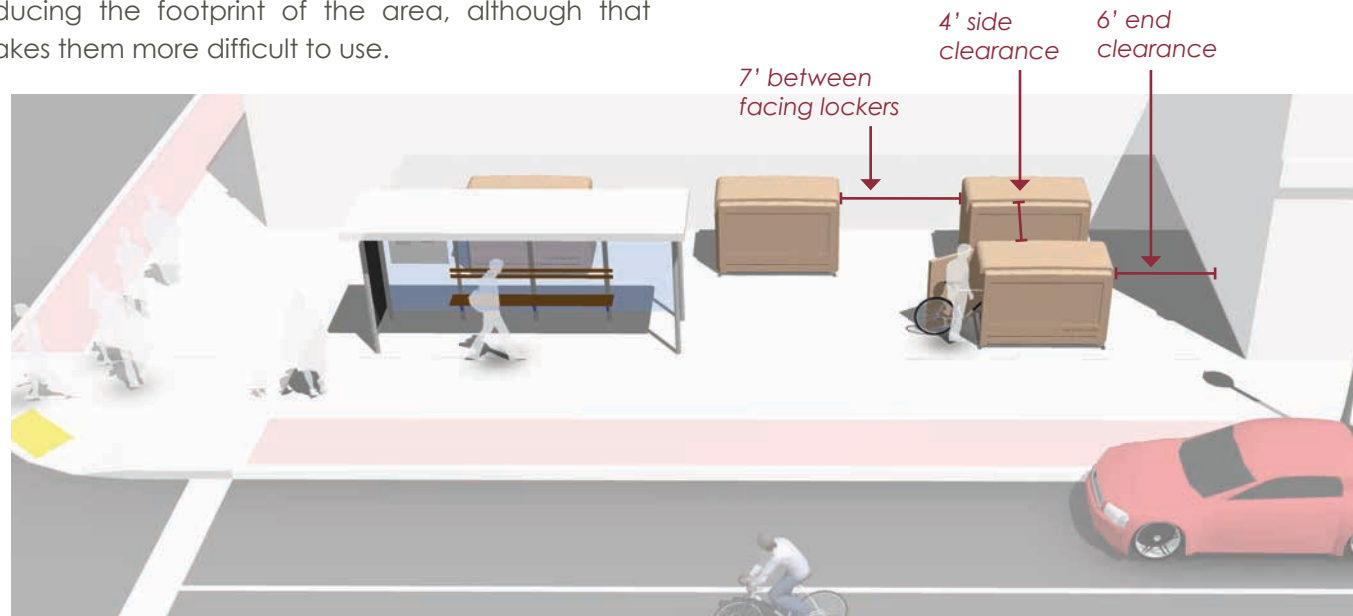
### Description

Bicycle lockers are intended to provide long-term bicycle storage for employees, students, residents, commuters, and others expected to park more than two hours. Long-term facilities protect the entire bicycle, its components, and accessories against theft and against inclement weather, including snow and wind-driven rain.

Bicycle lockers provide space to store a few accessories or rain gear in addition to containing the bicycle. Some lockers allow access to two users - a partition separating the two bicycles can help users feel their bike is secure. Lockers can also be stacked, reducing the footprint of the area, although that makes them more difficult to use.

### Guidance

- Minimum dimensions: width (opening) 2.5'; height 4'; depth 6'.
- 4 foot side clearance and 6 foot end clearance.
- 7 foot minimum distance between facing lockers.
- Locker designs that allow visibility and inspection of contents are recommended for increased security.
- Access is controlled by a key or access code.



### Discussion

Long-term parking facilities are more expensive to provide than short-term facilities, but are also significantly more secure. Although many bicycle commuters would be willing to pay a nominal fee to guarantee the safety of their bicycle, long-term bicycle parking should be free wherever automobile parking is free. Potential locations for long-term bicycle parking include transit stations, large employers, and institutions where people use their bikes for commuting and not consistently throughout the day.

## BIKE SPA (SECURE PARKING AREA)

### Description

A Secure Parking Area for bicycles, also known as a BikeSPA or Bike & Ride (when located at transit stations), is a semi-enclosed space that offers a higher level of security than ordinary bike racks. Accessible via key-card, combination locks, or keys, BikeSPAs provide high-capacity parking for 10 to 100 or more bicycles. Increased security measures create an additional transportation option for those whose biggest concern is theft and vulnerability.

*Double-height racks help take advantage of the vertical space, further maximizing the parking capacity.*



*In the space formerly used for seven cars, a BikeSPA can comfortably park 80 bikes with room for future expansion.*

### Guidance

Key features may include:

- Closed-circuit television monitoring.
- Double high racks & cargo bike spaces.
- Bike repair station with bench.
- Bike tube and maintenance item vending machine.
- Bike lock "hitching post" – allows people to leave bike locks.
- Secure access for users.

Natural

Farmland

Hamlet

Village

Town

City

Beach District

### Materials and Maintenance

Regularly inspect the functioning of moving parts and enclosures. Change keys and access codes periodically to prevent access to unapproved users.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

APBP. (2010). Bicycle Parking Guide 2nd Edition.

### Discussion

Long-term parking facilities are more expensive to provide than short-term facilities, but are also significantly more secure. Although many bicycle commuters would be willing to pay a nominal fee to guarantee the safety of their bicycle, long-term bicycle parking should be free wherever automobile parking is free. BikeSPAs are ideal for transit centers, airports, train stations, or wherever large numbers of people might arrive by bicycle and need a secure place to park while away.



## SWEEPING

### Description

Bicyclists often avoid shoulders and bike lanes filled with gravel, broken glass and other debris; they will ride in the roadway to avoid these hazards, potentially causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks (pedestrians need a clean walking surface), nor should debris be swept from the sidewalk onto the roadway.



### Guidance

- Establish a seasonal sweeping schedule that prioritizes roadways with major bicycle routes.
- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility.
- In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.
- Pave gravel driveway approaches to minimize loose gravel on paved roadway shoulders.
- Perform additional sweeping in the Spring to remove debris from the Winter.
- Perform additional sweeping in the Fall in areas where leaves accumulate.

## SIGNAGE

### Description

Bike lanes, shared shoulders, Bicycle Boulevards and paths all have different signage types for wayfinding and regulations. Such signage is vulnerable to vandalism or wear, and requires periodic maintenance and replacement as needed.



### Guidance

- Check regulatory and wayfinding signage along bikeways for signs of vandalism, graffiti, or normal wear.
- Replace signage along the bikeway network as-needed.
- Perform a regularly-scheduled check on the status of signage with follow-up as necessary.
- Create a Maintenance Management Plan.





## ROADWAY SURFACE

### Description

Bicycles are much more sensitive to subtle changes in roadway surface than are motor vehicles. Various materials are used to pave roadways, and some are smoother than others. Compaction is also an important issue after trenches and other construction holes are filled. Uneven settlement after trenching can affect the roadway surface nearest the curb where bicycles travel.



## PAVEMENT OVERLAYS

### Description

Pavement overlays represent good opportunities to improve conditions for bicyclists if done carefully. A ridge should not be left in the area where bicyclists ride (this occurs where an overlay extends part-way into a shoulder bikeway or bike lane). Overlay projects also offer opportunities to widen a roadway, or to re-stripe a roadway with bike lanes.



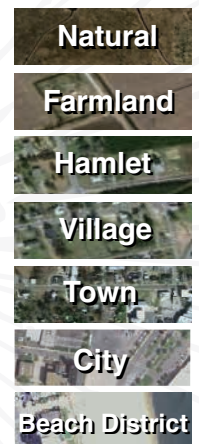
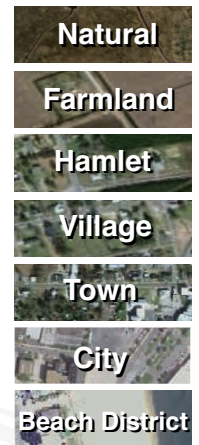
### Guidance

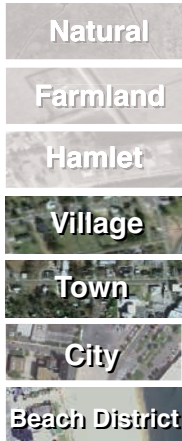
- Maintain a smooth pothole-free surface.
- Ensure that on new roadway construction, the finished surface on bikeways does not vary more than  $\frac{1}{4}$ ".
- Maintain pavement so ridge buildup does not occur at the gutter-to-pavement transition or adjacent to railway crossings.
- Inspect the pavement 2 to 4 months after trenching construction activities are completed to ensure that excessive settlement has not occurred.
- If chip sealing is to be performed, use the smallest possible chip on bike lanes and shoulders. Sweep loose chips regularly following application.
- During chip seal maintenance projects, if the pavement condition of the bike lane is satisfactory, it may be appropriate to chip seal the travel lanes only.

### Guidance

- Extend the overlay over the entire roadway surface to avoid leaving an abrupt edge.
- If the shoulder or bike lane pavement is of good quality, it may be appropriate to end the overlay at the shoulder or bike lane stripe provided no abrupt ridge remains.
- Ensure that inlet grates, manhole and valve covers are within  $\frac{1}{4}$  inch of the finished pavement surface and are made or treated with slip resistant materials.
- Pave gravel driveways to property lines to prevent gravel from being tracked onto shoulders or bike lanes.

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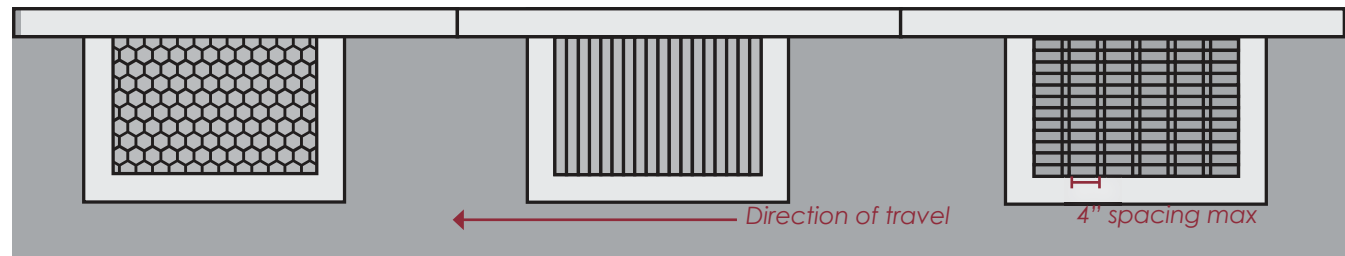




## DRAINAGE GRATES

### Description

Drainage grates are typically located in the gutter area near the curb of a roadway. Drainage grates typically have slots through which water drains into the municipal storm sewer system. Many older grates were designed with linear parallel bars spread wide enough for a tire to become caught so that if a bicyclist were to ride on them, the front tire could become caught in the slot. This would cause the bicyclist to tumble over the handlebars and sustain potentially serious injuries.



### Guidance

- Require all new drainage grates be bicycle-friendly, including grates that have horizontal slats on them so that bicycle tires and assistive devices do not fall through the vertical slats.
- Create a program to inventory all existing drainage grates, and replace hazardous grates as necessary – temporary modifications such as installing rebar horizontally across the grate should not be an acceptable alternative to replacement.

## GUTTER TO PAVEMENT TRANSITION

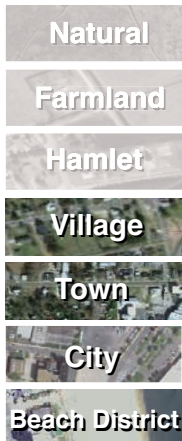
### Description

On streets with concrete curbs and gutters, 1 to 2 feet of the curbside area is typically devoted to the gutter pan, where water collects and drains into catch basins. On many streets, the bikeway is situated near the transition between the gutter pan and the pavement edge. This transition can be susceptible to erosion, creating a rough surface for travel.

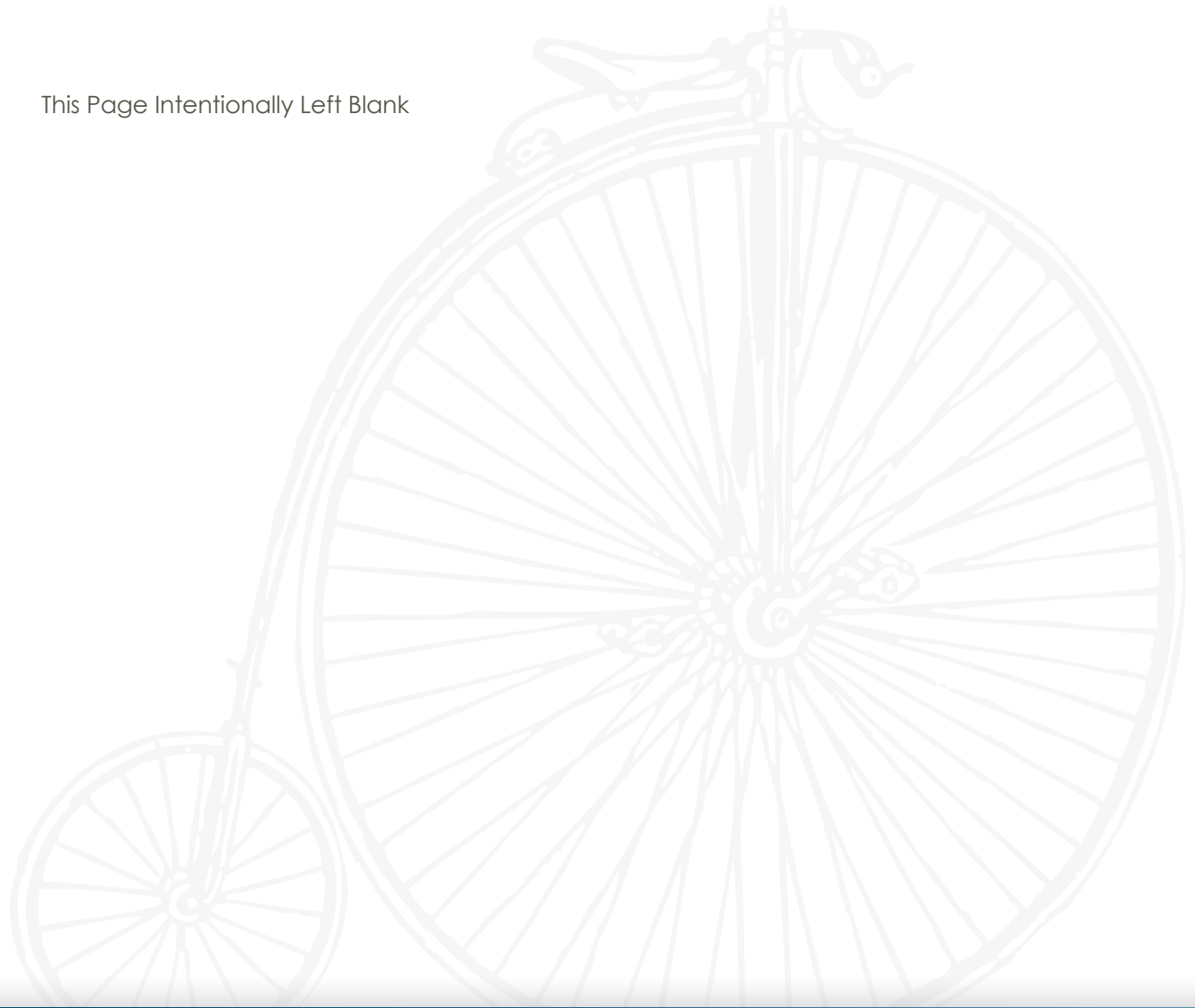


### Guidance

- Ensure that gutter-to-pavement transitions have no more than a 1/4" vertical transition.
- Examine pavement transitions during every roadway project for new construction, maintenance activities, and construction project activities that occur in streets.
- Inspect the pavement 2 to 4 months after trenching construction activities are completed to ensure that excessive settlement has not occurred.
- Provide at least 3 feet of pavement outside of the gutter seam.



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Broad Street, Edenton



# Appendix E

## Funding Sources

### OVERVIEW

This chapter outlines potential sources of funding for this plan's identified projects at the federal, state, and local government levels and from the private sector. Funding sources can be used for a variety of activities, including: programs, planning, design, implementation, and maintenance. Given that incorporated and unincorporated areas may not have the same eligibility for these funding sources, the summary chart at the end of the chapter provides guidance on the applicability of each source. It should be noted that this section reflects the funding available at the time of writing. The funding amounts, fund cycles, and even the programs themselves are susceptible to change without notice.

### FEDERAL FUNDING SOURCES

Federal funding from the United States Department of Transportation (US DOT) is typically directed through state agencies to local governments either in the form of grants or direct appropriations, independent from state budgets. Federal funding typically requires a local match of anywhere from five percent to 50 percent, but there are sometimes exceptions, such as the recent American Recovery and Reinvestment

Act stimulus funds, which did not require a match. The following section lists possible Federal funding sources that could be used to support the construction of bicycle improvements. Several of the funding resources are competitive and involve the completion of extensive applications with clear documentation of the project needs, costs, and benefits.

### *MOVING AHEAD FOR PROGRESS IN THE TWENTY-FIRST CENTURY (MAP-21)*

The largest source of federal funding for bicycle projects is the US DOT's Federal-Aid Highway Program, which Congress has reauthorized roughly every six years since the passage of the Federal-Aid Road Act of 1916. The latest act, Moving Ahead for Progress in the Twenty-First Century (MAP-21) was enacted in July 2012 as Public Law 112-141. The Act replaces the Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU), which was valid from August 2005 - June 2012.

MAP-21 authorizes funding for federal surface transportation programs including highways and transit for the 27 month period between July 2012 and September 2014. It is not possible to guarantee

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the continued availability of any listed MAP-21 programs, or to predict their future funding levels or policy guidance. Nevertheless, many of these programs have been included in some form since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, and thus may continue to provide capital for active transportation projects and programs.

In North Carolina, federal monies are administered through the North Carolina Department of Transportation (NCDOT), Metropolitan Planning Organizations (MPOs), and Regional Planning Organizations (RPOs). 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. There are a number of programs identified within MAP-21 that are applicable to bicycle-related transportation projects. These programs are discussed below.

More information: <http://www.fhwa.dot.gov/map21/summaryinfo.cfm>

### *TRANSPORTATION ALTERNATIVES*

Transportation Alternatives (TA) is a new funding source under MAP-21 that consolidates three formerly separate programs under SAFETEA-LU: Transportation Enhancements (TE), Safe Routes to School (SR2S), and the Recreational Trails Program (RTP). These funds may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, multi-use 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.

Average annual funds available through TA over the life of MAP-21 equal \$814 million nationally, which is based on a 2% set-aside of total MAP-21 allocations. Note that state DOT's may elect to transfer up to 50% of TA funds to other highway programs, so the amount listed on the website represents the maximum potential funding. Remaining TA funds (those monies not re-directed to other highway programs) are disbursed through a separate competitive grant program administered by NCDOT. Local governments, school districts, tribal governments, and public lands agencies are permitted to compete for these funds.

Each State Governor is given the opportunity to "opt out" of the Recreational Trails Program however, as of the date of the writing of this plan, only Florida



and Kansas have “opted out” of the RTP. For all other States, dedicated funds for recreational trails continue to be provided as a subset of TA. MAP-21 provides \$85 million nationally for the RTP.

For the complete list of eligible activities, visit: [http://www.fhwa.dot.gov/environment/transportation\\_enhancements/legislation/map21.cfm](http://www.fhwa.dot.gov/environment/transportation_enhancements/legislation/map21.cfm)

For funding levels, visit: <http://www.fhwa.dot.gov/MAP21/funding.cfm>

### *SURFACE TRANSPORTATION PROGRAM*

The Surface Transportation Program (STP) provides states with flexible funds that may be used for a variety of highway, road, bridge, and transit projects. A wide variety of bicycle and pedestrian improvements are eligible, including on-street bicycle facilities, off-street trails, sidewalks, crosswalks, bicycle and pedestrian signals, parking, 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 bicycle and pedestrian facilities may be located on local and collector roads, which are not part of the Federal-aid Highway System. 50% of each state’s STP funds are suballocated geographically by population to the MPOs; the remaining 50% may be spent in any area of the state.

More information: <http://www.fhwa.dot.gov/map21/stp.cfm>

stp.cfm

### *HIGHWAY SAFETY IMPROVEMENT PROGRAM*

MAP-21 doubles the amount of funding available through the Highway Safety Improvement Program (HSIP) relative to SAFETEA-LU. HSIP provides \$2.4 billion nationally for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. MAP-21 preserves the Railway-Highway Crossings Program within HSIP but discontinues the High-Risk Rural roads set-aside unless safety statistics demonstrate that fatalities are increasing on these roads. 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.

More information: <http://www.fhwa.dot.gov/map21/hsip.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 nonattainment 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 that do not receive CMAQ funding apportionments may apply for CMAQ funding to implement projects that will reduce travel by automobiles.

More Information: <http://www.fhwa.dot.gov/map21/cmaq.cfm>

### *FEDERAL TRANSIT ADMINISTRATION (FTA) FUNDING SOURCES, PROGRAMS, AND PLANNING*

The Federal Transit Administration provides funding to state, regional, and local governments to provide mass transportation services to the public. These funds include: FTA Section 5303, FTA Section 5307, FTA Section 5309 Fixed Guideway, FTA Section 5309 Bus, FTA Section 5309 New Starts, FTA Section 5310, FTA Section 5311, FTA Section 5316 Job Access and Reverse Commute (JARC), and FTA Section 5317 New Freedom Programs.

FTA Section 5303, 5304, 5305 Metropolitan and Statewide Planning Program funds provide funding for statewide and metropolitan coordinated transportation planning. Funds are distributed to regions based on urbanized area population and an FTA administrative formula. Federal planning funds are first apportioned to State DOTs. State DOTs then allocate planning funding to MPOs. Eligible activities

include pedestrian or bicycle planning to increase safety for non-motorized users, and to enhance the interaction and connectivity of the transportation system across and between modes.

More information: [http://www.fta.dot.gov/funding/grants/grants\\_financing\\_3563.html](http://www.fta.dot.gov/funding/grants/grants_financing_3563.html)

FTA Section 5307 funds are distributed to regions on urbanized area formula. In general, large urbanized area formula funds can be used for transit capital purposes only. Small urbanized area formula funds can be used for both transit capital and transit operations. MPO and/or RPO staff works with the region's transit operators to determine how these funds are prioritized.

FTA Section 5309 Fixed Guideway (FG) funds are also distributed to regions on an urbanized area formula. Unlike 5307 funds, the 5309 FG funds are generated in large urbanized areas only, and can be used for capital purposes on fixed guideway transit services such as rail, ferry, cable cars, and buses operating in exclusive rights of way.

FTA Section 5309 Bus and New Starts are earmarked by Congress. FTA Section 5309 Bus can be used for capital projects such as replacement or expansion of buses or bus facilities. FTA Section 5309 New Starts are used for building new rail, bus rapid transit, and ferry systems, or extensions to existing systems.

FTA Section 5310 funds are distributed to the states by the federal government to provide transit capital grants to non-profit agencies that provide transportation services to the elderly or persons with disabilities.

FTA Section 5311 funds are distributed to the regions on non-urbanized area formula. These funds are used for transit capital and operating purposes in non-urbanized areas.

FTA Section 5317 New Freedom Program funds are directed to elderly and disabled transportation services that go beyond those required by the Americans with Disabilities Act (ADA).

The Section 5316 Job Access and Reverse Commute (JARC) program was established to address the unique transportation challenges faced by welfare recipients and low-income persons seeking to obtain and maintain employment. The program provides capital, planning, and operating expenses for projects that transport low-income individuals to and from jobs and activities related to employment, and for reverse commute projects. In North Carolina, these funds have been granted for sidewalks and pedestrian signals. FTA apportions 60 percent among designated recipients in large urbanized areas with populations greater than 200,000; 20 percent to the states for small urbanized areas with populations between 50,000 and 200,000; and 20 percent to the states for rural and

small urban areas under 50,000 in population. Section 5316 funds are apportioned among the recipients by a formula which is based on the ratio that the number of eligible low-income and welfare recipients in each such area bears to the number of eligible low-income and welfare recipients in all such areas.

More information: [http://www.fta.dot.gov/funding/grants/grants\\_financing\\_3550.html](http://www.fta.dot.gov/funding/grants/grants_financing_3550.html)

### *FTA METROPOLITAN AND STATEWIDE PLANNING*

This program provides funding for statewide and metropolitan coordinated transportation planning. Federal planning funds are first apportioned to State DOTs. State DOTs then allocate planning funding to MPOs. Eligible activities include pedestrian or bicycle planning to increase safety for non-motorized users, and to enhance the interaction and connectivity of the transportation system across and between modes.

More information: [http://www.fta.dot.gov/funding/grants/grants\\_financing\\_3563.html](http://www.fta.dot.gov/funding/grants/grants_financing_3563.html)

### *PAUL S. SARBANES TRANSIT IN PARKS PROGRAM*

This program addresses the challenge of increasing vehicle congestion in and around our national parks and other federal lands. Eligible recipients include state, tribal, or local governmental authorities with jurisdiction over land in the vicinity of an eligible area acting with the consent of the Federal Lands



Management Area. The funds may support capital and planning expenses for new or existing alternative transportation systems in the vicinity of an eligible area. It includes non-motorized transportation systems such as pedestrian and bicycle trails.

More information: [http://www.fta.dot.gov/funding/grants/grants\\_financing\\_6106.html](http://www.fta.dot.gov/funding/grants/grants_financing_6106.html)

#### ***TRANSPORTATION FOR ELDERLY PERSONS AND PERSONS 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. Eligible subrecipients are private non-profit organizations or governmental authorities where no non-profit organizations are available

More information: [http://www.fta.dot.gov/funding/grants/grants\\_financing\\_3556.html](http://www.fta.dot.gov/funding/grants/grants_financing_3556.html)

#### ***PARTNERSHIP FOR SUSTAINABLE COMMUNITIES***

Founded in 2009, the Partnership for Sustainable Communities is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to “improve access to affordable housing, more

transportation options, and lower transportation costs while protecting the environment in communities nationwide.” The Partnership is based on five Livability Principles, one of which explicitly addresses the need for bicycle and pedestrian infrastructure (“Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation’s dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health”).

The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including both TIGER I and TIGER II grants). North Carolina jurisdictions should track Partnership communications and be prepared to respond proactively to announcements of new grant programs. Initiatives that speak to multiple livability goals are more likely to score well than initiatives that are narrowly limited in scope to bicycle improvement efforts.

More information: <http://www.epa.gov/smartgrowth/partnership/>

Resource for Rural Communities: [http://www.sustainablecommunities.gov/pdf/Supporting\\_Sustainable\\_Rural\\_Communities\\_FINAL.PDF](http://www.sustainablecommunities.gov/pdf/Supporting_Sustainable_Rural_Communities_FINAL.PDF)

### *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.

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.

More information: <http://www.nps.gov/ncrc/programs/rtca/> or contact the Southeast Region RTCA Program Manager Deirdre “Dee” Hewitt at (404) 507-5691

### *NATIONAL SCENIC BYWAYS DISCRETIONARY GRANT PROGRAM*

The National Scenic Byways Discretionary Grants program provides merit-based funding for byway-related projects each year, utilizing one or more of eight specific activities for roads designated as National Scenic Byways, All-American Roads, State scenic byways, or Indian tribe scenic byways. The activities are described in 23 USC 162(c). This is a discretionary program; all projects are selected by the US Secretary of Transportation.

Eligible projects include construction along a scenic byway of a facility for pedestrians and bicyclists and improvements to a scenic byway that will enhance access to an area for the purpose of recreation. Construction includes the development of the environmental documents, design, engineering, purchase of right-of-way, land, or property, as well as

supervising, inspecting, and actual construction.

More information: <http://www.bywaysonline.org/grants/>

#### *FEDERAL LANDS HIGHWAY PROGRAM*

The Federal Lands Highway Program (FLHP) is a coordinated program of public roads and transit facilities serving Federal and Indian lands. Funding for bicycle improvements is available through the Public Lands Highway – Discretionary, and Forest Highways Programs.

#### *DEPARTMENT OF ENERGY*

The Department of Energy's Energy Efficiency and Conservation Block Grants (EECBG) grants 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.

More information: <http://www1.eere.energy.gov/wip/eeecbg.html>

#### *PUBLIC LANDS HIGHWAY - DISCRETIONARY*

The Public Lands Highway - Discretionary (PLH-D) Program is intended for the planning, design, construction, reconstruction, or improvement of roads and bridges that are within or adjacent to, or provide access to public lands and Indian reservations. PLH-D funding has been used for bike trails, walkways, and transportation planning activities.

More information: <http://flh.fhwa.dot.gov/programs/plh/discretionary/>



## STATE FUNDING SOURCES

### *NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) STATE TRANSPORTATION IMPROVEMENT PROGRAM*

The NCDOT's State Transportation Improvement Program is based on the Strategic Transportation Investments bill, signed into law in 2013. The Strategic Transportation Investments (STI) bill – which contains the Strategic Mobility Formula – is a new way to fund and prioritize transportation projects to ensure they provide the maximum benefit to our state. It allows NCDOT to use its existing revenues more efficiently to fund more investments that improve North Carolina's transportation infrastructure, create jobs, and help boost the economy.

The Strategic Mobility Formula assigns projects for all modes into one of three categories: Statewide Mobility, Regional Impact, and Division Needs. All independent bicycle and pedestrian projects are placed in the "Division Needs" category, and are ranked on the following five criteria:

- Safety
- Access
- Demand or density
- Constructability
- Benefit/cost ratio

The highest ranked projects based on this formula are

the most likely to be included in the department's State Transportation Improvement Program (STIP). The STIP is a federally mandated transportation planning document that details transportation improvements prioritized by stakeholders for inclusion in the Work Program over the next ten years. The STIP is updated every two years.

The STIP contains funding information for various transportation divisions of NCDOT including: highways, aviation, public transportation, rail, bicycle and pedestrians, and the Governor's Highway Safety Program. Access to many federal funds require that projects be incorporated into the STIP. The STIP is the primary method for allocating state and federal transportation funds. In 2013, the General Assembly passed a new Strategic Transportation Investments (STI) law that governs how projects will be selected for inclusion in the STIP.

For more information on STI: [www.ncdot.gov/strategictransportationinvestments/](http://www.ncdot.gov/strategictransportationinvestments/)

To access the STIP: <https://connect.ncdot.gov/projects/planning>.

For more about the STIP process: <http://www.ncdot.org/performance/reform/>

### ***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.

More information: <https://connect.ncdot.gov/resources/safety/Pages/NC-Highway-Safety-Program-and-Projects.aspx>

### ***HIGH 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% federal funds and 10% 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).

More information: <https://connect.ncdot.gov/resources/safety/Pages/NC-Highway-Safety-Program-and-Projects.aspx>

### *NCDOT CONTINGENCY FUND*

The Statewide Contingency Fund is a \$10 million fund administered by the Secretary of Transportation. The Division Engineer elicits written requests from municipalities, counties, businesses, schools, citizens, legislative members and NCDOT staff. The appeals are reviewed on their merits by the Contingency and Small Urban Funds Committee, which makes recommendations for funding to the Secretary. Written requests must provide technical information such as justification, location, improvements being requested, timing, etc., for thorough review.

More information: [https://connect.ncdot.gov/resources/safety/Teppl/Pages/Teppl-Topic.aspx?Topic\\_List=F19](https://connect.ncdot.gov/resources/safety/Teppl/Pages/Teppl-Topic.aspx?Topic_List=F19)

### *SMALL URBAN FUNDS*

Each NCDOT Highway Division administers \$2 million of funds for small-scale improvement projects in urban areas. Projects must be within 2 miles of city limits and have a maximum cost of \$250,000. Requests for small urban funds may be made by municipalities, counties, businesses, schools, and industrial entities. A written request should be submitted to the Division Engineer providing technical information such as justification, location, improvements being requested, timing, etc., for thorough review.

### *SMALL CONSTRUCTION FUNDS*

The purpose of these funds is to finance improvements on the State System (US, NC, and SR routes) to be used for projects anywhere in the counties. These funds are used to fund a variety of transportation projects for municipalities, counties, businesses, schools, and industries throughout the state. There is a \$250,000 maximum amount per request per fiscal year. Any project with a total cost greater than \$150,000 requires a resolution or a letter of support for the project from the local jurisdiction.

More information: <http://www.nctransportationanswers.org/ourforms/SMALLCONSTRUCTIONFORM.pdf>

### *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.

More information: <http://www.ncdot.org/programs/ghsp/>



### *BICYCLE AND PEDESTRIAN PLANNING GRANT INITIATIVE*

The Bicycle and Pedestrian Planning Grant Initiative is a matching grant program administered through NCDOT that encourages municipalities to develop comprehensive bicycle plans and pedestrian plans. The Division of Bicycle and Pedestrian Transportation (DPBT) and the Transportation Planning Branch (TPB) sponsor this grant. All North Carolina municipalities are eligible and are encouraged to apply. Funding allocations are determined on a sliding scale based on population. Municipalities who currently have bicycle plans or pedestrian plans, either through this grant program or otherwise, may also apply to update their plan provided it is at least five years old.

More information: <https://connect.ncdot.gov/municipalities/PlanningGrant/Pages/default.aspx>

### *INCIDENTAL PROJECTS*

Bicycle and pedestrian accommodations such as bike lanes, sidewalks, intersection improvements, widened paved shoulders and bicycle and pedestrian-safe bridge design are frequently included as incidental features of highway projects. Most bicycle safety accommodations built by NCDOT, such as paved shoulders, are included as part of scheduled highway improvement projects funded with a combination of federal and state roadway construction funds or with a local fund match.

### *ROAD RESURFACING*

When space allows the inclusion of a bicycle lane onto a road without requiring significant drainage, right-of-way, or grading work, NCDOT can install the improvement during road resurfacing projects. If a project is feasible, the NCDOT can inform the affected community and offer them the opportunity to contribute to the marginal cost associated with these improvements.

### *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.

More information: <http://www.eatsmartmovemorenc.com/Funding/CommunityGrants.html>

### *THE NORTH CAROLINA PARKS AND RECREATION TRUST FUND (PARTF)*

The Parks and Recreation Trust Fund (PARTF) provides dollar-for-dollar matching grants to counties, incorporated municipalities, and public authorities, as defined by G.S. 159-7. Through this program,

several million dollars each year are available to local governments to fund the acquisition, development, and renovation of recreational areas. 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.

More information: [http://www.ncparks.gov/About/grants/partf\\_main.php](http://www.ncparks.gov/About/grants/partf_main.php)

### *THE NORTH CAROLINA DIVISION OF PARKS AND RECREATION*

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.

More information: <http://www.ncparks.gov/About/grants/main.php>

### *ADOPT-A-TRAIL PROGRAM*

The Adopt-A-Trail (AAT) Program is a source of small funds for trail construction, maintenance, and land acquisition for trails. The program funds \$108,000

annually in North Carolina, and awards grants up to \$5,000 per project with no local match required. Applications are due in February. More information is available from Regional Trails Specialists and the Grants Manager.

More information: [http://www.ncparks.gov/About/grants/docs/AAT\\_info.pdf](http://www.ncparks.gov/About/grants/docs/AAT_info.pdf)

### *POWELL BILL FUNDS*

Annually, Powell Bill state street-aid allocations are made to incorporated municipalities that 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. Funding allocations are based on population and mileage of town-maintained streets.

More information: <https://connect.ncdot.gov/municipalities/State-Street-Aid/Pages/default.aspx>

### *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.

More information: <http://www.cwmtf.net/#appmain.htm>

#### **COMMUNITY DEVELOPMENT BLOCK GRANTS**

Community Development Block Grant (CDBG) funds are available to local municipal or county governments for projects to enhance the vitality of communities by providing decent housing and suitable living environments and expanding economic opportunities. State level funds are allocated through the NC Department of Commerce's Division of Community Assistance and are intended to serve low-income and moderate-income neighborhoods. Greenways and bicycle improvements that are part of a community's economic development plans may qualify for assistance under this program. Recreational areas that serve to improve the quality of life in lower income areas may also qualify. Approximately \$50 million is available statewide to fund a variety of projects.

More information: <http://www.nccommerce.com/cd/investment-assistance>

#### **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 that 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.

For more about Tree City USA status, including application instructions, visit: [http://ncforestservice.gov/Urban/urban\\_grant\\_overview.htm](http://ncforestservice.gov/Urban/urban_grant_overview.htm)



### *SAFE ROUTES TO SCHOOL*

Safe Routes to School (SRTS) is a program that 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. The North Carolina Safe Routes to School Program is supported by federal funds through SAFETEA-LU and MAP-21 legislation.

Different types of reimbursable funding opportunities are available through this program, which include; Action Plans or School Travel Plans, Non-Infrastructure Program funding, Infrastructure Program funding, and Highway Division Funds. Please note that all SRTS projects "shall be treated as projects on a Federal-aid system under chapter 1 of title 23, United States Code." Although no local match is required and all SRTS projects are 100% federally funded, agencies are encouraged to leverage other funding sources that may be available to them, including grant awards, local, state, or other federal funding. SRTS funds can be used for any school, public or private, K-8, in a municipality or in the county jurisdiction.

The following provides information about the program.

- **Action Plans or School Travel Plans:** These are plans to improve pedestrian and bicycle safety within a two-mile radius of schools that are grades K-8. The Action Plans provide a framework for identifying projects, programs and activities that will make walking and bicycling to school safer and more appealing.
- **Non-Infrastructure Funds:** are used for pedestrian and bicycle education, encouragement, evaluation and enforcement. These grants are good for developing programs that inspire children to walk and bike to school.
- **Infrastructure Funds:** are funds that are awarded for the planning, design, and construction of pedestrian and bicycling facilities within a 2-mile radius of a school. Funding requests typically range from \$100,000 to \$300,000 per project. Types of projects may include sidewalk improvements, crossing improvements, on-street bike and pedestrian improvements, bike parking, traffic calming, and traffic separation devices among others. An adopted Comprehensive Transportation Plan or other type of pedestrian and bicycle plan that identifies needed infrastructure improvements is helpful in obtaining these grants.
- **Highway Division Funds:** are funds that are allocated by each of NCDOT's 14 Highway Divisions and the SRTS office to fund infrastructure projects on state-maintained roadways. The

projects must be within 2-miles of a school serving grades K-8 to be eligible. The funding amounts can be used to improve conditions for walking and biking to school.

More information: Contact Ed Johnson, ASLA, RLA, SRTS Coordinator, NCDOT, Division of Bicycle and Pedestrian Transportation; Email: erjohnson2@ncdot.gov, Phone: 919.707.2604

### *LOCAL GOVERNMENT FUNDING SOURCES*

Municipalities often plan for the funding of bicycle facilities or improvements through development of Capital Improvement Programs (CIP). 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 following: 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 bicycle projects are 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 bicycle 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 DISTRICTS (LIDs)*

Local Improvement Districts (LIDs) are most often used by cities to construct localized projects such as streets, sidewalks, or bikeways. 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 citywide 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), are 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., multi-use trail) 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 and streetscapes 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.

### *INSTALLMENT PURCHASE FINANCING*

As an alternative to debt financing of capital improvements, communities can execute installment or lease purchase contracts for improvements. This type of financing is typically used for relatively small projects that the seller or a financial institution is willing to finance or when up-front funds are unavailable. In a lease purchase contract the community leases the property or improvement from the seller or financial institution. The lease is paid in installments that include principal, interest, and associated costs. Upon completion of the lease period, the community owns the property or improvement. While lease purchase contracts are similar to a bond, this arrangement allows the community to acquire the property or improvement without issuing debt. These instruments, however, are more costly than issuing debt.

### *TAXES*

Many communities have raised money for general transportation programs or specific project needs through self-imposed increases in taxes and bonds. For example, Pinellas County residents in Florida voted to adopt a one-cent sales tax increase, which provided an additional \$5 million for the development of the overwhelmingly popular Pinellas Trail. Sales taxes have also been used in Allegheny County, Pennsylvania, and in Boulder, Colorado to fund open space projects. A gas tax is another method used by some municipalities to fund public improvements. A



number of taxes provide direct or indirect funding for the operations of local governments. Some of them are:

### *SALES TAX*

In North Carolina, the state has authorized a sales tax at the state and county levels. Local governments that choose to exercise the local option sales tax (all counties currently do), use the tax revenues to provide funding for a wide variety of projects and activities. Any increase in the sales tax, even if applying to a single county, must gain approval of the state legislature. In 1998, Mecklenburg County was granted authority to institute a one-half cent sales tax increase for mass transit.

### *PROPERTY TAX*

Property taxes generally support a significant portion of a municipality's activities. However, the revenues from property taxes can also be used to pay debt service on general obligation bonds issued to finance greenway system acquisitions. Because of limits imposed on tax rates, use of property taxes to fund greenways could limit the municipality's ability to raise funds for other activities. Property taxes can provide a steady stream of financing while broadly distributing the tax burden. In other parts of the country, this mechanism has been popular with voters as long as the increase is restricted to parks and open space. Note: other public agencies compete vigorously for

these funds, and taxpayers are generally concerned about high property tax rates.

### *EXCISE TAXES*

Excise taxes are taxes on specific goods and services. These taxes require special legislation and funds generated through the tax are limited to specific uses. Examples include lodging, food, and beverage taxes that generate funds for promotion of tourism, and the gas tax that generates revenues for transportation related activities.

### *OCCUPANCY TAX*

The NC General Assembly may grant towns the authority to levy occupancy tax on hotel and motel rooms. The act granting the taxing authority limits the use of the proceeds, usually for tourism-promotion purposes.

### *FEES*

A variety of fee options have been used by local jurisdictions to assist in funding pedestrian and bicycle improvements. Enabling actions may be required for a locality to take advantage of these tools.

### *STORMWATER UTILITY FEES*

Greenway trail property may be purchased with stormwater fees, if the property in question is used to mitigate floodwater or filter pollutants. Stormwater charges are typically based on an estimate of the amount of impervious surface on a user's property.

Impervious surfaces (such as rooftops and paved areas) increase both the amount and rate of stormwater runoff compared to natural conditions. Such surfaces cause runoff that directly or indirectly discharge into public storm drainage facilities and create a need for stormwater management services. Thus, users with more impervious surface are charged more for stormwater service than users with less impervious surface. The rates, fees, and charges collected for stormwater management services may not exceed the costs incurred to provide these services.

### *STREETSCAPE UTILITY FEES*

Streetscape Utility Fees could help support streetscape maintenance of the area between the curb and the property line through a flat monthly fee per residential dwelling unit. Discounts would be available for senior and disabled citizens. Non-residential customers would be charged a per-foot fee based on the length of frontage streetscape improvements. This amount could be capped for non-residential customers with extremely large amounts of street frontage. The revenues raised from Streetscape Utility fees would be limited by ordinance to maintenance (or construction and maintenance) activities in support of the streetscape.

### *IMPACT FEES*

Developers can be required to pay impact fees through local enabling legislation. Impact fees, which are also known as capital contributions, facilities fees, or system development charges, are typically collected from developers or property owners at the time of building permit issuance to pay for capital improvements that provide capacity to serve new growth. The intent of these fees is to avoid burdening existing customers with the costs of providing capacity to serve new growth so that “growth pays its own way.”

In North Carolina, impact fees are designed to reflect the costs incurred to provide sufficient capacity in the system to meet the additional needs of a growing community. These charges are set in a fee schedule applied uniformly to all new development. Communities that institute impact fees must develop a sound financial model that enables policy makers to justify fee levels for different user groups, and to ensure that revenues generated meet (but do not exceed) the needs of development. Factors used to determine an appropriate impact fee amount can include: lot size, number of occupants, and types of subdivision improvements. A developer may reduce the impacts (and the resulting impact fee) by paying for on- or offsite pedestrian and bicycle improvements that will encourage residents/tenants to walk, bike, or use transit rather than drive. Establishing a clear

nexus or connection between the impact fee and the project's impacts is critical in avoiding a potential lawsuit.

### *EXACTIONS*

Exactions are similar to impact fees in that they both provide facilities to growing communities. The difference is that through exactions it can be established that it is the responsibility of the developer to build the greenway or pedestrian facility that crosses through the property, or adjacent to the property being developed.

### *IN-LIEU-OF FEES*

As an alternative to requiring developers to dedicate on-site greenway or bicycle facilities that would serve their development, some communities provide a choice of paying a front-end charge for off-site protection of pieces of the larger system. Payment is generally a condition of development approval and recovers the cost of the off-site land acquisition or the development's proportionate share of the cost of a regional facility serving a larger area. Some communities prefer in-lieu-of fees. This alternative allows community staff to build facilities in priority areas rather than accept marginal investments that meet the quantitative requirements of a developer dedication but fall short of qualitative interests.

### *BONDS AND LOANS*

Bonds have been a very popular way for communities across the country to finance their bicycle and greenway projects. A number of bond options are listed below. Contracting with a private consultant to assist with this program may be advisable. Since bonds rely on the support of the voting population, an education and awareness program should be implemented prior to any vote. Billings, Montana used the issuance of a bond in the amount of \$599,000 to provide the matching funds for several of their TEA-21 enhancement dollars. Austin, Texas has also used bond issues to fund a portion of its bicycle and trail system.

### *REVENUE BONDS*

Revenue bonds are bonds that are secured by a pledge of the revenues from a specific local government activity. The entity issuing bonds pledges to generate sufficient revenue annually to cover the program's operating costs, plus meet the annual debt service requirements (principal and interest payment). Revenue bonds are not constrained by the debt ceilings of general obligation bonds, but they are generally more expensive than general obligation bonds.

### *GENERAL OBLIGATION BONDS*

Cities, counties, and service districts generally are able to issue general obligation (G.O.) bonds that



are secured by the full faith and credit of the entity. A general obligation pledge is stronger than a revenue pledge, and thus may carry a lower interest rate than a revenue bond. The local government issuing the bonds pledges to raise its property taxes, or use any other sources of revenue, to generate sufficient revenues to make the debt service payments on the bonds. Frequently, when local governments issue G.O. bonds for public enterprise improvements, the public enterprise will make the debt service payments on the G.O. bonds with revenues generated through the public entity's rates and charges. However, if those rate revenues are insufficient to make the debt payment, the local government is obligated to raise taxes or use other sources of revenue to make the payments. Bond measures are typically limited by time, based on the debt load of the local government or the project under focus. Funding from bond measures can be used for right-of-way acquisition, engineering, design, and construction of pedestrian and bicycle facilities. Voter approval is required.

### *SPECIAL ASSESSMENT BONDS*

Special assessment bonds are secured by a lien on the property that benefits from the improvements funded with the special assessment bond proceeds. Debt service payments on these bonds are funded through annual assessments to the property owners in the assessment area.

### *STATE REVOLVING FUND LOANS*

Initially funded with federal and state money, and continued by funds generated by repayment of earlier loans, State Revolving Funds (SRFs) provide low interest loans for local governments to fund water pollution control and water supply related projects including many watershed management activities. These loans typically require a revenue pledge, like a revenue bond, but carry a below market interest rate and limited term for debt repayment (20 years).

### *FUNDS FROM PRIVATE/NON-PROFIT FOUNDATIONS AND ORGANIZATIONS*

Many communities have solicited greenway and bicycle infrastructure funding assistance from private foundations and other conservation-minded benefactors. Below are several examples of private funding opportunities available in North Carolina.

#### *THE ROBERT WOOD JOHNSON FOUNDATION*

The Robert Wood Johnson Foundation was established 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 assure 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

For more information about what types of projects are funded and how to apply, visit <http://www.rwjf.org/grants/>

#### *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 nonprofit organizations and institutions throughout the state. Based in Raleigh, North Carolina, the foundation also manages a number of community affiliates throughout North Carolina, which makes grants available to non-profits 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.

More information: <http://www.nccommunityfoundation.org/Grants>

#### *WALMART STATE GIVING PROGRAM*

The Walmart Foundation financially supports projects that create opportunities for better living. Grants are awarded for projects that support and promote education, workforce development/economic

opportunity, health and wellness, and environmental sustainability. Both programmatic and infrastructural projects are eligible for funding. State Giving Program grants start at \$25,000, and there is no maximum award amount. The program accepts grant applications on an annual, state by state basis January 2nd through March 2nd.

Online resource: <http://foundation.walmart.com/apply-for-grants/state-giving>

#### *THE 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. A wide array of activities are eligible for funding, including infrastructural and programmatic projects.

Online resource: <https://www.riteaid.com/about-us/community-service/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. They have two grant cycles per year and generally do not fund land acquisition. However, they may be able to offer support in other areas of open space and greenways development.

More information is available at <http://www.zsr.org>

### *BANK OF AMERICA CHARITABLE FOUNDATION, INC.*

The Bank of America Charitable Foundation is one of the largest in the nation. The primary grants program is called Neighborhood Excellence, which seeks to identify critical issues in local communities. Another program that applies to greenways is the Community Development Programs, and specifically the Program Related Investments. This program targets low- and moderate-income communities and serves to encourage entrepreneurial business development.

More information: <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. The grant program has four focus areas: Environment, Education, Economic Development, and Community Vitality.

More information: <http://www.duke-energy.com/community/foundation.asp>

### *THE TRUST FOR PUBLIC LAND*

Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the Trust for Public Land is the only national nonprofit working

exclusively to protect land for human enjoyment and well-being. TPL helps conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities.

More information: <http://www.tpl.org>

### *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 (one to two years). Funding emphasis may not be on general operating expenses or staff payroll.



More information: <http://www.conservationalliance.com/grants>

### ***BLUECROSS BLUESHIELD OF NORTH CAROLINA FOUNDATION***

BlueCross BlueShield (BCBS) focuses on programs that use an outcome approach to improve the health and well-being of residents. The Health of Vulnerable Populations grants program focuses on improving health outcomes for at-risk populations. The Healthy Active Communities grant funds projects through non-profit organizations that enhance the physical environment to create spaces and places for physical activity. Eligible grant applicants must be located in North Carolina, be able to provide recent tax forms and, depending on the size of the nonprofit, provide an audit.

More information: <http://www.bcbsncfoundation.org/grants/>

### ***ANNUAL AZALEA CELEBRATION***

NC Beautiful has promoted environmental education, beautification, and stewardship in North Carolina for 40 years and holds the Annual Azalea Celebration to help non-profit organizations enhance their community spaces. Winning applicants receive 100 azalea plants free of charge to beautify school and church grounds, parks, greenways, public rights-of-way, and community and senior centers. In addition, recipients who sustain their projects and keep their

azaleas healthy for a 3-year period are eligible to receive cash awards and additional plants through the A.J. Fletcher Award.

More information: <http://www.ncbeautiful.org/programs/celebration.html>

### ***BIKES BELONG GRANTS***

The Bikes Belong Grant program funds important and influential projects that leverage federal funding and build momentum for bicycling in communities across the U.S. These projects include greenways and rail trails accessible by pedestrians and bicyclists. Applicants can request a maximum amount of \$10,000 for their project, and priorities are given to areas that have not received Bikes Belong funding in the past three years. Community Partnership Grants are a new Bikes Belong opportunity. These grants are designed to foster and support partnerships between city or county governments, non-profit organizations, and local businesses to improve the environment for bicycling in the community. Grants will primarily fund the construction or expansion of facilities such as bike lanes, trails, and paths. The lead organization must be a non-profit organization with IRS 501(c)3 designation or a city or county government office.

More information: <http://www.bikesbelong.org/grants/>

### *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 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. Valuable in-kind gifts 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*

Residents and other community members are excellent resources for garnering support and enthusiasm for a greenway corridor or bicycle facility. Furthermore, volunteers can substantially reduce implementation and maintenance costs. Individual volunteers from the community can be brought together with groups of volunteers from 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.

FUNDING SOURCE SUMMARY TABLE

Funding Source	~GEOGRAPHIC APPLICABILITY~				~POTENTIAL USES~		
	Municipality	Unincorporated Village	Rural Area	Natural Area/ Park	Planning	Programming	Design/ Construction
	Federal Funding						
Transportation Alternatives	x	x	x	x	x	x	x
Surface Transportation Program	x	x	x	x			x
Highway Safety Improvement Program	x	x	Only if safety statistics demonstrate that fatalities are increasing on rural roads			x	x
Congestion Mitigation/ Air Quality	x	x	x	x		x	x
FTA Section 5303, 5304, 5305 Metropolitan and Statewide Planning Program	X				x		
FTA Job Access and Reverse Commute Program	x	x	x		x	x	x
Paul S. Sarbanes Transit in Parks Program	x	x	x	x	x		
Transportation for Elderly Persons and Persons with Disabilities	x	x	x				
Partnership for Sustainable Communities	x	x	x		x	x	x
Land and Water Conservation Fund				x	x		x
Rivers, Trails, and Conservation Assistance Program	x	x	x	x	x		
National Scenic Byways Discretionary Grant Program		x	x	x			x
Federal Lands Highway Program		x	x	x			x
Department of Energy	x	x	x	x	x		x
Public Lands Highway - Discretionary				x	x		x



Funding Source	~GEOGRAPHIC APPLICABILITY~				~POTENTIAL USES~		
	Municipality	Unincorporated Village	Rural Area	Natural Area/ Park	Planning	Programming	Design/ Construction
	State Funding						
NCDOT State Transportation Improvement Program	x	x	x				x
Spot Safety Program (anywhere is eligible, but more likely in dense areas)	x						x
High Hazard Elimination Program (anywhere is eligible, but more likely in dense areas)	x						x
NCDOT Discretionary Funds	x	x	x	x			x
NCDOT Contingency Fund	x						x
Small Urban Funds	x						x
Spot Improvement Program	x	x	x	x			x
Small Construction Funds	x	x	x	x			x
Governor's Highway Safety Program		x	x				x
Bicycle and Pedestrian Planning Grant Initiative	x				x	x	
Incidental Projects		x	x				x
Road Resurfacing	x	x	x	x			x
Eat Smart, Move More North Carolina Community Grants	x	x	x			x	x
The North Carolina Parks and Recreation Trust Fund (PARTF)	x	(eligible through the county)	(eligible through the county)				x
The North Carolina Division of Parks and Recreation				x	x		x
Adopt-A-Trail Program	x	x		x			x
Powell Bill Funds	x						x
Clean Water Management Trust Fund (CWMTF)	x	x	x	x	x	x	x
Community Development Block Grants	City < 50,000 pop/ county <200,000	City < 50,000 pop/ county <200,000	City < 50,000 pop/ county <200,000		x	x	x
Urban and Community Forestry Grant	x	x			x		x

Funding Source	~GEOGRAPHIC APPLICABILITY~				~POTENTIAL USES~		
	Municipality	Unincorporated Village	Rural Area	Natural Area/ Park	Planning	Programming	Design/ Construction
	Local Funding						
Capital Reserve Fund	x						x
Capital Project Ordinances	x						x
Local Improvement Districts (LIDs)	x						x
Municipal Service District	x						x
Tax Increment Financing	x	x	x				x
Installment Purchase Financing	x	x	x				x
Sales Tax	x	x	x		x		x
Property Tax	x	x	x		x		x
Excise Tax	x	x	x				x
Occupancy Tax	x	x	x	x			x
Fees	x	x	x	x			x
Stormwater Utility Fees	x	x	x				x
Streetscape Utility Fees	x	x	x				x
Impact Fees	x	x	x				x
Exactions	x	x	x				x
In-Lieu-Of Fees	x	x	x				x
Bonds and Loans	x	x	x				x
Revenue Bonds	x	x	x				x
General Obligation Bonds (cities, counties, and service districts)	x	x	x				x
Special Assessment Bonds	x	x	x				x
State Revolving Fund Loans	x	x	x				x

Funding Source	~GEOGRAPHIC APPLICABILITY~				~POTENTIAL USES~		
	Municipality	Unincorporated Village	Rural Area	Natural Area/ Park	Planning	Programming	Design/ Construction
<i>Private/ Non-Profit Funding</i>							
The Robert Wood Johnson Foundation	x	x	x		x	x	
North Carolina Community Foundation	x	x	x	x	x	x	
Walmart State Giving Program	x	x	x	x	x	x	x
The Rite Aid Foundation Grant	x	Wherever there is an operating Rite-Aid				x	x
Z Smith Reynolds Foundation	x	x	x	x			x
Bank of America Charitable Foundation Inc	x	x			x	x	
Duke Energy Foundation	x	x	x			x	
The Trust for Public Land	x	x	x	x	x	x	
The Conservation Alliance		x	x	x	x	x	
Blue Cross Blue Shield of North Carolina Foundation	x	x	x			x	x
Annual Azalea Celebration	x	x	x	x		x	
Bikes Belong Grant	x	x	x	x			x
Local Trail Sponsors	x	x	x	x			x
Corporate Donations	x	x	x	x	x	x	x
Private Individual Donations	x	x	x	x	x	x	x
Fundraising/ Campaign Drives	x	x	x	x	x	x	x
Volunteer Work	x	x	x	x	x	x	x