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Acknowledgements

The development of the Pender County Collector Street Plan was a collaborative process involving numerous stakeholders, including the Pender County Collector Street Plan Steering Committee members, the Pender County Planning and Community Development Department, the Wilmington Urban Area Metropolitan Planning Organization, and members of the general public. We profoundly thank everyone involved for making this a successful project.

Pender County Collector Street Plan Steering Committee

David Piepmeyer, Pender County Commissioner
Hiram Williams, Chairman, Pender County Planning Board
Sonya Edens, Pender County Planning Board
Patrick Riddle, Division Planning Engineer, NCDOT
Adam Snipes, Transportation Engineer, NCDOT
Robert Vause, District Engineer, NCDOT
Karen Collette, Division 3 Engineer, NCDOT
Tommy Batson, Fire Marshal, Pender County
Ellen Cornette, Citizen
Bobbie Pufpaff, Citizen
Kevin Reynolds, Citizen
Chuck Strickland, Citizen

Pender County Planning and Community Development Department

Kyle Breuer, Planning Director
Megan O'Hare, Senior Planner

Wilmington Urban Area Metropolitan Planning Organization

Mike Kozlosky, Executive Director
Suraiya Montsinger, Senior Transportation Planner
Josh Lopez, Associate Transportation Planner
Beth Doliboa, Associate Transportation Planner

Consultant Team

Mike Rutkowski, P.E., AICP
Max Bushell, AICP
Scott Lane, AICP
Michelle Peele

Special Thanks to...

The citizens of Pender County for attending public meetings and providing valuable input.

Introduction

The Wilmington Urban Area Metropolitan Planning Organization (WMPO), in partnership with the Pender County Planning and Community Development Department, has commissioned this Collector Street Plan to determine future roadway connectivity needs in the southern portions of Pender County. The study area map is presented in Figure 1 below.

What are Collector Streets?

Collector streets are defined as streets that connect neighborhoods and local roads to the arterial roads. A few existing examples of collector streets in the study area are Country Club Drive, Sloop Point Loop Road, NC-133, and Hoover Road. These streets are typically two lanes, not more than two to three miles long, have speed limits between 25 and 45 mph, and carry lower volumes of traffic.



Figure 1: Pender County Collector Street Plan Study Area

Collector streets serve a number of important functions within the street network. They are very important in reducing congestion on arterial roads by equitably distributing the traffic burden so that shorter, local trips use the collector street system and long-distance trips remain on the arterial streets. Another important benefit is providing enhanced mobility opportunities for all users of the roadway, including emergency service providers, pedestrians, joggers, bicyclists, school buses, and municipal services. Pender County does not own or maintain roadways. Roads are either public and maintained by NCDOT or the roadways are private and maintained by private entities. Therefore, this plan is an important step toward ensuring that the development community that does build roads maintains appropriate connectivity across the study area.

Mission Statement and Purpose

The primary goal of the Pender County Collector Street Plan is to guide investment in new collector streets with the ultimate intention of improving connectivity, focusing land development in suitable areas, encouraging all modes of transportation, maintaining levels-of-service on existing roadways, promoting safety, ensuring that significant natural areas are conserved, and providing a safe and high-quality transportation system for existing and future residents, businesses, and visitors.

To achieve these goals, the Steering Committee, Pender County, and WMPO planners agreed on the following guiding principles and objectives for the Pender County Collector Street Plan.

- Develop a realistic and feasible network of collector streets that support the local street and arterial system
- Work with the development community to ensure proper connectivity and collector street design
- Be sensitive to environmental issues and “build in” context sensitive design approaches where applicable
- Integrate multimodal design features into the street design that support walkability and bikability

Existing Conditions

This section provides an overview of the project and information on the history, demographics, future growth, previous planning efforts, environmental conditions, and transportation in southern Pender County.

Background

The WMPO, whose jurisdiction includes seven (7) municipalities and three counties, is the primary organization responsible for regional transportation planning in the Wilmington metropolitan area. The portion of Pender County that is the focus of this collector street planning effort corresponds to the WMPO jurisdiction boundaries in Pender County. This area includes the unincorporated areas of Hampstead, Scotts Hill, and Rocky Point and parts of the Topsail, Long Creek, Holly, and Grady townships. The Pender County Collector Street Plan (CSP) study area encompasses 152 square miles. This CSP is a follow-up to the 2007 Coastal Pender Collector Street Plan and reflects the new boundary for the WMPO jurisdiction due to the designation of Wilmington as a Transportation Management Area (i.e. an urbanized area of over 200,000 people).

Growth is expected to continue in the study area, with much of the development in recent years centered around the Topsail Township and unincorporated Hampstead area (also unincorporated Scotts Hill). There is residential development along US 17, NC-210, and US 117. Industrial growth is planned along US 421 within the study area as well.

While rural land uses still dominate the outer reaches of the WMPO jurisdiction, significant infrastructure projects such as the proposed Hampstead Bypass and sewer investments will likely continue to spur growth to the west of US 17 in the Topsail Township of the study area. Additionally, the aforementioned industrial growth on US 421 will likely also serve as a catalyst for further development in the CSP study area.



Residential Suburban Development in the CSP Study Area.

This area is transitioning from primarily rural land uses to more suburban residential, commercial, and industrial development. As this occurs, the transportation network, which is comprised mostly of two-lane farm to market roads, will come under increasing strain. In order to accommodate future growth and allow for the efficient movement of people and goods in the CSP study area, a well-planned collector street system should be implemented. Collector streets serve as the conduit through which

people leave their homes on local streets and reach the major mobility carrying arterial streets, such as US 17, NC-210, US 117, and US 421. By planning a collector street network and working with the development community prior to significant land development in the area, traffic congestion can be more effectively managed in the long term, avoiding costly street reconstruction and widening projects. Additionally, the provision of collector streets can help direct growth to locations that are adequately serviced by roadway infrastructure, ultimately leading to the better use of public infrastructure investment dollars.

History

Settlement

European explorers first arrived in Pender County in 1524, reporting a surplus of wild game in the area. The county was gradually settled and in 1663, the Barbados commissioners explored and founded a community along the northeast branch of the Cape Fear River, naming the area Rocky Point. The town still exists today and retains the same name. Over the next fifty years, the population gradually increased and by 1725 the area was almost entirely settled. Officially, what we now know as Pender County was still part of New Hanover County until 1875.

The first European settlers of the area were Welsh, who came to settle the bottom land and take advantage of the tidal river transportation, though German and English settlers soon followed. The approximately 150 year period between 1725 and the United States Civil War saw sustained, if gradual, population growth in the



Sloop Point Plantation: Courtesy of the Pender County Public Library.

area and commercial success. Large plantations were constructed during this period of prosperity, including the Sloop Point and the Belvidere plantations; the Sloop Point plantation house is still standing, while the Belvidere plantation house has since been demolished.

Migration continued unabated through the Revolutionary War. Between 1763 and 1775, nearly 20,000 Scots moved to the Cape Fear region, augmenting the already diverse population in the area. However, in the early 1800s, technological advances in New England and settlement of cheap land to the west led people to leave eastern North Carolina, accounting for the slow pace of growth in the area. The advent of the railroad in 1840 changed this dramatically and led to a resurgence of both population and economic development in Pender County.

Revolutionary and Civil Wars

Residents of Pender County played an important role in both the Revolutionary and United States Civil Wars, fighting and winning a crucial battle against the Scottish Highlanders at Moores Creek, just northeast of Montague in 1776. In the United States Civil War, the area sent nearly 4,000 troops to war and was home to the youngest Confederate General, William D. Pender, after whom the County is named. He was killed in the Battle of Gettysburg in 1863.

Following the Civil War, the local plantation system declined, though much of the population continued to work in farming, clamming, fishing, and salt making among other professions. During the tumultuous Reconstruction era, local political machinations led to the formal creation of the County from the northeastern area of New Hanover County. The first Pender County seat was Watha, but was later moved to Burgaw, named after the local Native American tribe.

Transportation through the Years

Prior to the 19th Century, transportation in Pender County was restricted primarily to waterways, with Wilmington achieving important status as a trading hub at the terminus of the Cape Fear River, the only river in the state directly accessible to the ocean. Gradually, however, roads become more and more important as farmers needed a more direct link to markets for their goods. The first roads were cleared to provide access to river wharfs, but as time passed, more and more roads were constructed, eventually becoming the ideal mode of transportation for most Pender County residents.



Rocky Point Railyard: Courtesy of the Pender County Public Library.

In 1836, construction on the railroad line between Wilmington and Weldon in Halifax County began, connecting rural eastern North Carolina counties with

Washington D.C. and New York. The development of the railroad had major impacts on life in Pender County, opening new markets for agricultural goods and facilitating passenger travel. Additionally, plank roads began to be constructed during this time. Plank roads are the precursor to asphalt roadways. Initially, these roads provided better access to railroads, but soon became important pieces of transportation infrastructure in their own right.

Into the 20th century, roads continued to be the most important infrastructure, while the railroad system gradually became obsolete. Passenger service was discontinued in 1939, though freight lines still operated on the Pender County railroad until the 1980s. In the early 20th Century, old plank roads, such as the Holly Shelter Plank Road, Duplin Road, and Clinton Road, were improved substantially, becoming US 17, US 117, and US 421, respectively. Over the course of the century, these roads were further

improved, while the interstate highway system was also constructed. Interstate 40 was originally planned to end in Morehead City, but the plans were revised and the interstate terminated in Wilmington instead.

The Current Day

In the current day, Pender County's economy is predominantly comprised of farming and manufacturing enterprises. Agricultural products include blueberries, strawberries, tobacco, soybeans, and livestock, while factories produce clothing, food and pressure sensitive labels.

Pender County is located on the coastal plain in Southeastern North Carolina and includes six towns and seven communities. The incorporated Town of Burgaw, located to the north, is the county seat and the location of many of the County government buildings. With a land area of 869.79 square miles, Pender County is the fifth-largest county in North Carolina by land area.

The Cape Fear River forms the southern bounds and then traverses the study area east of I-40, while the Black River serves as the western study area boundary. The NE Cape Fear River and six creeks, including Long Creek, Morgan's Creek, Turkey Creek, Harrison Creek, Godfrey Creek, and Cross Creek make up the other significant water features in the area. The study area abuts the Intracoastal Waterway on the eastern side.

The CSP study area contains five significant highway facilities. Both NC-210 and NC-133 provide east-west mobility and access across the study area, while US 421, US 117, and US 17 serve as north-south roadways. Interstate 40

also bisects the County on a north-south axis. Collectors and local roads provide access to shopping, business, and residential land uses in the study area.

Demographics

The Pender County Collector Street Plan (CSP) study area does not

exactly correspond to United State Census Block Group or Census Tract boundaries. For ease of analysis and understanding, Census Tracts and Pender County as a whole are used to calculate demographics. Census data from the 2010 Decennial Census was used to determine population statistics for the Census Tracts referenced in Figure 2. Overall, 30,505 people reside in these Census Tracts, with 85.26 percent identifying as white, 8.8 percent identifying as African-American, 0.6 percent identifying as Native American, and 0.5 percent as Asian. People identifying as belonging to some other race account for 2.8 percent of the population of the study area, while 1.9 percent identify as belonging to two or more races. Approximately 5.5 percent of people are Hispanic or Latino in this area.

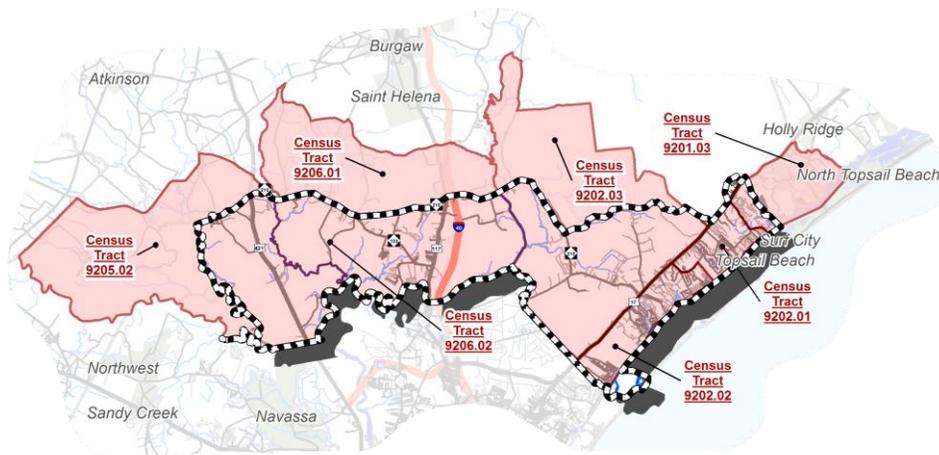


Figure 2: Census Tracts Used for Demographic Analysis

Due to the substantial population changes in Pender County, Census Tract boundaries were significantly altered between the 2000 and 2010 Decennial Censuses. As such, comparing population in our specific study area between these two time periods lacks utility for this project. However, in comparing between the 2010 Census and the 2013

American Community Survey, Census tract boundaries remained the same. Overall, the area has seen some population growth, with an estimated population of 31,533 in 2013. Of the workers aged 16 or over in the selected Census Tracts, almost 80 percent travel to work by driving alone, while 15.6 percent carpool, and less than 1 percent walk, bike, or take public transportation. The median household income for these Census Tracts ranges from \$41,867 to \$68,152, with an average median household income across all Census Tracts of \$48,951. The highest median income is in Census Tract 92.02, which contains the unincorporated community of Hampstead.

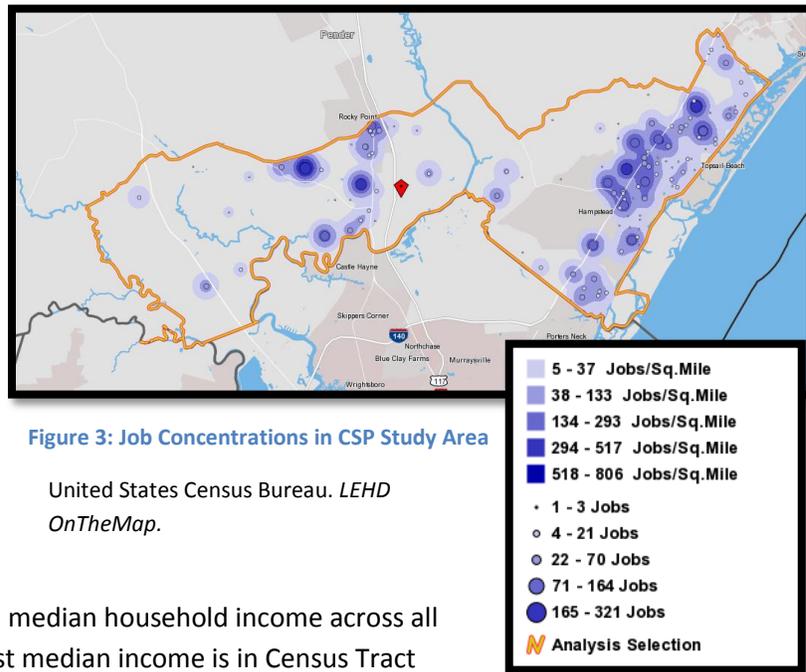


Figure 3: Job Concentrations in CSP Study Area

United States Census Bureau. LEHD OnTheMap.

Commuting

In examining primary jobs and commuting patterns, the exact CSP study area boundary was used. Overall, jobs are mostly congregated around the Topsail Township and the more densely populated areas to the east and west of US 17, while areas along US 117, US 421 and NC-133 are also job centers in Pender County, as indicated in Figure 3.

There are 973 people who both live and work in the study area. Less people are commuting to the study area to work from other places at 2,266, while more people live in the study area, but work elsewhere at 10,230 (Figure 4). With this in mind, it is clear that the CSP study area supports a large commuting residential population. Figure 4 indicates that 83 percent of the working population of the CSP study

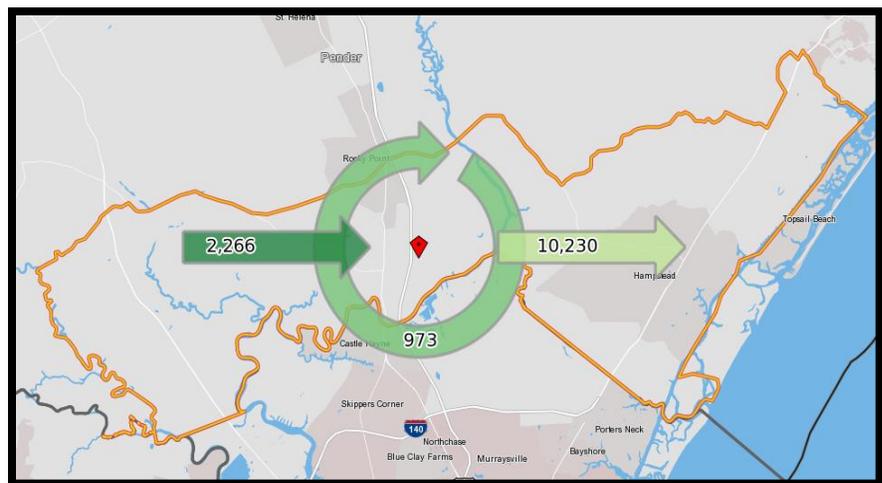


Figure 4: Commuting Statistics for CSP Study Area

area commutes more than 10 miles to work, with nearly half traveling between 10 and 24 miles to the major urban and employment center of Wilmington, NC. Jacksonville and area military bases are also large employers and represent significant employment destinations for residents of the study area. A

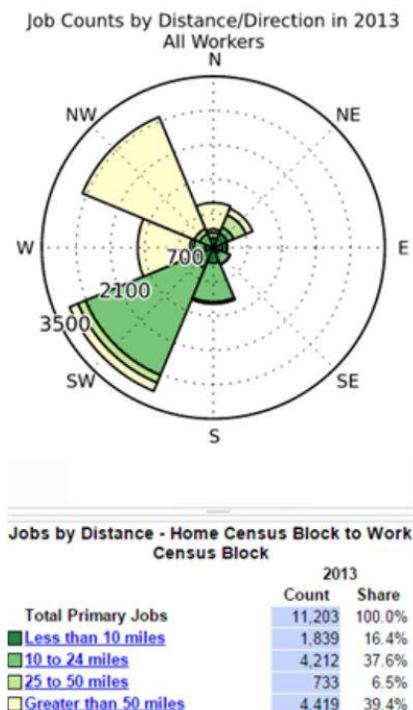


Figure 5: Commuting Distances in the CSP Study Area

significant portion, accounting for 39.4 percent of people, are also commuting northwest from the CSP study area, likely to industrial and commercial centers in the interior of Pender County and in nearby counties. These commuting trips are predominantly for distances of 50 miles or more. Across the CSP study area, average commute times ranged from 25 to 31 minutes (see Figure 5). Overall, these commuting patterns reflect the fact that the study area serves as the location for many homes, but for substantially fewer employers. With such a large commuting population and further development forecast in the area, it will be very important to maintain major mobility carriers at relatively uncongested levels.

Of the 3,239 primary jobs in the study area, 21.6 percent are held by people aged 29 or younger, 57 percent by people aged 30 to 54, and 21.4 percent by people aged 55 or older. The most prevalent type of employment in the CSP study area is educational services, which accounts for 20.7 percent of all jobs.

Other major job sectors include health care and social assistance (11

The most prevalent type of employment in the CSP study area is educational services, which accounts for 20.7 percent of all jobs.

percent), retail trade (10.7 percent), construction (9.6 percent), and accommodation and food service (8.9 percent). Agriculture, Forestry, Fishing, and Hunting, historically the leading employment sector in Pender County, now only accounts for 6.2 percent of all jobs.

Future Growth

According to the North Carolina Office of State Budget and Management, Pender County as a whole is projected to grow by 11,201 people between 2010 and 2020, roughly a 22 percent increase. The rate of growth continues the existing trend in Pender County between 2010 and 2014, a period which experienced growth in excess of 5.8 percent overall. Looking further into the future, Pender County is forecast to grow by a further 18 percent between 2020 and 2030.

As the County is growing at a rapid rate, much of the projected growth is likely to fall in areas of Pender County close to the Atlantic coastline and in proximity to existing community nodes and metropolitan areas. The CSP study area will likely see a substantial population boost as the Wilmington metropolitan area continues to expand, while Jacksonville and area military bases will also continue to spur growth in this area. Residential growth will also likely continue along the major highways in the study area. These

areas are particularly ripe for development due to the appeal of a rural living with quick access to Wilmington on US Routes and Interstate 40.

In many cases, rapid land development can leave transportation planners with few options to improve the transportation networks in an area. Constructing new roads or widening existing roads after surrounding parcels have developed is often a controversial and costly process. With new development adding further pressure to the existing roadway network in the CSP study area, the need for a Collector Street Plan that prioritizes roadway investments, is based on community input, and focuses new roadway construction in areas away from sensitive natural features cannot be overstated.

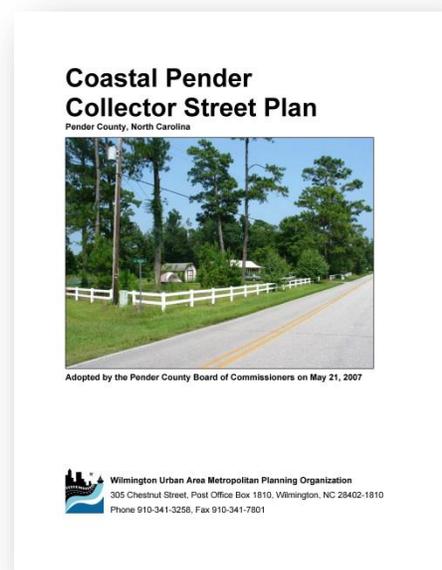
Previous Planning Efforts

The first step in the planning process was to gather existing planning documents. A number of plans were examined including;

- 2007 Coastal Pender Collector Street Plan,
- 2010 Pender County Comprehensive Parks and Recreation Master Plan,
- 2012 US 17/NC 210 Corridor Study,
- Cape Fear Transportation 2040 (Metropolitan Transportation Plan), and
- 2010 Pender County Comprehensive Land Use Plan.

2007 Coastal Pender Collector Street Plan

The Coastal Pender County Collector Street Plan is the guiding document for the planning of new collector streets within a small area of coastal Pender County. The plan expounds on the background, history, demographics, and future growth potential within the study area, while also detailing the previous plans and studies relating to collector streets. This plan created specific recommendations for new collector streets based on public outreach and also suggested implementation strategies.



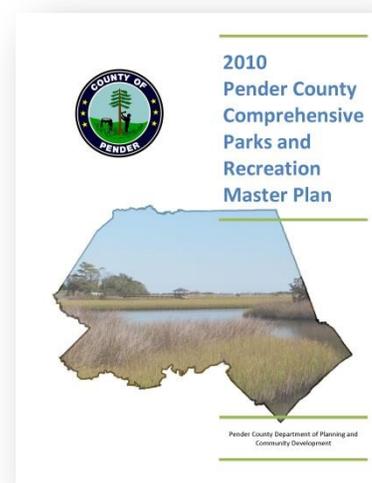
Relationship to the Pender County Collector Street Plan Project

This plan serves as a precursor to the current Pender County Collector Street Plan effort. The current planning effort encompasses the entire Wilmington Urban Area Metropolitan Planning Organization jurisdiction within Pender County, a much larger area than the area examined in the 2007 Coastal Pender Collector Street Plan. This larger area is the result of the WMPO designation as a Transportation Management Area, which expanded the WMPO's boundaries to encompass larger areas of Pender County. The 2007 Coastal Pender Collector Street Plan only addresses collector streets in a small area of north of the New Hanover County line focused on the Topsail Township and the community of Hampstead. This plan is bounded by the Holly Shelter Game Lands on the west and Sloop Point Loop Road in the north and represents a significant population node in Pender County.

The recommendations of this plan include a number of new collector streets as well as new arterials. While some collector streets are proposed in areas between US 17 and the Intracoastal Waterway to improve the current road network, the majority of recommended new collector roadways are located between US 17 and the study area boundary to the west due to land available for development in these areas. Some existing roads are extended to make new connections, such as Godfrey Creek Road, Holiday Drive, and Wolf Pond Road, while a large number of new collector roads are recommended in the areas between Island Creek Road and US 17. These recommendations will be re-evaluated as part of this planning effort and will serve as the basis for recommendations in the 2016 Pender County Collector Street Plan. However, the lack of an environmental analysis component in the 2007 Coastal Pender Collector Street plan requires that any recommendations from this plan be vetted extensively to ensure that construction is feasible before inclusion in the current planning effort.

2010 Pender County Comprehensive Parks and Recreation Master Plan

The 2010 Pender County Comprehensive Parks and Recreation Master Plan provides a framework for the development of future parks and recreation opportunities in Pender County and also catalogs existing facilities and supportive programs. A substantial public outreach effort was conducted as part of the Plan, which helped identify critical parks and recreation needs and provided insight into the desires of Pender County citizens with regard to recreation opportunities, particularly with respect to the provision of pedestrian and bicycle facilities. The Plan also recommended new park and recreation facilities and identified funding solutions while also addressing proposed bicycle and pedestrian facilities in Pender County.



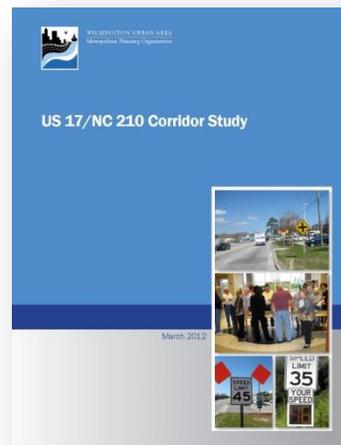
Relationship to the Pender County Collector Street Plan Project

This Plan recommends numerous parks and greenway facilities in the Pender County Collector Street Plan (CSP) Study Area. Two waterway access areas are proposed in the plan. The first water access, at the terminus of Lewis Road, has been completed and another in the Scotts Hill area has yet to be completed. Additionally, this plan recommends a number of new parks including the Scotts Hill Community Park in the Scotts Hill area, the Island Creek Neighborhood Park in the vicinity of the intersection of NC Highway 210 and Island Creek Road, and the Rocky Point Regional Park near the Heide Trask High School in Rocky Point just outside the CSP Study Area. Other possible parks include the Cape Fear Neighborhood Park near the Cape Fear Elementary School east of Rocky Point on NC-133, the Long Creek Community Park situated at the terminus of Montague Road at NC-210, and the Sand Ridge Neighborhood Park along US 421. The Sand Ridge Neighborhood Park would serve as a trailhead for the West Pender Rail-Trail. If implemented, these proposed new parks would be likely to generate pedestrian, bicycle, or vehicular traffic on mainline roads and may necessitate other access via new collector streets.

This Plan also identifies recommended bicycle and pedestrian projects in the Study Area. The proposed Coastal Pender Greenway would utilize the Duke Energy's easement, extending from NC-210 near Island Creek Road north to NC-210 near Surf City, ultimately connecting pedestrian and bicycle facilities in Surf City to facilities in New Hanover County. The Coastal Pender Rail-Trail, the Central Pender Rail-Trail, and the West Pender Rail-Trail are also recommended, the first along US 17, the second along the rail corridor parallel to US 117, and the third running parallel to US 421 as indicated in Figure 21.

2012 US 17/NC-210 Corridor Study

US 17 and NC-210 are both vital mobility carriers within the Pender County Collector Street Plan (CSP) study area. This study was convened to identify near-term strategies to address safety and mobility issues on US 17 and NC-210. Ultimately, the goal of this study was to address safety and mobility deficiencies on US 17 and NC-210 in Hampstead and identify strategies to reduce the rate of injuries and fatalities in traffic crashes, reduce delay, and improve the road for pedestrians and bicyclists. Both crashes and pedestrian and bicycle mobility are key issues on this corridor. In fact, a pedestrian facility is planned on US 17 between Washington Acres and Sloop Point Loop, which will support safe pedestrian travel along the corridor. Planning and environmental studies on US 17 resulting from this plan has been programmed in the State Transportation Improvement Program (U-5732 – Superstreet Conversion).



Relationship to the Pender County Collector Street Plan Project

As both US 17 and NC-210 are key roads within the CSP, the proposed improvements will have a tangible effect on traffic volumes as well as access management, including a reduction in left turn volume. It is possible that by reducing left turning movements on US 17, the demand for cross-access via collector streets will become even more important, particularly in the areas east of US 17. These proposed roadways are included in this plan as priority new collectors.

Cape Fear Transportation 2040

The Cape Fear Transportation 2040 plan, prepared by the WMPO, is the Metropolitan Transportation Plan for the Wilmington Urban Area. This plan is designed to present a fiscally-constrained vision of transportation projects within a twenty-year time horizon. This plan includes a substantial public outreach effort and addresses six areas of transportation; aviation, bicycle and pedestrian, ferry and water transportation, freight and rail, mass transportation, and roadways. A robust public involvement process provided the basis for many of the recommended projects and policies.

Relationship to the Pender County Collector Street Plan Project

This plan prioritizes improvements within the CSP study area and also provides some information about growth in the Pender County portion of the WMPO area. Notably, employment is forecast to grow substantially in area west of US 421, while population is forecast to grow across the entire CSP study area.

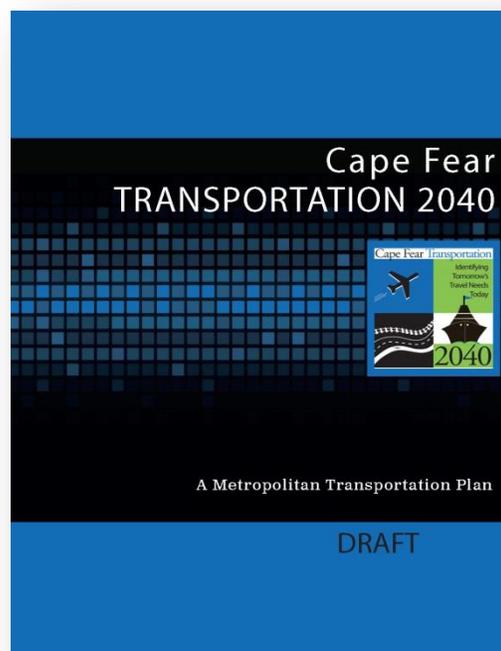
No ferry and water projects are identified in the Pender County area, while only one freight/rail project extends to the study area, namely a rail line extension from Invista to Pender Commerce Park, located along US 421 in the CSP study area (FR-6).

Three bicycle and pedestrian projects within the CSP study area are identified, including proposed sidewalks along Jenkins Road from US 17 to Saint Johns Church Road (BP-70), Saint Johns Church Road from Jenkins Road until it ends (BP-72), and Masters Lane from Doral Drive to Sloop Point Loop Road (BP-73). These improvements were included in this study.

Some mass transit improvements are forecast for the CSP study area, mostly in the form of Park and Ride locations, but also in the form of transit stop improvements in the Topsail Township. The Park and Ride locations are located at US 421 and Cowpen Landing Road (MT-128), and US17 at NC-210 in the shopping center parking lot (MT-39), and US 17 at Sidbury Road (MT-75). Transit stop improvements are located at US 17 at NC-210 (MT-18), US 117/NC-133 at Old Blossom Ferry Road (MT-120), and US 421 at Blueberry Road (MT-121). These improvements were examined as part of this study.

Major roadway improvements are also proposed as part of this plan. These improvements include a superstreet on US 17 between Washington Acres Road and Sloop Point Loop Road (R-12); improvements to NC-210 between Island Creek Road and US 17 (R-36); the Hampstead Bypass, which stretches from Porters Neck Road to Sloop Point Road (R-38); and intersection improvements at Country Club Drive/Doral Drive and Sloop Point Loop Road (R-39). Any roadway improvements should align with the proposed cross-sections as detailed in this plan.

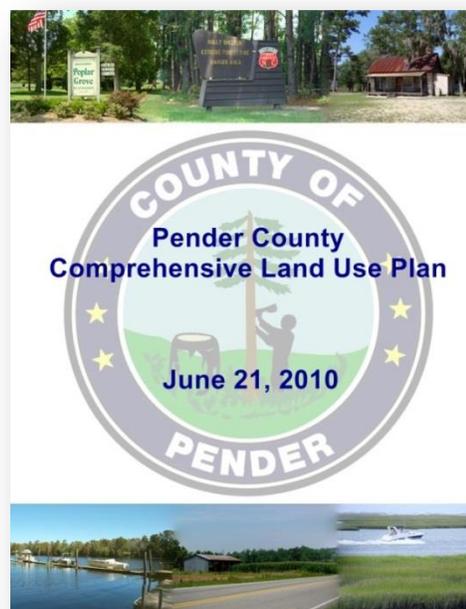
This plan also details information about environmental justice in the CSP area. There are substantial areas with low income populations and populations without access to vehicles in the CSP, mostly along the northern edge of the study area boundary.



2010 Pender County Comprehensive Land Use Plan

The 2010 Pender County Comprehensive Land Use Plan is the main planning document for land use planning in the County and provides guidance to support orderly growth and development. Over the course of the planning process, two main steps were realized by local planners and citizens. The first was to prepare a comprehensive land use planning document that sets goals and policies for the future, while the second was to update regulatory standards, procedures, and combine freestanding ordinances into a unified development ordinance. Overall, the planning process was designed to promote consensus among stakeholders to build broad support for established goals, provide the basis for development of design standards and regulations, and establish the need for coordination among County departments and with other units of government.

Conforming to ten key smart growth tenets, this plan advocates for a mix of land uses; compact building design; a range of housing choices and opportunities; walkable communities; distinctive and attractive communities with a strong sense of place; preserving open space, environmental areas, and farmland; strengthening development towards existing communities; providing a variety of transportation choices; making decisions fair, predictable, and cost effective; and encouraging collaboration from citizens and stakeholders. This plan addresses growth management, infrastructure, development patterns/community appearance, housing and community development, natural resources, historic and cultural preservation, parks and recreation, open space, waterway access, agricultural preservation, hazard mitigation, economic development, small area plans, and the procedures for amending the Comprehensive Plan. This plan also presents a series of important maps, most notably the future land use maps for different areas of the County.



Relationship to the Pender County Collector Street Plan Project

As the main document directing development in Pender County, the plan advocates for development around existing communities, the preservation of rural and agricultural lands, and the avoidance of areas subject to floods, wetlands, high winds, or wildfires. In addition, water and sewer should not be extended to areas designated as rural growth areas as identified in the 2010 Comprehensive Land Use Plan. Any proposed collector streets were vetted carefully in light of these recommendations. Also, this effort used zoning designations to help identify collector street spacing standards based on the level/density of planned future development. These standards are discussed in greater detail in subsequent sections.

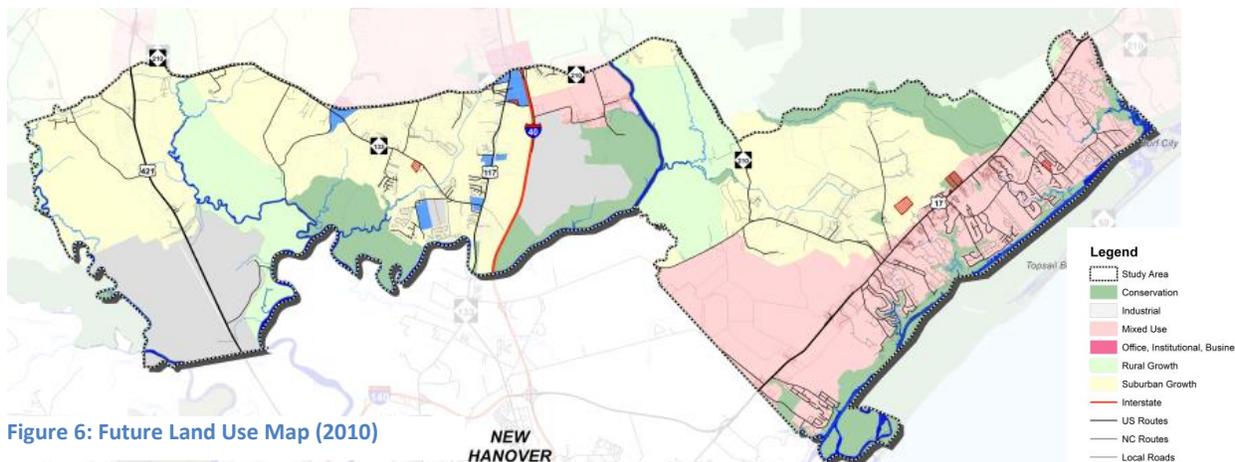


Figure 6: Future Land Use Map (2010)

The future land use map indicates that much of the area east of US 17 is classified as mixed use or conservation, while much of the remaining land in the CSP study area is slated for rural or suburban growth, with some areas reserved for conservation purposes, particularly close to the NE Cape Fear River. The land uses in three Small Area Plan geographies are also presented in this document. The Coastal Pender Small Area Plan is primarily noted as mixed use, though an area of suburban growth is indicated to the west of US 17, north of NC-210, and bounded by the Holly Shelter Game lands in the north. The Rocky Point Small Area Plan is centered approximately on the interchange of NC-210 and I-40 and US 117. Land uses are varied in this area, with industrial areas in the southeast, rural growth in the northeast, mixed use in the northwest, and suburban growth with some conservation areas in the southwest. The US 421 South Corridor Small Area Plan is a linear planning area running along US 421 north from the New Hanover County border. The southern portion of the planning area is consumed by a large industrial parcel, while the middle section is designated as a suburban growth area. Farther north, the area is slated to develop as a mixed use area. The future land use map is located in Figure 6.

Any proposed collector streets should support the land uses indicated in this plan. This plan is scheduled for an update in coming years.

Environmental Conditions

Pender County is also known as one of the few natural habitats for the Venus Fly Trap, which is found only in the Carolina Bay region within a seventy-five mile radius of Wilmington. Red Cockaded Woodpeckers are prevalent in this area as well. Pender County contains some notable conservation areas, including the southern portion of the Holly Shelter Game Lands, parts of the Cape Fear River Wetlands Game Lands, and areas of the North Carolina Coastal Land Trust Preserves.



Venus Fly Trap, Pender County:
Courtesy of the Pender County Public Library.

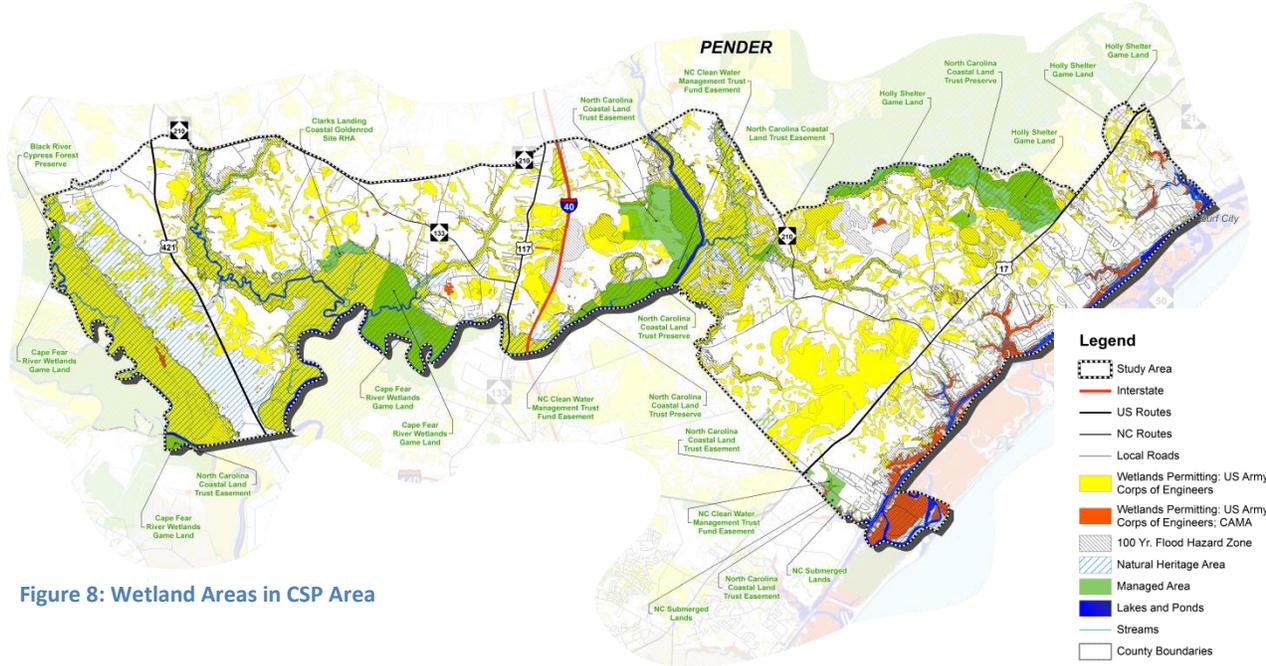


Figure 8: Wetland Areas in CSP Area

As a coastal county, Pender County has significant environmental features that have the potential to limit development. In particular, substantial parts of the County are covered by wetland areas. Though buildable in some cases, these areas often require United States Army Corps of Engineers (US ACE) permits and/or North Carolina Coastal Area Management Act (CAMA) impact permits, which can make development more complex and more time-consuming. These lands also support a diverse array of wildlife and serve other important functions including water filtration and flood protection. Appendix B indicates those wetlands that will likely not require permitting to develop, the wetlands which require a US ACE permit, and those that require both a US ACE and CAMA permit to develop, while 7 indicates the location of these areas within the study area. This map is also located in Appendix A, the map book for this document. Figure 8 indicates the percentage of the study area that requires permitting to build.

With population increasing substantially in Pender County, sensitive environmental areas are under increasing pressure from development; it is fundamentally important to protect, manage, and minimize impacts to important environmental areas to ensure that the natural legacy in Pender County is maintained for future generations.

Wetland Permitting Requirements

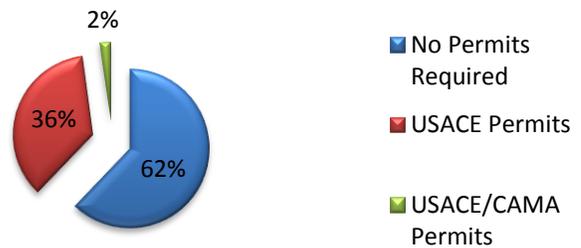


Figure 7: Wetland Permit Requirements

Additionally, irrespective of whether developable lands support uses that are rural or urban in character, Pender County residents expect clean water, while federal and State regulations mandate that land remain unpolluted and air quality is maintained at an acceptable level, as determined by North Carolina

standards. Meeting the twin goals of providing clean water and air and reducing pollution will require that sensitive natural areas be preserved from development, whether it is public or privately funded.

The careful examination of environmental permitting requirements and conservation areas indicates the challenge the County faces in constructing new collector street connections. In order to fulfill the County's commitment to preserving sensitive natural areas, collector streets must be developed in such a way as to avoid these areas or to mitigate the impact of new road construction to ensure that these connections are developed with the least environmental disturbance.

Existing Transportation Conditions

Arterial Streets

Referencing NCDOT Geographic Information Systems (GIS) data for Pender County, there are a number of roadways that fall into the category of arterial roads in the CSP

study area. Arterials are defined as roads that provide the highest level of service at the greatest speed for the longest uninterrupted distance, with some degree of access control. Essentially, the primary function of these roads is to support mobility between destinations. These roads provide less accessibility to nearby properties, though some arterials do support access to adjacent land uses. With regard to functional classification, these roadways fall between collector streets and interstates.

In the CSP study area, three US routes and two NC routes constitute the arterial system. One interstate, I-40, is also present in the study area running north-south. US 17, US 117, and US 421 all provide north-south access as well, while NC-210 provides east-west mobility across the study area

US 17

US 17 begins in Punta Gorda, Florida and snakes up the eastern coastline north to Winchester, Virginia. US 17 provides mobility in a north-south direction from Wilmington in the south towards Jacksonville in the north, running parallel to the Intracoastal Waterway. It is duplexed with NC-210 between Hampstead and Surf City and runs for 12.6 miles within the project study area. Beginning at Sidbury Road on the southern edge of the CSP study area and continuing as far north as Pearson Lane, US 17 is a four-lane divided full-access facility, configured by NCDOT as a "superstreet". The "superstreet" facility includes signalized left-turn facilities, U-turn crossovers, and bulb-outs to allow for tractor-trailer U-turn movements. Left-turning movements from driveways and cross-streets are mostly restricted, but are allowed at certain locations. North of Washington Acres Road, US 17 becomes a five-lane, undivided facility with a two-way, left-turn lane through Lodge Road, before the roadway reverts back to a four-



NCDOT Crews Prepare for a Tropical Storm, Flickr: NCDOTcommunications 2004.

lane, divided section with unrestricted median breaks at most major roadway cross-street intersections. There are currently 11 signals along US 17 in the CSP study area, of which three are signalized left turns and seven are fully signalized. These signalized left turns are located at Sidbury Road, at Scotts Hill Loop Road in the northbound direction only, and at a bulbout approximately 1/3 of a mile north of Scotts Hill Loop Road in the southbound direction only. The fully signalized intersections are located at NC-210/Dan Owen Drive, at Hoover Road, at the Bailey Shoppes commercial amenities approximately 2,000 feet north of the Hoover Road intersection, at Jenkins/Country Club Drive, at the Hampstead Town Center located approximately 1,400 feet north of Country Club Drive, at Vista Lane/Topsail Middle and High School access, and at Sloop Point Loop Road. One emergency traffic signal is in operation at the Hampstead Volunteer Fire Department.



US 17 in the Pender County Collector Street Plan Study Area

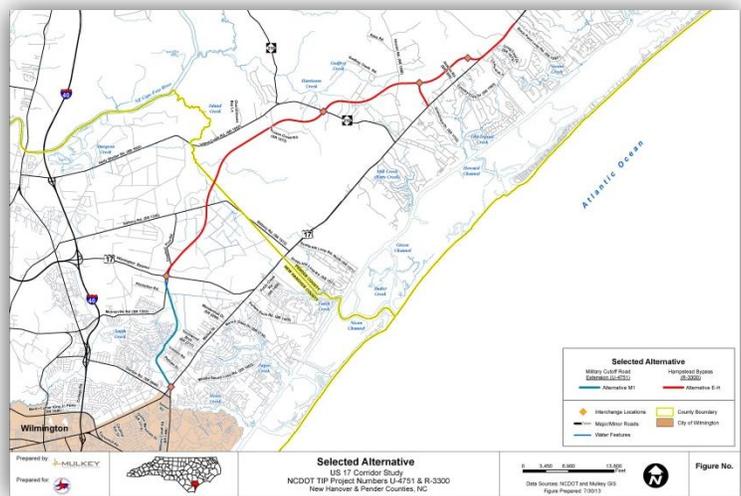
There is a funded STIP project to convert existing US 17 to a superstreet (U 5732), which will implement important access management upgrades along US 17 from Washington Acres Road to Sloop Point Loop Road, ultimately reducing traffic congestion in this area.

Running parallel and occasionally joining I-95, US 17 runs for 1,206.47 miles and has been in existence since 1926. Volumes along US 17 range from 38,000 vehicles per day (vpd) in the southern portion of the CSP study area to 36,000 vpd in Hampstead and 28,000 vpd leading to the split with NC-210 just north of the CSP study area boundary.

This roadway is also used as a primary hurricane evacuation route and serves the military between Camp Lejeune, the Port of Wilmington, and Military Ocean Terminal at Sunny Point.

[Hampstead Bypass \(R 3300\)](#)

The Hampstead Bypass was originally identified in the 1997 Thoroughfare Plan for Pender County as a proposed principal arterial, running parallel to US 17. Beginning just south of Sloop Point Loop Road and rejoining US 17 at Porters Neck



Proposed Hampstead Bypass Alignment

with the existing and planned portions of the I-140 bypass around the City of Wilmington. The Hampstead Bypass would provide higher speed controlled access around the unincorporated community of Hampstead. This roadway is recommended to improve not only traffic carrying capacity, but also to improve safety in this heavily traveled corridor.

The STIP identifies this project as R-3300. As of September 2015, the final environmental document for this project, the State Record of Decision (SROD) has been completed and indicates that the selected alternative is M1+E-H. This project is currently unfunded.

US 117

US 117 is a two-lane arterial road with occasional turn lanes that traverses the study area just to the west of I-40 in a north-south direction. Running from Wilmington to Wilson, US 117 runs for 114 miles and is contained completely within the state of North Carolina. Within the CSP study area, US 117 provides access to some adjacent land uses over its 5.38 mile span.

There are two signalized intersections along this portion of US 117, one at NC-133 and one at the intersection with NC-210. Some commercial development is present at the NC-210 and US 117 intersection. Volumes along US 117 ranged between 7,100 vpd south of NC-210 and 12,000 vpd north of NC-210 in the CSP study area.

US 421

US 421 is another north-south route through the CSP study area, passing through the western portion of the study area. As a spur route of US 21, US 421 traverses four states, Indiana, Kentucky, Virginia, and North Carolina, running for 941 miles from Wilmington, NC to Michigan City, Indiana. US 421 travels for 8.05 miles within the CSP study area, entirely as a four-lane divided facility with no signalized intersections along the portion within the study area. There is relatively little adjacent development along US 421 in this area. However, the Pender County Commerce Park is located along this corridor and is slated for future industrial development. A water facility and wastewater treatment plant and a seafood-processing plant are already located in the park. It is anticipated the Park will see additional development. A discontinued rail line also runs adjacent to US 421. Volumes along US 421 decrease as US 421 continues northward, with volumes of 4,300 vpd close to the New Hanover County line gradually decreasing to 4,900 vpd north of NC-210. However, US 421 does serve as an important freight route, accommodating significant volumes of truck traffic as well as mobility needs for freight and military to and from the Port at Morehead City.

NC-210

NC-210 serves east-west traffic along the north boundary of the CSP study area. Beginning at US 17 in the east, NC-210 runs for approximately 23.5 miles within the study area, not including the portion that is duplexed with US 17 running north between Hampstead and Surf City. The ultimate terminus is just east of Selma/Smithfield, while the



Typical Cross-Section on NC-210

terminus in the CSP study area is just shy of the intersection with US 421, commonly known as Johnson's Corner. NC-210 is a two-lane facility for the entirety of the portion in the study area and provides access from homes and subdivisions along the roadway to commercial amenities and other major arterials and highways. Some major agricultural holdings are present in the western portion of the study area along NC-210. The roadway crosses the NE Cape Fear River close to the interchange with I-40.

There are three signals along NC-210 in the CSP study area, located at the US 117 and NC-210, the interchange of I-40 and NC-210, and at NC-210 and US 17. In contrast to other routes in the study area which do not meander, NC-210 makes sharp turns along the route, most notably at the intersections with Island Creek Road and NC-133. Volumes along NC-210 vary between 1,900 vpd near US 421 and 7,800 vpd near Hampstead.

Interstate 40

I-40 is a major Interstate Highway that traverses the southern United States beginning in Wilmington and terminating in Barstow, California. Within the CSP study area, I-40 runs northward for 5.5 miles. As an Interstate facility it is controlled access, there are no signalized intersections, though there is one interchange, with NC-210, in the CSP study area. I-40, as an interstate facility, carries substantially more traffic than other roadways in the CSP study area, though not as much as US 17, at 24,000 vpd.

Existing Collector Streets

Collector streets are defined as streets that connect neighborhoods to the major arterial roads. These streets are typically two lanes, not more than two to three miles long, with speed limits between 35 and 45 mph, and lower volumes of traffic. The CSP study area is generally lacking in collector streets, though some streets that fit this criteria are in fact present, predominantly in the vicinity of the unincorporated community of Hampstead. Streets such as Sidbury Road, Scotts Hill Loop, Washington Acres Road, Factory Road, Hoover Road, Country Club Drive, Sloop Point Road, and Sloop Point Loop Road are emblematic of typical collector streets found in the CSP study area.

NC-133

NC-133 is the only NC Route designated as a collector street in the CSP study area. Linking US 117 and NC-210, NC-133 only runs for approximately 4.9 miles in the study area. With its genesis in Oak Island, NC-133 runs northward, eventually duplexing with US 117 before extending westward to its terminus at NC-210. NC-133 does include one signalized intersection in the CSP study area, at US 117. This roadway provides access for residences to major roads. Additionally, there are some agricultural lands only accessible via NC-133. Volumes along NC-133 equate to 9,100 vpd.

Local Streets

Local streets, as one would expect, are not used for long distance travel. Their primary function is to provide access to adjacent properties and they often include pedestrian amenities in the form of



Typical Local Street in the CSP Study Area

sidewalks within the right-of-way. Local streets also funnel traffic to the collector and arterial systems and form the basis of the functional classification system.

For the most part, local streets are designed to minimize through traffic. However, local streets will also often provide important connectivity to neighborhood land uses, particularly for non-motorized modes. In the CSP study area, there are a number of local roads. Many of these streets are maintained by NCDOT, which identifies these roads with a Secondary Route number, while some of the private roads are maintained by Homeowner’s Associations (HOAs). Pender County does not own or maintain any roadway facilities.

Functional Classification

The Wilmington Urban Area MPO member jurisdictions refer to the functional classification of roadways in their land development codes and regulations in an effort to better coordinate land use and transportation planning. The WMPO reviewed the federal functional classification of all roadway elements in the WMPO Planning Area Boundary following the decennial census and the organization’s

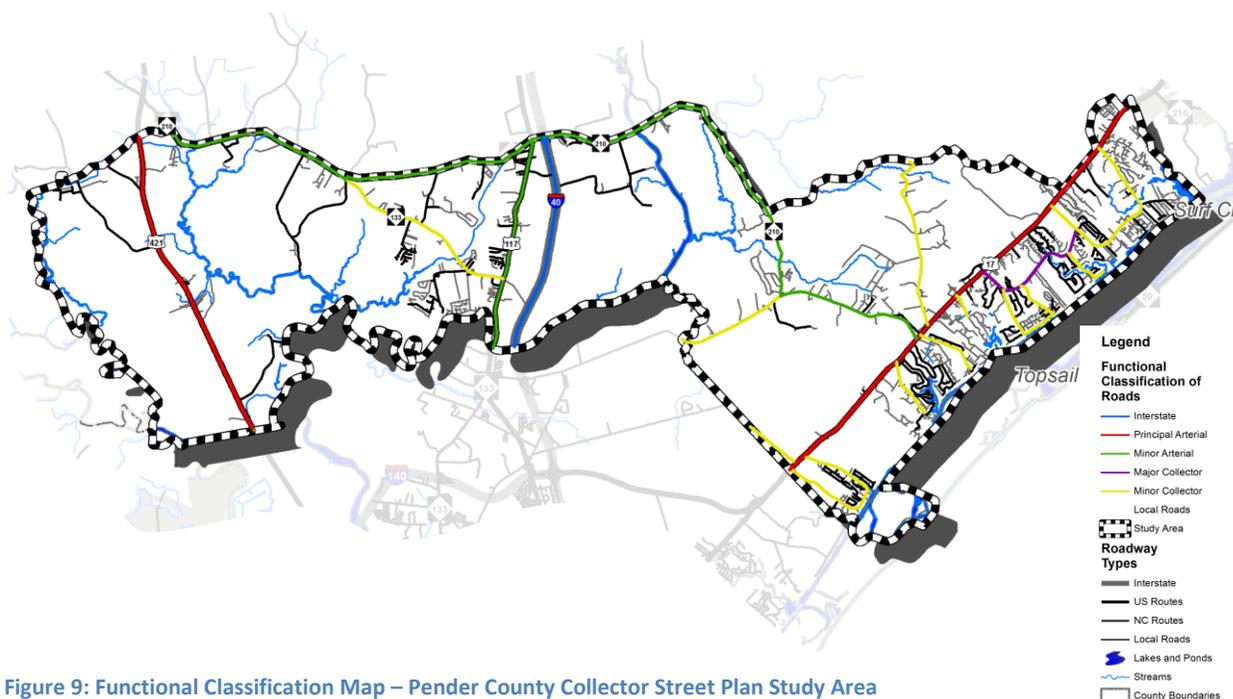


Figure 9: Functional Classification Map – Pender County Collector Street Plan Study Area

Transportation Advisory Committee proposed changes to the federal functional classification of WMPO Planning Area Boundary’s roadways. However, several of the proposed changes were not accepted by the NCDOT due to statewide constraints that were not directly related to the functional nature of existing conditions in the WMPO Planning Area Boundary roadway network. Therefore, the Transportation Advisory Committee adopted the “Wilmington Urban Area MPO’s Local Functional Classification Maps” for member jurisdictions to refer to for non-federal local planning purposes on August 26, 2015. Figure 9 details these roads within the CSP study area.

Pedestrian and Bicycle

Pedestrian and bicycle facilities are very limited in the CSP study area. There are isolated pockets of developer-built sidewalk present, most notably in the neighborhoods along Crown Pointe Drive, East and West Island View Drive, and in the Avendale neighborhood off of NC-210, but overall, only approximately 8 miles of sidewalk are currently built. However, new developments are adding sidewalks, as a recommendation of the 2007 Collector Street Plan. This accounts for roughly 4 percent of the total roadway mileage in the study area. There are no crosswalks or pedestrian signals at signalized intersections, though some off-road hiking and biking trails are present in the Holly Shelter Game Land. Further bicycle and pedestrian installations are currently programmed, including a Safe Routes to School and DA funded project, but have not yet been constructed.

In terms of bicycle facilities, there are no dedicated facilities in the CSP study area, though there is one bicycle route, the NC 3: Ports of Call route. NC 3 runs along the coastline from Norfolk, Virginia to North Myrtle Beach, South Carolina and passes along both the Pamlico and Albemarle Sounds. Within the CSP study area, NC 3, also known as the “Venus Flytrap” section, runs along Island Creek Road, NC-210, and north via US 17. Other pedestrian and bicycle facilities are programmed in the study area, including the Mountains-To-Sea Trail, the Coastal Pender Greenway, the Coastal Pender Rail Trail, the Central Pender Rail Trail, and the East Coast Greenway identified on the Bicycle and Pedestrian Facilities Map, located in the mapbook for this document. However, the exact alignments for these trails has not yet been determined. Additionally, Cape Fear Transportation 2040 (Metropolitan Transportation Plan) recommends three pedestrian and bicycle projects in the CSP study area, one along Jenkins Road from US 17 to St Johns Church Road and the other on Master Lane from Doral Drive to Sloop Point Loop Road.

Public Transportation

The Cape Fear Public Transportation Authority, which is also known as Wave Transit, provides a variety of public transportation options to residents of the Cape Fear region. However, no fixed transit routes penetrate the CSP study area. Transit service is offered to the CSP study area by the Pender Adult Services Transportation, allowing anyone to ride, though focused primarily on people aged 65 or older and individuals with disabilities. Service begins at the Cape Fear Community College North Campus and continues north on US 17 to the Topsail Senior Center, then doubles back and travels along NC-210 and

Venus Flytrap D-3

General Description
Leaving the populated area north of Wilmington, you will travel through a remote, wooded area for about 10 miles. As before, the terrain continues to be flat. Turning onto US 17, the “Ocean Highway”, you will parallel the coast for about 9 miles before turning east on NC 210, which will take you to Topsail Island. An 8 mile stretch along the shore gives you plenty of opportunity to stop and enjoy the beautiful sandy beaches. Leaving the coastfront once again, you will travel inland for a few miles to pick up another road which parallels the coast. Approximately 38 miles/61 kilometers.

Hazardous Areas
US 17, a major route through the area, has much more traffic than is desirable. This road is a three-lane facility, which creates the passing situation for motorists. 9 miles.
NC 210, along Topsail Island has a high volume of seasonal traffic during summer months, 8 miles.

Roadway Condition
The roads in this segment are in good condition. There is a paved shoulder along most of 1002 in New Hanover and Pender counties. US 17 is a three lane road.

Services
Services are limited from the beginning of the segment to the NC 210/US 17 intersection. Periodic stores and restaurants provide needed services along the remainder of the segment. There are a number of private campgrounds and motels along the route. There are no bicycle shops in this segment.

Points of Interest

- 1 Venus Flytrap
The Venus Flytrap is the most dramatic of all carnivorous plants. Spreading from its base are leaves three to six inches long, each of which broadens into a pair of kidney-shaped lobes. The leaf has six slender hairs, spaced so as to form a triangle on each lobe. Secretions inside the margin of the leaf act as a lure for insects. When an unfortunate bug touches the tip of the hairs, the trap springs shut. The plant squeezes its prey by not immediately pressing too tightly. Tiny insects can escape through the spaces between the long, stiff bristles at the outer edges of the lobes. These bristles form prison bars for prey large enough to constitute a worthwhile meal. After a few minutes, the lobes of the leaf slowly press more and more tightly together, killing the soft bodied insect. Digestion takes 5 to 10 days, after which the leaf opens again, ready to trap the next victim.
- 2 Sloop Point
Probably built between 1726 and 1731 by John Baptista Ashe, the house is possibly the earliest surviving house in this part of the state. Of particular interest is the “West Indian” type porch, common to the Carolinas, Deep South and West Indies. One chimney of this house is so large that it contains a door and a porch. This property, which is privately owned, is listed on the National Register of Historic Places.

Excerpt from the NC Bicycle Route Brochure. Courtesy of <http://www.ncdot.gov/travel/mappubs/bikemaps/>.

US 117 north to Burgaw and Wallace. As a deviated fixed route service, passengers can be picked up or dropped off within 15 miles of any of four fixed stop locations.

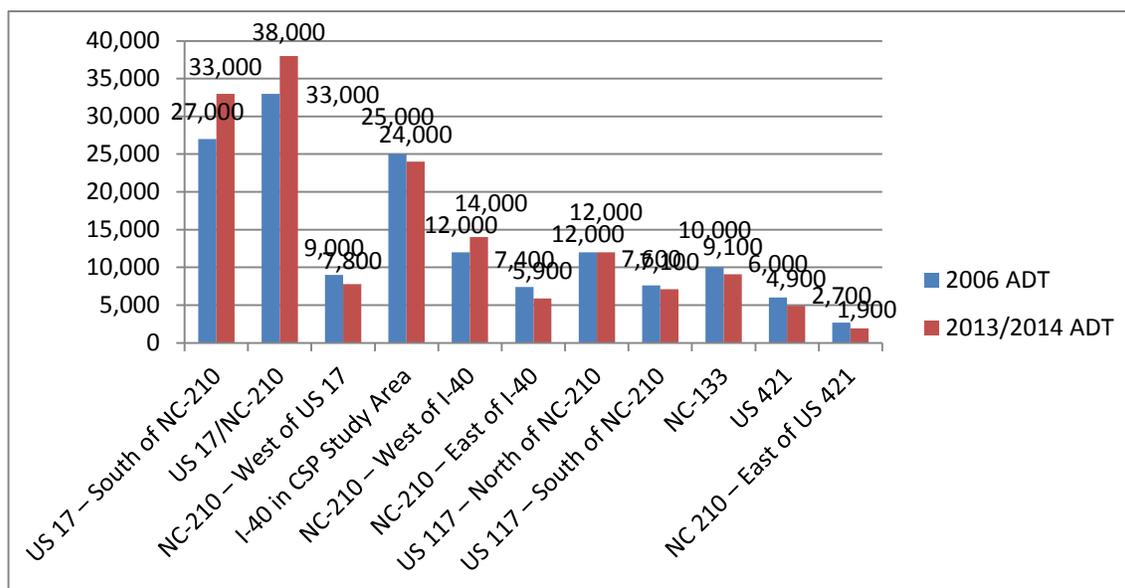
Cape Fear Transportation 2040 proposes three park and ride locations in the PC CSP study area, at US 17 and NC-210, US 17 and Sidbury Road, and US 421 and Cowpen Landing Road. These locations, designed to accommodate 8-20 parking spaces and serve people wishing to access vanpools and carpools, will be contain dedicated spots and signage. Additionally, Cape Fear Transportation 2040 calls for stop amenity upgrades at three locations, US 117/NC-133 at Old Blossom Ferry Road, US 421 at Blueberry Road, and US 17 at NC-210.

Traffic and Safety

The North Carolina Department of Transportation provides annual traffic counts for most streets within the CSP study area. Traffic counts represent a yearly average amount of traffic on that roadway segment and are collected annually for most interstates and NC routes and biannually for secondary routes. The following table (Table 1) provides further detail with regard to certain roadways in the CSP study area.

Table 1: Selected AADT Comparisons

Roadway Name	2006 ADT	2013/2014 ADT	Percent Change
US 17 – South of NC-210	27,000	33,000	22.2%
US 17/NC-210	33,000	38,000	15.2%
NC-210 – West of US 17	9,000	7,800	-13.3%
I-40 in CSP Study Area	25,000	24,000	-4.2%
NC-210 – West of I-40	12,000	14,000	16.7%
NC-210 – East of I-40	7,400	5,900	-20.2%
US 117 – North of NC-210	12,000	12,000	0%
US 117 – South of NC-210	7,600	7,100	-6.6%
NC-133	10,000	9,100	-9%
US 421	6,000	4,900	-18.3%
NC 210 – East of US 421	2,700	1,900	-29.6%



Judging from the changes in ADT between 2006 and counts conducted in 2013/2014, traffic has increased substantially on NC-210 and on US 17 and is reduced on roads within the study area west of I-40.

Indeed, even I-40 has a lower ADT, though not by a substantial amount. This is

likely due to the growth and development around the Topsail Township and further development between US 17 and the Intracoastal Waterway. As new subdivisions are constructed in that area and on undeveloped parcels along NC-210 between I-40 and US 17, traffic is likely to continue to increase.

Transportation improvements are also likely to focus on these areas. These AADTs may also reflect a difference in population and housing type in the Topsail Township area and with the planned developments in the Scotts Hill area.

In terms of safety, an analysis of crash types and severities was conducted for the entire CSP study area using crash data from the three year period between

It is also important to note that new developments are required to conduct a Traffic Impact Study for any new development forecast to generate more than 100 trips in the AM or PM peak hour.

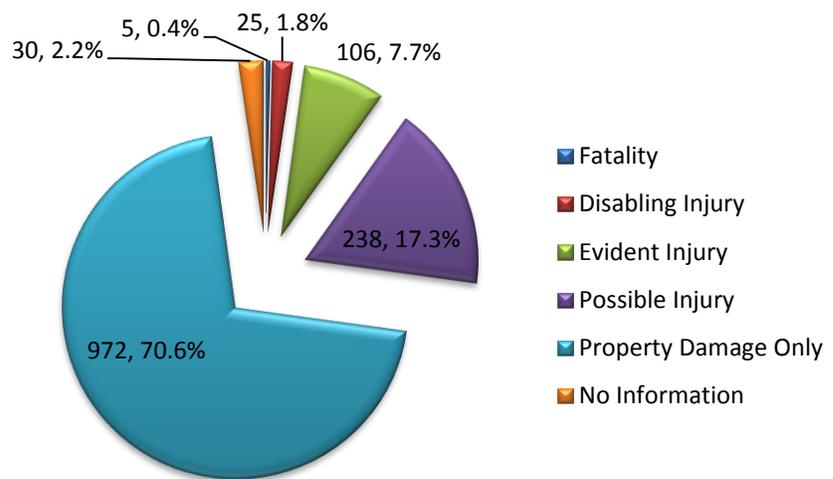


Figure 10: Crash Severities

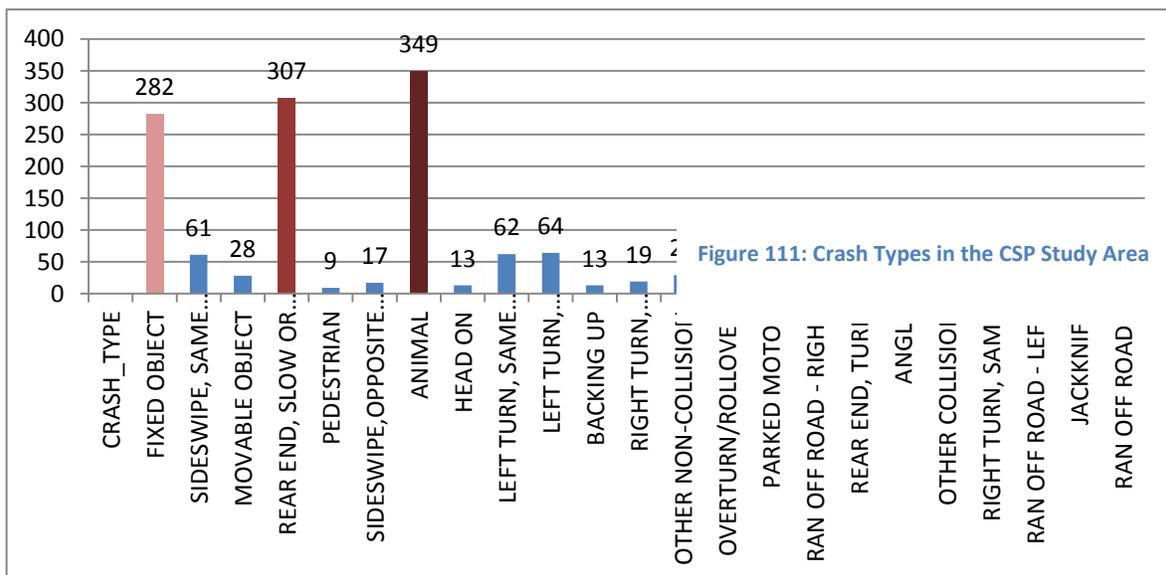


Figure 111: Crash Types in the CSP Study Area

2011 and 2013. Overall, 1,376 crashes occurred during that time, with 5 crashes (0.4%) resulting in a fatality. A further 25 crashes (1.8%) resulted in a disabling injury, while 106 crashes (7.7%) resulted in an evident injury, 238 crashes (17.3%) resulted in a possible injury, and 972 crashes (70.6%) resulted in property damage only. Figure 10 provides this information. There were 30 crashes (2.2%) with no severity information. The majority of crashes occurred during daylight conditions (61.2%), while 36.7% occurred during dark conditions on roadways without lighting. The remaining percent (3.5%) occurred either during dark conditions on roadways with lighting, at dusk, or at dawn. In terms of crash type, **Error! Reference source not found.** indicates that the most prevalent crash type was a collision with an animal (349, 25%), followed by Rear End, Slow or Stop (307, 22%) and Fixed Object (282, 20%).

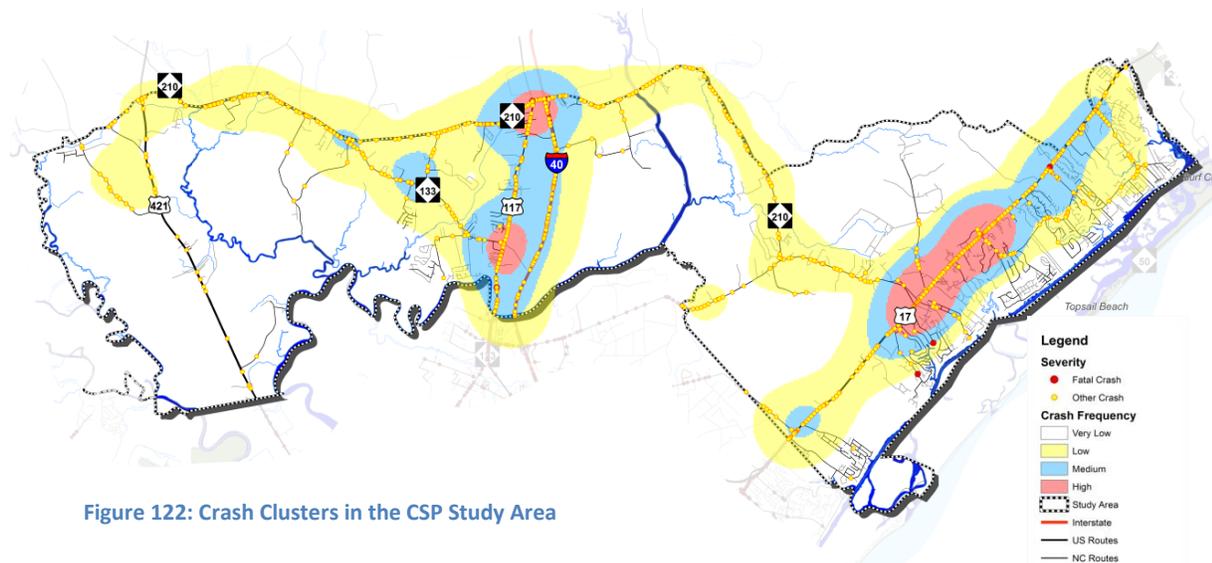


Figure 122: Crash Clusters in the CSP Study Area

In terms of crash location, crashes occurred across the study area, but were most concentrated along US 17, at the interchanges at I-40 and US 117, and at the

intersection of US 117 and NC-133. With the exception of the southern portion of US 421, all major US, NC, and Interstate routes experienced higher concentrations of crashes than other roads. US 17, in particular, had the highest concentration of crashes, including two fatal crashes along the roadway. Figure provides further detail. With new signal timing projects occurring along US 17 and the proposed (but currently unfunded) implementation of the Hampstead Bypass, it is possible that there will be a reduction of crashes in this area as these projects will ultimately reduce traffic volumes on the roadway and streamline traffic flows through the corridor.

TIA Section

The 2007 Coastal Pender County Collector Street Plan and the current Pender County UDO (Unified Development Ordinance, revised December 2015) speaks to the requirements for a Traffic Impact Analysis (TIA) for various kinds of development types in Section 6.1 (for example). The emphasis on TIAs in the role of determining land use suitability and infrastructure needs for transportation is crucial: the TIA represents a concrete linkage between land use and transportation. The familiar, letter-based system for evaluating performance is based on vehicular delays, typically as they move through an

intersection. The amount of vehicular delay that is incurred goes up as more trips are added from new development, but delay can be reduced by redistributing traffic through a more-connected network or making other street improvements. An important part of that network is the construction of collector streets, which form a valuable second tier of streets that balance land accessibility with local mobility needs in a community.

Any new development that is anticipated to generate more than 100 trips in any hour of the day has to prepare and submit a detailed traffic impact analysis so that staff, decision-makers, and the interested public can review the anticipated traffic impacts. Projects that have an impact on the street network can also include mitigation efforts like changes in land use type/intensity or off-site improvements. These mitigation efforts are an important part of the development process, and help manage the negative consequences to valuable roadway capacity in places that are developing faster than publicly funded roadway projects can be built to handle the extra need. The policy section of this report describes some suggested changes and improvements to the TIA process and documentation, but it is the explicit intent of Pender County to continue to enforce the requirements for TIAs for every applicable development project going forward.

It is also important to note that new developments are required to conduct a Traffic Impact Study for any new development forecast to generate more than 100 trips in the AM or PM peak hour, as per the 2007 Coastal Pender County Collector Street Plan and the Unified Development Ordinance. It is Pender County’s intention to continue to enforce this measure.

Land Use/Zoning

The future land use map provides a bold vision for the CSP study area. Substantial portions of the study area are designated as mixed use and suburban growth, while rural growth and conservation areas account for proportionally less. Additionally, there is some industrial growth, mostly in the southern portion around US 421 and along the east side of I-40. **Error! Reference source not found.** indicates the proposed land uses by percent of the study area. The mixed use areas are predominantly located in the more developed areas along US 17, while suburban growth is concentrated near the Holly Shelter Game Land, just northwest of Hampstead, as well as in areas along the northern portion of US 421 and in areas west of I-40.

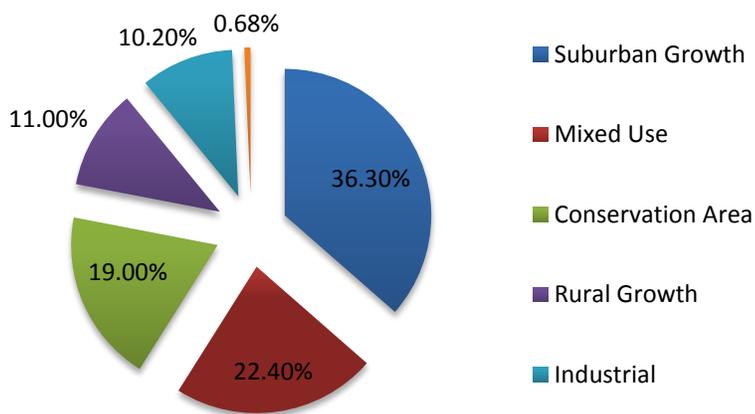


Figure 13: Future Land Uses (2010)

These land use categories are very important with regard to the development of a Collector Street Plan, though street spacing standards will be based on current zoning with some consideration of future land use. In terms of current zoning, the existing zoning map paints a vastly different picture of the CSP study area. Much of the area is dominated by Rural Agricultural, which accounts for 52.8 percent, while 22.5 percent is Residential and 10.8 percent is Planned Development. The remaining categories, such as General Industrial (6.6 percent), Environmental Conservation (5.3 percent), General Business (1.2 percent), Office and Institutional (0.6 percent), and Manufactured Housing Community (0.1 percent), all account for a total of 13.8 percent, a small portion of the study area. The existing zoning map (Figure 14) is included below.

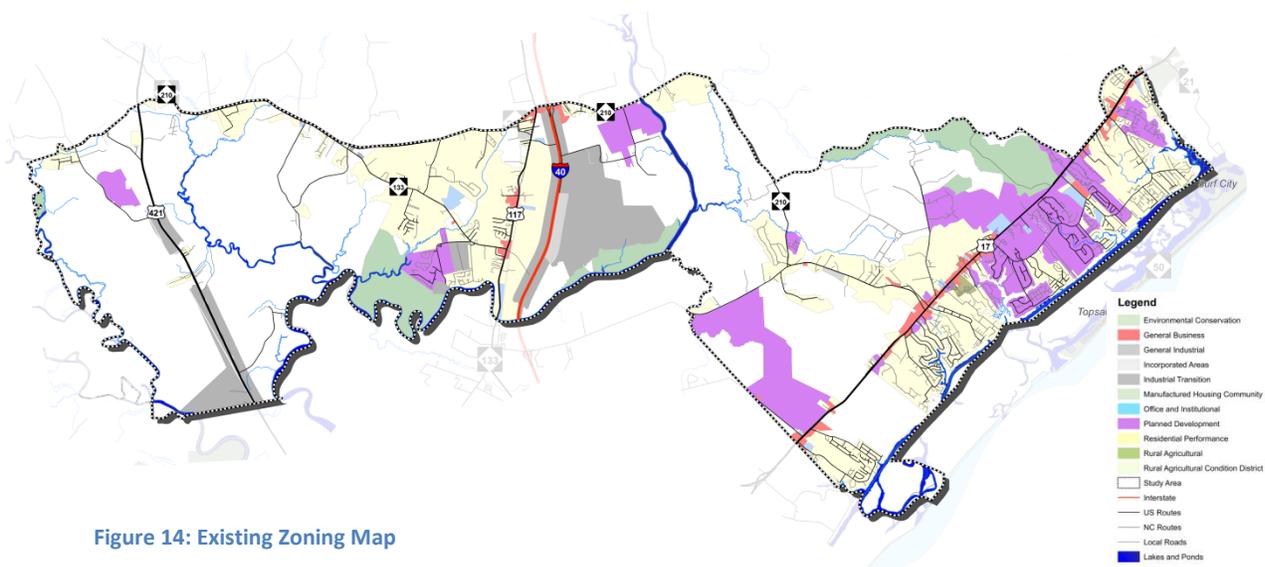


Figure 14: Existing Zoning Map

Public Input

Public outreach is vital to ensuring that a planning process reflects local wishes and desires and ultimately receives support from elected officials and the public. To ensure that public opinion played an important role in shaping this project, a Steering Committee was convened at the outset of this process. Over the course of this project, four Steering Committee meetings and two public outreach meetings were held. Pender County and WMPO staff also



Figure 14: Steering Committee Members at Work

presented to local officials and at public meetings.

Meeting Summaries

The Steering Committee was composed of seventeen members, including community members, elected and appointed officials as well as staff from the WMPO, Pender County, and NCDOT. The 17 Steering Committee members provided important oversight and input to the process of developing the preferred collector street scenario. Using paper maps and markers, Steering Committee members indicated areas on the map in need of greater connectivity and helped revise the collector street alignments. The Steering Committee also provided important feedback on the proposed roadway cross-sections and helped prioritize policy measures for inclusion in this plan. As a result of the

Steering Committee’s active participation in the project, key stakeholders were able to provide important input into this planning process. With their support, this Pender County Collector Street Plan will have broad buy-in from the public, multiple agencies, as well as, elected officials.

Public Outreach

Two public outreach meetings were held, one at the Heide Trask Senior High School in Rocky Point and the other at the Hampstead Annex in Hampstead. Attendees provided input on where collector streets are needed in the study area, where pedestrian and bicycle facilities are desired, and which cross-sections apply to specific collector streets. Additionally, Pender County Staff sent the survey and a link to the website to every church in the study area through the Postal Service to solicit feedback as well.

Survey

Another important method to reach people in the CSP study area was the paper and online survey. Disseminated through the project website



Figure 16: Public Outreach Meeting at Heide Trask Senior High School.

Pender County Collector Street Plan
PUBLIC MEETING: October 1, 2015

WE NEED YOUR FEEDBACK! The Pender County Collector Street Plan is underway and we want YOU to participate.

We cordially invite you to attend a **Public Outreach Meeting** for the Pender County Collector Street Plan. This is your community, so stop by to have a say in where roads are built and how the county plans for new roads around Hampstead and Rocky Point and along NC 210, NC 133, I-40, US-117, and US-421.

The meeting will be held at the Heide Trask High School Library on Thursday, October 1 at 5:30 PM. The exact address is 14328 NC HWY 210 in Rocky Point.

If you can't make it, take our **survey!** Just follow this link (<http://questionpro.com/AJ8I2SQED>) or scan the QR Code to access an online version. It won't take more than 15 minutes, we promise!

Pender County Collector Street Plan
PUBLIC MEETING - January 21, 2016

Concerned about CONGESTION?
Pender County continues to grow. As new development comes to the number of cars on major roads, such as US 17 in Hampstead, NC 210, US 421, and US 117 will continue to increase. How can the county reduce congestion on these roadways? What are some of the strategies to accommodate the increase in the number of cars on Pender County roads?

What about NEW DEVELOPMENT?
Development is forecast to occur across southern Pender County. How will development affect the transportation system? What are some of the important connections to and from new developments in Pender County?

COLLECTOR STREETS matter!
Collector streets provide crucial access between neighborhoods and major roads. This plan will determine where these important connections need to be made.

All of these questions, and others you didn't know you had, **WILL** be answered! Come to our meeting to find out more about collector streets planning in Pender County!

Attend our Meeting! Give your Feedback! Shape your Community!

Meeting Location: **HAMPSTEAD ANNEX** (15060 US Hwy 17, Hampstead, NC 28443) 5:00 – 7:00, Thursday, January 21, 2016

For more information, call or email:
Ashi Lopez: 251-341-7820, ash.lopez@hampsteadnc.gov
Allyson Phelan: 251-341-7811, allyson@hampsteadnc.gov

www.pendercollector.com

Hampstead Annex Location
15060 US Hwy 17
Hampstead, NC 28443

Figure 15: Flyers for the Public Meeting.

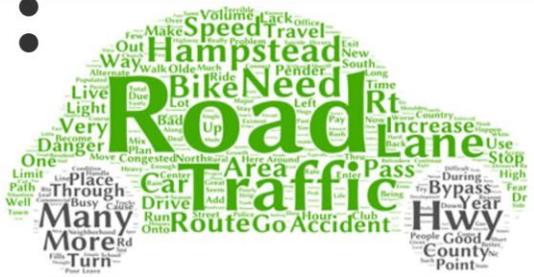
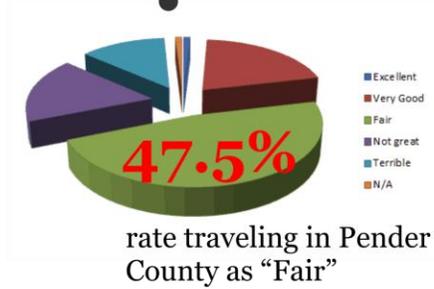
(www.pendercollector.com) and through advertising at meetings and community events, the survey consisted of 12 questions, asking general questions such as how long the respondent has lived in Pender County, how the experience of traveling in Pender County is, and work status. The survey also provided an open-ended question, soliciting feedback from respondents about their experiences traveling, by any mode, in Pender County. Some of the responses to this question and other information from the survey is provided in Figure 17.

Overall, with 112 people responding to the survey and the active participation of members of the Steering Committee, the public outreach component of this planning process solicited substantial feedback. The importance of local champions and ensuring ownership of planning efforts cannot be overstated. Ultimately, the numerous opportunities to provide input and emphasis on citizen and stakeholder collaboration led to the development of a community-supported plan.

Survey Summary

The most important features to include on collector streets are...

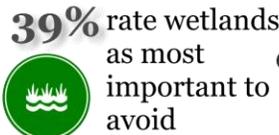
-  Lighting **25%**
-  Bike Lanes or Bikeways **24%**
-  Sidewalks **21%**



The most mentioned words in the survey.



7 out of 10 people are not concerned about the impact of collector streets, if they are well designed



80% think Hampstead is most in need of collector streets

27% think avoiding a problematic intersection is the most important.

Select Quotes

“

- Heavy traffic on US 17
- Motorists do not observe speed limits. Need that bypass around Hampstead!
- Middle lane is the problem!
- When an accident occurs there is no way to by-pass it as there are few if any roads around the accident.
- Trouble and danger entering and exiting US 17.
- No shoulders on two lane roads, ex. 210 west, no bike lanes, roads with more than 20 homes remain unpaved, "suicide" turning lanes.

”

Figure 17: Selected Survey Responses

Recommendations

As part of the process for recommending new collector streets for the CSP project, the project team undertook a number of steps to ensure that the proposed collector street network reflects existing



Bicycle parked outside of the Jade Garden restaurant in Rocky Point

conditions, land suitability, future proposed land uses, stakeholder input, ongoing roadway design projects, and other current planning processes. It was particularly important to ensure that the recommendations accommodate likely users of the facility. For instance, all collector streets should allow for the efficient movement of emergency vehicles, while only some collector streets will need to support larger vehicles, such as tractor trailer trucks or fire engines among others. It was also important to assess whether pedestrians and/or bicyclists should be accommodated and to what degree. A thorough understanding of these issues as well as how the collector street network supports connectivity between land uses was a crucial component of this planning effort. This section presents the recommended collector street connections.

Emergency/School Vehicles

It is important to note that all roadways, and particularly collector streets, will be designed to

accommodate the safe and convenient movement of emergency vehicles, including roll curb where appropriate. Additionally, every effort was made to create alignments conducive to easy and safe access by school buses.

Connectivity/VMT Reduction

Collector streets, while providing access to neighborhoods and facilitating access to the arterial network, also serve another important function, reducing need to access major corridors. With the provision of additional access points to neighborhoods, commercial centers, and schools, travelers will have additional options to access their local destinations. By allowing back access between land uses, people can reach their destinations without having to drive on major roadways.

Land Use Connectivity

Certain land uses (for instance major employment centers) generate substantial traffic at particular times of the day. Providing better access from residential neighborhoods to employment centers (especially to areas slated to develop as industrial centers) was an important consideration for this plan. There are large-scale industrial operations in the western portion of the study area; much of the collector street development in these areas is underpinned by the need to connect to industrial facilities or provide an alternate connection to reduce peak hour congestion. It is also important to provide alternative access from US 17, which has the highest population density.

Large Trip Generators

With local shopping amenities, numerous school facilities, and industrial areas in the CSP study area, it will also be important to provide access from arterial roads to these facilities. Hampstead itself is an important regional destination as well. Providing additional access to areas of high traffic is another important consideration in the development of the proposed collector street network.



School bus traffic on US 117

Spacing Standards

Spacing Standards were developed as part of a modeling exercise (conducted in 2011) to determine the ideal spacing needed for streets to maintain a Level-of-Service “D” on all roadways within a given study area. A Level-of-Service “D” constitutes acceptable conditions under which speed and freedom to maneuver are severely restricted, though traffic flow is still stable. A Level-of-Service “D” serves as a baseline in this instance. The details of the spacing standards are presented in Table 2 below. The parentheses indicate the zoning definition that corresponds to the land use intensity. The Access Function column refers to the amount of access that the collector street will provide. As land use intensity increases, there are more collector streets, allowing transportation network users to access specific areas via different routes, meaning that the access provided per collector street is lower than if the collector was the only street in a low intensity area. In the “lowest intensity” areas, each collector streets provides substantial access, more than if there were multiple collector streets nearby.

Table 2: Spacing Standards

Type of Collector Street (Zoning Designation)	Intensity	Access Function	Approximate Street Spacing
No Collector Streets (Environmental Conservation)	No Development	N/A	N/A
Lowest Intensity (Rural Agricultural)	Less than 2 Dwelling Units per Acre	Highest	3,000 to 6,000 feet apart
Medium Intensity (General Business, General Industrial, Industrial Transitional, Manufactured Housing Community, Residential Performance)	2 to 4 Dwelling Units per Acre	High	1,500 to 3,000 feet apart
High Intensity (Residential Mixed, Office Institutional, Planned Development)	More than 4 Dwelling Units per Acre	Medium	750 to 1,500 feet apart

Source: Stantec, Wake County TDM Modeling Analysis, 2011.

Each land use type is assigned an approximate street spacing based on the density and intensity of land use development; the proposed street spacing may not exactly correspond to the ideal spacing standard, based on the presence of natural or man-made features. Figure 19 provides further detail.

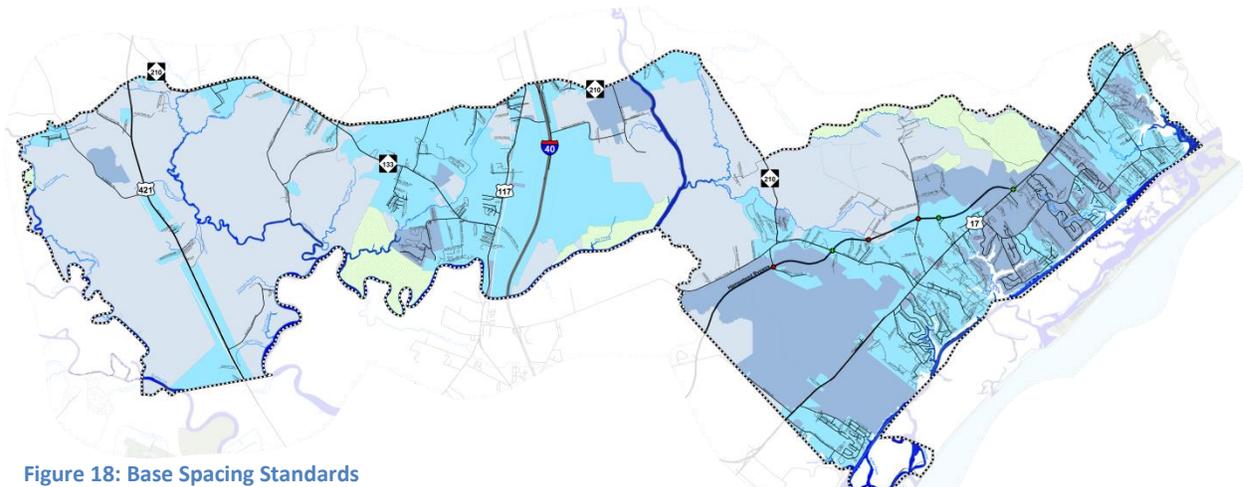


Figure 18: Base Spacing Standards



Soil Road and Paper Streets

“Soil roads,” existing unpaved roads in the CSP study area, and “paper streets,” platted connections that are identified as a future connection, were also considered as part of this process. If possible, an unpaved road was considered as a proposed collector street along the existing soil road. This will ultimately reduce the cost of constructing proposed collectors. In a similar vein, project planners endeavored to route collector streets through as few parcels as possible in order to mitigate right-of-way costs for parties responsible for implementing the design and construction of collector streets in the future.

Recommended Plan

With existing conditions in mind, a collector street scenario was created and refined for the CSP area. Pender County, WMPO, and the public commented on the proposed alignment, ultimately leading to a broadly accepted plan. Figure 20 provides more detail. Additionally, a pedestrian and bicycle facility map was also created as part of this planning effort. This map (Figure 21) indicates those existing signed bicycle routes, proposed multi-use trails, and collector streets designated as bike friendly connections. Discussion on Complete Streets Policies in the “text” of the plan



“Soil road” in the project study area



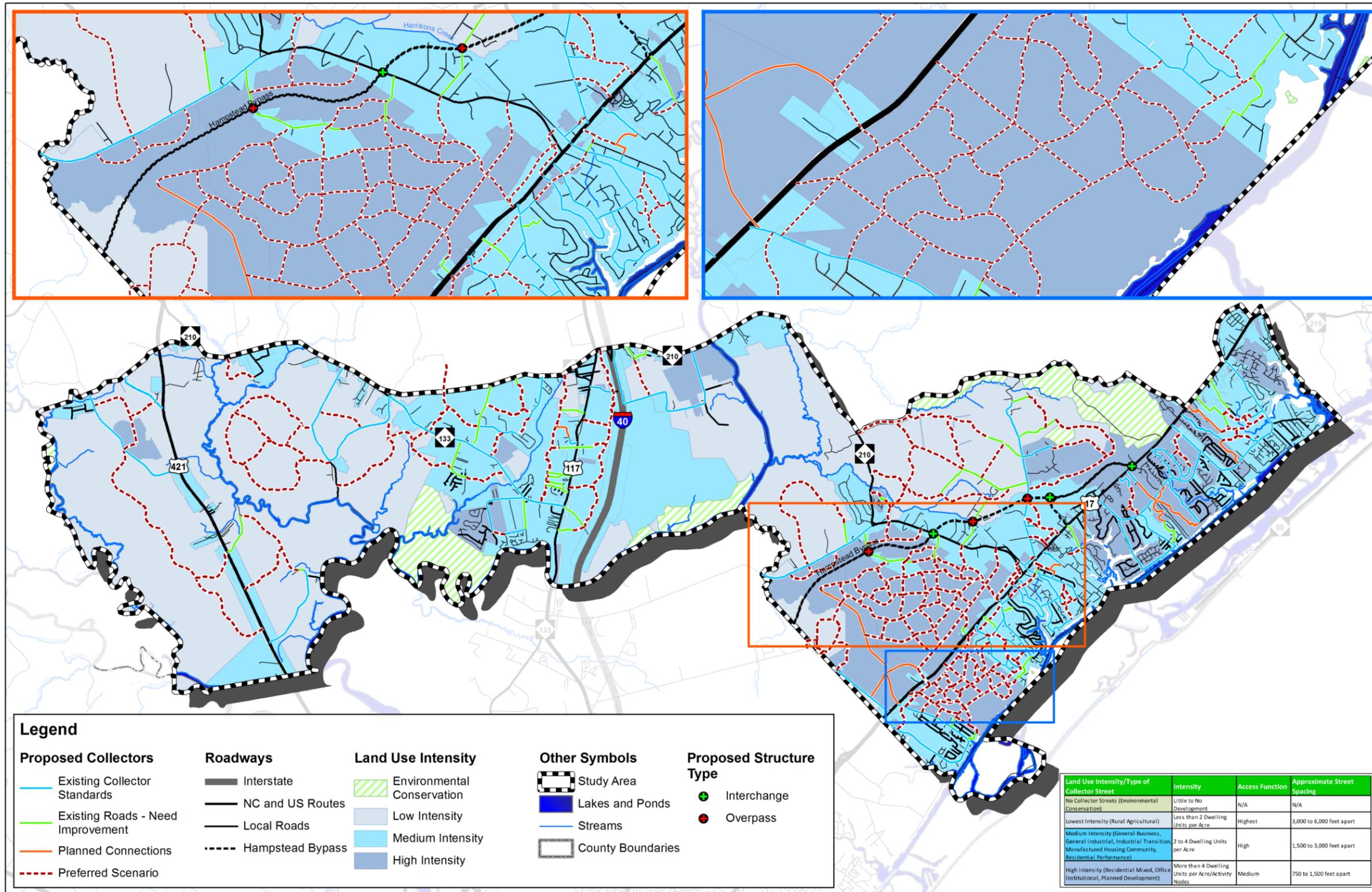


Figure 19: Preferred Collector Street Scenario

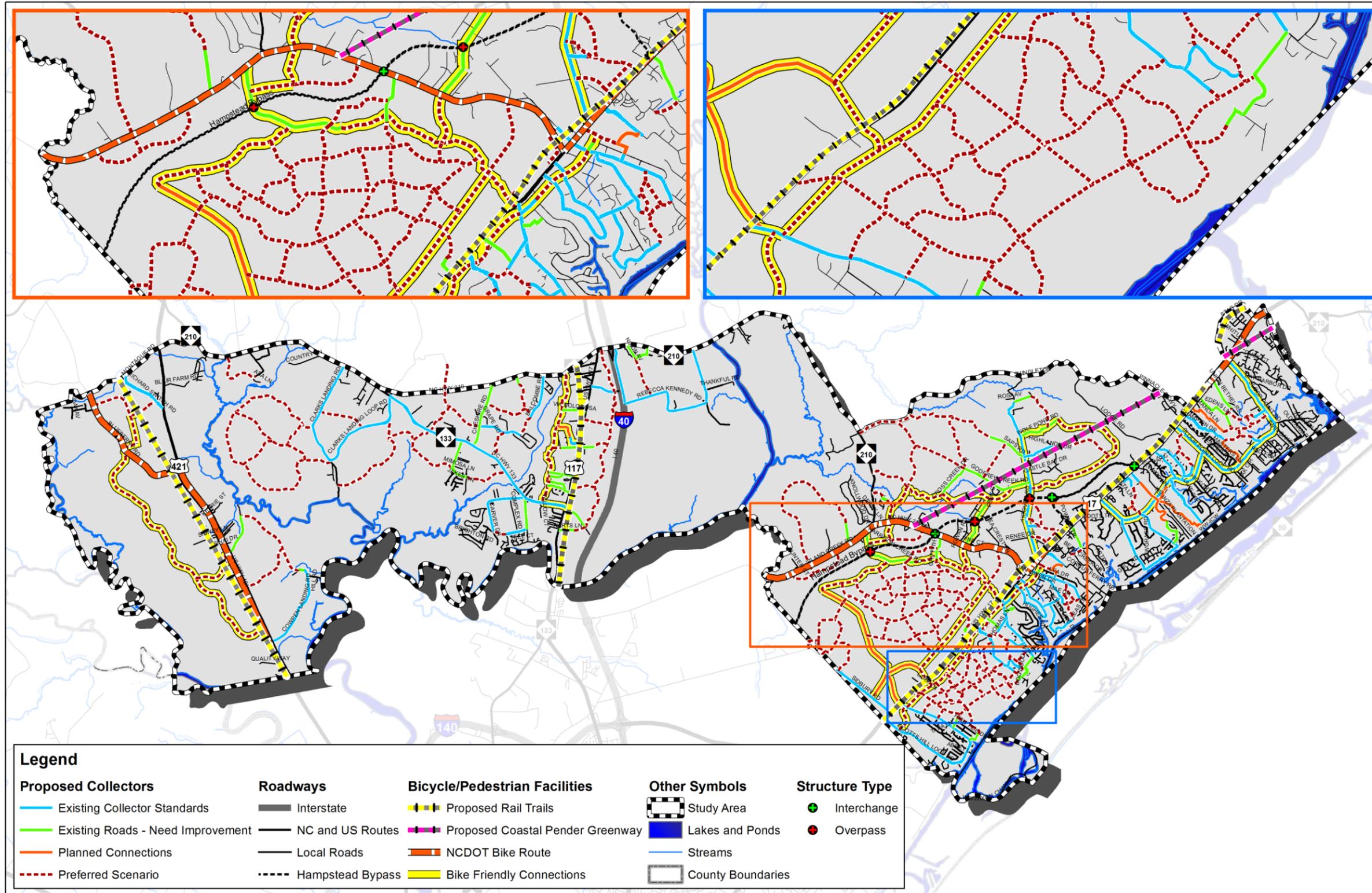


Figure 20: Proposed Pedestrian and Bicycle Facilities

Design Requirements

Cross-Sections

A series of cross-sections were developed as part of this plan, ranging from a rural cross-section (best suited to areas with sparse development) to a neighborhood cross-section (designed to accommodate automobiles, pedestrians, and bicyclists in a more densely populated area). These cross-sections are presented in the following figures and are color-coded to the collectors identified on the map. Each color does not represent one cross-section, in fact, an array of cross-sections are presented for each category for flexibility in design, while still maintaining Pender County's goals in terms of providing amenities for pedestrians and bicyclists. Each recommended cross section was designed based on the most current version of NCDOT's Complete Streets Policies. This was done to ensure that each road was built to NCDOT design standards.

Land Use Intensity

These categories are broadly linked to development intensity, which also served as the underlying information for creating the spacing standards used to program collector streets. While land use intensity can function as a determinant for the level of amenity provided for pedestrians and bicyclists, the presence of key County destinations, including schools and parks, may also necessitate the presence of a pedestrian and/or bicycle facility, regardless of land use intensity.

Cross-Section Categories

The following tables categorize the cross-sections developed as part of this plan. The requirements reflect the minimum cross-section allowed for each roadway designation. If the roadway is programmed to be constructed by a developer, they may increase the cross-section to any higher level designation, but must construct collector streets to the minimum standards, in accordance with NCDOT standards and to the specifications provided in the cross-sections. To avoid confusion, a sidewalk is defined as a recommended 5' facility, a bike lane as a recommended 5' facility, and a sidepath as a recommended 10' facility. A sidepath is the equivalent of a multi-use path for the purposes of this plan.

Figure 31 is color-coded to match a cross-section category, indicating which cross-sections categories apply to which proposed collector street. This allows flexibility in determining which cross-section is most appropriate for the context, while ensuring that pedestrian and bicycle amenities are in fact constructed as part of collector streets. It is important to keep in mind that the exact design of each of these cross-sections will ultimately be determined during the final design and platting process with input from NCDOT.

Group 1

Baseline	This facility will include: <ul style="list-style-type: none"> • two travel lanes and • a 2' to 4' shoulder.
Baseline with Bike Lanes	This facility will include: <ul style="list-style-type: none"> • two travel lanes and • two on-road bicycle lanes.
Baseline with Sidewalk	This facility will include: <ul style="list-style-type: none"> • two travel lanes and • a 2' to 4' shoulder and • sidewalks on one or two sides.

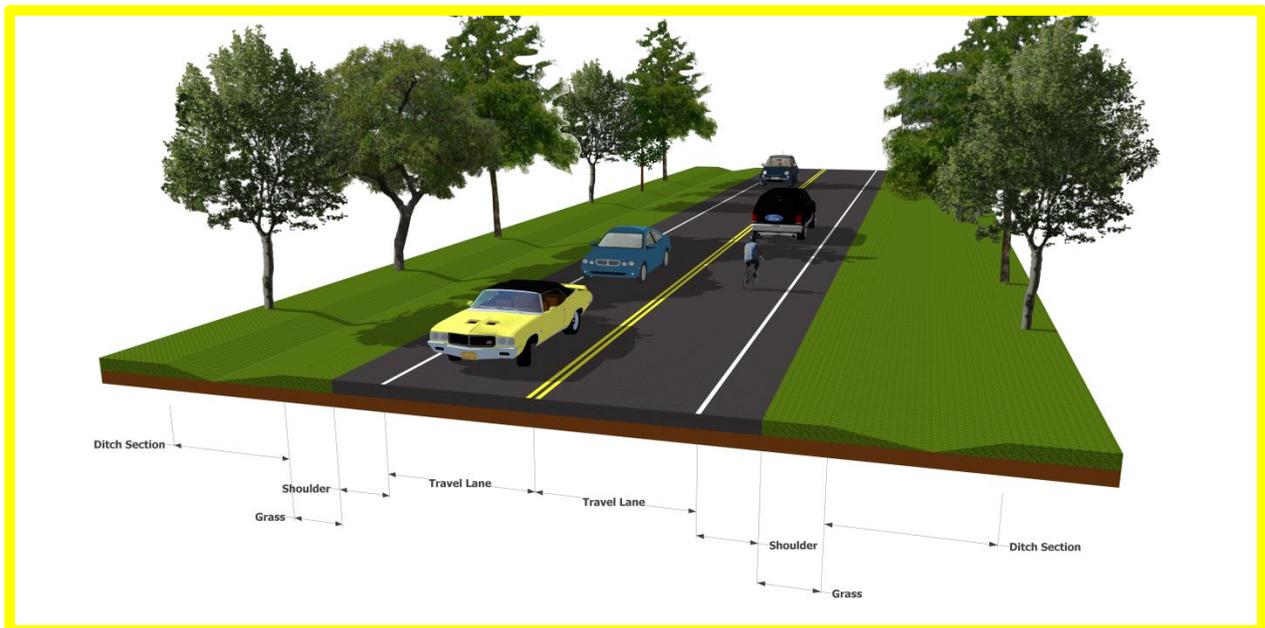


Figure 21: Baseline



Figure 22: Baseline with Bike Lanes



Figure 23: Baseline with Sidewalk (only required on one side)

Group 2

<p>Baseline with Sidewalk and Bike Lanes</p>	<p>This facility will include:</p> <ul style="list-style-type: none"> • two travel lanes, • two sidewalks, and • two on-road bicycle lanes.
<p>Baseline with Sidepath</p>	<p>This facility will include:</p> <ul style="list-style-type: none"> • two travel lanes and • one separated sidepath.

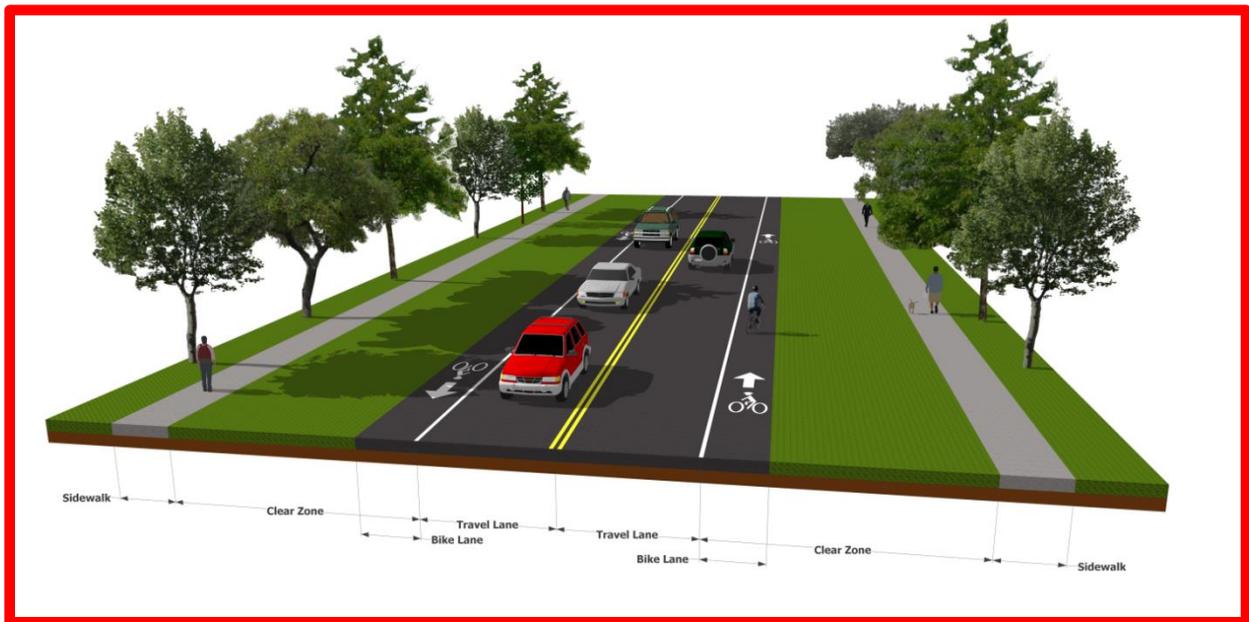


Figure 24: Baseline with Sidewalks and Bike Lanes

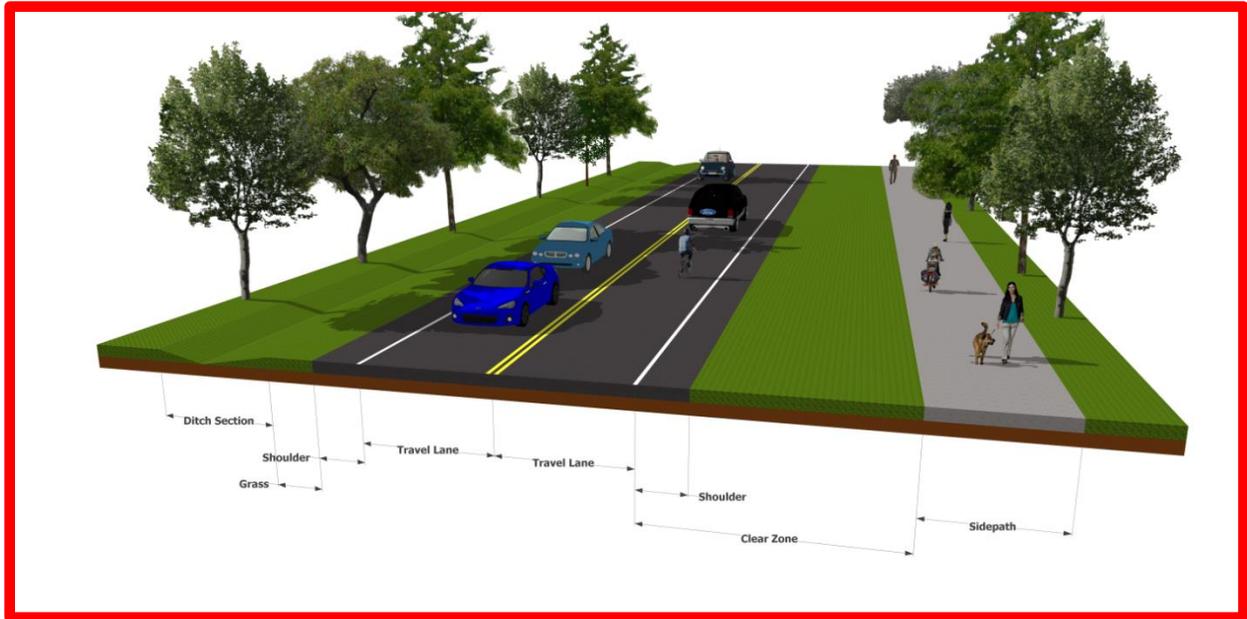


Figure 25: Baseline with Sidepath

Group 3

<p>Residential with Sidepath (one side) <u>or</u> Sidewalk (both sides)</p>	<p>This facility will include:</p> <ul style="list-style-type: none"> • two travel lanes and • either a sidepath on one side <u>or</u> • two sidewalks on both sides.
<p>Baseline with Sidepath</p>	<p>This facility will include:</p> <ul style="list-style-type: none"> • two travel lanes and • one separated sidepath.

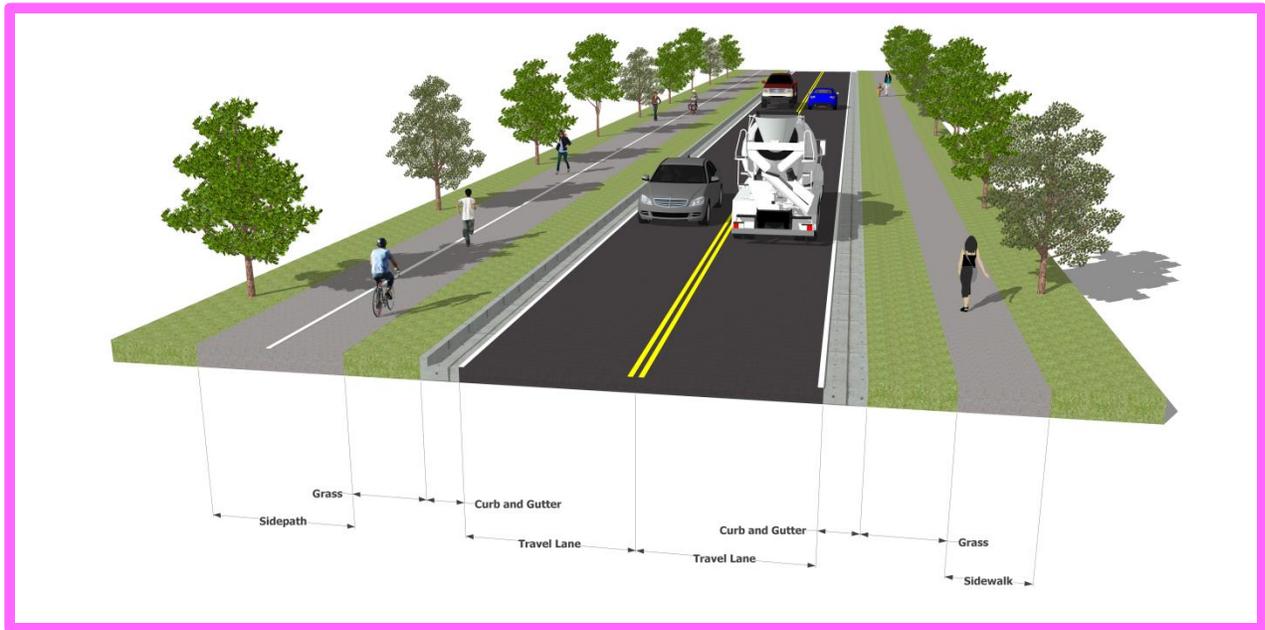


Figure 26: Residential with Sidepath (one side) or Sidewalks (both sides)

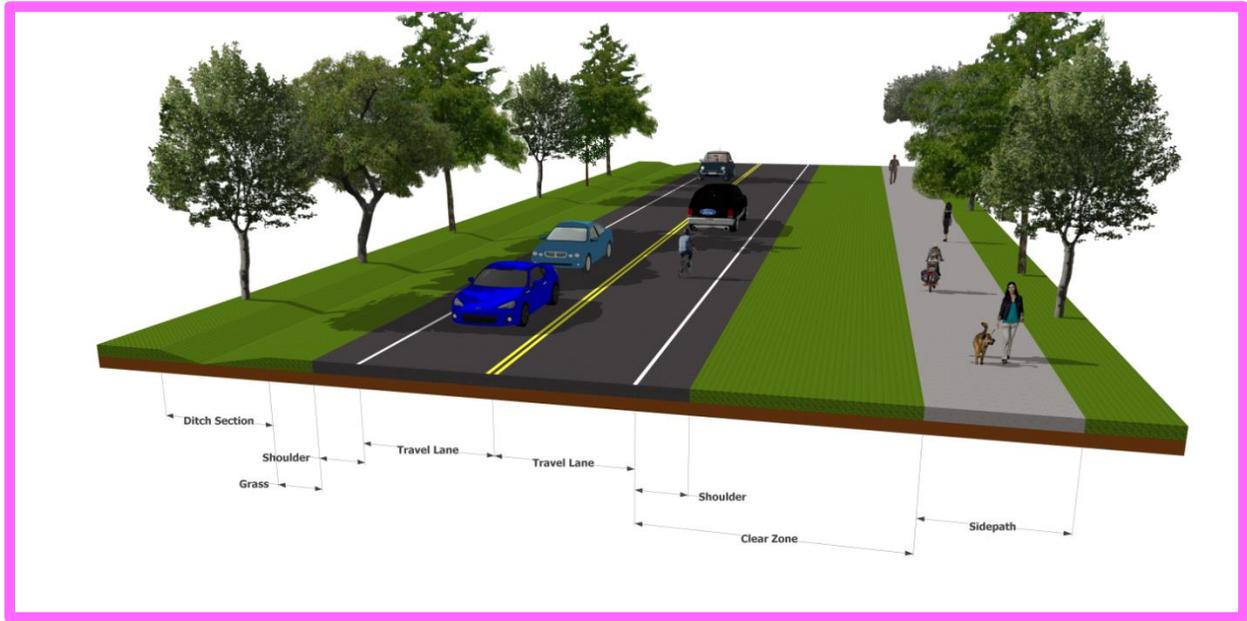


Figure 27: Baseline with Sidepath

Group 4

<p>Residential Median-Divided with Bike Lanes and Sidewalk (both sides)</p>	<p>This median-divided facility will include</p> <ul style="list-style-type: none"> • a planted median, • two travel lanes, • two bike lanes, • and sidewalks on both sides.
<p>Neighborhood with Bike Lanes and Sidewalks (both sides)</p>	<p>This facility will include:</p> <ul style="list-style-type: none"> • two travel lanes, • two bike lanes, • and two sidewalks.

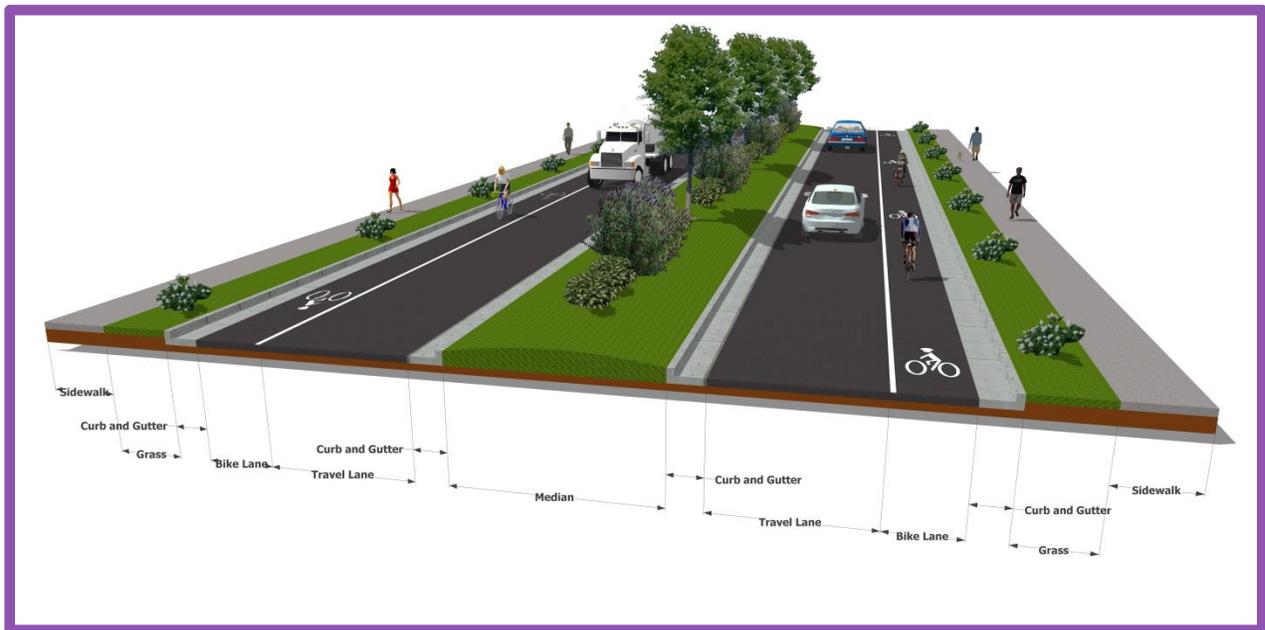


Figure 28: Residential Median-Divided with Bike Lanes and Sidewalks (both sides)

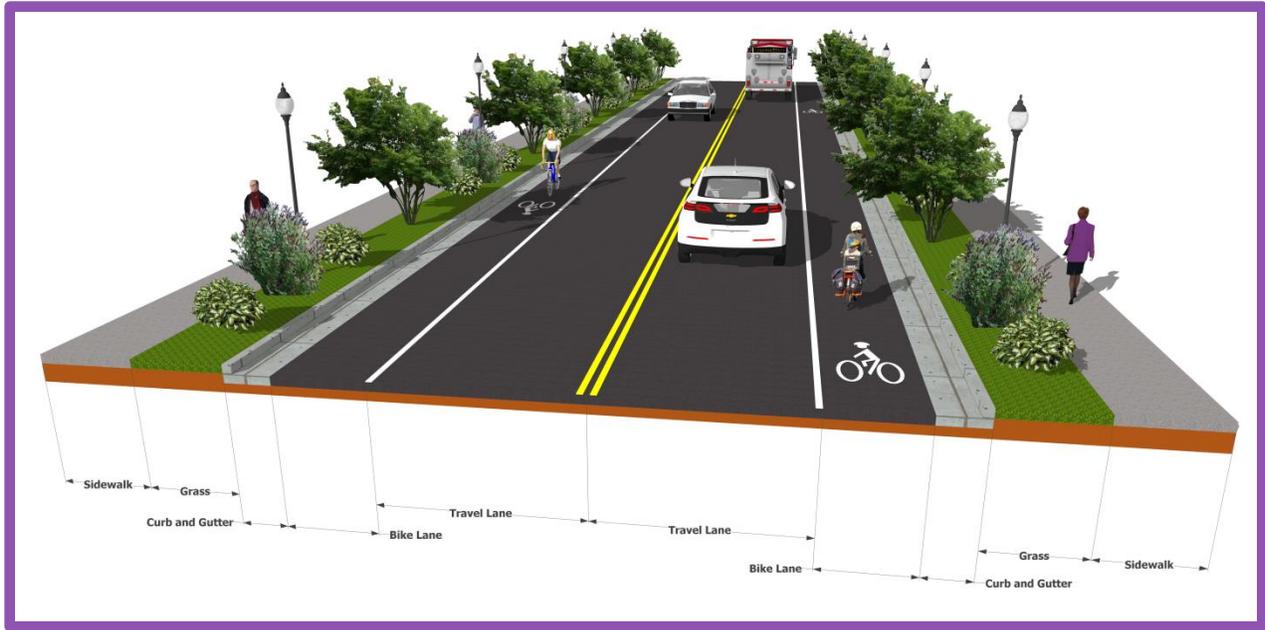


Figure 29: Neighborhood with Bike Lanes and Sidewalks (both sides)

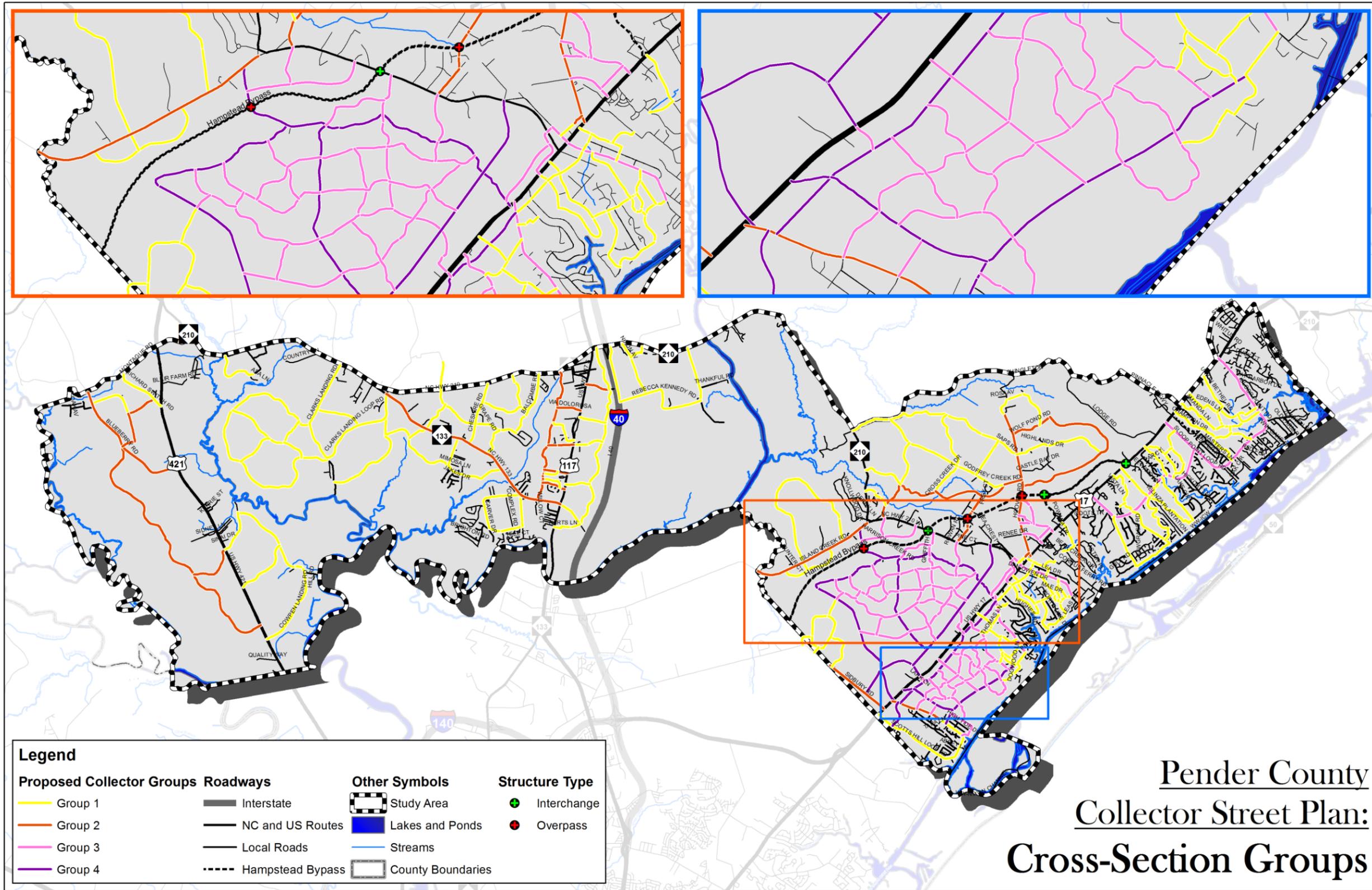


Figure 30: Proposed Cross-Sections

**Pender County
Collector Street Plan:
Cross-Section Groups**

Policy Strategies

Each of the following tables provides further information on the proposed policy measures for Pender County, as they relate to the Pender County Collector Street Plan. The policies in Table 3 through Table 8 were evaluated by the CSP Steering Committee as most important.

Table 3: Stormwater/Green Streets Policy Requirement

<p>Description/Purpose</p>	<p>Stormwater and Green Streets Policies can help ensure stormwater Best Management Practices (BMPs) are implemented, safeguarding precious natural resources, ensuring water quality, and preventing infrastructure maintenance issues. Both the North Carolina Department of Transportation and the North Carolina Department of Natural Resources provide guidance regarding stormwater BMPs. In Pender County, shellfish areas can be negatively affected as nutrient rich runoff from roads and other impervious surfaces enters streams, rivers, and wetlands. Safely treating stormwater runoff is important in terms of maintaining critical wildlife habitats and ensuring water quality for plant, animal, and human uses.</p>
<p>Target Performance Measure</p>	<p>Pender County will implement a community education campaign regarding the importance of stormwater mitigation; develop a stormwater management and maintenance plan; and explore the possibility of providing incentives to developers for providing stormwater BMPs which will enhance the standard level of treatment. Incentives could include reducing required widths for lanes, sidepaths, or ROW; alternative materials for bike/ped facilities such as pervious pavements; and density credits for developments. All provisions should be developed and articulated in a Stormwater Management Plan.</p>
<p>Sample Language / Recommendation</p>	<p>Stormwater BMPS and Green Streets Policies are essential in mitigating pollution and maintaining water quality, particularly in sensitive natural areas. Pender County is home to significant natural resources, which can be negatively impacted by stormwater runoff. To avoid this type environmental degradation, stormwater BMPS are recommended to be implemented as appropriate to local conditions.</p>
<p>Comments</p>	<p>The measure ensures a rigorous implementation of stormwater BMPs and establishes a regulatory framework to require stormwater BMPs where appropriate. Providing stormwater BMPs around critical surface waters and watershed areas can help mitigate water quality issues.</p>

Table 4: Street Spacing and Access Standards

Description/Purpose	This policy creates street spacing standards for collector streets to ensure adequate cross access between land uses.
Target Performance Measure	<p>The benefits of establishing a maximum distance between collector streets (or any “through” street that connects with the rest of the street network) include: traffic relief on major roadways, more even distribution of pass-by traffic, improving emergency response access / reliability, increasing bicycling / walking propensity in an area by shortening the distance between destinations, and creating efficiencies for public (and private) service vehicles to do their jobs in less time. Several of these benefits have the secondary promise of reducing mobile source pollution. When street spacing standards are established by local governments, they often vary considerably, but a reasonable balance between the costs of construction and the desire to achieve the benefits of a tighter-grained network is ¼-mile to ½-mile for collector streets. Local streets should connect to the collector streets together to form a hierarchy of streets that serve their intended uses. Regardless, it is much easier to create a street network as new development occurs rather than “retrofit” new street connections into existing neighborhoods that often feel like more connectivity introduces more problems than it solves. (reference: <i>Driveway and Street Intersection Spacing</i>, Transportation Research Circular No. 456, 1996; Levinson, Herbert, <i>Street Spacing and Scale</i>, TRB Circular E-C019: Urban Street Symposium; and various municipal codes including West Richland, WA; Fairborn, OH; and Fuquay-Varina, NC).</p>
Sample Language / Recommendation	<p>Any site plan or master development plan requiring the implementation of a collector street as defined by the adopted Pender County CSP or the WMPO non-federal classification shall meet minimum spacing standards as defined by the attached table. If modifications or waiver to the spacing standards are warranted for any reason, they must be based on objective criteria, including:</p> <ol style="list-style-type: none"> 1. The modification or waiver is necessary to eliminate impacts on existing drainage patterns or natural features such as riparian areas, significant trees or vegetation, or steep slopes. 2. An existing structure such as a substantial retaining wall makes widening a street or right-of-way or required placement of lines impractical or undesirable. 3. Street access to an existing lot would be eliminated without the waiver or modification. 4. Building on an existing lot would be infeasible without the waiver or modification. 5. The modification or waiver is needed to allow development of, or street access to, the property because of topographical constraints.

	<p>6. The existing infrastructure (a) does not meet current standards, (b) is and will remain functionally equivalent to current standards, and (c) there is little likelihood that current standards will be met in the area.</p> <p>7. The installation of the required improvements would likely cause unacceptable significant adverse environmental impacts and the waiver/modification would avoid such impacts.</p> <p>8. There is insufficient right-of-way to allow a full width street cross-section and additional right-of-way cannot be provided.</p> <p>9. There is no street or right-of-way adjacent to the property and easement access has been obtained across private property.</p> <p>10. Required street frontage improvements for individual single-family dwellings could best be accomplished by planned area-wide improvements at a future date.</p> <p>Maximization of the number of lots or parcels in a land division is not a reason to allow a waiver or modification.</p>																				
<p>Comments</p>	<p>Each land use type is assigned an approximate street spacing based on the density and intensity of land use development.</p>																				
<p>Notes</p>	<table border="1"> <thead> <tr> <th data-bbox="553 1020 857 1077">Type of Collector Street (Zoning Designation)</th> <th data-bbox="857 1020 1040 1077">Intensity</th> <th data-bbox="1040 1020 1198 1077">Access Function</th> <th data-bbox="1198 1020 1425 1077">Approximate Street Spacing</th> </tr> </thead> <tbody> <tr> <td data-bbox="553 1077 857 1125">No Collector Streets (Environmental Conservation)</td> <td data-bbox="857 1077 1040 1125">Little to No Development</td> <td data-bbox="1040 1077 1198 1125">N/A</td> <td data-bbox="1198 1077 1425 1125">N/A</td> </tr> <tr> <td data-bbox="553 1125 857 1173">Lowest Intensity (Rural Agricultural)</td> <td data-bbox="857 1125 1040 1173">Less than 2 Dwelling Units per Acre</td> <td data-bbox="1040 1125 1198 1173">Highest</td> <td data-bbox="1198 1125 1425 1173">3,000 to 6,000 feet apart</td> </tr> <tr> <td data-bbox="553 1173 857 1266">Medium Intensity (General Business, General Industrial, Industrial Transition, Manufactured Housing Community, Residential Performance)</td> <td data-bbox="857 1173 1040 1266">2 to 4 Dwelling Units per Acre</td> <td data-bbox="1040 1173 1198 1266">High</td> <td data-bbox="1198 1173 1425 1266">1,500 to 3,000 feet apart</td> </tr> <tr> <td data-bbox="553 1266 857 1333">High Intensity (Residential Mixed, Office Institutional, Planned Development)</td> <td data-bbox="857 1266 1040 1333">More than 4 Dwelling Units per Acre/Activity Nodes</td> <td data-bbox="1040 1266 1198 1333">Medium</td> <td data-bbox="1198 1266 1425 1333">750 to 1,500 feet apart</td> </tr> </tbody> </table>	Type of Collector Street (Zoning Designation)	Intensity	Access Function	Approximate Street Spacing	No Collector Streets (Environmental Conservation)	Little to No Development	N/A	N/A	Lowest Intensity (Rural Agricultural)	Less than 2 Dwelling Units per Acre	Highest	3,000 to 6,000 feet apart	Medium Intensity (General Business, General Industrial, Industrial Transition, Manufactured Housing Community, Residential Performance)	2 to 4 Dwelling Units per Acre	High	1,500 to 3,000 feet apart	High Intensity (Residential Mixed, Office Institutional, Planned Development)	More than 4 Dwelling Units per Acre/Activity Nodes	Medium	750 to 1,500 feet apart
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High Intensity (Residential Mixed, Office Institutional, Planned Development)	More than 4 Dwelling Units per Acre/Activity Nodes	Medium	750 to 1,500 feet apart																		

Table 5: Traffic Impact Studies Requirement

<p>Description/Purpose</p>	<p>NCDOT requires that Traffic Impact Studies be conducted for developments forecast to generate 3,000 vehicle trips per day (vpd). Pender County would require a lower threshold, 100 vehicle trips during the AM or PM peak hour or 1,000 vpd. This policy would help ensure that the arterial system in Pender County is not unduly burdened without providing alternative access.</p>
<p>Target Performance Measure</p>	<p>Require new developments forecasted to generate over 100 trips during the AM or PM Peak hour or 1,000 vpd to conduct a Traffic Impact Study.</p> <p>The TIA is a useful assessment tool that can have an expanded range and different levels of considerations to make it more suitable for use on collector streets. TIA reports are a critical part of the development review and approval process, as they are the primary tool for identifying the potential net effects from a development proposal. The standard “1,000” thresholds (per day) that trigger a TIA represent a significant fraction (8%-10%) of the total capacity of a collector street. A significant increase in traffic on a collector street can reduce functional integrity and public purpose. A traffic study should consider all modes of travel including cars, transit cyclists and pedestrians.</p>
<p>Sample Language / Recommendation</p>	<p>A Traffic Impact Analysis (TIA) shall be required if one of the following apply to a specific site plan: the development generates 1,000 vehicle trips per day or 100 vehicles in the AM or PM peak hour. This requirement applies to and counts for all phases of a proposed development. Other stipulations regarding internal capture, trip generation, trip distribution, and peak hour factors will be part of the basic requirements of the TIA. It is recommended to assess and quantify the cumulative impact to the roadway network and establish processes to address additional traffic created as a result of additional development.</p>
<p>Comments</p>	<p>With substantial development likely to occur in the CSP study area of Pender County in the next decades, establishing robust measures to ensure that back access is created to new developments is of paramount concern. Traffic is already heavy on US 17 and the provision of multiple developments without adequate cross-access to other roadways in the area will only worsen existing traffic issues. This measure is a requirement.</p>

Table 6: NCDOT Complete Streets Design Manual

Description/Purpose	The NCDOT Complete Streets Design Manual provides guidance on the design and construction of streets that accommodate all users of the transportation system, including bicyclists, pedestrians, transit users, and motorists. This policy would require implementing a Complete Streets approach in new street design and construction in areas where bicycle and pedestrian amenities are programmed in the adopted Pender County Collector Street Plan.
Target Performance Measure	Proposed collector streets should be designed to Complete Streets standards to accommodate pedestrians and bicyclists when these facilities are recommended in the adopted Pender County Collector Street Plan. It is recommended that providing incentives to developers be explored for building Complete Streets in certain cases. Incentives could include reducing required widths for lanes, sidepaths, or ROW; alternative materials for bike/ped facilities such as pervious pavements; use of curb and gutter (i.e., narrow width); utilizing multiuse path on one side of street; and density credits for developments. All provisions should be developed and articulated in a Stormwater Management Plan.
Sample Language / Recommendation	Proposed collector streets as defined by the Pender County Collector Street Plan (CSP) will adhere to the NCDOT Complete Streets Design Manual, including the design of multimodal facilities – i.e., proposed pedestrian and bicycle facilities must be designed and constructed to the applicable standard.
Comments	This measure is based on a stated desire from the public and other adopted plans in the County to include more pedestrian and bicycle amenities along roads in the CSP study area. Future construction of roadways (new or existing) should be constructed to the standards indicated in the NCDOT Complete Streets Design Manual and in the adopted Pender County Collector Street Plan on the collector roadways.
Notes	The information in this table is a requirement. Specific treatments must be implemented as they are programmed within the adopted Pender County Collector Street Plan.

Table 7: Environmental Conservation Policy

<p>Description/Purpose</p>	<p>Extending outward from the need to create interconnected populations (streets and greenways) and a reduced footprint from water quality/quantity impacts is the desire to create interconnected ecologies. This practice is called “landscape ecology,” a subset of conservation biology which requires the consideration of how green spaces can interconnect to provide habitat for species, green space for people, and preserve the rural character that is valued in Pender County. Large, protected areas like parks and preservation zones need to be connected with “stepping stone” areas that allow the movement of wildlife and promotion of biodiversity.</p> <p>It is recommended to develop a “Greenprint” that shows areas that would be preserved based on utility (or lack thereof) to private development; linkages to large, protected areas; and biologically diverse habitat (e.g., streams, older-growth forests).</p> <p>Future developments would incorporate these green areas into their plans as part of the requirements for open space; additional space provisions could be rewarded through clustering bonuses that allow a higher intensity of development elsewhere on the site.</p>
<p>Target Performance Measure</p>	<p>Avoid sensitive natural areas to the degree possible when programming new development or reserving road right-of-way.</p>
<p>Sample Language / Recommendation</p>	<p>In order to preserve the unique natural environment in Pender County, any new development that would require the construction of collector street as defined (alignment) by the Pender County CSP, would avoid or minimize impacts to sensitive natural areas, such as wetlands, floodplains, and areas with endangered flora/fauna. Additional justification (i.e., Corps Delineation, etc.) or other additional resource may be necessary as determined by planning staff.</p>
<p>Comments</p>	<p>In some cases, development will necessarily encroach into sensitive natural areas. Avoiding these areas is strongly recommended, though Pender County understands that it may not always be feasible or even desirable to do so.</p>

Table 8: Tri-Party Agreement

<p>Description/Purpose</p>	<p>The Tri-Party agreement is a framework for the construction and maintenance of new pedestrian and bicycle facilities along collector streets. While NCDOT would ultimately maintain the street, all maintenance and liability costs for the construction and maintenance of pedestrian and bicycle facilities would be borne by Pender County (or HOA) until the construction is complete. At that point, maintenance would be transferred to the Home Owner’s Association or other qualified party, absolving both the NCDOT and Pender County from any liability or maintenance relating to the pedestrian and bicycle amenity.</p>
<p>Target Performance Measure</p>	<p>Negotiate and implement the Tri-Party agreement with NCDOT. (See steps in Appendix F). Inform effected development community/Homeowner’s Associations that this agreement may be warranted for specific situations related to the implementation of bicycle or pedestrian facilities.</p>
<p>Sample Language / Recommendation</p>	<p>See Appendix F.</p>
<p>Comments</p>	<p>The Tri-Party Agreement is fundamental to constructing and maintaining pedestrian and bicycle amenities in the CSP study area. Implementing and abiding by this agreement would be a requirement in situations where bicycle and pedestrian agreements are planned to be constructed.</p>

Table 9: General Connectivity of Collector Roadways

<p>Description/Purpose</p>	<p>Connectivity requires that private entities coordinate across different properties to anticipate future, connections between adjacent properties. Providing connectivity to nearby amenities and to the arterial system is important to avoid congestion across the transportation system. This policy requires that new roadways be constructed to provide connections between the collector and arterials systems.</p> <p>As new development is programmed, this policy would require that collector roadways are not closed off, but are “stubbed out” to ensure that future roadway construction could tie back in to the public roadway network. Essentially, this policy stipulates that no collector street can dead end.</p>
<p>Target Performance Measure</p>	<p>Each new development needs to provide connections to another collector or arterial within the recommended spacing, or shall provide a signed stub-out to allow future connections as new development occurs. All practical connections must be included.</p> <p>No collector street should be disconnected without signage (i.e., Future Connection)</p>
<p>Sample Language / Recommendation</p>	<p>By definition, collector streets are not “dead-end” streets: they always connect to (1) adjacent land at a location that allows the continuation of the collector street onto the adjacent property; or (2) another collector street or another, higher-level (e.g., arterial) street.</p> <p>Furthermore, any new development or additions to existing developments such that the total number of dwelling units exceeds one hundred (100) shall be required to provide for vehicular access to at least two (2) public streets.</p> <p>However, in instances where the collector street cannot be constructed in its entirety a temporary turnaround at the end of the street</p> <ol style="list-style-type: none"> 1. The temporary turnaround shall be reviewed and approved by NCDOT. 2. Stub-outs shall be adequately signed at the time of final plat recordation, with an easement recorded to the adjacent parcel, and their existence shall be noted on all subdivision plats and deed documents. 3. Stub-out streets will connect to adjacent properties in such a way as to ensure that stream crossings, floodplains and other barriers are avoided to create the continuation of the street.



Comments	Collector streets should provide numerous points of access to the surrounding collector and arterial system. This policy would recommend that developments provide connections to ensure that Efforts should be made to connect to existing street stubs and streets rights-of-way.

Table 10: Bicycle and Pedestrian Accommodation

Description/Purpose	As Pender County develops, the demand for safe, comfortable bicycle and pedestrian facilities will continue to increase. By creating a policy that requires the accommodation of non-motorized users along collector streets, particularly in areas close to residential developments, schools, or parks, the network of facilities for pedestrians and bicyclists will become a high-quality amenity in the County. Beyond health and mobility related benefits, one additional advantage of accommodatins for bike/pedestrians is preservation of capacity along the roadways with reduced vehicular use. (active modes of transportation)
Target Performance Measure	Connect key destinations, including schools, parks, commercial centers, and residential developments with pedestrian and bicycle amenities.
Sample Language / Recommendation	All proposed collector streets, as defined by the Pender County CSP, shall have accommodations for bidirectional bicycle or pedestrian facilities. In the case of Group 1 collector streets, requirements for bicycle or pedestrian accommodations will be made in accordance with existing planning documents. Other bicycle and pedestrian accommodations will be considered if afforded by existing planning documents.
Comments	The inclusion of sidewalks/pedestrian paths/bikeways on all collector streets should be viewed as a minimum standard.

Table 11: Reduced Paper Streets

<p>Description/Purpose</p>	<p>A paper street is a “street shown on a recorded plan but never built on the ground” (Shapiro v. Burton, 23 Mass. App. Ct. 327, 328, 1987). These anticipated roads are shown in planning documents or on plats currently on record.</p> <p>This policy would require that platted right of way becomes built to NCDOT standards to ensure connectivity is implemented.</p>
<p>Target Performance Measure</p>	<p>Minimize the number of new paper streets and mileage.</p> <p>Encourage the construction of paper streets to the greatest extent possible; reduce the number and extent of paper streets.</p>
<p>Sample Language / Recommendation</p>	<p>All platted site plans must honor paper streets, reserving right-of-way and ensuring that streets can be constructed to NCDOT standards. Paper streets must be preserved until such time as they are constructed.</p>
<p>Comments</p>	<p>Proper ROW preservation/width is needed to ensure implementation of an adequate street system with the appropriate non-motorized facilities.</p>

Island Creek Road and NC-210

The intersection of Island Creek road and NC-210 poses a serious safety issue for motorists. Between January 1, 2011 and December 31, 2013, a total of 11 crashes occurred in the direct vicinity of this intersection. Five of the crashes correspond to the “angle” crash type, while four are defined as “rear end, slow or stop” type crashes. One “fixed object” and one “overturn/rollover” crash also occurred at



Figure 31: Proposed Infrastructure Changes

this location. In order to mitigate the crash issue at this location, the proposal is to modify the existing intersection and alignment as needed and potentially; close the cut-through to through traffic, essentially creating a cul-de-sac at this location, and adding a full signal only if warranted at the intersection of what is now Island Creek Road and Dallie Futch Road. In effect, NC -210 would continue onto Island Creek Road before turning right onto Dallie Futch Road before rejoining current NC-210 north of the cut-through. Figure 32 provides more information.

Funding

Collector streets are likely to be funded through a variety of sources. The development community may aid in constructing these facilities, while Pender County, the WMPO, and NCDOT may also

have a hand in creating new collector streets. What is certain is that finding alternative funding sources will help Pender County and its residents realize this plan quickly and begin to see the results of a more robust collector street network. A few likely funding sources are detailed as potential revenue sources.

Transportation Bonds

Local roadways are often not particularly high on NCDOT Division priority lists, especially in this new era of SPOT funding. With this in mind, strategic bond measures can prove instrumental in helping gather funds to construct needed local facilities. Pedestrian and bicycle facilities, in particular, may be good

candidates for local funding sources, though voters have approved bond measures for larger road construction in other communities, both large and small.

Impact Fees

Impact fees are another way that local governments can pay for needed infrastructure. Often used for water or wastewater service, police and fire protection, and schools, impact fees can also be levied to provide funding for new infrastructure. These fees place the burden on developers and remove the burden from local taxpayers, who are often forced to pay for sometimes expensive new public services that may not directly benefit them. While levying impact fees requires approval from the North Carolina General Assembly and is not a typical funding mechanism, these fees are something that Pender County could consider.

TIGER Grants

Short for Transportation Investment Generating Economic Recovery (TIGER), these grants provide discretionary funding for projects (rail, road, port, and transit) that will have a significant impact on the Nation, a metropolitan area, or a region. Now in the 8th round of grants, this could be a funding mechanism to fund a marquee project in the CSP study area.

Private Grants

Foundations and other private organizations will often provide infrastructure grants to communities. Depending on the specific grant, private money may be available, particularly to support the construction of pedestrian and bicycle facilities.

FAST Act Funding

The new Fixing America's Surface Transportation (FAST) Act could be another important funding source for Pender County. This 5-year, \$305 billion, transportation bill provides substantial funding for roads and bridges, public transportation, highway and motor vehicle safety, truck and bus safety, hazardous materials, railroads, and other provisions. Depending on the State of North Carolina chooses to allocate this funding, some may be available to counties to help construct important infrastructure projects.

Ultimately, it is our assumption that many of the collector streets in Pender County will be constructed by the development community and that the funding sources mentioned above can support collector street construction, but will likely not be primary sources of funding.

Action Plan

The following steps constitute important actions that can be undertaken to implement the recommendations of this Pender County Collector Street Plan. While other funding sources may become available, these actions present a clear way forward with the ultimate goal of achieving plan implementation within a reasonable timeframe.

Action	Responsible Party	Timing
Adopt Pender County Collector Street Plan	Pender County Commissioners	Spring 2016
Research and Apply for FAST Transportation Funding (in coordination with the WMPO)	WMPO, Pender County Planning and Community Development Department	Ongoing
Pursue Funding to Implement Collector Street Recommendations (local, state, private)	Pender County Planning and Community Development Department	Ongoing
Pursue Grants, including TIGER and SRTS, to implement marquee projects, pedestrian and bicycle facilities	WMPO, Pender County Planning and Community Development Department	Ongoing
Adopt Policy Measures into County Ordinances	Pender County Planning and Community Development Department	Spring 2017
Develop Bicycle and Pedestrian Plan to Reflect Collector Street Plan Recommendations	WMPO, Pender County Planning and Community Development Department	2018-2020

As the development community will build some of the collector streets, it is important to note that Pender County will do its utmost to implement this plan, but will not be funding collector street construction directly.

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