

DRAFT Pender County Bicycle & Pedestrian Plan

June 2023

Section 1: Existing Conditions

This section provides a summary of existing transportation plans, analyzes the demographic makeup of the study area, and identifies travel characteristics of the population.

Section 2: Network Assessment

This section provides a summary of public engagement activities, including results from the public survey, and steering committee meetings.

Section 3: Proposed Network and Priorities

This section provides the proposed network recommendations, including specific facility types, cross-sections, and high priority projects.

Section 4: Policy Review and Recommendations

This section provides a summary of existing policies that are relevant to bicycle and pedestrian facilities in the study area, as well as new recommended policies.

Section 5: Implementation

This section provides key steps toward implementing the recommendations identified in the plan, including funding opportunities and maintenance of facilities.

Existing Conditions

Existing plans were reviewed to determine locations where bicycle and pedestrian facilities had already been proposed. Demographic data was then analyzed for the study area to determine the demographic makeup and population characteristics. This data helped determine the areas of highest need for bicycle and pedestrian facilities.

Findings from Existing Plans

NC-210 East Coast Greenway Corridor Feasibility Study (Draft 2023)

The East Coast Greenway is a 3,000-mile route from Maine to Florida with the purpose of connecting cities and towns along the east coast with a safe walking and biking facility. The greenway crosses the study area in two locations. The main line is along US Hwy 421 and the coastal route enters from Jacksonville and passes through Wilmington. The NC-210 East Coast Greenway Corridor Feasibility Study concerns the coastal route along NC-210 and determines the feasibility of creating a dedicated facility separated from the roadway, and alternative routes. Community input is being gathered with a draft study slated for public review early 2023.



Figure 1: Preliminary Route for the NC-210 East Coast Greenway Corridor

Pender County Comprehensive Parks and Recreation Master Plan (2022)

There are very few bicycle or pedestrian facilities identified as existing within the project study area, but the masterplan does identify several planned parks just outside of the area that could serve as points of

connection. The proposed Canetruck Community Park is just west of the Black River and looks to encompass the inland spur of the Mountains to Sea trail. It is also a Federal Emergency Management Agency buyout property. At the northwestern extent, the proposed Long Creek Community Park straddles NC 210 at the Montague community and is on county-owned property.

Pender County Streets Plan (2021)

The Pender County Streets Plan is an update to the 2016 Pender County Collector Street Plan for the determination of future transportation needs as it relates to connectivity. The plan identified opportunities for new collector street alignments and corresponding bicycle and pedestrian facilities. To incorporate non-motorized facilities, each recommended street section provided the option to add either a multi-use path or a bike lane and sidewalk combination.

There was significant support for the addition of these facilities for any new streets. Public input from the plan indicated that 58% of respondents would walk or bike more often if better, safer facilities were provided. Another 20% were receptive to utilizing facilities if they were present. Furthermore, almost 35% of responses indicated a desire for the installation of bike lanes, multi-use paths and sidewalks whenever new streets are added to the network.

Select your top three priorities to be addressed when new collector streets are being constructed.

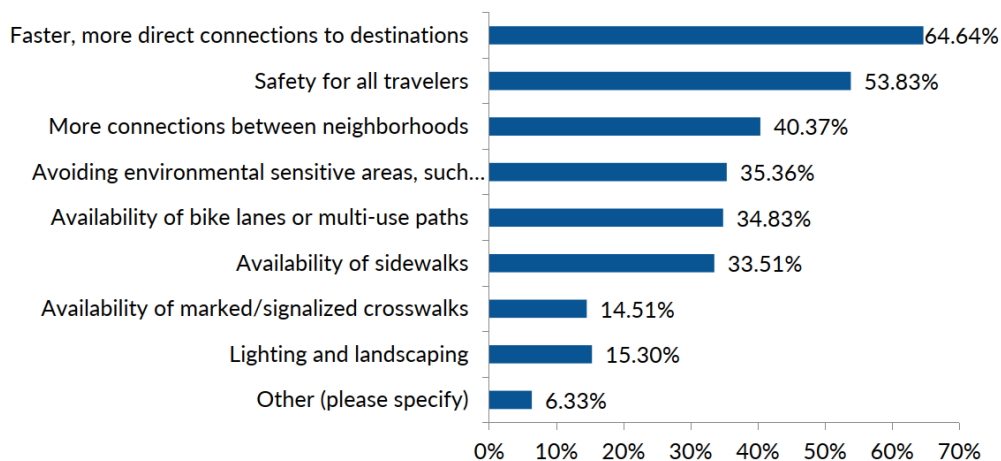


Figure 2: Transportation Priorities Identified in the First Public Survey for the Pender County Streets Plan

Cape Fear Moving Forward 2045 (2020)

The Cape Fear Moving Forward 2045 plan provided an assessment of all modes of transportation and provided an overview of potential projects. The study area is included in this assessment but very few projects have been identified for the more rural portion of the Wilmington Area Metropolitan Planning Organization urban planning area. The study does recognize that significant population growth is anticipated through the year 2045 for the northern most areas of the planning jurisdiction, which include the study area.

Pender 2.0: Comprehensive Land Use Plan (2018)

The Pender 2.0: Comprehensive Land Use Plan was developed in 2018 with the goal of guiding the direction of future growth and other needs within unincorporated areas in the County. The plan addresses the role of transportation alternatives in the county and identifies the increasing desirability of non-motorized alternatives. Transportation alternatives, like biking and walking, are increasingly utilized to access community resources as well as for recreational uses according to current trends. Unincorporated Pender County lacks pedestrian and bicycle facilities outside of those provided within planned subdivisions to support the growth in these trends. The plan identified several projects, which, at the time, were not under construction and the specific alignments had not been determined.

- Mountains-to Sea Trail
- Coastal Pender Greenway
- Coastal Pender Rail Trail
- Central Pender Rail Trail
- East Coast Greenway

Cape Fear Regional Bicycle Plan (2017)

The Cape Fear Regional Bicycle Plan identifies several existing bike and pedestrian trails through preservation areas in Pender County. The East Coast Greenway is currently being planned through the eastern side of the study area and the plan identifies planned and existing paths to the north and south that terminate at the borders of the study area.

Pender County Comprehensive Transportation Plan (2016)

NCDOT Transportation Planning Branch completed a study of Pender County's transportation needs through 2040. The transportation plan assessed highway, public transportation, rail, bike, and pedestrian facilities within Pender County. The project study area was not included in the Pender County Transportation Plan because it exists in the northern portion of the Wilmington Metropolitan Planning area. Nevertheless, several recommendations for pedestrian and bike facilities were provided within the plan that may be relevant to this study.

- A multi-use path recommended for Shaw Hwy (SR 1522) terminating at its intersection with NC 210
- A multi-use path recommended along US Hwy 117 terminating at its intersection with NC 210
- A multi-use path recommended along NC 210 between Malpass Corner Road (SR 1120) which terminates at Montague Road

- A multi-use path recommended near the intersection of Blueberry Road and Malpass Corner Road that terminates near the vicinity of the Pender County Solid Waste facility on Montague Road
- An on-road bike facility recommended along Blueberry Road (SR 1114) terminating at Montague Road

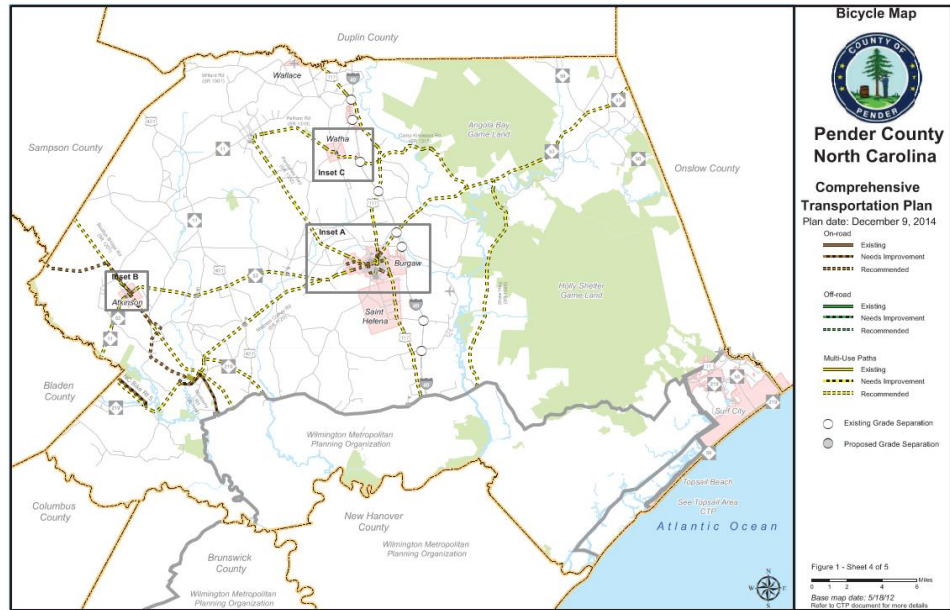


Figure 3: Pender County Transportation Plan Bicycle Map

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Wilmington Comprehensive Greenway Plan (2013)

A portion of the greenway plan was proposed, but not included on the prioritized project list. It consists of a bike lane which connects to the East Coast Greenway at Holly Shelter Road and terminates in Castle Hayne to the west. It does not appear that this alignment for the Greenway is still proposed at present.

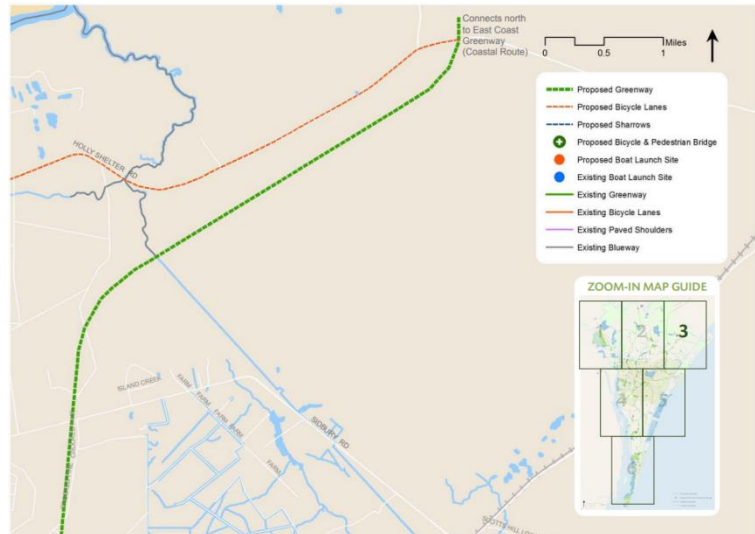


Figure 4: Proposed Greenway from the Wilmington Comprehensive Greenway Plan

Review of Development Codes

The Pender County Unified Development Ordinance (UDO) was last updated in September of 2022 where there are supportive bike and pedestrian codes throughout. Below is a summary:

- Bicycle and Pedestrian Improvement Overlay District (BPIOD)
 - Areas will be determined on a case-by-case basis depending on existing studies and plans, development patterns, and other factors
 - Individual single-family lots and some subdivisions are exempt
 - Fee-in-lieu option for applicants who are unable to provide facilities and can demonstrate hardship
- Site designs cannot degrade existing bike and pedestrian
- Planned Development districts must address bicycle, transit, and pedestrian circulation

Demographics and Socioeconomics

A demographic and socioeconomic analysis was carried out for the study area based on the data obtained from American Community Survey (ACS) 2020 5-year estimates. The study area does not overlap completely with the Census Tracts and Census Block Group (CBG) boundaries in the ACS data; therefore, this section may contain data from parts of the census tracts and CBGs partially outside the study area. Figure 5 shows the Census Tracts and CBGs considered for this analysis.

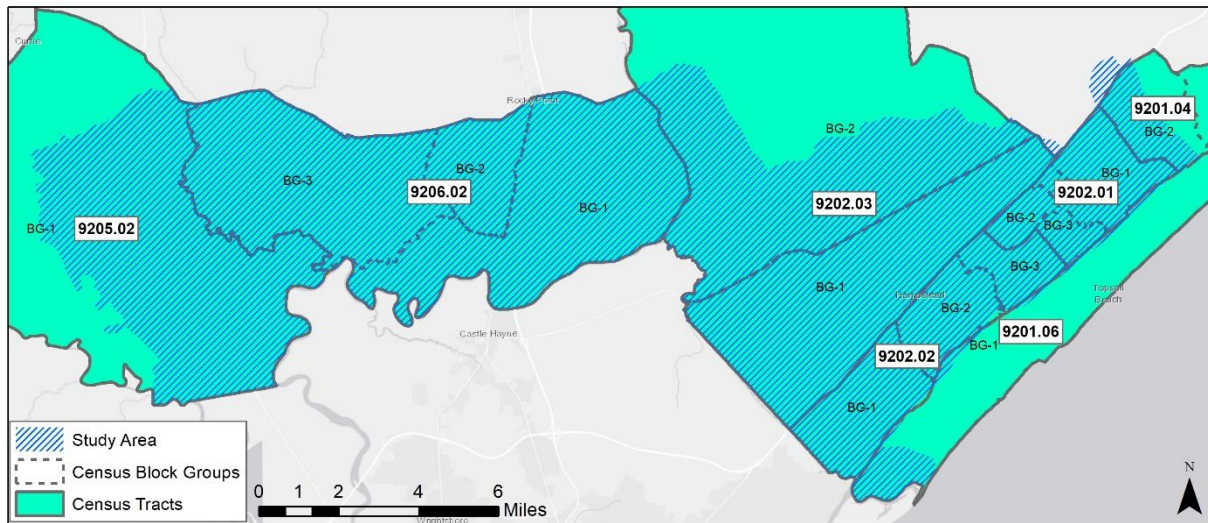


Figure 5: Census Block Groups in the Study Area

In 2020, the population of the study area was 36,027, which is not distributed equally across the study area. The areas west of US-17 are sparsely populated with an overall density of fewer than 1 person per 10 acres. East of US-17, the population density is between 1.1 to 2.2 persons per acre which leads to 57% of the area's population living in 17% of the total study area. This is because most development in the study area is concentrated between US-17 and the Atlantic Ocean. Figure 6 shows the population in each CBG (shown as number) and the density (shown in color).

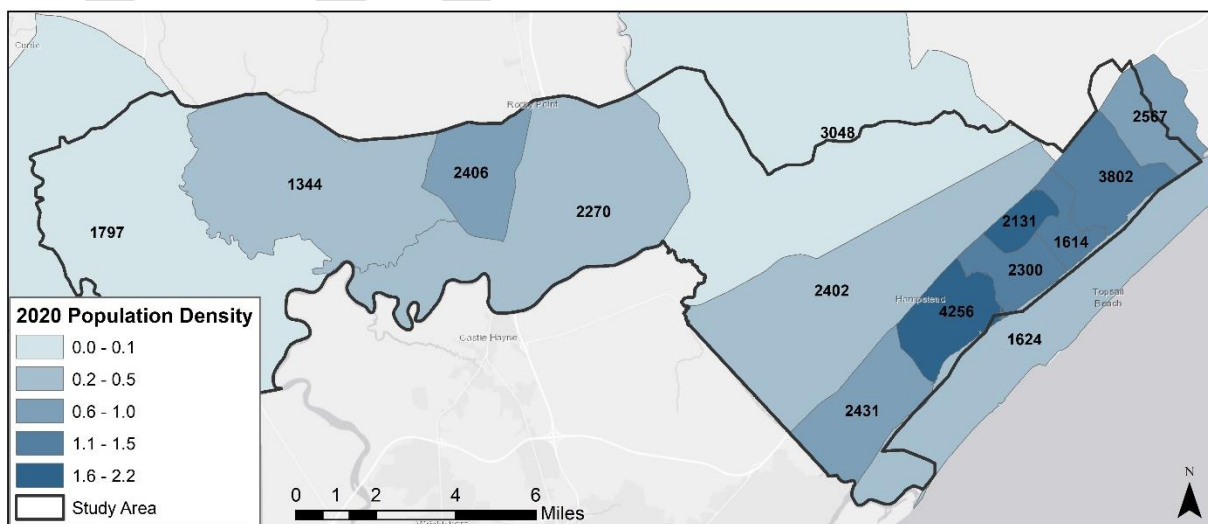


Figure 6: 2020 Population Density

The Wilmington MPO Travel Demand Model (TDM) contains the population forecast for 2045. This is considered to be the official forecast on which transportation projects are based. According to this forecast, the population of the study area is projected to increase to 48,574 in 2045, which is an increase of approximately 33% from 2020. The geographic distribution of this growth is shown in Figure 7 where the colors show the population density, and the numbers show the population in the Traffic Analysis Zones (TAZs). TAZs are geographic divisions smaller than CBGs specially created for analyzing travel behavior in TDMs. The population density distribution in 2045 is projected to be similar to that in 2020, with a key exception of the area between US-17 and US-17 bypass in the southeast of the study area.

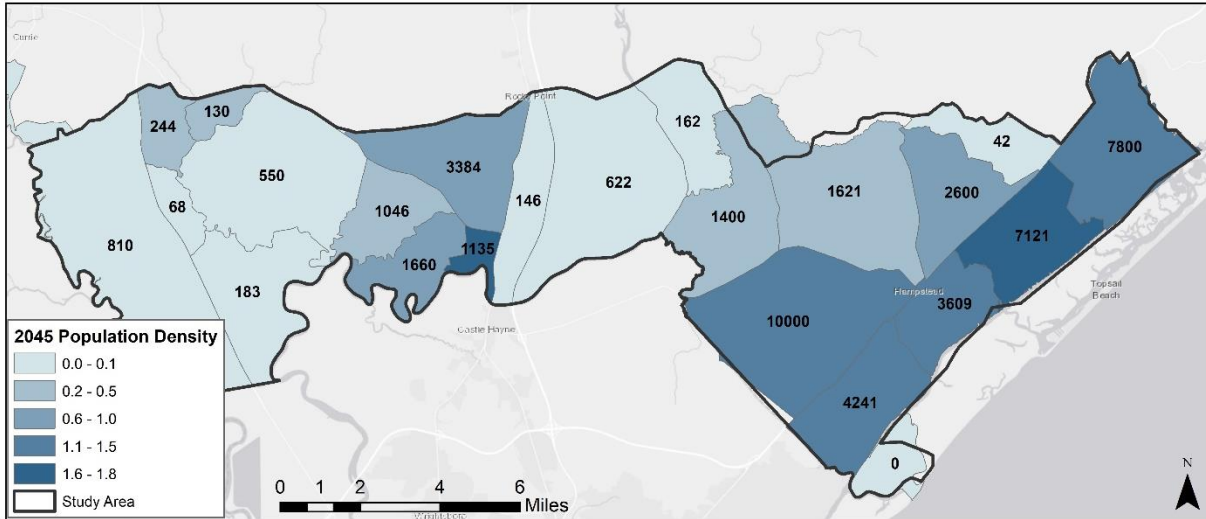


Figure 7: 2045 Population Density

The Pender County Comprehensive Plan (PCCP) was developed prior to the Wilmington MPO TDM being adopted. The Future Land Use in the PCCP allows for a significantly higher level of density than what was later assumed in the TDM. This issue was realized during the preparation of the Pender County Collector Street Plan (PCCSP) and population projections were calculated based on the density assumed in the PCCP. According to those calculations, even at 50% buildout of the adopted land use, the future population of the study area was projected to be higher than 200,000 which is four times that of the official projections (Figure 8).

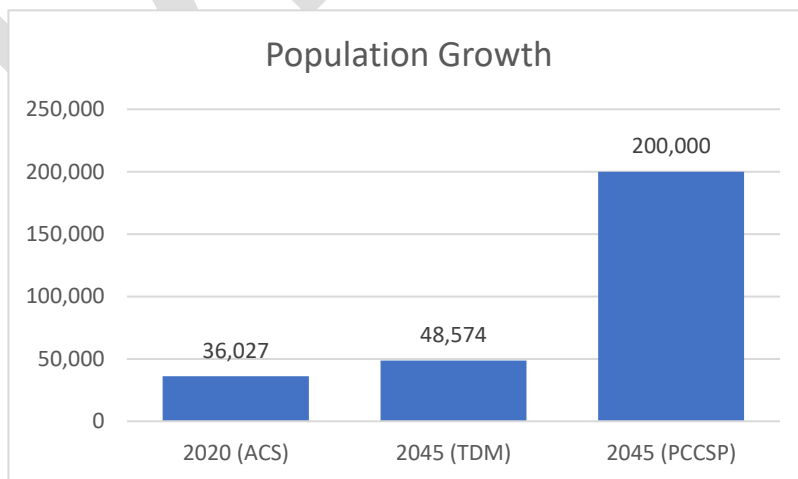


Figure 8: Population Growth

Age and Sex

Of the total population in 2020, 17,001 (49.3%) were male and 17,456 (50.7%) were female. The median age of the study area is 42.2 years which was higher than North Carolina's median age of 38.9 years. The median age varies significantly within the study area as shown in Figure 9. The areas to the northeast have the highest concentration of younger population.

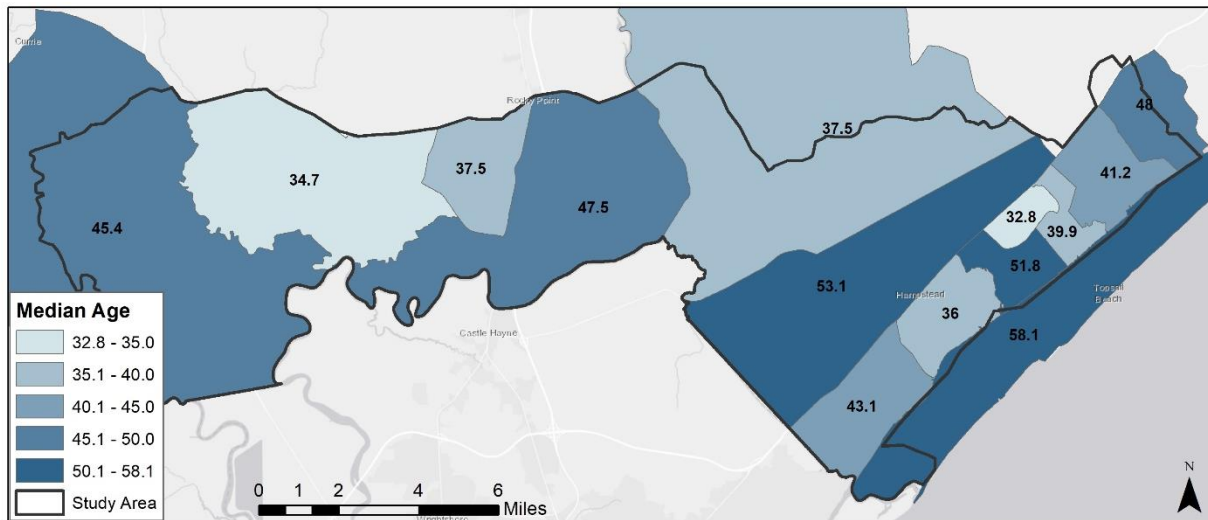


Figure 9: Median Age

Of the total population, 17.7% were under the age of 15, 64.5% were between the ages of 15 and 64, and 17.8% were of 65 years of age or above. Figure 10 shows the population pyramid of the study area.

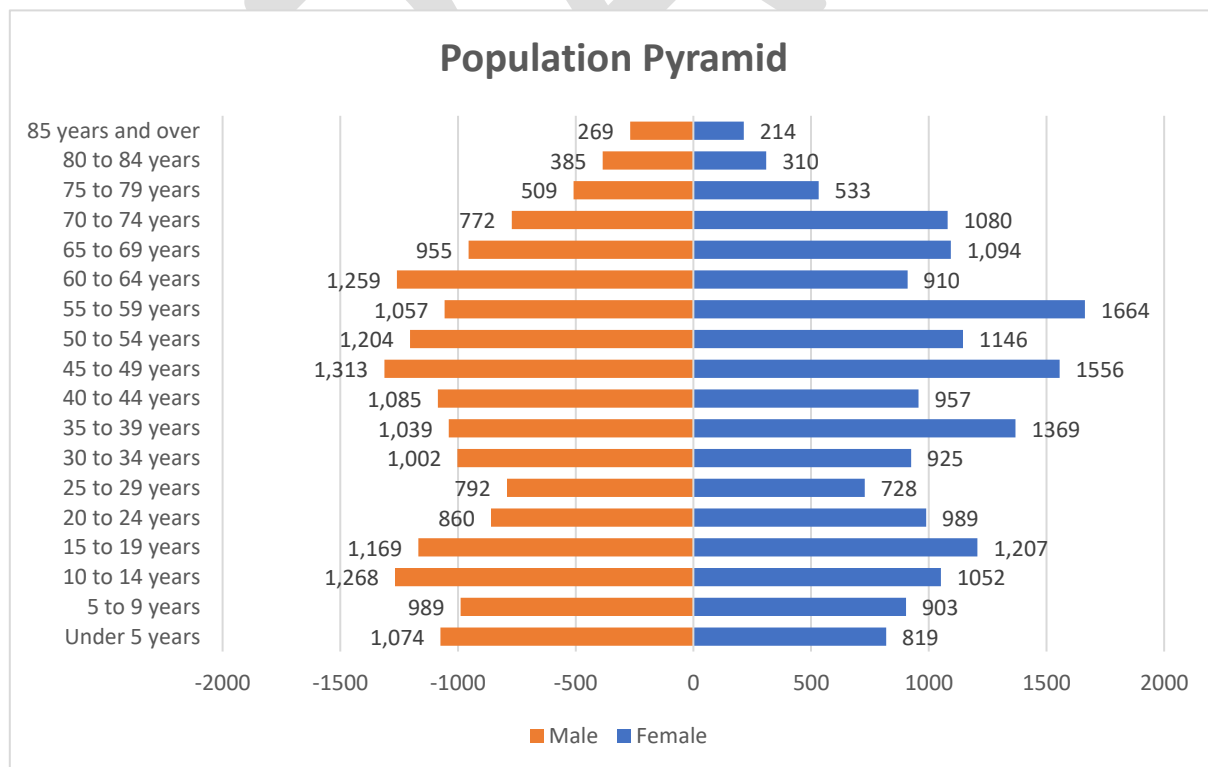


Figure 10: Population Pyramid

Race

The racial breakdown of the population in the study area in 2020 was as follows: 90% White, 3.4% African American, 2.7% Two or more races, 2.6% some other race, 0.9% Asian, 0.2% Native American, and 0.2% Pacific Islander or Native Hawaiian. 4.6% of the total population identified as of Hispanic or Latino origin. The racial makeup of the area is very different from the overall makeup of North Carolina where 67.6% of the population is White, and 22.3% is African American, and more than 10% of the population identifies as Hispanic or Latino. Figure 11 shows the comparison of the racial makeup between the Study Area and North Carolina.

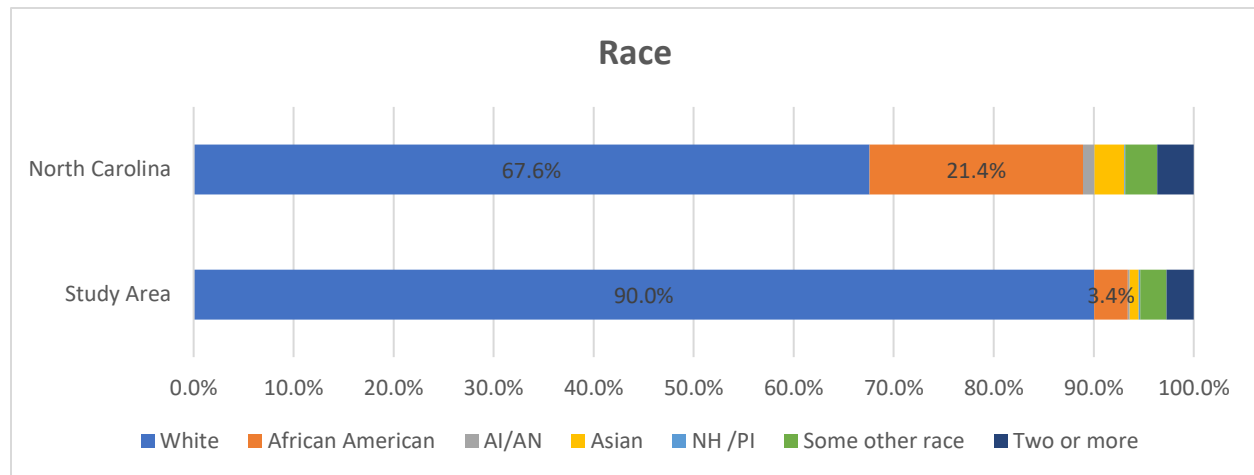


Figure 11: Racial makeup of the study area compared to North Carolina

Income and Poverty

The Median Household Income (MHHI) of the Study Area in 2020 was approximately \$69,500, which was significantly higher than that of the state (\$56,642) which suggests that overall, the study area is wealthier than the state as a whole. However, as shown in Figure 12, there are significant regional variations in income distribution. The MHHI of areas to the west of the Northeast Cape Fear River trends lower than the statewide MHHI while the converse is true for the areas to the east. The areas to the east of US-17 have a higher MHHI than the rest of the study area.

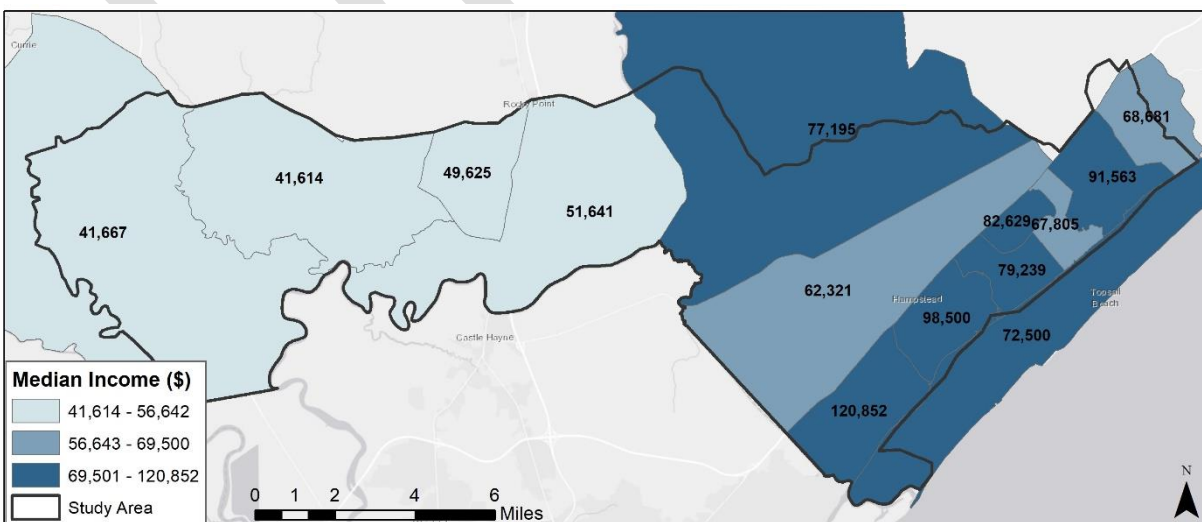


Figure 12: Median Income

Figure 13 shows the comparison of household income distribution between the study area and the state of North Carolina. The study area has fewer proportions of households with a MHHI less than \$50,000 than the state, and has higher proportions of households with a MHHI above \$50,000 than the state. This is in line with the fact that the MHHI of the study area is higher than that of the state.

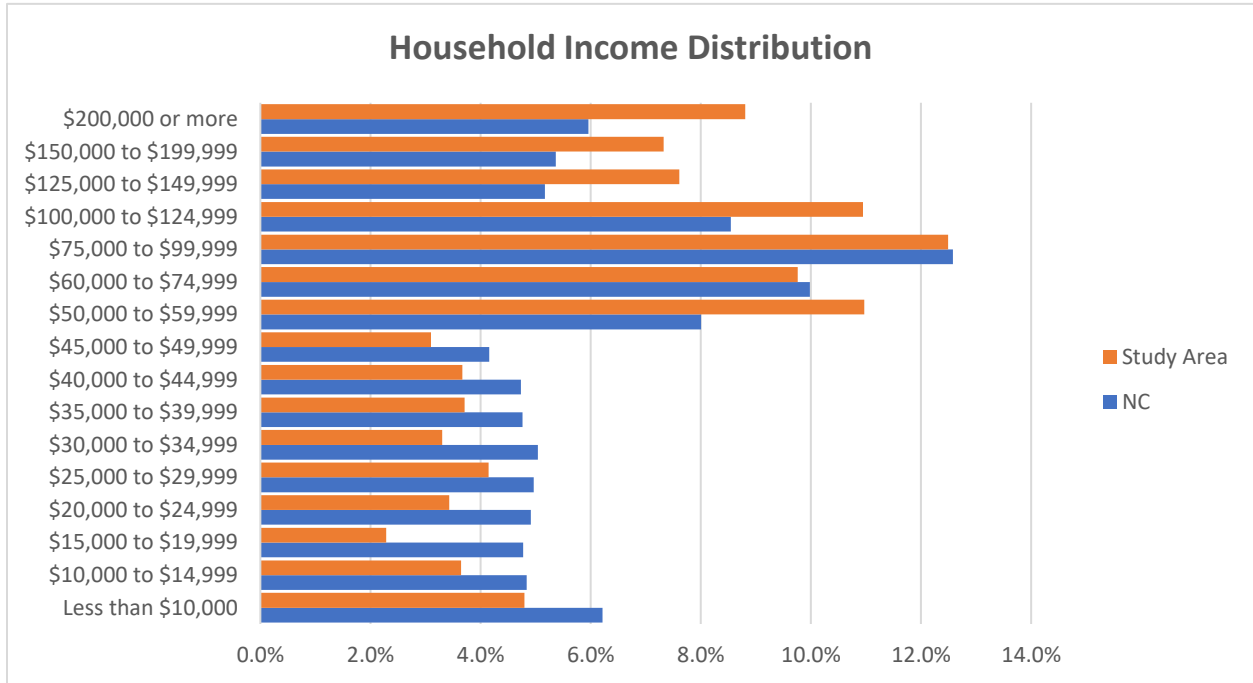


Figure 13: Household Income Distribution of the study area compared to North Carolina

The poverty figures of the study area show a similar outlook. 8.9% of the households in the study area are below the poverty line compared to 14.1% of the households in North Carolina. Figure 14 shows the regional variation between the concentration of households below poverty line. The labels show the total number of households below poverty line in each CBG in 2020.

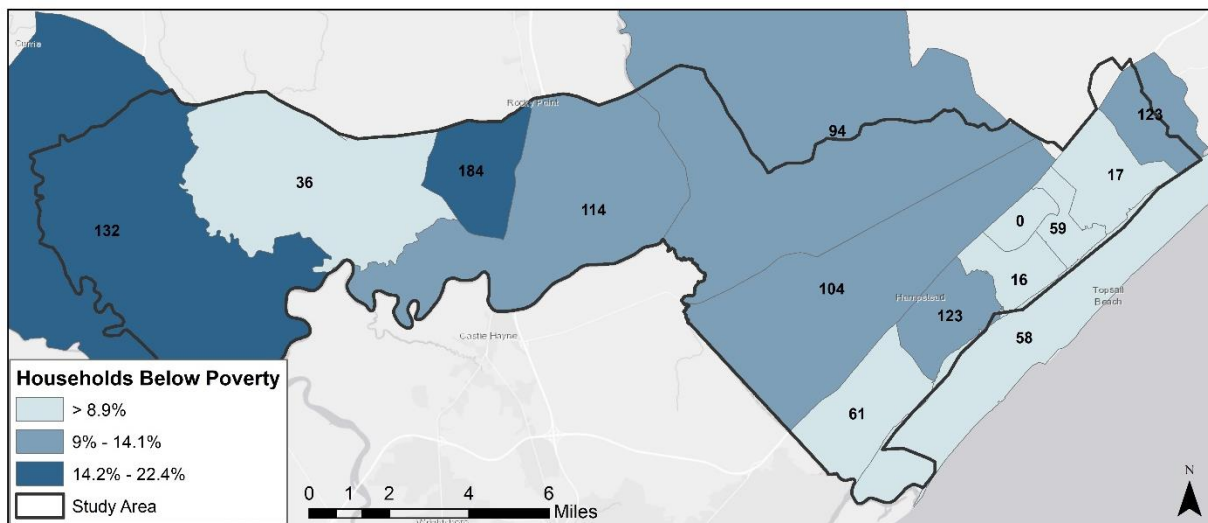


Figure 14: Households below Poverty

Environmental Justice Index

NCDOT's Environmental Justice (EJ) Index Score is comprised of 3 factors: people with low incomes, racial minorities, and ethnic minorities (Hispanic or Latino origin). Scores range from 0 to 12, with higher scores indicating higher concentrations of EJ populations. EJ Index scores are relatively low to moderate throughout the study area. Figure 15 shows the EJ Index for the study area and surrounding communities.

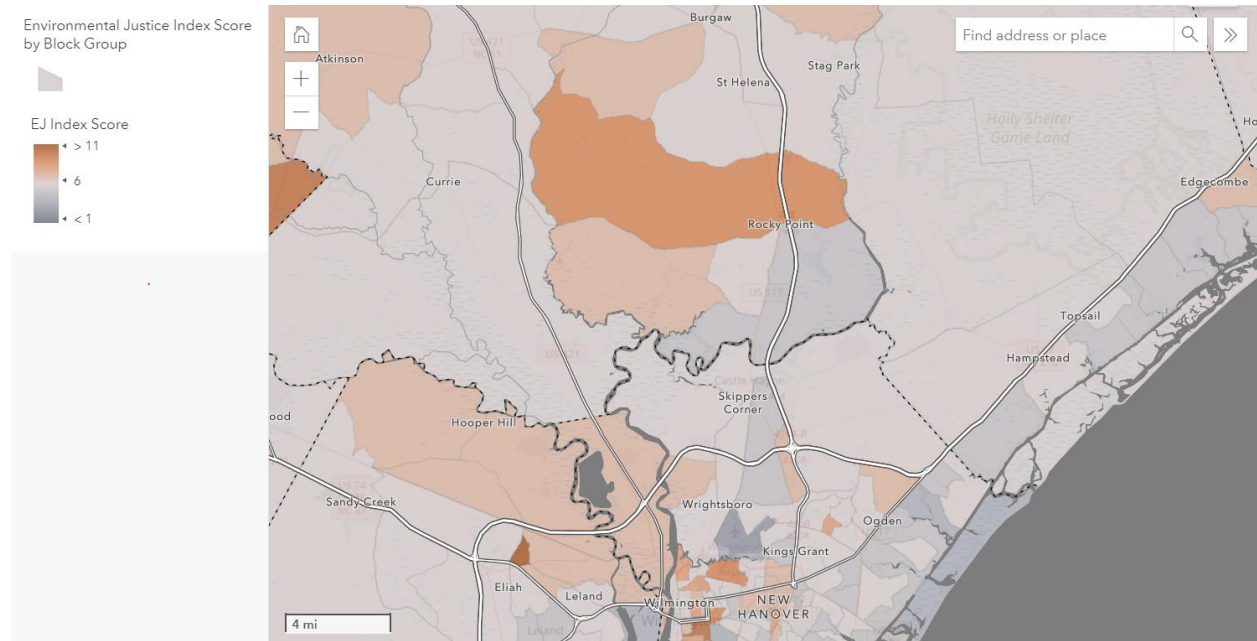


Figure 15: NCDOT's NC Equity and Transportation Disadvantage Screening Tool
<https://storymaps.arcgis.com/stories/7e3bbd00fe014a77b5f1620334209712>

Transportation Disadvantage Index

NCDOT's Transportation Disadvantage Index (TDI) Score is comprised of six factors: car-less households, people with low incomes, youth aged 15 and under, seniors aged 65 and over, adults with mobility impairments, and Black, Indigenous, and Persons of Color (BIPOC) populations. Scores range from 6 to 18, with higher scores indicating higher concentrations of transportation disadvantaged populations. TDI scores are relatively low throughout the study area. Figure 16 shows the TDI for the study area and surrounding communities.

Transportation Disadvantage Index Score by Block Group

TDI Index Score

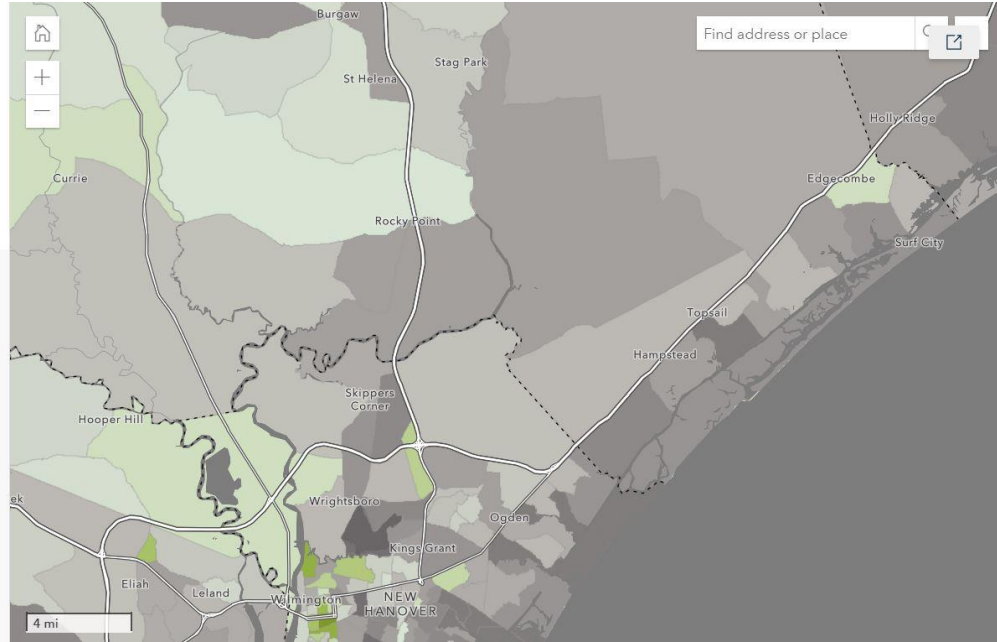


Figure 16: NCDOT's NC Equity and Transportation Disadvantage Screening Tool
<https://storymaps.arcgis.com/stories/7e3bbd00fe014a77b5f1620334209712>

Education

ACS provides estimates for educational attainment for residents 25 years and over. Based on these estimates, the residents in the study area have an overall higher educational attainment than the rest of the state of North Carolina. Figure 17 shows the relative percentages of educational attainment of the residents above 25 years in the study area and the state of North Carolina. The biggest difference between the two is the number of residents with no or some school, which is 7.3% for the study area and 11.5% for North Carolina. Similarly, those with a bachelor's degree or above form 36.1% in the study area compared to 30.2% in North Carolina.

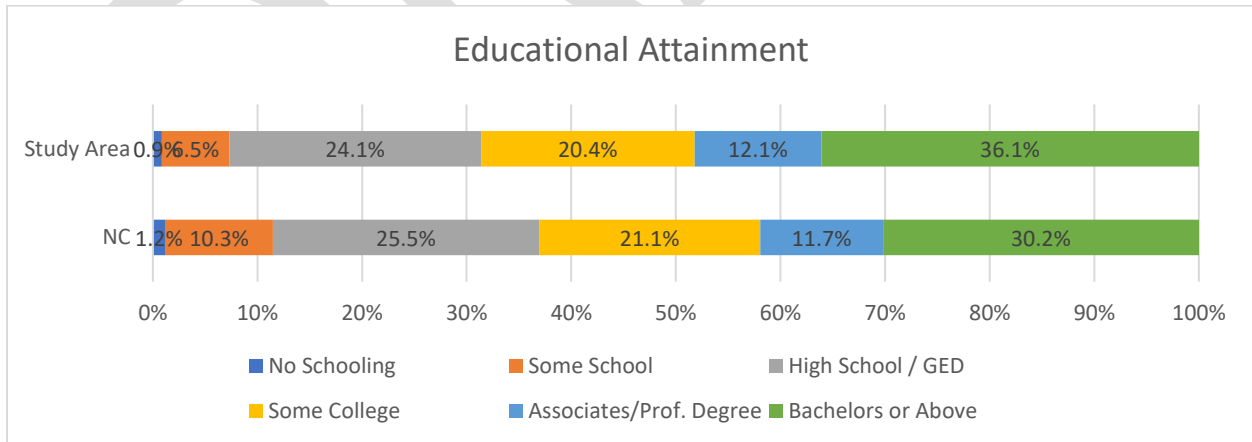


Figure 17: Educational Attainment for the study area and North Carolina

Employment

In 2020, 58.7% of the population of the study area 16 years and above was employed or in the armed forces, 4% was unemployed, and 37.3% was not in the labor force. These figures of the study area are at par with those of the state. The education, healthcare and social assistance industry employed the highest number of people while agriculture and ancillary industries employed lowest (Figure 18).

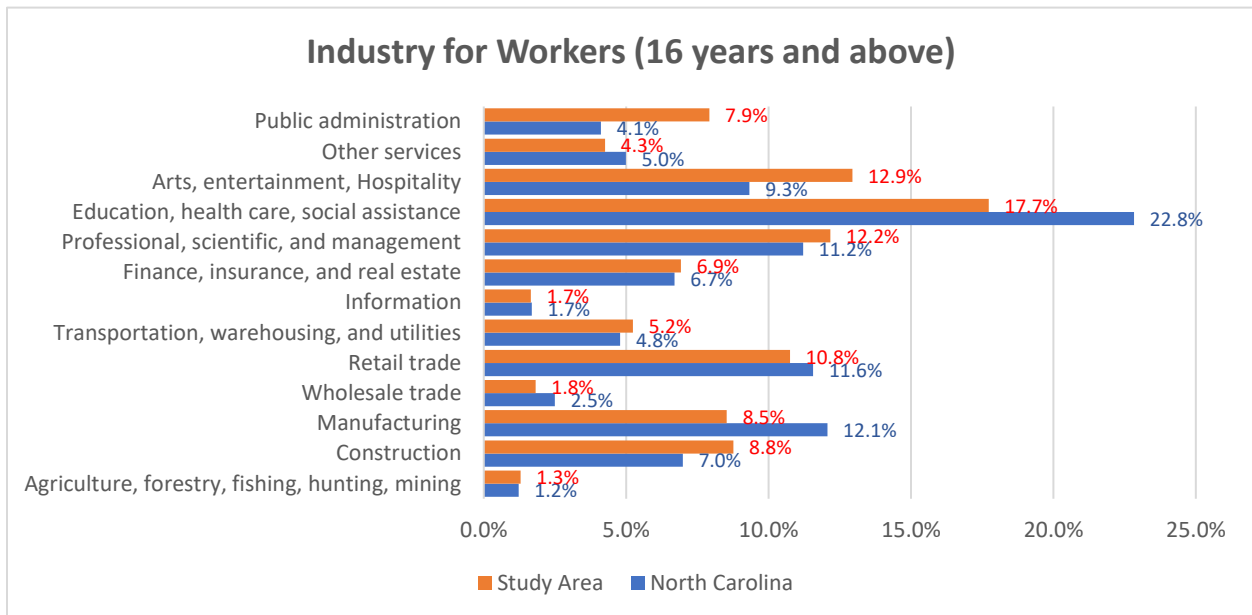


Figure 18: Industry for Workers for the study area and North Carolina

The employment data in the study area is derived from the Wilmington MPO TDM and is presented for the model's current and future years – 2015 and 2045 respectively – by TAZs in Figure 19 and Figure 20. According to this data, the total employment in the study area will reduce by approximately 10% from 6,455 in 2015 to 5,926 in 2045, which means that the employment growth will not be in line with the population growth, and more people will have longer commutes to workplaces outside the study area, primarily to the south. In addition to this reduction in overall number of jobs, they will also concentrate around US-17.

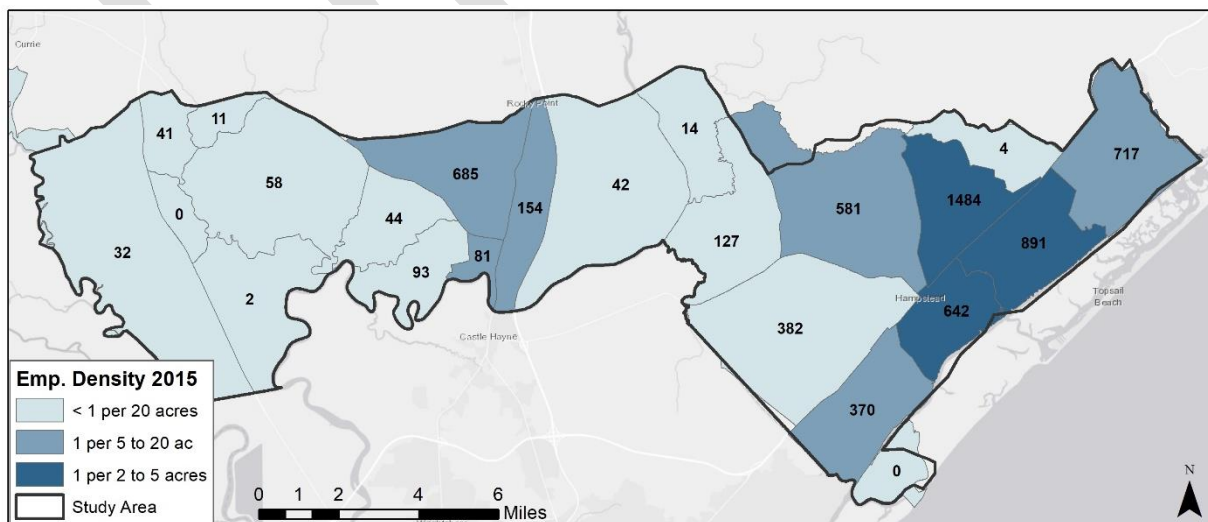


Figure 19: 2015 Employment Density

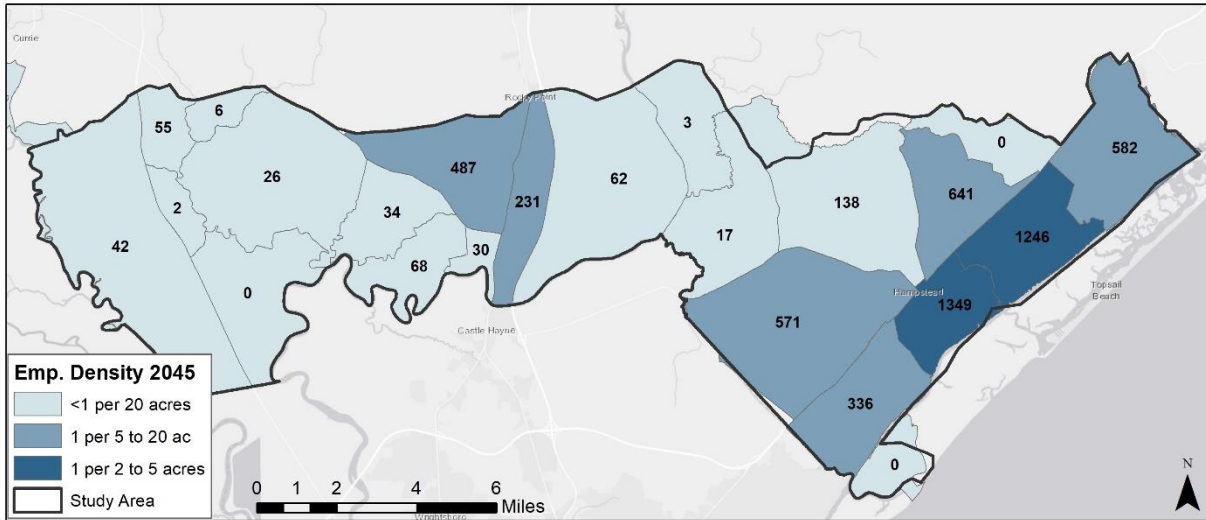


Figure 20: 2045 Employment Density

Travel Characteristics

Vehicle sufficiency

A household where there are fewer cars than workers, or that has no cars is considered a vehicle-insufficient household. This metric is reported on a Census Tract level which means that the data is not available at the level of CBGs. The Census Tract boundaries, in most cases, extend much beyond the Study Area. However, for this case, it was assumed that the vehicle-insufficient households were evenly distributed in each Census Tract.

In 2020, there were 646 vehicle-insufficient households in the study area. Compared to the statewide proportion of 8.9%, the study area had less proportion of vehicle-insufficient households (5%). The Figure 21 shows the distribution of vehicle-insufficient households in the study area. The center of the study area between US-17 and US-421 has higher than average concentration of vehicle-insufficient households in the study area, of which the area east of Northeast Cape Fear River is almost as much as the state average.

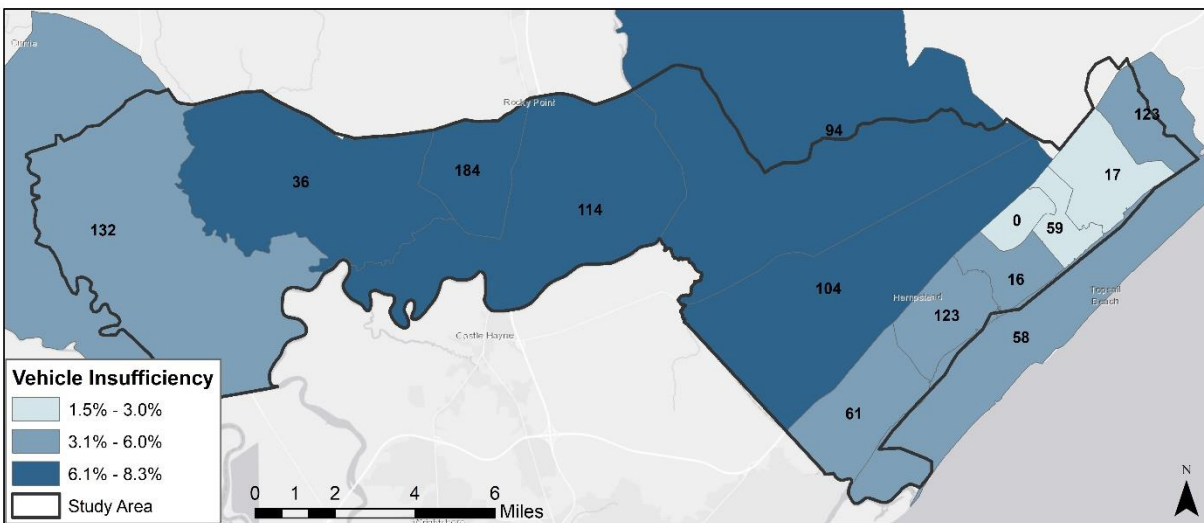


Figure 21: Vehicle Insufficient Households

Means of Transportation to Work

The study area is heavily dependent on personal vehicles as a means of transportation to work with almost 89% people driving or carpooling to work as seen in Figure 22. A significant portion of people works from home. Of the remaining 1%, 92 people walked, 9 people used a bicycle, and 23 people used other means to get to work. A combination of sufficient alternative infrastructure and distance from work may make it difficult for people to not use a car to go to work.

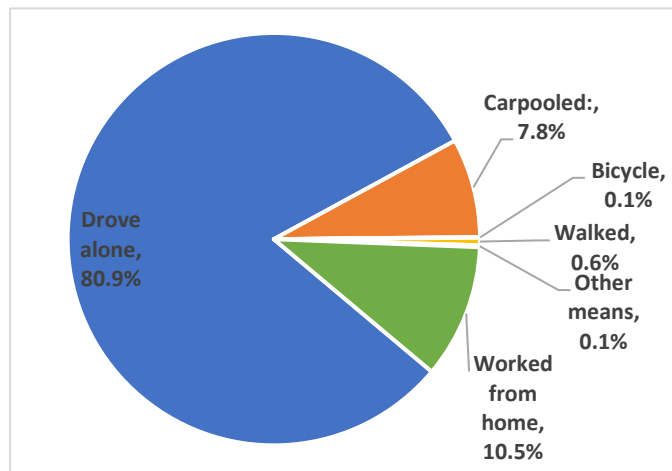


Figure 22: Means of Transportation to Work

Travel time to work

The median travel time to work for the area is approximately 31 minutes, which is at par with state and national indices. Figure 23 shows the distribution of travel time to work for non-work-from-home workers. There is a significant portion of workers (6%) that travel less than 10 minutes to work, which is about 960 workers that work close enough to their residence that if provided a viable alternative, could potentially switch to non-motorized modes.

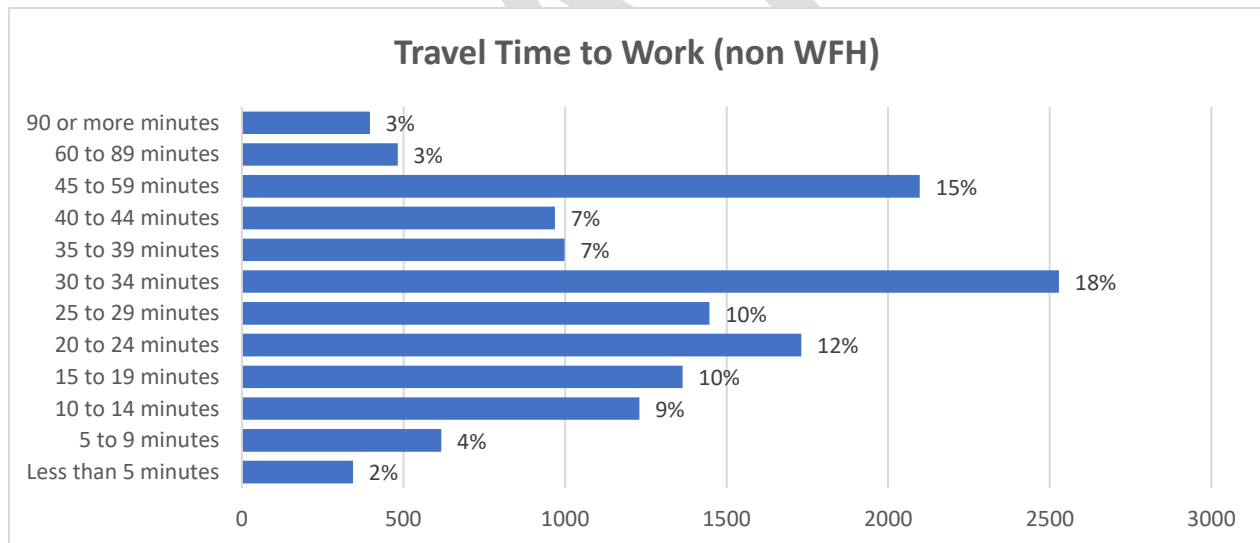


Figure 23: Travel Time to Work

Wilmington MPO TDM data suggests that, on an average, only 22% of the daily household trips are Home-based Work (HBW) trips. That means a majority of trips are not work trips and may or may not have a similar modal and travel time distribution as HBW trips. These trip types include home-based social trips (HBS), home-based other (HBO) trips and non-home-based (NHB) trips. It may be challenging to convert any HBS and NHB trips to non-motorized trips because of carpooling and trip-chaining that occurs more often during those trips, but HBO trips may have a higher probability of a mode-change to non-motorized modes.

Community Resources

A key part of this analysis is to identify popular destinations in the study area. Figure 24 shows the distribution of key destinations – businesses, schools, churches and government buildings. This data was obtained from the address points dataset provided by Pender County. Businesses and government buildings were further filtered based on the type of location that the customers would typically be able to walk to if proper infrastructure existed (e.g., Stores, pharmacies, restaurants, medical facilities, etc.). Most destination locations in the study area are situated along US 17 and NC 210.

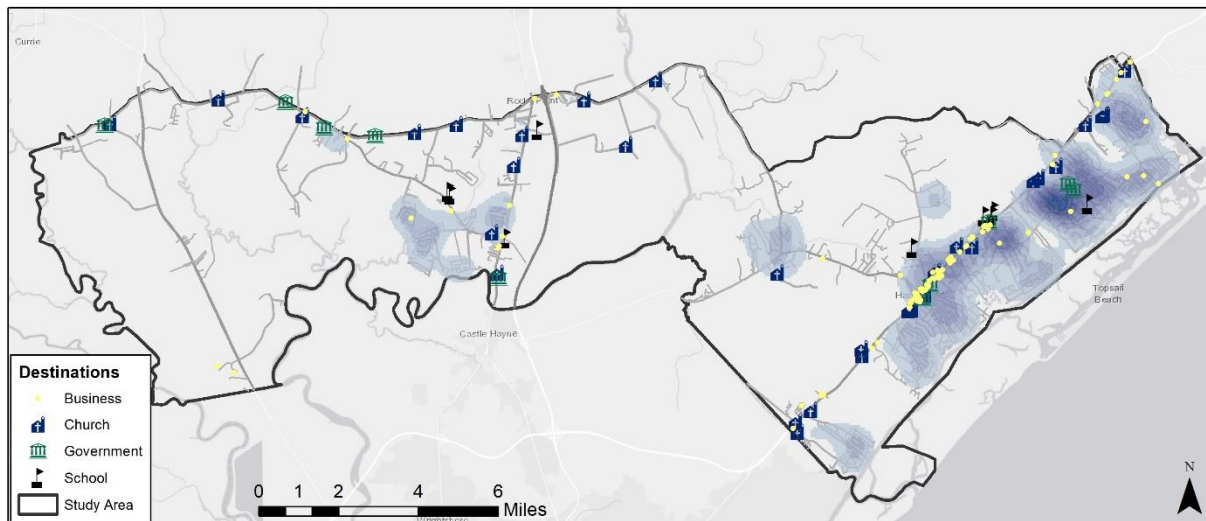


Figure 24: Community Resources

The shaded regions on the map correspond to density of dwelling units weighted on their propensity to use non-motorized transport. A single-family dwelling (SFD) units within half mile radius to a destination point was considered to have twice the propensity of farther SFDs. Multi-family dwelling (MFD) units were considered to have four times the base propensity (SFDs farther than $\frac{1}{2}$ mile) regardless of their distance to a destination. This analysis combines the locations of potential origin-destination pairs of short Home-Based Other trips which have a high propensity to shift from motorized to non-motorized travel modes.

According to this analysis, portions of central and northern US-17 corridor and parts of US-117 display a high proportion of origin-destination pairs of a shorter, more walkable length. These areas should ideally get priority in phasing for the bicycle and pedestrian infrastructure projects that will be recommended as a part of this study.

Land Use

The future land use plan mirrors the future population and employment densities presented in the previous sections. The study area is primarily residential, with pockets of commercial and mixed-use land uses concentrated around US-17 and US-117. The development patterns suggest a higher propensity of north-south movements that could potentially consist of non-motorized trips, and a lower propensity of similar east-west movements.

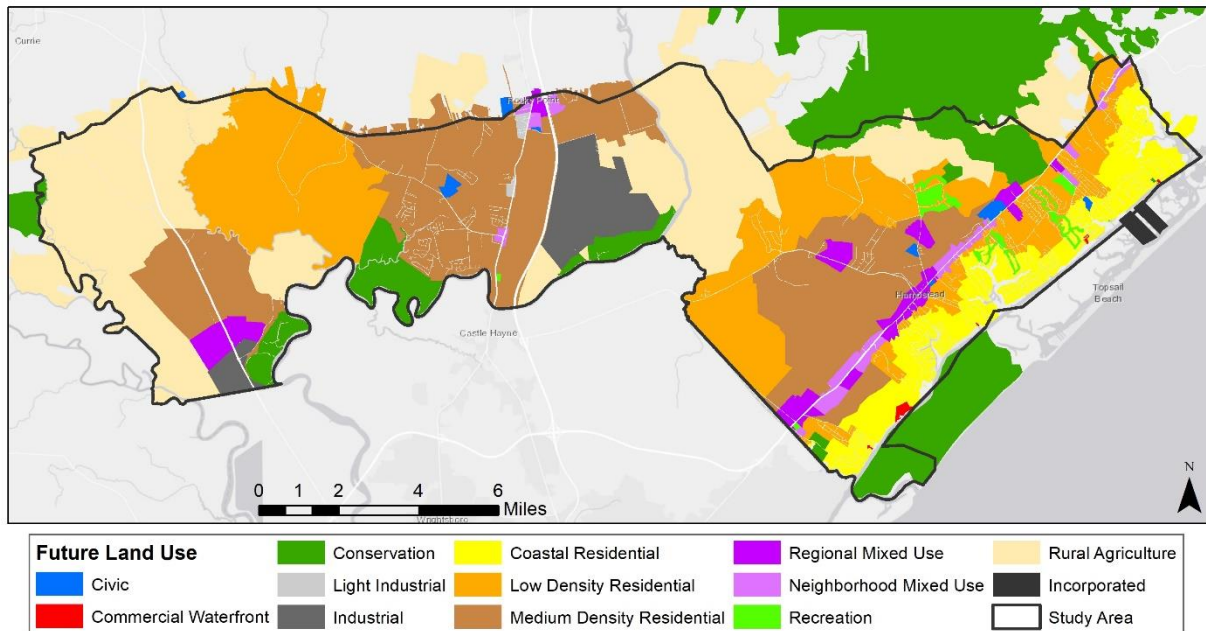


Figure 25: Future Land Use

Recent Developments

Several developments were under planning or construction phase at the time of writing this report. The Figure 26 shows the location of the recent developments in the study area. Most developments are concentrated along US-17. Overall, 27 commercial developments, 12 master development plans, and several other subdivisions.

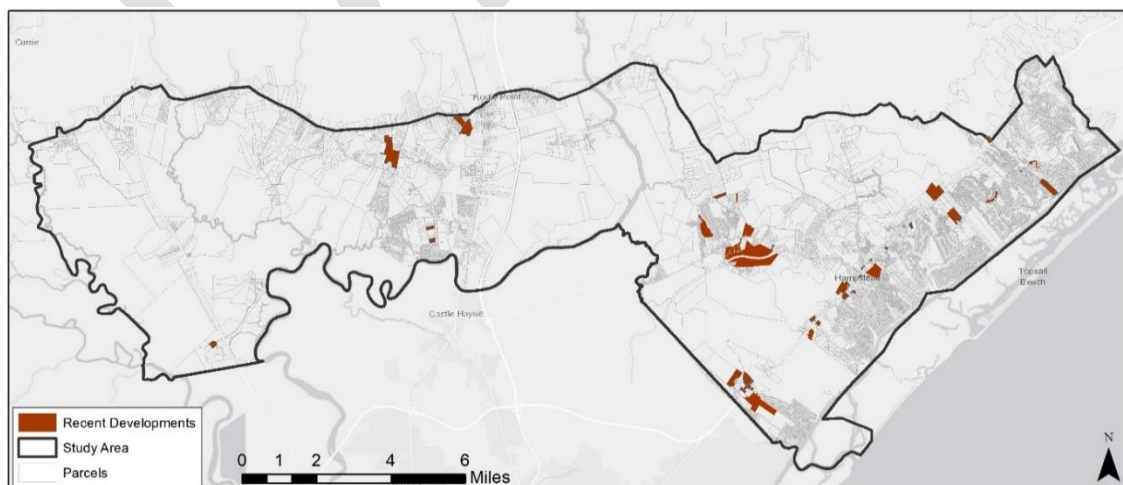


Figure 26: Recent Developments

Current and Proposed Transportation Network

Roadway

Major roadways throughout the study area include I-40, US-117, US-17, US-421, NC-133, and NC-210. Secondary and private roads are scattered throughout with the majority being located between US-17 and Topsail Beach. The planned Hampstead Bypass will terminate in the study area along US-17. Construction is ongoing with a completion date of 2030. Figure 27 also shows the collector streets recommendations derived from the PCCSP.

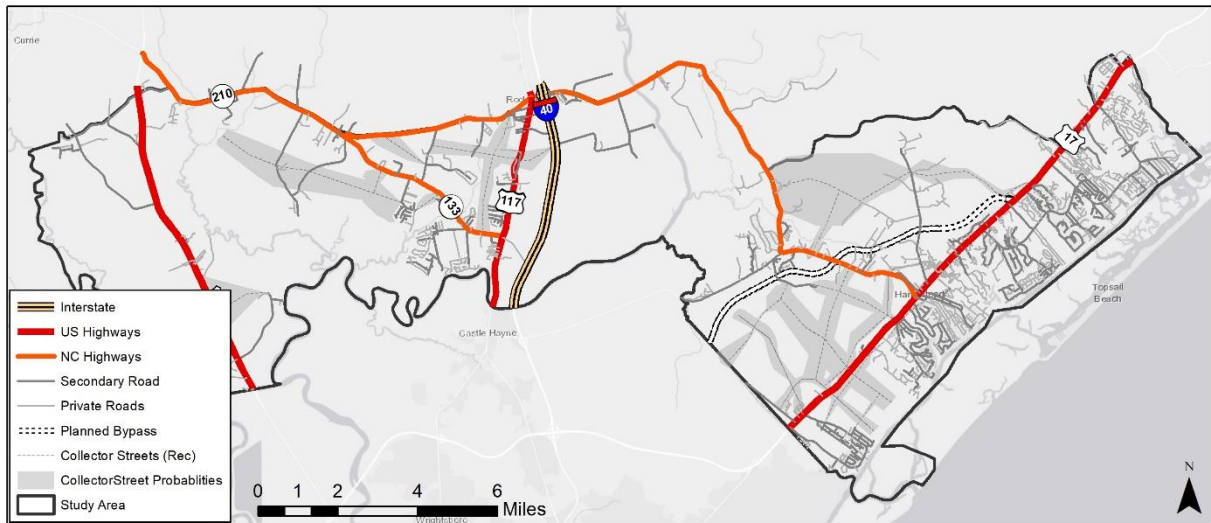


Figure 27: Collector Street Recommendations

Bicycle & Pedestrian

Existing sidewalks with the project area include small sections within recent neighborhood developments. Alignments for the East Coast Greenway are proposed in the western and eastern half of the study area. Other bicycle and pedestrian recommendations draw from the PCCSP and other area transportation plans. Most recommendations for bicycle and pedestrian facilities occur in the eastern half of the study area near US 17, demonstrating a strong desire for facilities here.

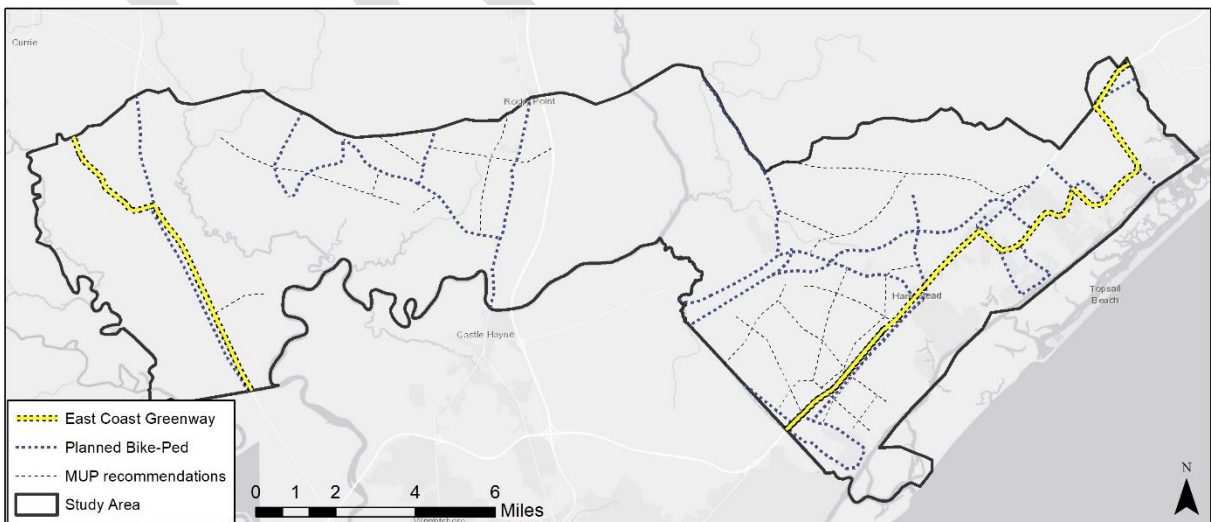


Figure 28: Planned Bicycle and Pedestrian Facilities

Bicycle and Pedestrian Crash Assessment

Safety is one of the key priorities for designing proper bicycle and pedestrian infrastructure. Data for the location and severity of pedestrian and bicycle infrastructure is maintained by NCDOT. Figure 29 and Figure 30 show the locations of all pedestrian and bicycle crashes respectively between 2007 and 2021 in the study area, with a heatmap created using the location and severity data.

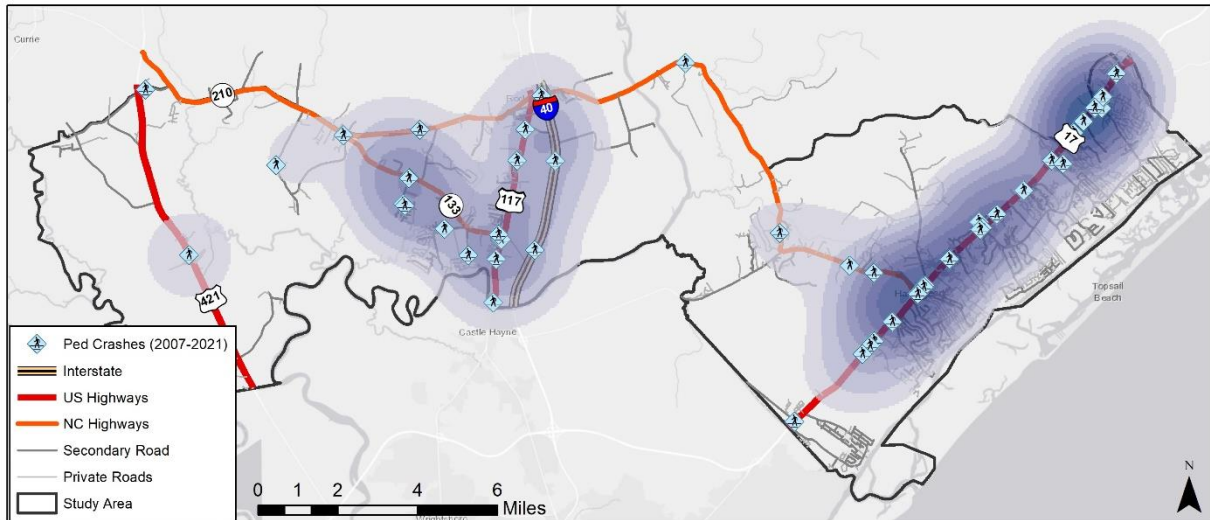


Figure 29: Pedestrian Crashes

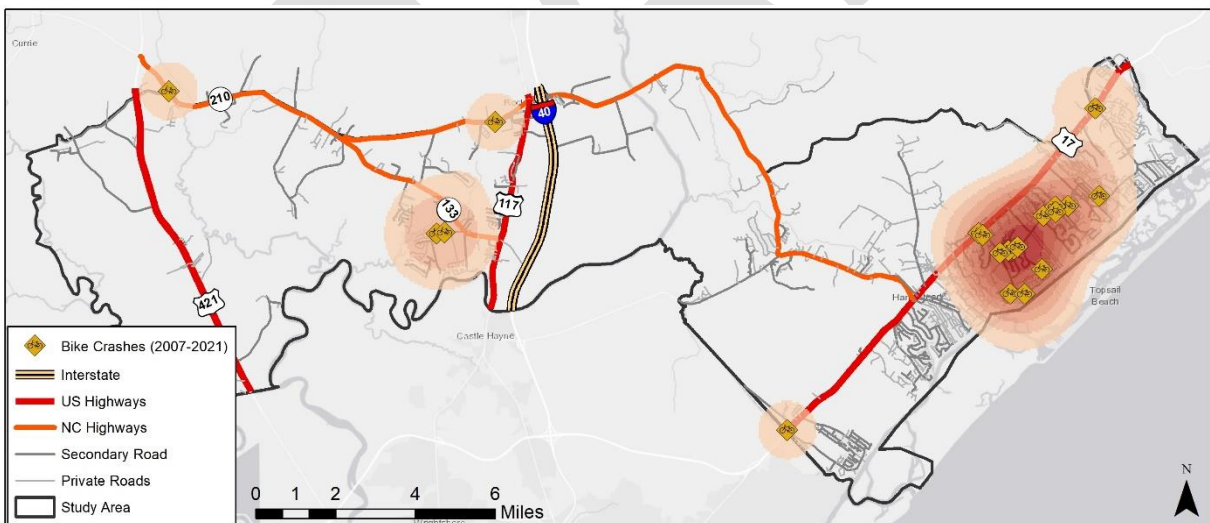


Figure 30: Bicycle Crashes

Network Assessment

Public Involvement Summary

Public engagement activities conducted for the project in 2022-2023 revealed bicycle and pedestrian conditions, including where users currently or would like to be able to walk and bike, where challenges exist to doing such, and ideas for improving bicycle and pedestrian conditions. 619 survey responses were collected as of March 9, 2023. The following provides a summary of public engagement responses:

- 74% of respondents indicated they were interested, but concerned with bicycling in Pender County and 69% of respondents indicated they were interested, but concerned with walking in Pender County
- Less than 30 participants currently bike and walk to commute to school, work, or connect to transit. Approximately 130 participants bike or walk to visit family and friends
- For the purpose of running errands, 94 participants responded that they currently bike, and 77 participants responded that they currently walk
- 31 participants said they currently bike daily, while 180 participants currently walk daily. When asked how often they would bike or walk if the network was improved, 198 participants answered that they would bike daily and 286 participants answered that they would walk daily
- The most used current mode of transportation is a single-occupant car. When participants were asked about desired commuting patterns, biking was ranked as the most desired mode of transportation if the system was improved
- The option for “Safe biking/walking routes” was the most popular choice of participants to encourage more walking or biking. Participants provided 159 comments about amenities that would encourage participants to bike or walk. Among those comments, the common themes were about safety, having well-lit trails, bathroom facilities, dedicated bike lanes, sidewalks, and crosswalks.

The following series of heat maps were created using the public survey responses. Areas that are blue had a low number of responses from survey participants, while areas that are yellow had a moderate number of responses, and areas that are red had the highest number of responses. These red areas are also referred to as hot spots and indicate a high concern area.

Public survey participants were able to identify where their trips start and where their trips end. As shown in Figure 1, most trips originate in Hampstead, specifically just east of US 17. Figure 2 shows that most trip destinations are also in Hampstead and are concentrated along US 17. Trips destinations along US 17 include grocery stores, shopping, and restaurants.

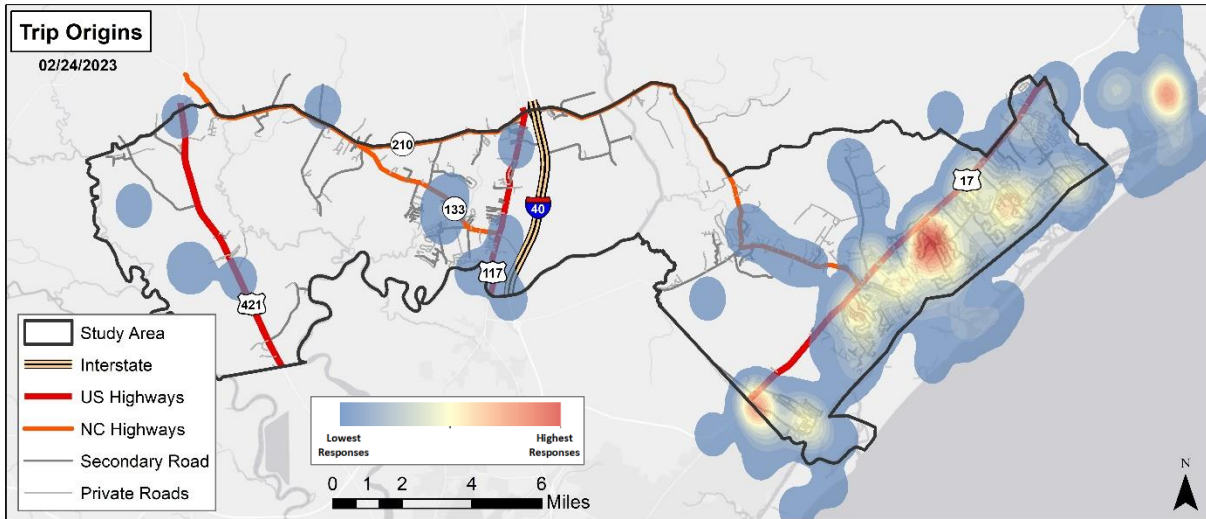


Figure 1: Trip Origins

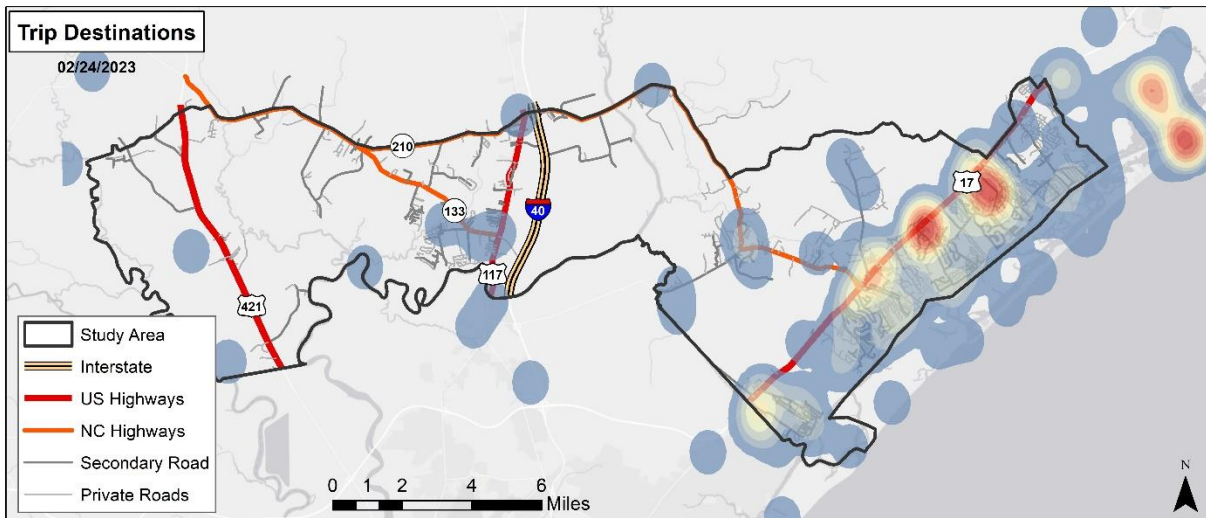


Figure 2: Trip Destinations

Figure 3 shows the destinations that survey participants would like to bike or walk to. These destinations are concentrated along US 17 and into the residential areas east of US 17. Figure 4 shows places of interest in the project area including schools, recreational facilities, and commercial destinations. Grocery stores, like Food Lion and Lowes Food, along US 17 are high priority destinations for residents. In the western half of the project area, the Food Lion shopping center and Millers Pond Park are noted as destinations individuals would like to bike or walk to.

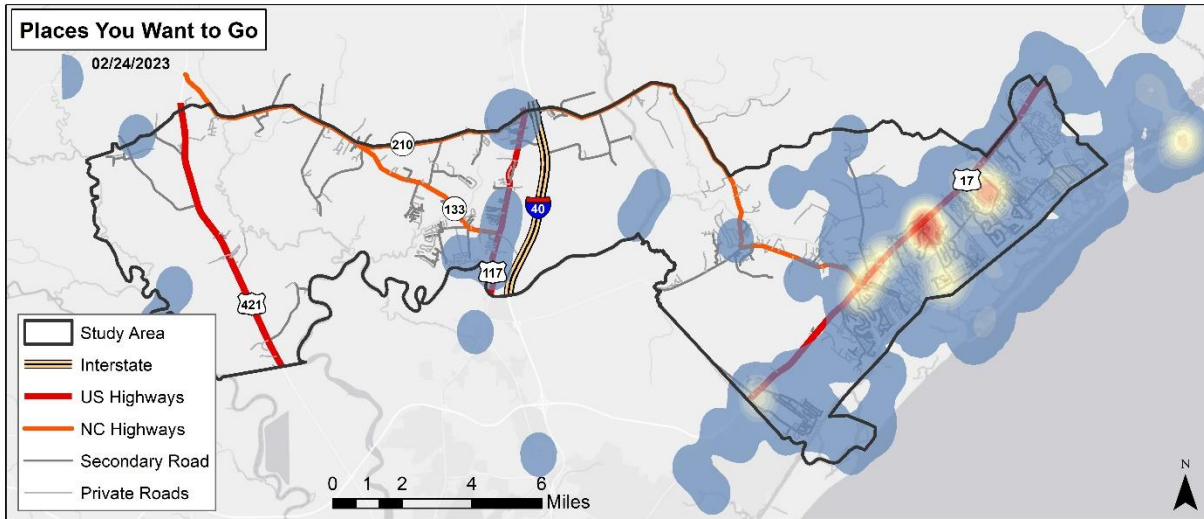


Figure 3: Places participants want to walk or bike to

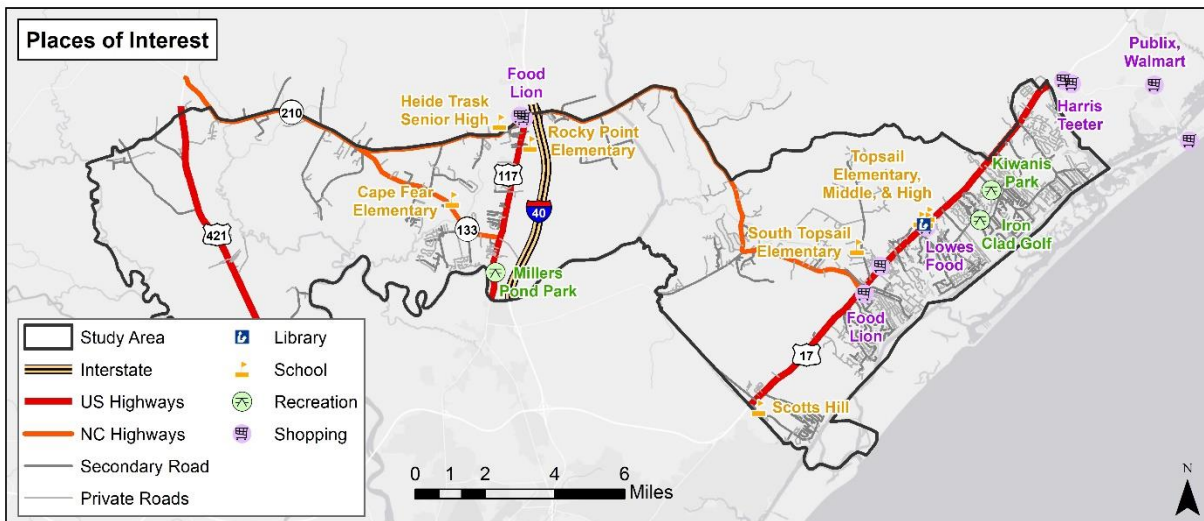


Figure 4: Places of Interest

Figure 5 and Figure 6 show areas that participants identified as biking or walking challenges. US 17, particularly around Lowes Food, Topsail Elementary, Topsail Middle, and Topsail High, is a hotspot for biking challenges. The area around Scotts Hill and near the US 17-NC 210 intersection were also identified as challenge areas for biking. The area around Kiwanis Park is a hotspot for walking challenges. The areas around Lowes Food and Topsail schools, the US 17-NC210 intersection, and Scotts Hill were also identified as moderate concern areas for walking.

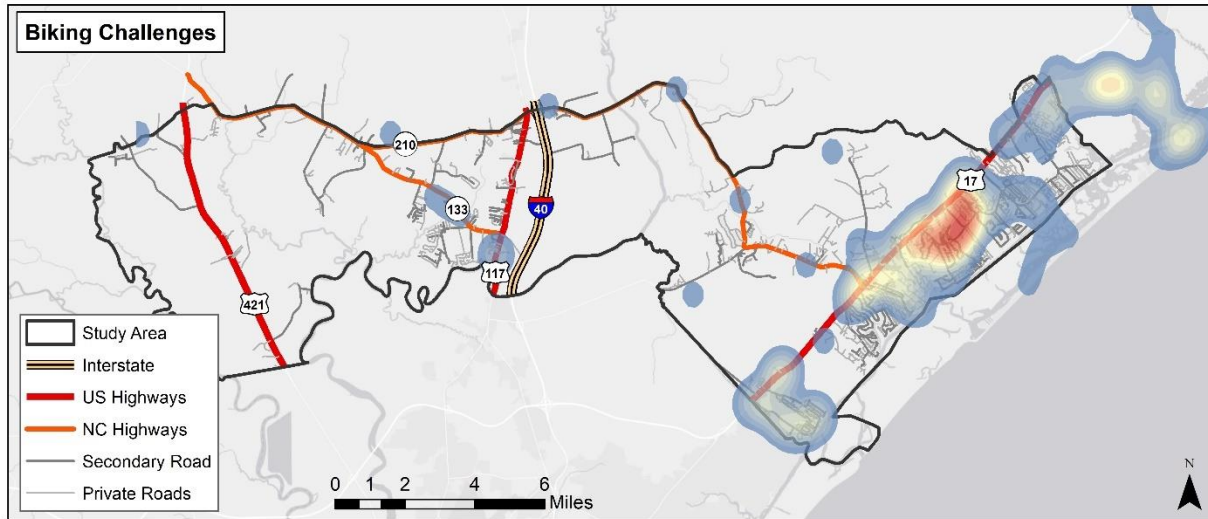


Figure 5: Biking Challenges

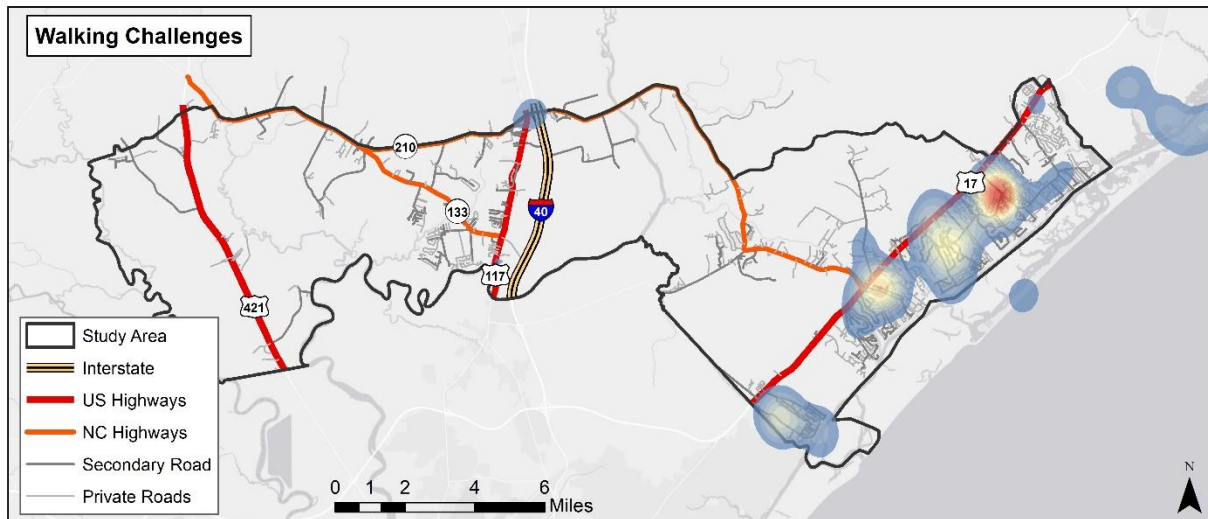


Figure 6: Walking Challenges

Figure 7 shows areas where needed improvements were identified. Hot spots are noted along US 17 near Lowes Food and Topsail schools, the US 17-NC210 intersection, and Scotts Hill. Other noted improvements needed included east of US 17 near Kiwanis Park and along US 117.

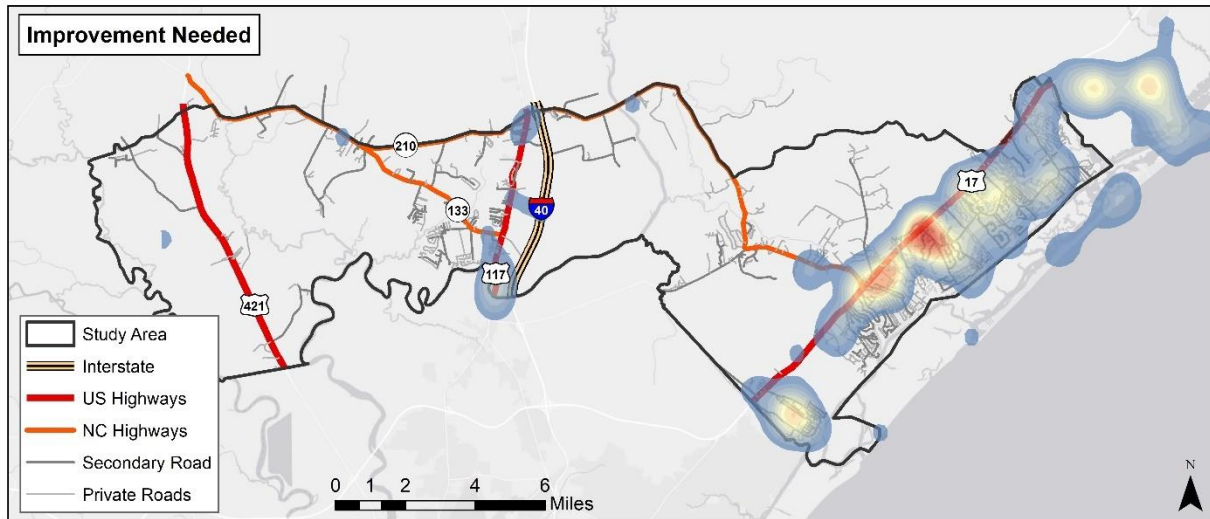


Figure 7: Improvements Needed

Participants were asked to rate their level of comfort using different bicycle and pedestrian facilities including shared lanes, wide shoulders, sidewalks, and greenways. As noted in Figure 8, participants are most comfortable using a greenway for biking and least comfortable using a shared lane. As noted in Figure 9, participants are most comfortable using a greenway for walking, followed closely by a sidepath. Participants are least comfortable using a wide shoulder for walking.

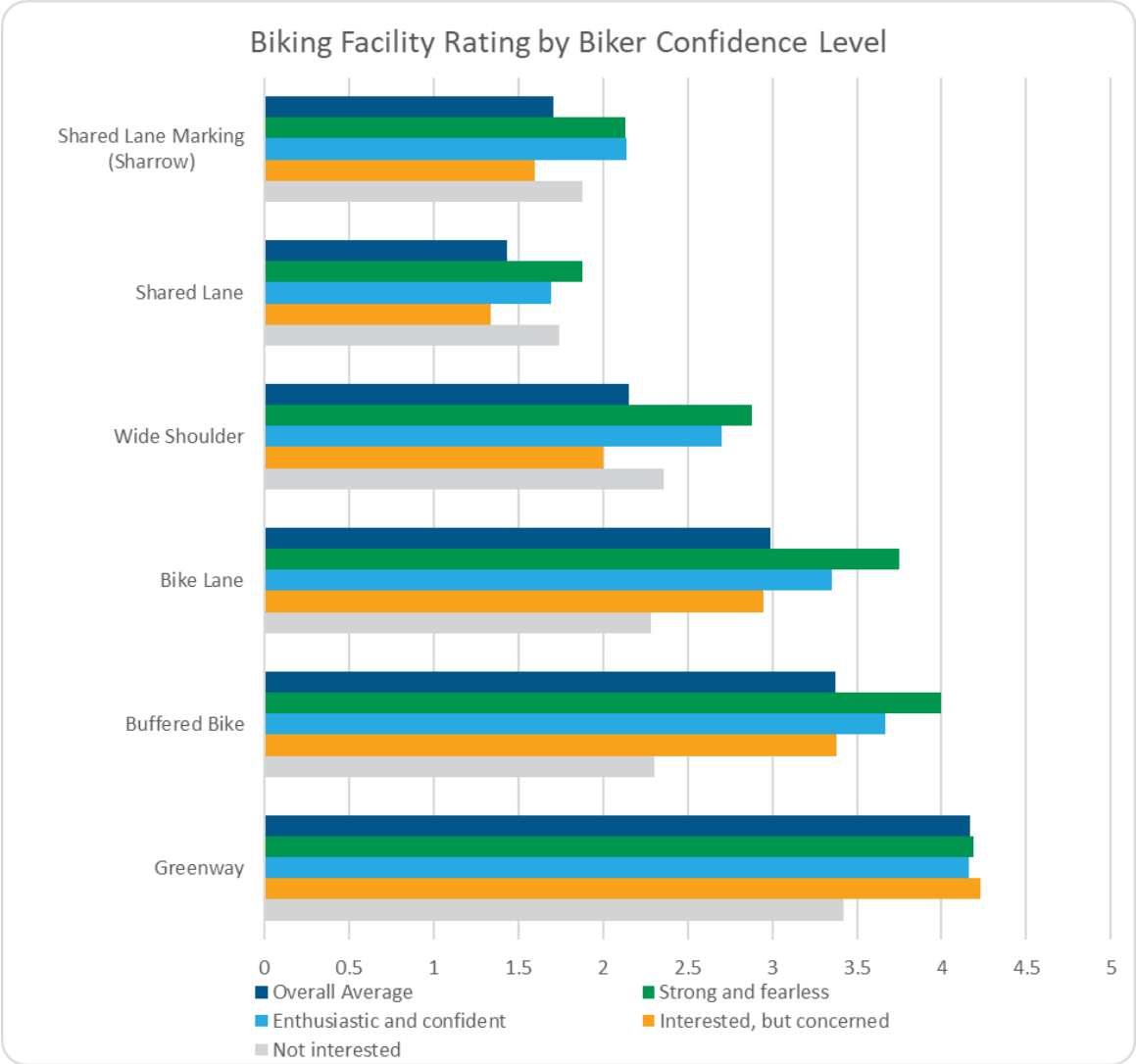


Figure 8: Bicycle Facility Rating by Biker Confidence Level

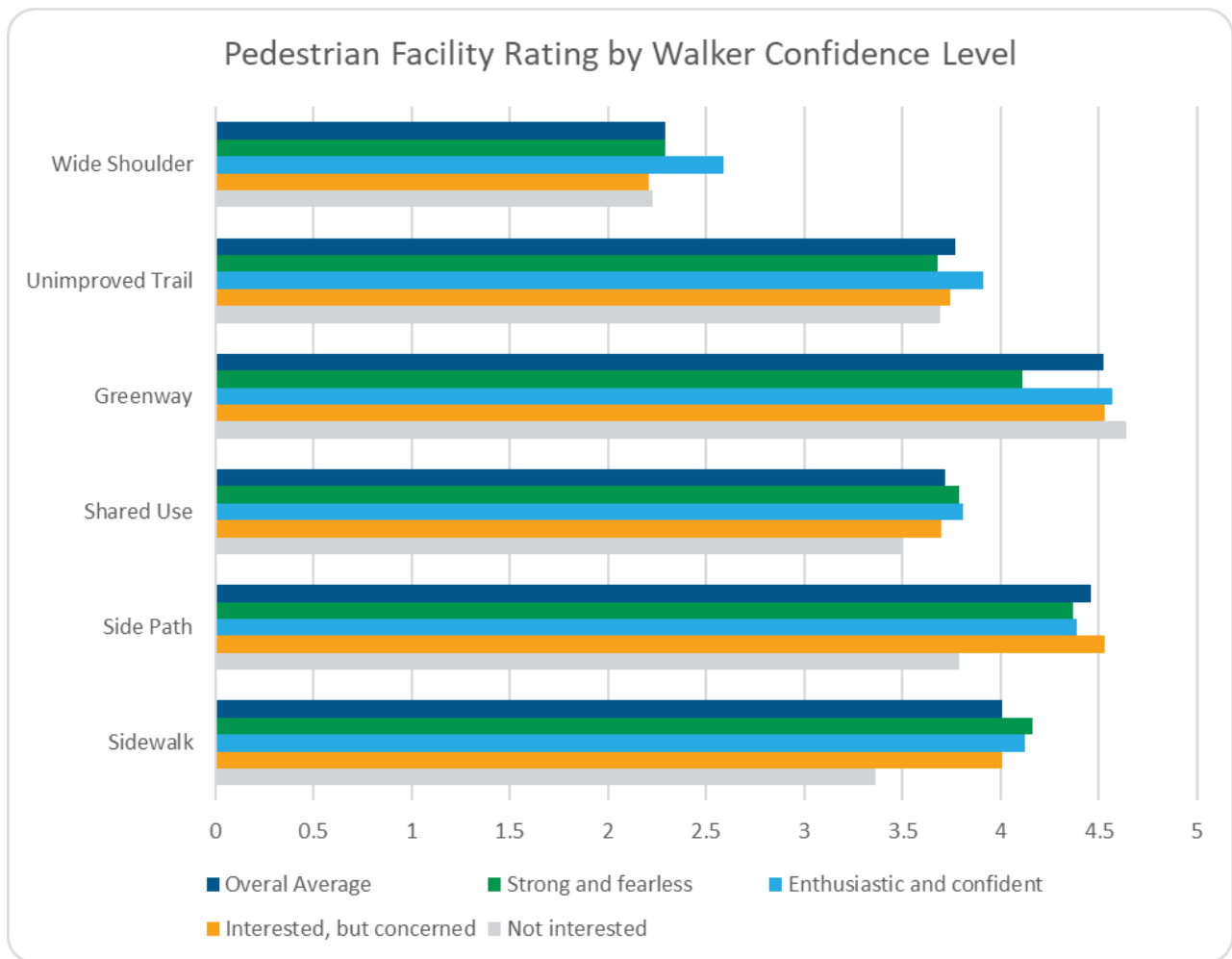


Figure 9: Pedestrian Facility Rating by Walker Confidence Level

Steering Committee Meetings

A steering committee, comprised of Wilmington MPO staff, NCDOT staff, WAVE transit staff, residents, cyclists, business owners, and healthcare workers, met three times throughout the project to provide the team with input on the current and proposed network. The following provides summaries from each of these meetings.

February 1, 2023: 9 steering committee members, along with the project team, met to discuss the plan goals and implementation. Some key goals identified include safety for all users, reducing bicycle and pedestrian crashes, and network connectivity. The committee then identified desired locations for bicycle and pedestrian accommodations which include health care centers, schools, recreational spaces, US 17, and high development areas.

April 3, 2023: 7 steering committee members, along with the project team, met to discuss the public input received and further prioritize locations for improvements. Steering committee members completed two exercises during the meeting. The first exercise determined the top corridors they felt should be prioritized for improvements. The second exercise determined what type of facilities were preferred for specific corridor segments and locations. The results of these exercises showed that US

421, US 117, US 17, Hoover Road, and the eastern portion of NC 210 were the highest priorities for steering committee members. Spots improvements at the US 17-NC 210 intersection, US 17-Hoover Road intersection, and along US 17 at the Topsail schools were also identified as high priorities.

As part of this exercise, committee members were asked to rank their top values for the bicycle and pedestrian network out of a list of guiding values. The following guiding values were evaluated:

- Complementary: Complement and support other county initiatives and development
- Choice: Desire to not use vehicles for every trip and opportunities for walking and biking
- Comfort: Increase in facilities and amenities for walkers and bikers of all ages and abilities
- Safety: Improved bicycle and pedestrian safety and improved connections across US 17
- Connectivity: Enhanced access to commercial areas, health centers, and schools
- Equity: While most activity occurs near US 17, equitably distribute bike and pedestrian facilities across the county
- Health: Support the region's goals to improve public health
- Readiness: The plan should respond to current needs, show community supports, help prepare the county for future growth, and be fiscally feasible

Connectivity and safety ranked the highest, with six committee members ranking each as a top priority. Two committee members ranked readiness as a top priority. One committee member ranked comfort as a top priority and one committee member ranked complementary as a top priority.



Figure 10: Steering Committee members completing a network prioritization exercise

Proposed Network

Input from the public engagement efforts and Steering Committee exercises, combined with criteria for the use of pedestrian and bicycle facilities taken from various technical resources, was used to develop a desired network of bicycle and pedestrian facilities across the urbanized portion of Pender County. Recommendations focused on providing a connected and safe network for all users as top priorities, with emphasis on safe access to commercial areas along US 17, including safe crossings of US 17, access to the Rocky Point area, and access to schools and parks.

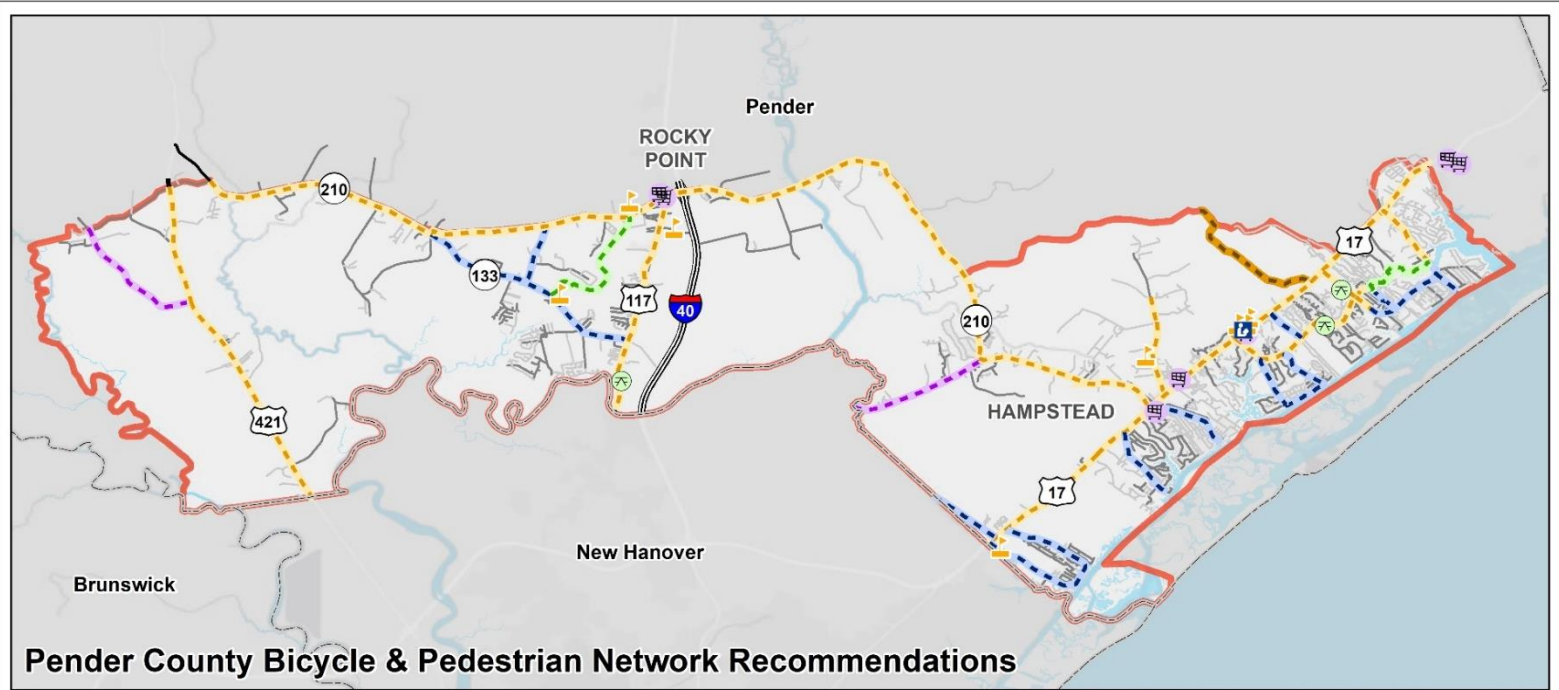
The public input results and Steering Committee discussion emphasized that a bicycle and pedestrian network would not only provide needed mobility options for residents, but the ability to connect residential areas within a mile of US 17 would offer an opportunity for those wanting to access commercial areas to walk or bike, thus helping to reduce the vehicle traffic on US 17.

Facility type was determined using local input, as well as context considerations such as roadway speed and volume, network connectivity, and adjacent land use. Technical resources that were considered in the development of the network include:

- NCDOT Highway Typical Sections for Use in SPOT Online, 2019
- NCDOT Complete Streets Policy, 2019
- NCDOT Roadway Design Manual, 2018
- FHWA Guidance on Bicycle and Pedestrian Accommodation, 2011

Bicycle and Pedestrian Network Recommendations

Figure 1 and Figure 2 on the following pages show the bicycle and pedestrian network recommendations for the study area. Table 1 lists the bicycle and pedestrian network recommendations for the study area. These recommendations are considerate of the fiscal constraint associated with constructing and maintaining a network of bicycle and pedestrian facilities, the general rural character of many roadways in the study area, the right-of-way constraints associated with several roadways, and the rate of population growth across the study area.



- | | | |
|--|---|--|
|  Study Area | Network Recommendations | Places of Interest |
|  County Boundary |  Bike Lane |  Library |
|  Interstate |  Greenway |  School |
|  US Highways |  Sidepath |  Recreation |
|  NC Highways |  Sidewalk |  Shopping |
|  Secondary Road |  Unpaved Trail | |
|  Private Roads | | |

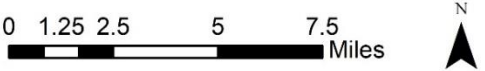
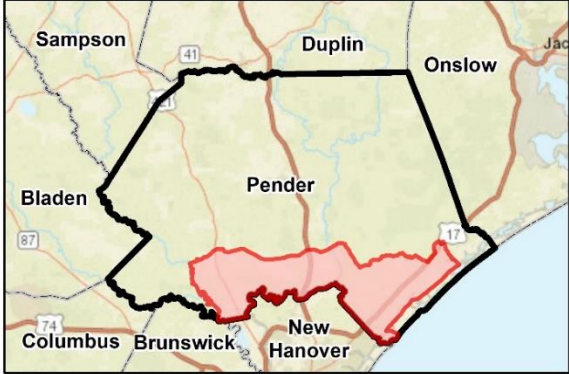


Figure 1: Network Recommendations

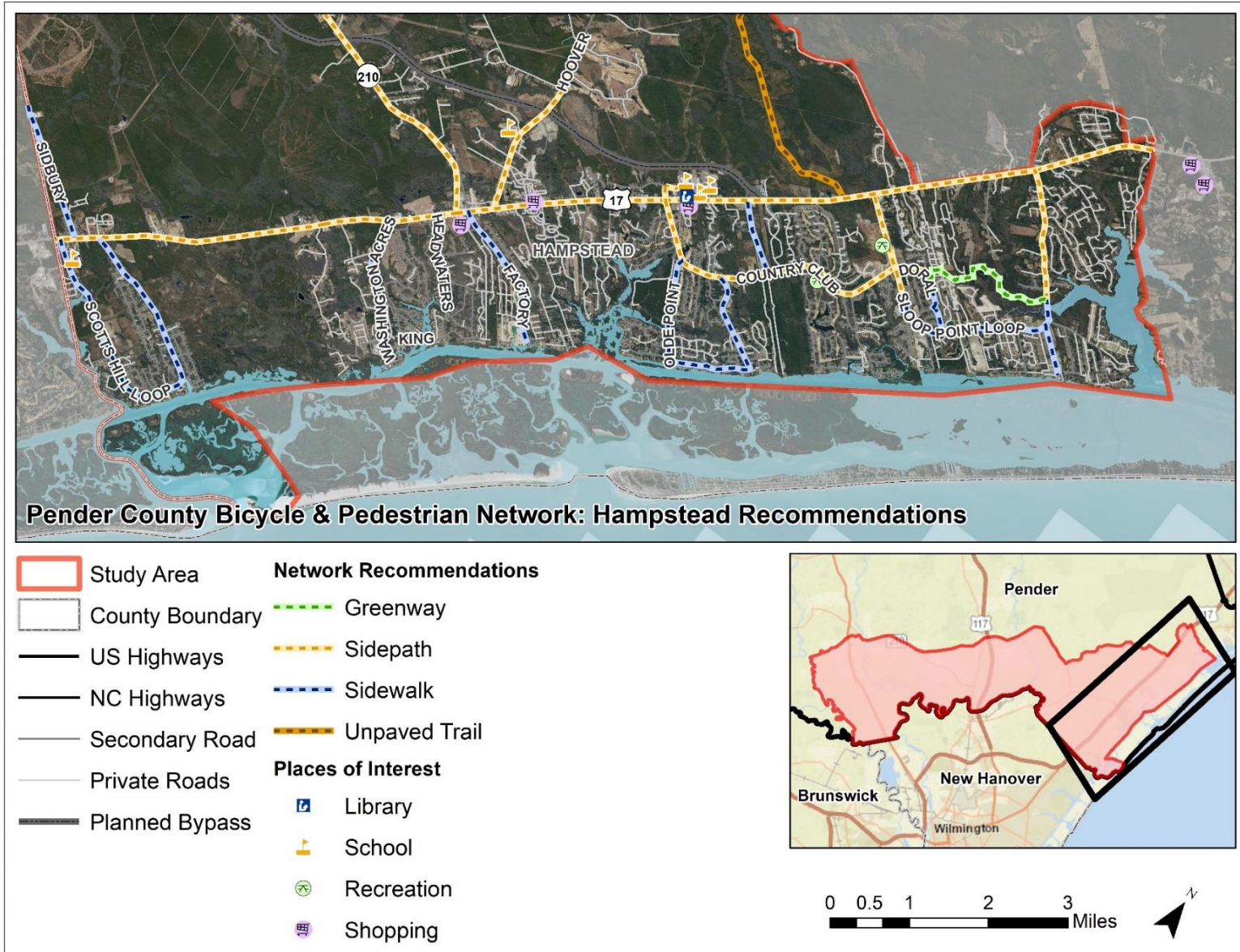


Figure 2: Network Recommendations for Hampstead

Table 1: List of Bicycle and Pedestrian Network Recommendations

Corridor	From	To	Facility Recommendation
Avila Drive Extension	US-17	Country Club Road	Sidewalk
Blueberry Road	US-421	Montague Road	Bike lane
Cheshire Road	NC-133	NC-210	Sidewalk
Country Club Road	US-17	Sloop Point Loop Road	Sidpath
Doral Drive	Sloop Point Loop Road	East Coast Greenway	Sidpath
Doral Drive	East Coast Greenway	Masters Lane	Sidewalk
East Coast Greenway	Doral Drive	Sloop Point Road	Greenway
Factory Road	US-17	Waterfront Circle	Sidewalk
Holly Shelter Road/Island Creek Road	New Hanover County line	NC-210	Bike lane
Hoover Road	Highlands Drive	Godfrey Creek Road	Sidpath
Hoover Road	Godfrey Creek Road	US-17	Sidpath
Jenkins Road	US-17	N St Johns Church Road	Sidpath
Kings Landing Road	Country Club Road	Olde Point Road	Sidewalk
Lewis Road	Sloop Point Loop Road	Sloop Point	Sidewalk
Lodge Road	US-17	Study area limits	Unpaved Trail
Masters Lane	Doral Drive	Sloop Point Loop Road	Sidewalk
N St Johns Church Road	Jenkins Road	Topsail Middle School	Sidpath
NC-133	NC-210	US-117	Sidewalk
NC-210	Shaw Highway	Royal Oak Drive	Sidpath
NC-210	Dallie Futch Road	US-17	Sidpath
NC-210	NC-133	Shaw Highway	Sidpath
NC-210	Montague Road	NC-133	Sidpath
Olde Point Road	Country Club Road	Kings Landing Road	Sidewalk
Scotts Hill Loop Road	US-17	US-17	Sidewalk
Shaw Highway	Study area limits	NC-210	Sidpath
Sidbury Road	US-17	Study area limits	Sidewalk
Sloop Point Loop Road	Doral Drive	North Topsail Elementary School	Sidpath
Sloop Point Loop Road	US-17	Doral Drive	Sidpath
Sloop Point Loop Road, Sloop Point Road	North Topsail ES	Tidewater Court	Sidewalk
Sloop Point Road	US-17	Tidewater Court	Sidpath
Turkey Creek Greenway	NC-210	NC-133	Greenway
US-117	New Hanover County line/Northeast Cape Fear River	NC-210	Sidpath
US-17	Whitebridge Road	NC-210	Sidpath
US-17	NC-210	Country Club Road	Sidpath
US-17	Sloop Point Road	Cornel Lane	Sidpath

Corridor	From	To	Facility Recommendation
US-17	New Hanover County line	Whitebridge Road	Sidepath
US-17	Lodge Road	Sloop Point Road	Sidepath
US-17	Country Club Road	Lodge Road	Sidepath
US-421	New Hanover County line	Blueberry Road	Sidepath
US-421	Blueberry Road	Montague Road	Sidepath
Washington Acres Road	US-17	End of roadway	Sidewalk

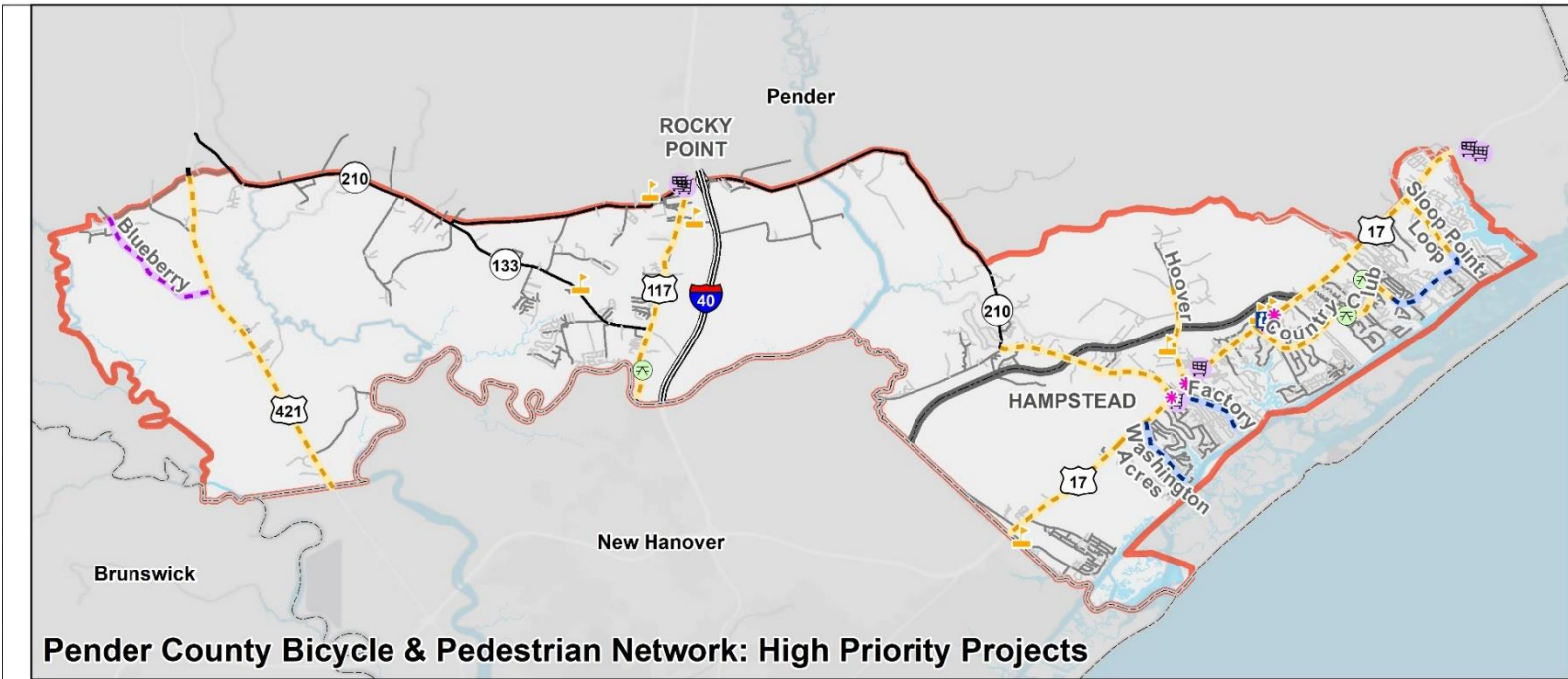
Facilities on US 17 are recommended on both sides of the roadway. Other roadways should be evaluated on a case-by-case basis to determine if facilities on one or both sides are recommended during project planning.

Network Priorities

The Steering Committee used input from the public engagement efforts along with project values to prioritize bicycle and pedestrian facilities that should be at the forefront of planning in Pender County. Figure 3 and Figure 4 show the high priority bicycle and pedestrian projects for the study area. Understanding that there are limited financial resources, these are projects that the Steering Committee felt have the highest desire and need and would result in the greatest impact.

Highly desirable destinations, like grocery stores, restaurants, businesses, medical offices, and schools, are concentrated along and near US 17. Residential developments both west and east of US 17 are growing and residents have a desire to access these destinations along US 17 by bike and walking. These high priority projects were selected because they would prioritize safe bicycle and pedestrian access between these locations while helping to reduce vehicle trips on US 17.

Table 2 lists these high priority projects. Three intersection projects were identified as part of these high priorities. These improvements would improve safety and accessibility across US 17 near active commercial areas and Topsail schools. The intersection near Lowes Food and Topsail Elementary, Topsail Middle, and Topsail High schools was especially identified as a safety concern. Improvements could come in the form of high visibility crosswalks, improved ADA accessibility, median pedestrian islands, curb extensions, lighting, and improved bicycle and pedestrian signalization such as countdown timers, Rectangular Rapid-Flashing Beacons (RRFB), and High-Intensity Activated (HAWK) crosswalk.



- | | |
|-----------------|-------------------------------|
| Study Area | High Priority Projects |
| County Boundary | Sidewalk |
| Interstate | Sidepath |
| US Highways | Bike Lane |
| NC Highways | Intersection Improvements |
| Secondary Road | Places of Interest |
| Private Roads | Library |
| Planned Bypass | School |
| | Recreation |
| | Shopping |

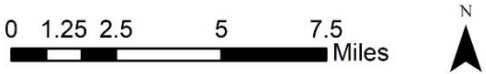
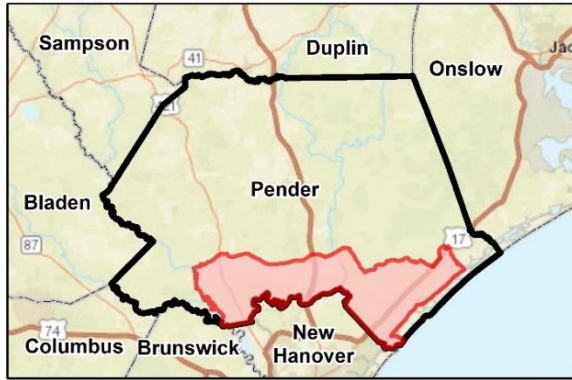
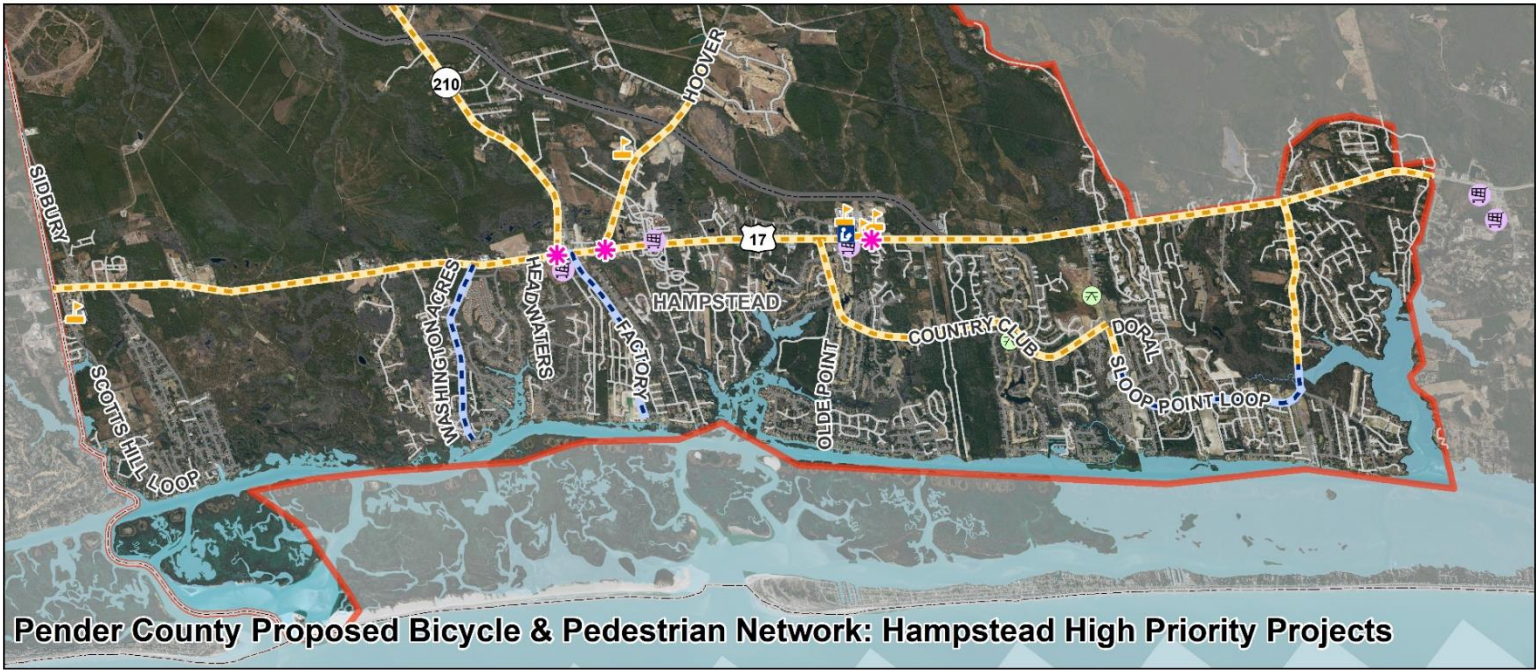


Figure 3: High Priority Projects



Pender County Proposed Bicycle & Pedestrian Network: Hampstead High Priority Projects

- | | | | |
|---|-----------------|---|---------------------------|
|  | Study Area | High Priority Projects | |
|  | County Boundary |  | Sidewalk |
|  | US Highways |  | Sidepath |
|  | NC Highways |  | Intersection Improvements |
|  | Secondary Road | Places of Interest | |
|  | Private Roads |  | Library |
|  | Planned Bypass |  | School |
| | |  | Recreation |
| | |  | Shopping |

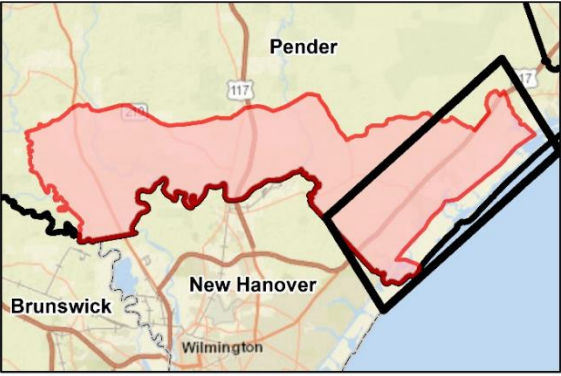


Figure 4: High Priority Projects for Hampstead

Table 2: Priority Bicycle and Pedestrian Projects

Corridor	From	To	Priority Recommendation
Blueberry Road	US-421	Montague Road	Bike Lane
Country Club Road	US-17	Sloop Point Loop Road	Sidepath
Factory Road	US-17	Waterfront Circle	Sidewalk
Hoover Road	Godfrey Creek Road	US-17	Sidepath
NC-210	Dallie Futch Road	US-17	Sidepath
Sloop Point Loop Road	Doral Drive	North Topsail Elementary School	Sidepath
Sloop Point Loop Road, Sloop Point Road	North Topsail ES	Tidewater Court	Bike Lane
Sloop Point Road	US-17	Tidewater Court	Sidepath
US-117	New Hanover County line/Northeast Cape Fear River	NC-210	Sidepath
US-17	Whitebridge Road	NC-210	Sidepath
US-17	NC-210	Country Club Road	Sidepath
US-17	Sloop Point Road	Cornel Lane	Sidepath
US-17	New Hanover County line	Whitebridge Road	Sidepath
US-17	Lodge Road	Sloop Point Road	Sidepath
US-17	Country Club Road	Lodge Road	Sidepath
US-421	New Hanover County line	Blueberry Road	Sidepath
US-421	Blueberry Road	Montague Road	Sidepath
Washington Acres Road	US-17	End of roadway	Sidewalk
NC 210/US 17 Intersection	--	--	Intersection improvements
Hoover Road/US 17 Intersection	--	--	Intersection improvements
Lowes Food/Topsail Schools Intersection	--	--	Intersection improvements

Bicycle and Pedestrian Network Recommended Facility Types

Greenway / Shared Use Path

A greenway, or shared use path, provides a travel area separate from motorized traffic for bicyclists, pedestrians, wheelchair users, skaters, joggers, and other users. Greenways offer network connectivity opportunities beyond the roadway network, as they are often located along streams, in utility corridors and parks.



Figure 5: Sample greenway graphics

Context Considerations:

Greenways operate independently of roadway corridors and are fully separated from traffic and can even become their own corridors, following features such as waterways or utility easements. However, when selecting bicycle and pedestrian facilities, greenways and shared use paths should be considered as multi-modal alternatives for roadway corridors that exceed traffic volumes of 6,000 vehicles per day and speed limits higher than 35 miles per hour. Greenways may provide network alternatives to arterial and collector roadway connections and are appropriate in low-density areas as well as high-density areas to serve as a corridor connection.

Design Considerations:

Greenways should be designed to a width of 10-12 feet in most locations, with a 2-foot shoulder on either side. In areas where low volumes are expected or the corridor is constrained, an 8-10-foot greenway may be adequate. Areas where usage is expected to be very high may be built to a width of 12-14 feet.

A variety of surface treatments are available for greenways depending on expected use, context, and budget. Paved trails are often constructed with asphalt or concrete. Asphalt tends to be more popular and cost-effective than concrete, but concrete is more durable. A less expensive option is an unpaved or

natural surface trail, with compacted aggregates and compacted native soil being popular and durable alternatives. Compacted aggregates often consist of granite fines which are readily available in many locations. Natural surface trails, while less expensive to construct, require proper drainage and more careful maintenance to ensure that materials remain sufficiently compacted. In areas where floodplains or wetlands are present, boardwalk structure is often required for trail construction. Boardwalk is typically more expensive to construct but has a lower maintenance cost. Two main surface options for boardwalk include timber and concrete, with timber being less expensive but more maintenance-intensive than concrete.

Greenways typically do not require pavement marking except in certain locations and contexts. Where greenway traffic is heavy, a 4-inch dashed yellow center line stripe and 4-inch solid white edge line may be used. Solid center lines may be employed in locations where sightlines are poor or the greenway approaches a roadway crossing, and edge lines may be employed in locations where evening use is expected. Signage such as the Bikes Yield to Peds (R9-6) specified in the Manual on Uniform Traffic Control Devices (MUTCD) may be used at the entrance of a greenway segment as a reminder of user etiquette, and many communities use customized wayfinding signs to provide navigation to destinations and other greenways. Figure 6 provides an example cross-section of a preferred greenway facility.

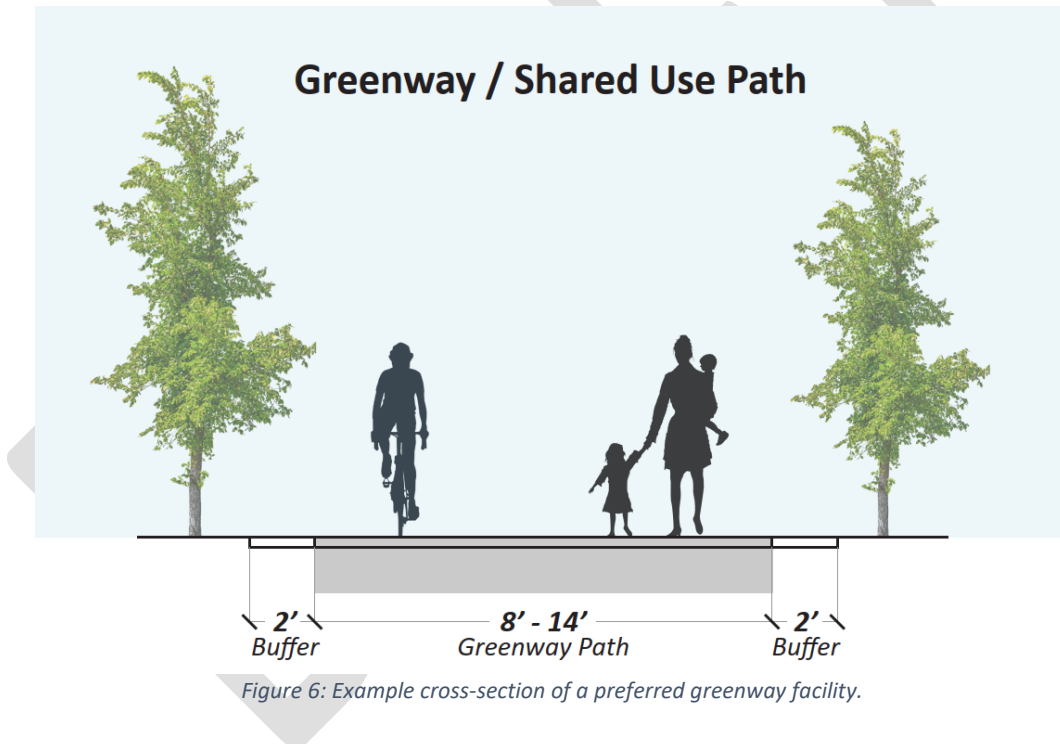


Figure 6: Example cross-section of a preferred greenway facility.

Sidepath

A sidepath is a bi-directional shared use path adjacent to and parallel to a roadway. Sidepaths offer a low-stress experience for bicycle and pedestrians along network routes with high-speed or high-volume traffic.



Figure 7: Sample sidepath graphics

Context Considerations:

Sidepaths are used along roads with high volumes that exceed 6,000 vehicles per day and moderate to high speeds over 35 miles per hour. Sidepaths are used along arterial and collector roadways and are generally recommended in high-density areas to provide dedicated space for bicyclists and pedestrians.

Design Considerations:

Sidepaths should be designed to a width of 10-12 feet in most locations, with 2 feet of clearance on either side. In areas where low volumes are expected or the corridor is constrained, an 8-10-foot trail may be adequate. Areas where usage is expected to be very high may be built to a width of 12-14 feet. The sidepath should be separated from the roadway by at least 5 feet, with additional separation up to 20 feet recommended along high-speed roadways.

Sidepaths are commonly constructed with asphalt or concrete. Asphalt pavement tends to be the most popular and cost effective for paved trails. Concrete pavement is more durable, but costs more than asphalt pavement. As such, concrete trails are typically more common in urban settings (where projected user volumes are high or the trail may be subject to vehicular loading more often) or in areas subject to heavy flooding forces that may cause damage to the trail.

Sidepaths typically do not require pavement marking except in certain locations and contexts. Where sidepath traffic is heavy, a 4-inch dashed yellow center line stripe may be used. Edge lines may be employed in locations where evening use is expected. Signage such as the Bikes Yield to Peds (R9-6) specified in the MUTCD may be used at the entrance of a sidepath segment as a reminder of user etiquette, and many communities use customized wayfinding signs to provide navigation to destinations and other greenways. Other signs may be used to indicate the bidirectional nature of the facility, taking care that any signage is positioned such that it will not be interpreted as guidance for drivers on the adjacent roadway. Figure 8 provides an example cross-section of a preferred sidepath facility.

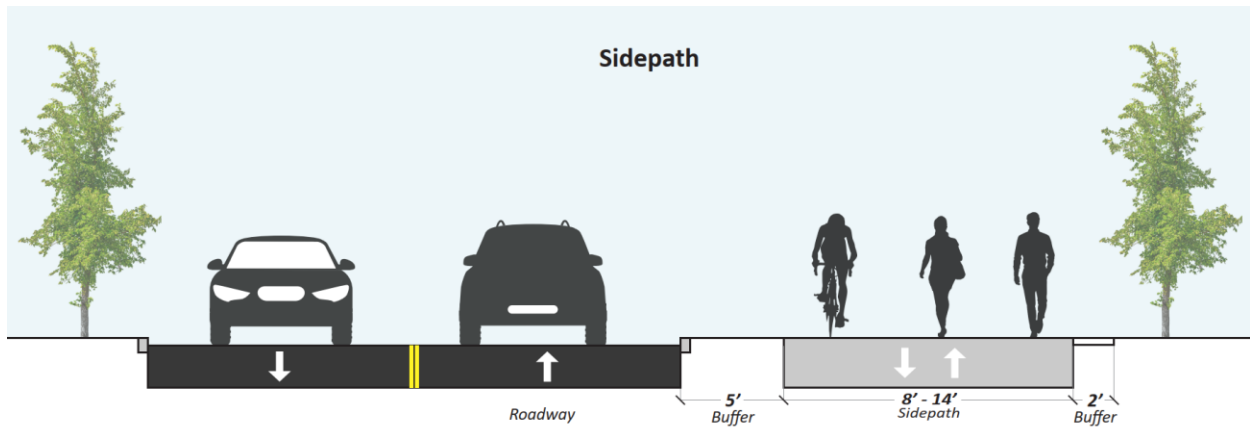


Figure 8: Example cross-section of a preferred sidepath facility

On-Road Facilities

On-road facilities consist of bicycle and pedestrian accommodations provided directly within the roadway. These facilities can be separate or buffered from traffic, or simply striped as dedicated facilities along the outside of the road. The following provides a discussion of various bicycle lane facilities that can be considered for the roadways identified in the bicycle and pedestrian network as desiring bike lanes. When a project opportunity to implement a bike lane facility comes to fruition, the County can work with NCDOT to identify a preferred facility type based on how the character of the corridor has evolved.

Separated Bicycle Lane

A separated bicycle lane is a facility for exclusive use by bicyclists that is located within or directly adjacent to the roadway and is physically separated from motor vehicle traffic by a buffered space with a vertical separation element. Separated bicycle lanes can be designed to accommodate one-way and bi-directional travel.



Figure 9: Sample separated bike lane graphics

Context Considerations:

Separated bicycle lanes are recommended along roadways with high volumes that exceed 6,000 vehicles per day and moderate to high speeds over 35 miles per hour. Separated bicycle lanes are recommended along major roadways and collectors that serve as primary connections to destinations. Separated bicycle lanes are appropriate in areas with moderate to high volumes of bicycle and pedestrian activity. In high-density areas, design treatments should consider potential conflicts with transit stops and driveway crossings to mitigate safety concerns for bicyclists.

Design Considerations:

Separated bike lanes should be designed to a minimum width of 5 feet for one-way facilities, with 7-foot lanes preferred. The bicycle lane should be separated from the roadway by at least 3 feet to provide clearance, or by a minimum of 1 foot where curb is present. Bicycle lanes can be separated from the roadway by a variety of methods, including by installing flexible delineator posts, armadillos, or placing it behind the curb. Separation from pedestrians may be required when the bike lane is immediately adjacent to and at the same level as a sidewalk.

Separated bicycle lanes should be marked with the standard bicycle lane symbol (MUTCD marking 9C-3) to clearly indicate their intended use. Where separated bicycle lanes are adjacent to a sidewalk, additional signage such as MUTCD signs D11-1a (Bicycle) and D11-2 (Pedestrian) may be necessary to indicate which users belong on which facility. Figure 10 provides an example cross-section of a preferred separated bike lane facility.

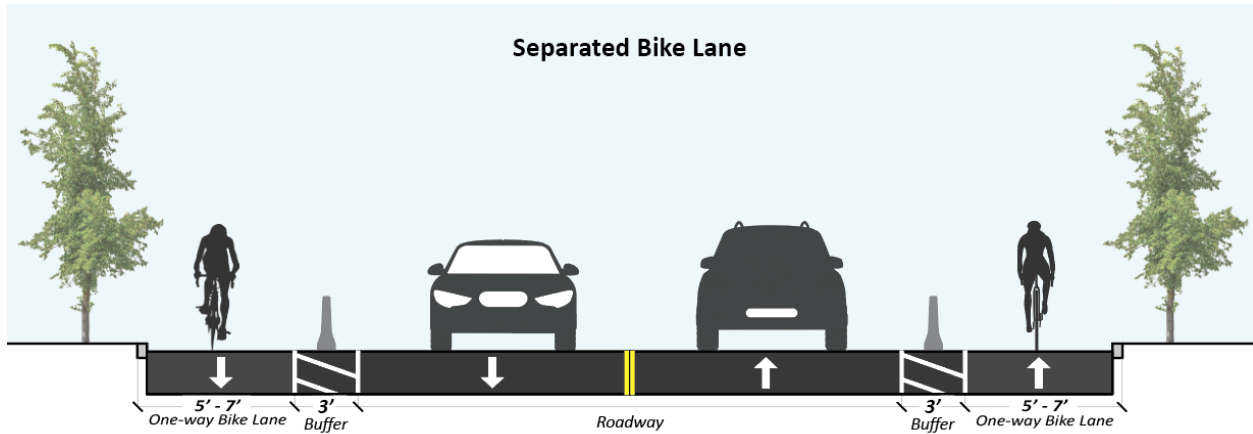


Figure 10: Example cross-section of a preferred separated bike lane facility

Buffered Bicycle Lane

A buffered bicycle lane designates a travel space for bicyclists within the roadway corridor through use of pavement markings, optional signage, and a buffer space separating the bicycle lane from the adjacent travel lane.



Figure 11: Sample buffered bike lane graphics

Context Considerations:

Buffered bicycle lanes are recommended along roads with moderate volumes and speeds. Buffered bicycle lanes are appropriate treatments for roadways with traffic volumes between 3,000 and 6,000 vehicles per day and moderate speeds between 25 and 35 miles per hour. Buffered bicycle lanes are appropriate treatments along arterial and collector roadways that connect local bikeway routes to

regional corridors. Buffered bicycle lanes are recommended in areas with increased bicycle and pedestrian activity.

Design Considerations:

Buffered bike lanes should be designed to a minimum width of 5 feet, with 6 feet preferred. The bicycle lane should be buffered from other traffic by at least 18 inches by a painted double white line. If the buffer is 3 feet or more, it should be marked with diagonal stripes or chevron markings to increase visibility and motorist compliance. Markings should be between 30 to 45 degrees and striped at intervals between 10 and 40 feet.

Buffered bicycle lanes should be marked with the standard bicycle lane symbol (MUTCD marking 9C-3) to clearly indicate their intended use. Where right turns are made across the buffered bicycle lane, the turn lane should be placed to the right of the bicycle lane, or a combined bicycle lane/turn lane can be used when space is limited. MUTCD sign R4-4, Begin Right Turn Lane Yield to Bikes, should be used at the start of the turn lane to alert drivers to the potential conflict with bicyclists when entering or crossing the buffered bicycle lane. Lines should be dashed where cars are expected to cross the bike lane to access turn lanes. The bike lane may be painted to increase visibility and minimize confusion with other facilities. Green is the standard paint color for bicycle lane markings, which may be applied throughout the bicycle lane, at intersections, or in conflict areas. Figure 12 provides an example cross-section of a preferred buffered bike lane facility.

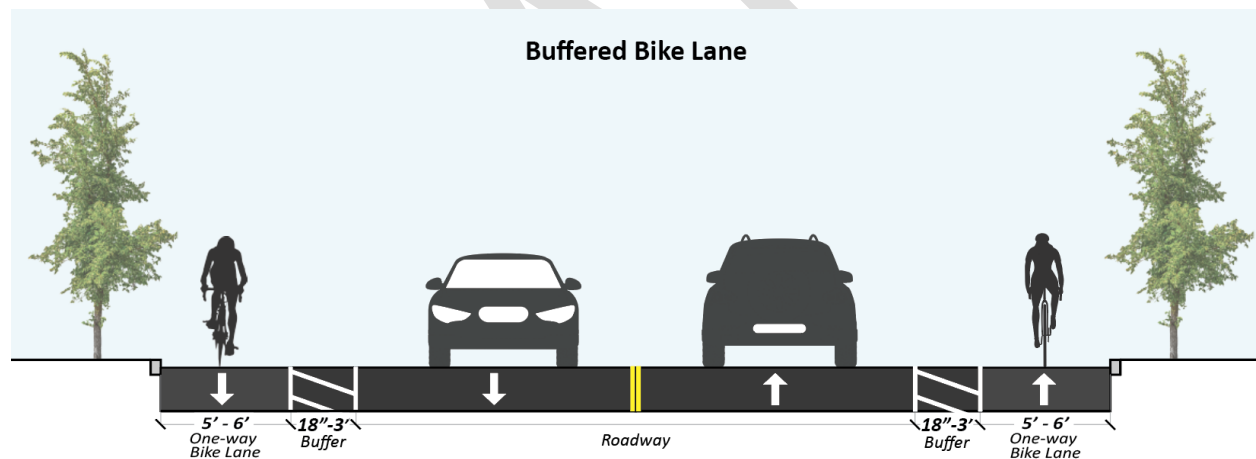


Figure 12: Example cross-section of a preferred buffered bike lane facility.

Bicycle Lane

A bicycle lane designates a travel space for bicyclists within the roadway corridor through use of pavement markings and optional signage to provide accommodations in the absence of more separated facilities.



Figure 13: Sample bicycle lane graphics

Context Considerations:

Bicycle lanes may be used along roads with moderate traffic volumes and speeds. Bicycle lanes are appropriate treatments along roads with traffic volumes between 3,000 and 6,000 vehicles per day and moderate speeds between 25 and 35 miles per hour. Bicycle lanes are appropriate treatments along arterial and collector roadways that connect local bikeway routes to regional corridors. Bicycle lanes are recommended in areas with increased bicycle and pedestrian activity and in areas where right-of-way constraints limit the ability to provide a higher quality facility.

Design Considerations:

Bicycle lanes should be designed to a minimum width of 5 feet, with 6 feet preferred. The bicycle lane should be marked with a solid white line and standard bike lane symbol. If the bicycle lane is more than 7 feet wide, there may be issues with drivers using the bike lane for driving or parking. The bike lane markings should not be dashed at driveway crossings, as the MUTCD does not recognize driveways as intersections.

Bicycle lanes should be marked with the standard bicycle lane symbol (MUTCD marking 9C-3) to clearly indicate their intended use. Where right turns are made across the bicycle lane, the turn lane should be placed to the right of the bicycle lane, or a combined bicycle lane/turn lane can be used when space is limited. MUTCD sign R4-4, Begin Right Turn Lane Yield to Bikes, should be used at the start of the turn lane to alert drivers to the potential conflict with bicyclists when entering or crossing the bicycle lane. Lines should be dashed where cars are expected to cross the bike lane to access turn lanes. The bike

lane may be painted to increase visibility and minimize confusion with other facilities. Green is the standard paint color for bicycle lane markings, which may be applied throughout the bicycle lane, at intersections, or in conflict areas. Figure 14 provides an example cross-section of a preferred bike lane facility.

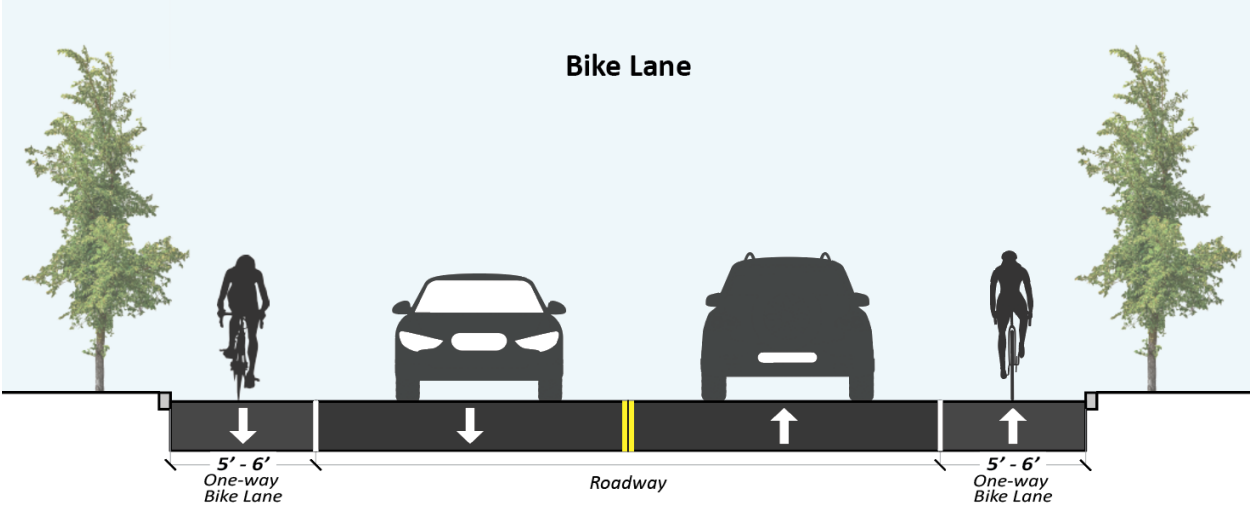


Figure 14: Example cross-section of a preferred bike lane facility

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Sidewalk

A sidewalk is a bidirectional path that provides a dedicated travel area for pedestrians in the transportation network. Sidewalks are physically separated from the roadway by a curb or unpaved buffer space.



Figure 15: Sample sidewalk graphics

Context Considerations:

Sidewalks are recommended on all but the most low-speed and low-volume roadways. Sidewalks should be considered for roadway corridors that exceed traffic volumes of 2,000 vehicles per day and speed limits higher than 10 miles per hour. Sidewalks are recommended for all types of roadways where pedestrian activity is likely. Sidewalks are also appropriate in areas with a variety of land uses and may best serve short-distance travel along roadways with pedestrian-generating development, such as neighborhoods, schools, shopping centers, and employment centers.

Design Considerations:

Sidewalks should be designed to a minimum width of 6 feet, with 5 feet recommended in constrained sections. A buffer of at least 5 feet between the sidewalk and curb roadway should be included wherever possible to provide physical separation from vehicle traffic.

Sideways are commonly constructed with asphalt or concrete. Asphalt pavement tends to be the most popular and cost effective for paved trails. Concrete pavement is more durable, but costs more than

asphalt pavement. As such, concrete trails are typically more common in urban settings (where projected user volumes are high or the trail may be subject to vehicular loading more often) or in areas subject to heavy flooding forces that may cause damage to the trail.

Sidewalks typically do not require markings except at intersections or midblock crossings, where marked crosswalks should be provided. Crosswalk markings should be designed to a minimum width of 6 feet, and the high-visibility “continental” design is recommended. At lower volume intersections or stop signs the standard, or “transverse” crosswalk marking may be acceptable. Signage such as the MUTCD R10-15 Turning Vehicles Yield to Pedestrians may be used to alert drivers to the presence of pedestrians at crosswalks. Figure 16 provides an example cross-section of a preferred sidewalk facility.

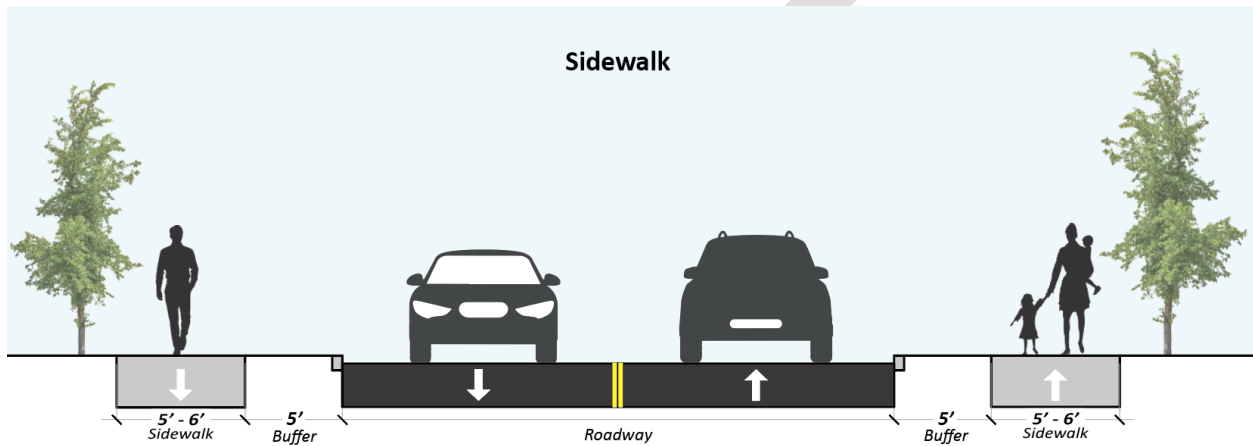


Figure 16: Example cross-section of a preferred sidewalk facility

Intersection Improvements

There are several locations along US 17 where improved bicycle and pedestrian crossings are desired to provide safer and more comfortable access to commercial areas and schools. Improvements could come in the form of high visibility crosswalks, improved ADA accessibility, median pedestrian islands, curb extensions, lighting, and improved bicycle and pedestrian signalization such as countdown timers, Rectangular Rapid-Flashing Beacons (RRFB), and High-Intensity Activated (HAWK) crosswalk. Intersection improvements should be discussed with NCDOT as part of ongoing planning and design work for upgrades to US 17.

To the right is an example of a RRFB that can be activated to alert motorists of a pedestrian or bicyclist crossing at a crosswalk. RRFB's are suitable for lower volume, lower speed roadways.



Figure 17: Rectangular Rapid Flashing Beacon

The following shows an example of a HAWK signal that can be activated to alert motorists of a pedestrian or bicyclists crossing at a crosswalk. These are used for corridors with high traffic volumes and high speeds where extra attention needs to be brought to a crossing.



Figure 18: HAWK Signal

The below shows an example of a median pedestrian island, high visibility crosswalk, and enhanced lighting.

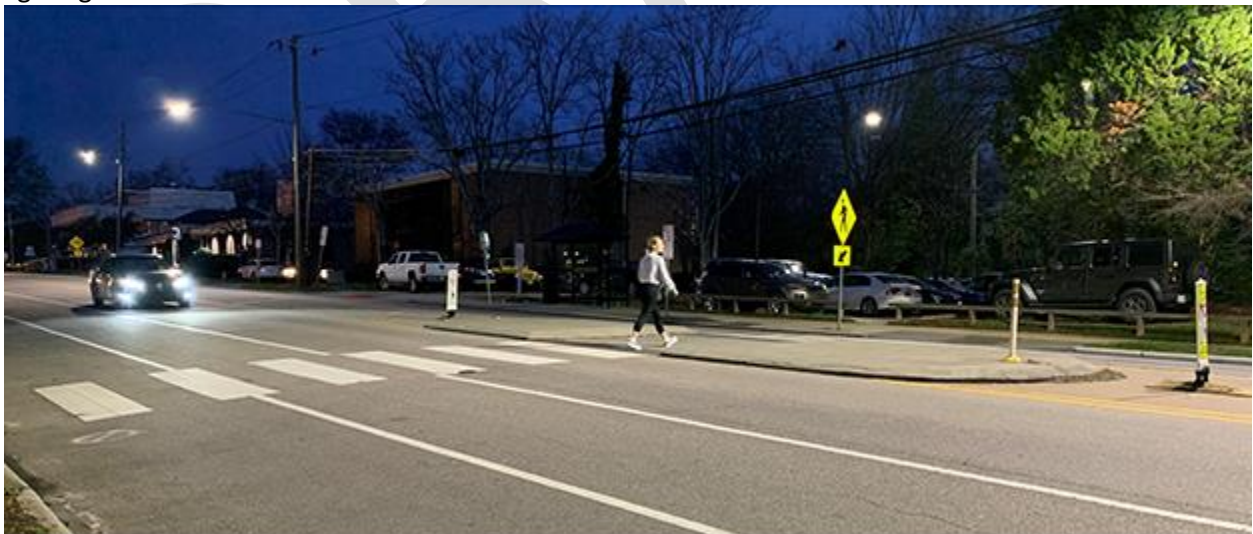


Figure 19: High visibility crosswalk with a median pedestrian island and enhanced lighting

Policy Review

Existing policies, ordinances, and design guidance documents at the county, state, and federal levels were reviewed that are relevant to walking and biking in Pender County. Findings are provided in the table below.

The following policies, ordinances, and design guidance were reviewed as part of this exercise:

- Pender County Unified Development Ordinance, 2022
- Pender County Code of Ordinances, 2020
- NCDOT Highway Typical Sections for Use in SPOT Online, 2019
- NCDOT Complete Streets Policy, 2019
- NCDOT Roadway Design Manual, 2018
- FHWA Guidance on Bicycle and Pedestrian Accommodation, 2011
- NCDOT Bridge Policy, 2000

POLICY	KEY RECOMMENDATIONS THAT RELATE TO THE PENDER COUNTY BICYCLE & PEDESTRIAN MASTER PLAN
<p>Pender County Unified Development Ordinance (2022)</p>	<p>The Unified Development Ordinance (UDO) regulates development within Pender County. There are several provisions in the UDO which affect the implementation of bicycle and pedestrian infrastructure in Pender County.</p> <p><i>4.6.10 Permitted Obstruction in Required Yards</i> Sidewalks, uncovered steps, and handicapped access ramps are included as permitted obstructions in any required yard.</p> <p><i>4.8.1 PD: Planned Development District</i> D. Development Standards - Development in a PD District shall be subject to all applicable regulations unless otherwise waived or modified by the County in the terms of the approved master land use plan. In no case shall the decision-making body waive or modify the following standards for a proposed PD development: 5) Street connectivity requirements; 6) Sidewalk and greenway requirements;</p> <p>E. Transportation and Circulation System 2) Pedestrian-oriented communities are encouraged to maximize opportunity for pedestrian activity and improve the quality of the pedestrian experience. Planned subdivisions must adhere to the design standards for drainage and paving in this Ordinance. 4) Adequately constructed and maintained bike and/or hiking trails shall be counted toward the open space requirement. Bicycle lanes and multi-use pathways that extend the minimum right-of-way width shall be designed in accordance with the North Carolina Bicycle Facilities Planning and Design Guidelines Manual.</p> <p><i>4.11.1 EC: Environmental Conservation District</i> C. Development Standards - In order to reduce the impact of development on the existing natural environment, the following standards apply to all land disturbing activities within an EC district:</p>

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- 1) With the exception of a pedestrian trail or a fence, no land disturbing activities may occur within a required yard or within one hundred (100) feet of:
- 2) All lands located within a designated floodway (AEFW);
- 3) All site area under the jurisdiction of the Army Corps of Engineers (the Corps) or the North Carolina Department of Natural Resources, Division of Water Quality (DWQ);
- 4) All lands located within a CAMA shoreline buffer;
- 5) All lands located below the high water line of an existing pond, lake, or stream; and
- 6) All lands with slopes steeper than twenty-five (25) percent.

4.12.6 Bicycle and Pedestrian Improvement Overlay District

The Bicycle and Pedestrian Improvement Overlay District is created on a case-by-case basis and informed by development activity, current and future roadway improvement projects, current and future bicycle and pedestrian usage and demand, and all relevant adopted plans.

E. District Requirements

1) Provision of Facilities and Infrastructure

a) Bicycle and pedestrian infrastructure shall be constructed as part of a development proposal within an adopted Bicycle and Pedestrian Improvement Overlay District if one or more of the following conditions are met:

- i) The proposed development is located within the jurisdiction of the Wilmington Metropolitan Planning Organization (WMPO) and is located along an existing or planned principal or minor arterial and/or major or minor collector street as defined by the WMPO Functional Classification Map, or;
- ii) The proposed development is located outside the jurisdiction of the Wilmington Metropolitan Planning Organization and is located along an existing or planned principal or minor arterial and/or major or minor collector street as defined by the NCDOT Functional Classification Map.
- iii) The proposed development is located along a road or street where bicycle and/or pedestrian improvements have been identified and included in an adopted bicycle and pedestrian plan or another adopted plan.

b) The type of facility provided shall be in accordance with adopted local and regional bicycle and pedestrian, transportation, and other plans. If a proposed development has road frontage on an existing or planned arterial or collector street as defined by the WMPO or NCDOT and is not listed on any adopted bicycle or pedestrian plan, then the required construction of bicycle and pedestrian infrastructure shall not be applied.

2) Facility Location, Design, and Construction

a) Where possible, bicycle and pedestrian infrastructure shall be constructed within the public right-of-way in consultation with NCDOT.

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- i) If off-road bicycle and pedestrian infrastructure (sidewalks, multi-use paths, and similar) cannot be constructed in the public right-of-way, the improvement shall be constructed within a dedicated public easement and shall be along the entire length of road frontage for the appropriate facility constructed or to-be-constructed.
 - b) Sidewalks shall be constructed as concrete or other like-material to minimum dimensions of 5' wide and 4" thick along the entire length of road frontage of a subject parcel not including driveways as described by AASHTO standards.
 - c) Multi-use paths shall be constructed as asphalt or other like-material to minimum dimensions of 10' wide and 4" thick along the entire length of road frontage of a subject parcel not including driveways as described by AASHTO standards.
 - d) Bike lanes and other on-road bicycle and pedestrian infrastructure shall be designed and constructed in accordance with AASHTO standards and in consultation with NCDOT.
 - e) Off-road bicycle and pedestrian infrastructure shall generally be constructed parallel to the adjacent street. Curves and meanders shall be kept to a minimum.
 - i) Deviations and meanders from the proposed route are permitted if the proposed route impacts wetlands, significant trees, creeks and streams, and/or other environmentally sensitive features or areas.
 - ii) Boardwalks may also be constructed where meanders are not appropriate with required state and federal permits, should they be required.
 - iii) Boardwalks shall maintain facility minimum width and design standards as described in this section and AASHTO standards and be in compliance with the Americans with Disabilities Act and as described in the United States Forest Service's Wetland Trail Design and Construction.
- 3) Payment-in-Lieu: A payment-in-lieu of bicycle and pedestrian facility construction shall be provided as an option to all applicants if construction is impractical or if genuine hardships caused by the construction requirement can be shown.
- a) If one or more of the following conditions are met, developers must utilize this option instead of constructing a sidewalk:
 - i) The road or street on which a parcel has frontage is included in the NCDOT State Transportation Improvement Program or other transportation improvement plan for widening within the next five years;
 - ii) The road or street on which a parcel has frontage is scheduled to receive bicycle or pedestrian infrastructure as part of another project.
 - iii) If deviations from a proposed route are required as described in Section 4.12.6.D.1.D above.
 - b) Payments-in-lieu of bicycle and pedestrian facility construction shall be calculated by determining a linear foot amount of facility responsibility for a parcel.

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- i) The type of facility required shall be determined by locally-adopted bicycle and pedestrian plans.
- ii) The linear foot length of sidewalk responsibility shall be the subject parcel's frontage along an arterial or collector street as defined by the NCDOT Functional Classification Map, minus proposed driveways widths as approved by NCDOT.
- iii) The dollar amount per linear foot of facility responsibility for each type of facility shall be determined by the Board of Commissioners, subject to change.
- iv) Total payment-in-lieu contribution shall be calculated by multiplying the linear feet of facility responsibility for a subject parcel by the price per linear foot of appropriate facility as set by the Pender County Board of Commissioners.

c) Those individuals utilizing the payment-in-lieu option shall still be required to dedicate public easements for facility construction and use if the facility cannot be entirely located within the public right-of-way.

4) Site Design

a) Access

- i) Pedestrians and bicyclists shall be provided with dedicated facilities to reach a building or structure from the location or point of the bicycle or pedestrian facility.
- ii) If pedestrian access is provided via a parking lot, said parking lot shall include islands and/or crosswalk striping to provide pedestrians with a safe corridor in which to move between sidewalk and front entrance.
- iii) Any bicycle or pedestrian infrastructure that crosses a driveway or curb cut shall include crosswalk striping or other similar markings to denote the path of the facility and to alert motorists.
- iv) If required facility to be constructed is a bike lane or multi-use path, bike racks shall be provided.

b) Building Design

- i) All commercial structures within the Bicycle and Pedestrian Improvement Overlay District shall have at least one (1) public entrance that directly faces the public street.

c) Amenities

- i) Pedestrian amenities, such as benches and seating areas, are encouraged in all scenarios and shall be required to be included in site designs when distance between front property line and main structure entrance is greater than 50 feet.
- ii) Other amenities, such as those providing shade and lighting, are encouraged. Any provided shade trees shall be in accordance with Article 8

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- 'Landscaping and Buffering' of this ordinance.
- iii) In accordance with standards in approved bicycle and pedestrian plans, amenities such as pet waste stations and bike repair stations shall be provided at regular intervals depending upon type of facility constructed.
- iv) Any provided amenities shall not be placed in the public right-of-way unless those amenities can be placed in such a way that does not obstruct the minimum facility width. Provided amenities placed in public rights-of-way shall be done so in consultation with NCDOT.
- v) Any provided amenities shall complement the design of other bicycle and pedestrian elements, nearby buildings and structures, and the character of the community.
- vi) Any provided amenities shall be constructed of durable, high-quality materials. Such materials include treated wood, metal and steel, and hardened plastics. Amenities shall be designed specifically for outdoor use. Indoor furniture shall not satisfy the requirements of this ordinance.
- vii) The property owner assumes all liability and all maintenance and upkeep responsibility for all provided amenities.
- viii) Any proposed amenities shall be clearly shown and labelled on all submitted site plans.
- d) Any bicycle and pedestrian improvements made to a site shall be in compliance with the Americans with Disabilities Act and all other applicable federal, state, and local legislation.

7.6 Open Space

Whenever land is subdivided for residential purposes in excess of ten units, a portion of the land must be dedicated for open space.

B. Open space areas can be defined by active or passive open space as follows:

2) Passive Open Space areas must consist of undisturbed, unique and sensitive natural features when available, that may include streams, floodplains, wetlands (excluding tidal marsh) conservation resources, and natural heritage areas if identified. These natural spaces will be characterized by undisturbed soils and natural vegetative cover for wildlife habitat. Passive Open space may become part of designated County greenways. Amenities such as walking paths, piers, picnic areas and other passive recreational uses will be allowed with minimal disturbance of the vegetation.

C. Required Open Space: All new residential subdivisions shall provide open space in the amount of 0.03 acres per dwelling unit within the subdivision. No more than 50% of the required open space shall be designated as passive open space. 50% or more of the required open space shall be designated as active open space.

E. Standards for Park, Recreation and Open Space Areas: Except as otherwise approved by the Planning Board, all park, recreation and open space areas shall meet the

POLICY	KEY RECOMMENDATIONS THAT RELATE TO THE PENDER COUNTY BICYCLE & PEDESTRIAN MASTER PLAN
	<p>following criteria:</p> <p>3) Greenways: If open space is a greenway, the land shall be a continuous linear parcel through the subdivision of at least 30 feet in width.</p>
<p>Pender County Code of Ordinances (2020)</p>	<p>While many regulations related to bicycle and pedestrian facility development in Pender County are contained in the UDO, there are a few relevant sections of the Code of Ordinances.</p> <p><i>14.190. – Watershed buffer areas required</i></p> <p>(a) A minimum 30-foot vegetative buffer for development activities is required along all perennial waters indicated on the most recent versions of U.S.G.S. 1:24,000 (7.5 minute) scale topographic maps or as determined by local government studies. Desirable artificial streambank or shoreline stabilization is permitted.</p> <p>(b) No new development is allowed in the watershed buffer except for water-dependent structures and public projects such as road crossings and greenways where no practical alternative exists. These activities should minimize built-upon surface area, direct runoff away from the surface waters and maximize the utilization of stormwater best management practices.</p>
<p>NCDOT Complete Streets Policy (2019)</p>	<p>The NCDOT Complete Streets Policy Update was adopted by the Board of Transportation in August 2019. This policy requires NCDOT to consider and incorporate multimodal facilities in the design and improvement of all transportation projects in North Carolina. The adopted Comprehensive Transportation Plan (CTP) is considered the controlling plan for the identification of nonmotorized facilities to be evaluated as part of a roadway project. The CTP may include and/or reference locally adopted plans for public transportation, bicycle and pedestrian facilities, and greenways. Bicycle, pedestrian, and public transportation facilities that appear in the CTP directly or by reference will be included as part of the proposed roadway project, and NCDOT is responsible for the full cost of the project. Bicycle, pedestrian, and transit facilities incidental to a roadway project where a need has been identified through the project scoping process but not identified in an adopted plan may be included in the project. Inclusion of these incidental facilities requires the local jurisdiction to share the incremental cost of constructing the improvements based on population thresholds. The policy also establishes maintenance responsibility for active transportation facilities. Bicycle, pedestrian, and transit improvements inside a municipal boundary are subject to local maintenance. For bicycle, pedestrian, and transit improvements outside of a municipal boundary where a county maintenance agreement has not been executed to maintain the facility, NCDOT will maintain the facility after construction if the bicycle or pedestrian facility lies within NCDOT right-of-way. Projects that have not completed environmental review prior to August 2019 are subject to the Complete Streets Policy.</p> <p>Maintenance of Multimodal Facilities: A local maintenance agreement will be executed within the timeframe identified in the PDN for all separated bicycle and pedestrian improvements (e.g., sidewalk or shared-use path) inside or outside a municipal boundary. In the event an agreement cannot be reached, the next highest non-separated facility type will be evaluated for inclusion in the project. Exceptions may be made on a case-by-case basis and NCDOT may agree to maintain separated facilities when a maintenance agreement is not in place in unique project areas of high pedestrian/bicycle demand or high risk related to crossing</p>

POLICY	KEY RECOMMENDATIONS THAT RELATE TO THE PENDER COUNTY BICYCLE & PEDESTRIAN MASTER PLAN
	distance or other conditions.
NCDOT Highway Typical Sections for Use in SPOT Online (2019)	<p>This document contains 57 different highway typical cross sections for use in SPOT Online. The typical sections listed in this guidance provide a variety of options for users to choose from when entering the desired cross section for a new project in the application. Each typical section includes several data elements, such as the number of lanes, median type, and amount of right-of-way needed. These data elements are used to calculate quantitative scores for the Prioritization process, as well as calculate a planning-level cost estimate for the project.</p> <p>This guidance contains typical sections (2F and 2P) for 2-lane undivided roads with paved shoulders and sidewalks in Coastal Area Management Act (CAMA) designated counties. These typical sections prescribe design speeds of 25 to 45 miles mph and minimum clear zones of 20 ft. Pender County is considered a CAMA county.</p>
NCDOT Roadway Design Manual (2018)	<p>The Roadway Design manual provides general design information, design criteria, and plan preparation guidance for NCDOT roadways. Guidance on clear zones can be referenced in Part 1, Chapter 1-4N. Guidance states that the recommended clear zone range for flat, level terrain adjacent to a straight section of a 60mph highway with an average daily traffic of 6000 vehicles is a width of 30 to 32 feet. For steeper slopes on a 70-mph roadway, the clear zone range increases to 38 to 46 feet. Additional clear zone guidance is provided for roadway facilities based on design speed, design ADT, and roadside slope.</p> <p>Guidance on multimodal design elements can be referenced in Part 1, Chapter 4 Sections 4.14, 4.15, and 4.16. Guidance states that shared-use paths, often referred to as greenways, are paths physically separated from motor vehicle traffic and used by pedestrians, bicyclists, and other non-motorized users. The width of a shared-use path may vary, based on expected user volumes and context.</p> <ul style="list-style-type: none"> • <i>Desirable width – 12 to 14 feet</i> • <i>Minimum width – 10 feet; 8 feet in exceptionally constrained areas</i> <p><i>Vertical clearance, minimum – 8 feet</i></p>
FHWA Guidance on Bicycle and Pedestrian Accommodation (2011)	<p>Under the US Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation, "The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems...transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes." There are no Federal laws or regulations that prohibit shared use paths or bicycle use along or near Interstate highways or other freeways. Bicycle and pedestrian accommodations may be allowed on Interstate and other major highways and freeways. Bridges are essential in any transportation network, and many Interstate or other freeway bridges often are the only possible bridges across rivers, canyons, railroads, other highways, or other major barriers. Major highway bridges often are necessary links for nonmotorized transportation networks.</p> <p>Under 23 U.S.C. 217(g), transportation plans must consider bicycle and pedestrian</p>

POLICY	KEY RECOMMENDATIONS THAT RELATE TO THE PENDER COUNTY BICYCLE & PEDESTRIAN MASTER PLAN
	<p>accommodations.</p> <p><i>23 U.S.C. 217(g) Planning and Design. --</i></p> <ol style="list-style-type: none"> <i>1. In General. --Bicyclists and pedestrians shall be given due consideration in the comprehensive transportation plans developed by each metropolitan planning organization and State in accordance with sections 134 and 135, respectively. Bicycle transportation facilities and pedestrian walkways shall be considered, where appropriate, in conjunction with all new construction and reconstruction of transportation facilities, except where bicycle and pedestrian use are not permitted.</i> <p><i>Safety considerations. --Transportation plans and projects shall provide due consideration for safety and contiguous routes for bicyclists and pedestrians. Safety considerations shall include the installation, where appropriate, and maintenance of audible traffic signals and audible signs at street crossings.</i></p>
<p>NCDOT Bridge Policy (2000)</p>	<p>This policy establishes design elements of new and reconstructed bridges on the North Carolina Highway System. Vertical clearances for new structures shall be designed above all sections of pavement including the useable shoulder. Future widening and pavement cross slope will be considered in design clearance. Vertical clearances for facilities are as follows: over interstates, freeways, and arterials: 16'-6" to 17'-0"; over local and collector roads and streets: 15'-0" to 15'-6"; over all railroads: 23'-0" to 23'-6" or less if approved by Railroads; pedestrian overpasses and sign structures vertical clearance: 17'-0" to 17'-6". Sidewalks shall be included on new bridges with curb and gutter approach roadways that are without control of access. A minimum handrail height of 42" is required.</p>



Policy Recommendations

The following policy recommendations were developed for Pender County to improve bicycle and pedestrian infrastructure within the County and to help implement the recommended bicycle and pedestrian network projects. Key recommendations for bicycle and pedestrian-related policies, ordinances, and design considerations are included in the table below.

POLICY RECOMMENDATION	DESCRIPTION
<p>Define active transportation facilities</p>	<p>Pender County should establish definitions for active transportation facilities including greenways, sidepaths, bike lanes, and sidewalks. Defined facilities will support consistent terminology across all future policies, ordinances, and design guidelines. The County could amend its UDO to incorporate a glossary with these new definitions.</p> <p><i>Please refer to the Facility Typology Guidance within this plan for recommended facility definitions.</i></p>
<p>Expand the number of Bicycle and Pedestrian Improvement Overlay Districts to require developer-built bicycle and pedestrian facilities in high-growth and other priority areas of the County</p>	<p>According to the County’s UDO, bicycle and pedestrian infrastructure shall be constructed as part of a development proposal within an adopted Bicycle and Pedestrian Improvement Overlay District. Each Bicycle and Pedestrian Improvement Overlay District is created on a case-by-case basis and informed by development activity, current and future roadway improvement projects, current and future bicycle and pedestrian usage and demand, and all relevant adopted plans.</p> <p>Pender County should expand its Bicycle and Pedestrian Improvement Districts in high-growth areas of the County, especially areas of regional significance, and in areas identified as high-priority for pedestrian and bicycle facilities (see Figure X High-Priority Projects).</p> <p>An existing Bicycle and Pedestrian Improvement Overlay District was created along the US-17 corridor between Washington Acres Rd and Sloop Point Loop Rd in 2018. The County should consider the following:</p> <ol style="list-style-type: none"> 1.) Expand Bicycle and Pedestrian Improvement Overlay Districts along all corridors identified in the Network Plan, or at a minimum, those corridors identified as high priority corridors. 2.) Evaluate adopting new and expanding existing Overlay Districts in areas proposed as Regional Mixed Use in the Pender 2.0 Comprehensive Plan, which include US-17, NC-210, US-117, US-421, Washington Acres Road, Factory Road, Hoover Road, and sections of the East Coast Greenway running along Blueberry Road, Country Club Road, and Sloop Point Loop Road.
<p>Adopt active transportation-related policies that are consistent with the goals of the CAMA</p>	<p>Pender County is considered a Coastal Area Management Act (CAMA) county; therefore, it should adopt policies (including design considerations for bicycle and pedestrian facilities) that are consistent with the goals of the CAMA. The CAMA of 1974 mandates all 20 coastal counties to have a land use plan and requires permits for any development in specially designated areas called Areas of Environmental Concern (AEC).</p> <p>According to Pender County’s Land Use Plan (2018), AECs are generally those areas that are in close proximity to water (e.g., ocean, ICWW, creeks, etc.) or marsh (wetlands). A CAMA permit must be acquired if a development project meets all of</p>

POLICY RECOMMENDATION	DESCRIPTION
	<p>the following conditions:</p> <ul style="list-style-type: none"> • The project is located within one of the 20 coastal counties of North Carolina • The project is considered "development" under CAMA • The project is within, or affects, an Area of Environmental Concern established by the Coastal Resources Commission • The project does not qualify for an exemption <p>The 2018 Pender County Land Use Plan states that Pender County strongly supports the designation and preservation of all remaining coastal wetlands. Acceptable land uses within coastal wetlands may include utility easements, fishing piers, and docks. Under the Environmental Conservation District in the UDO, the County states that pedestrian trails are exempt from the list of land disturbing activities within the EC district.</p> <p>The County should consider expanding their list of permitted and non-permitted land uses within coastal wetlands to consider bicycle and pedestrian facilities like boardwalks and bridges. If both fall within "pedestrian trails" then the terminology should be defined in a glossary or expanded further upon to clearly articulate the permitted uses.</p>
<p>Establish an active transportation facility maintenance plan</p>	<p>Pender County will need to consider establishing an active transportation facility maintenance plan that includes debris removal and schedules for facility clean-up coordination, routine and special maintenance, and re-striping and resurfacing schedules for paved greenways, sidepaths, and sidewalks along roadways where NCDOT has not assumed maintenance responsibilities. This could fall under the purview of the Parks & Recreation Department or another county department that could either take on the responsibility in-house, or procure a contractor through procurement to conduct the routine maintenance.</p>
<p>Include a Provision of Public Access policy in the Unified Development Ordinance (UDO)</p>	<p>The County should consider a provision within the UDO to allow public access greenways, sidepaths, and sidewalks within easements or rights-of-way of all new utility corridors. According to Rails-to-Trails Conservancy, greenways and trails may be co-located with the following types of utilities:</p> <ul style="list-style-type: none"> • Electric transmission lines • Gas lines • Sewer lines • Water pipelines • Broadband/fiberoptic • Irrigation canals/districts <p>Working with landowners may be essential to acquiring property and constructing a continuous and comprehensive greenway network. Standard greenway easement widths vary between 20-30 ft with 30 ft as the preferred width, 20 ft constrained.</p> <p>Establishing this policy provides an avenue for greenways, sidepaths, and sidewalks to be incorporated into new developments as services are established, as opposed to retroactively granting public access to easements.</p>

POLICY RECOMMENDATION	DESCRIPTION
<p>Promote bicycle and pedestrian connections at existing cul-de-sacs</p>	<p>Cul-de-sacs and single-entry developments limit walkability due to their lack of connectivity. Constructing roadway connections to existing cul-de-sacs or stub streets is also challenging, therefore bicycle and pedestrian facility connections can help address limitations in terms of connectivity and walkability.</p> <p>An adopted code would mandate that bicycle and pedestrian connections be made between any proposed development and an adjacent existing or proposed development, or at a minimum, a 20 to 30-foot right-of-way be stubbed to a property line and reserved for future bicycle and pedestrian connections. The County could mandate that a preferred greenway, sidepath, or sidewalk facility be constructed between a proposed development and an adjacent development, or require that connections be made to an existing greenway, sidepath, sidewalk, recreational area, commercial area, or school.</p>
<p>Adopt outdoor lighting ordinances or codes</p>	<p>Pender County should adopt outdoor lighting ordinances or codes that minimize costs, promote energy conservation, support safe trail systems and healthy habitat environments for threatened and endangered species within the County. The County should add its new provisions to 7.11 OUTDOOR LIGHTING in the UDO.</p> <p>A Model Lighting Ordinance exists to address the need for strong, consistent outdoor lighting regulation in North America. Several municipalities throughout the nation have adopted similar codes to control light pollution, including glare, light trespass, and skyglow.</p> <p>Visit the link to learn more about the Model Lighting Ordinance: https://www.darksky.org/our-work/lighting/%20public-policy/mlo/</p> <p>Rails-to-Trails also provides a toolbox on bicycle and pedestrian lighting design: https://www.railstotrails.org/build-trails/trail-building-toolbox/design/lighting/</p>
<p>Establish wayfinding standards</p>	<p>Pender County should consider establishing county-wide bicycle and pedestrian facility wayfinding standards to foster consistent branding, placement, use, and design of wayfinding signage (including route confirmation, directional, and kiosk signage). Wayfinding standards should complement the existing greenways, sidepaths, and park wayfinding standards to create a comprehensive multi-modal wayfinding system.</p>

Example Policies

A peer review of policies from other areas regarding overall developer responsibilities for bicycle and pedestrian facilities was conducted to provide Pender County with examples that can be used to guide policy recommendations in Pender County.

POLICY	RELEVANT LANGUAGE									
<p>City of Durham and Durham County Unified Development Ordinance (2023)</p>	<p><i>12.4 Pedestrian and Bicycle Mobility</i> <i>12.4.2 Sidewalk Requirements</i></p> <p>A. A sidewalk shall be provided along public or private right-of-way as shown in the table below.</p> <table border="1" data-bbox="480 548 1081 648"> <thead> <tr> <th>Street Type</th> <th>Rural Tier</th> <th>All Other Tiers</th> </tr> </thead> <tbody> <tr> <td>Freeways; Expressways</td> <td>None</td> <td>None</td> </tr> <tr> <td>All other streets</td> <td>None</td> <td>Both Sides</td> </tr> </tbody> </table> <p>B. Preliminary and minor plats, and developments required to improve existing right-of-way to City or NCDOT standards, as applicable, shall provide public sidewalk within right-of-way pursuant to paragraph 12.4.2A, Sidewalk Requirement.</p> <p>C. For all other development except as exempted pursuant to paragraph 12.4.2D, Exemptions, required sidewalk along the right-of-way frontage of the development site shall be provided, as applicable per paragraph 12.4.2A, through only one of the following two methods. The following methods shall not be used in combination:</p> <ol style="list-style-type: none"> 1. Sidewalk located within the right-of-way and/or on-site <ol style="list-style-type: none"> a. Sidewalk shall connect to external sidewalks that extend to the property of the subject development, including connectivity to crosswalks and end of pavement at all adjacent intersections. b. Sidewalk located on-site shall meet the following criteria: <ol style="list-style-type: none"> (1) The sidewalks shall be located within a public access easement; (2) The maximum distance from the right-of-way, measured to the closest edge of the sidewalk to the right-of-way, shall be 20 feet; and (3) Lighting per Sec. 7.4, Outdoor Lighting, shall be provided either by proposed or existing on-site lighting, or street lights within the right-of-way. 2. Payment-in-lieu (City only) <ol style="list-style-type: none"> a. Payment-in-lieu of constructing required sidewalk shall be made at the rate set by the City Council. b. In order to accommodate future sidewalk, a recorded easement shall be provided along frontage of the subject property where no sidewalk is proposed if the existing right-of-way is not of sufficient width to accommodate a sidewalk. <p><i>12.5 Recreation Land</i> <i>12.5.2 Dedication, Impact Fees, and Payment-in-Lieu</i></p> <p>A. In the County</p> <ol style="list-style-type: none"> 1. The applicant for a residential development shall be responsible for either: <ol style="list-style-type: none"> a. Dedicating 1,150 square feet of land for recreation purposes (including active and passive recreation areas, including trails) for each proposed dwelling unit; or b. Making payment-in-lieu equivalent to the tax value of 1,150 square feet of comparable property per dwelling unit. 2. One of the following shall be required: 	Street Type	Rural Tier	All Other Tiers	Freeways; Expressways	None	None	All other streets	None	Both Sides
Street Type	Rural Tier	All Other Tiers								
Freeways; Expressways	None	None								
All other streets	None	Both Sides								

	<ul style="list-style-type: none"> a. Dedication of land; or b. Payment-in-lieu of dedication. <p>B. In the City</p> <ul style="list-style-type: none"> 1. The applicant for a residential development shall be responsible for: <ul style="list-style-type: none"> a. Paying a recreation impact fee or dedicating 575 square feet of land for parks and active recreation areas for each proposed dwelling unit; and b. Paying a resource based recreation impact fee or dedicating 575 square feet of land for passive recreation areas (including trails) for each proposed dwelling unit. 2. Where recreation service districts have been established, payments made under this section shall be expended within the respective district from which collected. 3. The following, individually or in combination, shall be required based upon jurisdiction and whether the development is located on the Durham Trails and Greenways Master Plan or the Durham Comprehensive Bicycle Transportation Plan: <ul style="list-style-type: none"> a. Payment of an impact fee; b. Dedication of land; or c. Payment-in-lieu of dedication.
<p>Town of Wake Forest Unified Development Ordinance (2022)</p>	<p><i>6. Subdivision and Infrastructure Standards</i></p> <p><i>6.8 Sidewalks and other Pedestrian Facilities</i></p> <p><i>6.8.1 Sidewalks</i></p> <p>A. General Standards/Location: Sidewalks are required in accordance with the Town of Wake Forest Transportation and Pedestrian Plan, and the Town Street Classifications in Section 6.7.2. Alternative facilities or a payment in lieu may be considered in accordance with C and D below.</p> <p>C. Alternative Compliance: Alternative provisions for pedestrian movement meeting the intent of this section may be used where unreasonable or impractical situations would result from application of these requirements. Such situations may result from significant street trees, impending road widening, topography, utility easements, lot configuration or other unusual site conditions. In such instances, the Administrator may approve an alternate plan that proposes different pedestrian amenities provided that the intent of this section is fulfilled.</p> <p>D. Payments in Lieu: In lieu of alternative compliance in C above, the Administrator may approve a payment in lieu (in accordance with an adopted annual fee schedule) where any one or a combination of factors render compliance impractical:</p> <ul style="list-style-type: none"> 1. Steep slopes 2. Absence of existing sidewalks along the corridor and in the general neighborhood 3. Where sidewalks are not shown on the town’s adopted Pedestrian Plan. <p><i>6.9 Bicycle Facilities</i></p> <p><i>6.9.1. Requirement For Installation</i></p> <p>A. Bike lanes or separate off-street multi-use paths shall be installed on new or modified roadways where designated for such by the Town of Wake Forest Transportation Plan or similarly adopted plan; and/or as specified in Section 6.9.3 below where the adopted plan does not provide sufficient guidance.</p> <p>B. Where a proposed development does not include new or widening of existing collector or thoroughfare streets, the developer shall reserve right-of-way sufficient to accommodate the appropriate bikeway facility.</p>

**City of Salisbury Land
Development
Ordinance (2022)**

4. Subdivisions and Infrastructure

4.9 Sidewalk Program

A. Sidewalk Requirements.

1. Existing Streets. As part of a proposed subdivision or new development along an existing publicly-maintained street in the corporate City limits, sidewalks shall be constructed along all applicable street frontages per the standards of Section 4.7 of this Chapter.

2. Infill Lots. Sidewalk construction may not be required if the new development lot is considered an infill lot pursuant to Section 6.3.I, Infill Provisions, Sidewalk Compatibility Standards.

3. New Streets. As part of new street construction, sidewalks shall be constructed along both sides of the new street per the standards of Section 4.7 of this Chapter.

B. Sidewalk Alternatives for Existing Streets. When the approving authority determines that the construction of a required sidewalk along an existing publicly-maintained street is unfeasible due to special circumstances, including but not limited to: an impending road widening; impracticality due to topography, streams, or other environmental limitations, or if constructed it would not connect with a similar existing or proposed improvement therefore would not provide an immediate or future or future transportation or public safety benefit, the approving authority may approve a payment in lieu of sidewalk construction.

C. Sidewalk Payment In Lieu Program. As authorized under this section, a payment may be made to the City of Salisbury in lieu of sidewalk construction. The value of the payment shall equal the average linear foot sidewalk project cost, as determined by the Engineering & Development Services Department of the City of Salisbury and calculated per time and material cost at the time of the request. The applicant is informed of the amount to be paid upon issuance of the zoning permit, or adoption of the ordinance for a Conditional District Overlay development, and payment shall be made prior to issuance of the Certificate of Occupancy.

Payments received in lieu of construction shall be placed in a restricted fund and set aside in a deferred revenue account to be used to install or repair sidewalks within the general area of the corporate City limits.

7. Recreational Open Space

7.6 Payment in Lieu of Allocation

Development that meets all of the following criteria shall be eligible for payment in lieu of allocation of recreational open space:

- Contains less than 50 proposed dwelling units, and
- Is located less than one-fourth-mile radius from an existing or planned public park (or public school with recreational facilities accessible to the general public), and
- Includes a proposed connection to the park or school by sidewalk or greenway trail.

A. The value of such payment shall be 300 percent of the predevelopment tax value of the required recreational open space area. A combination of recreational open space allocation and payment in lieu of allocation shall be permitted.

B. All payments shall be made prior to Final Plat approval. Failure to submit the required payment prior to Final Plat approval will delay approval until payment is rendered.

C. All funds received for payment in lieu shall be deposited into a special Parks and Recreation Development fund. Collected payments, including accrued interest, shall be expended solely for the acquisition, development, or rehabilitation of the existing or planned public park that was employed for payment in lieu eligibility.

D. An amount of land, equivalent to the payment in lieu value, located elsewhere within

	<p>the City's Parks and Recreation Master Plan planning area may be accepted subject to City Council approval.</p>
<p>City of Wilson Unified Development Ordinance (2022)</p>	<p><i>7. Parks & Open Space</i> <i>7.3 Payment in Lieu of Park Space Dedication</i> Any person developing and/or subdividing property subject to this chapter may, upon approval of the Administrator, make a payment in lieu of any required dedication of public recreational space, except that the dedication requirement for any areas designated as future greenways on an adopted plan are not eligible to be met by payments in lieu of dedication. <i>7.3.1 Fee Determination and Disbursement</i> A. Determination of Payment In Lieu: Payment in lieu of dedication shall be the product of the post-development appraised value of the land (per gross acre) to be developed multiplied by the number of acres to be dedicated. The following formula shall be used to determine the fee: Post Development Appraised Value of Entire Development (per gross acre) X Required Park space Dedication (acres) =Payment in Lieu Dedication Fee B. Determination of Post Development Appraised Value: The Post Development Appraised Value of the Entire Development shall be established prior to Preliminary Plat approval by an Appraiser who is a Member of the Appraisal Institute (MAI) or a North Carolina General Certified Appraiser. C. Credit for Park and Greenway Connections: Credit toward a payment in lieu shall be given for the cost of constructing pedestrian/bicycle accessways that connect to existing parks or greenways, up to a maximum of 50% of the required payment in lieu. Such pedestrian/bicycle accessways shall meet the standards of Section 6.7.2 and the City of Wilson Manual of Specifications, Standards and Design. D. Disagreements Regarding Payments In Lieu: Any disagreement in the amount of required payment shall be resolved by conducting a professional appraisal of the fair market value of the property. The professional appraiser shall be mutually agreed upon by the developer and city. An appraiser shall be appointed by the city, at the developer's expense, should an agreement not be reached. E. Disbursement of Payments In Lieu: All payments made in lieu of dedication shall be made at the time of Final Plat approval or prior to the issuance of the first Certificate of Occupancy (whichever comes first as appropriate). Failure to submit the required fee along with such applications will delay approval of such submissions until payment is rendered. All funds received for payment in lieu of dedication shall be deposited in a special fund or line item to be used only for the acquisition, development, or redevelopment of public recreation space by the city. <i>7.3.2 Required Payments in Lieu</i> A payment in lieu of dedication may be required by the Administrator. Reasons for requiring payments in lieu of dedication may include, but are not limited to, sufficient proximity to existing public parks as determined by the Director of Parks and Recreation and/or existing topographic or geographic conditions as determined by the Administrator.</p>
<p>Town of Mooresville Unified Development Ordinance (2022)</p>	<p><i>5. Development Standards</i> <i>5.1 Access and Connectivity Standards</i> <i>5.1.4. Landowner or Developer Responsible for Improvements</i> A. The landowner or developer of the development, subject to the requirements of this section shall provide the road, street, bikeway, sidewalk, greenway, and other access and circulation improvements, both on the development site and, as appropriate; off the site, as required by the approved development approval or permit, in accordance with the standards of this section, the engineering requirements in the Land</p>

Development Design Standards manual, which is incorporated herein by reference, the regional Comprehensive Transportation Plan, the Mooresville Transportation Master Plan, and the standards of Chapter 6: Subdivision Standards.

B. The landowner or developer of the development, as appropriate, shall dedicate any on-site required rights-of-ways or easements, as appropriate, for transportation system improvements, such as streets and bicycle and pedestrian facilities, identified in local and regional plans such as Mooresville Transportation Master Plan, the Comprehensive Plan, and the regional Comprehensive Transportation Plan (CTP), and where appropriate, construct such facilities in accordance with the standards of this UDO.

5.1.6 Street, Sidewalk, and Greenways Standards

C. Bicycle Facilities

1. Bicycle Facility Requirements

- a. All development that includes street construction shall include a combination of bicycle facilities and low-speed local streets, where applicable, that provide a safe, comfortable, and convenient route within the development and to bicycle facilities outside the development.
- b. Bicycle facilities shall be installed on new streets in accordance with the CTP and/or the Town's Bicycle Plan. Any collector or higher street not within such plan shall provide an on-street bicycle lane and appropriate buffer. Sharrows and bicycle lanes are strongly encouraged on all local streets.
- c. For development along existing streets for which bicycle facilities are identified in the CTP and/or the Town's Bicycle Plan, the developer shall dedicate additional right-of-way as necessary to accommodate the bicycle facility.
- d. Where appropriate due to anticipated traffic volumes or conflicts with vehicular traffic, on-street bicycle facilities shall include features that enhance separation from motor vehicles such as physical buffering through means such as bollards, parked cars, or by being placed behind the roadway curb; or use of a separate shared sidepath or greenway trail, in accordance with the standards of the Town's Bicycle Plan.
- e. Greenways and bicycle-pedestrian bridges shall be constructed to the standards of this UDO and the Town's Bicycle Plan.

2. Exceptions

- a. The Planning Director may waive or modify the requirement to install bicycle facilities if the Planning Director determines:
 - i. Development of the bicycle facility is impractical or infeasible due to the presence of topographic conditions or because of existing development patterns and the applicant makes a payment to the Town in-lieu of the installation;
 - ii. Adding a greenway or other bicycle facility will exceed more than five percent of the land area within the overall site;
 - iii. The street is under construction or a contract for construction has been signed and the planned improvement would remove the bicycle facilities; or
 - iv. When a connection between properties requires a bicycle or pedestrian bridge and there is no legally established right-of-way or easement to complete the connection to the other side, a fee-in-lieu payment may be permitted for 50 percent

of the bridge cost; however, legal access shall be provided to the property line allowing a future connection to be made.

b. The Planning Director may adjust the sidewalk width standards in this section or the street tree and planting width standards in the landscape and buffer standards in this chapter, to facilitate inclusion of a bicycle facility along a street due to the conditions identified in this section.

D. Sidewalks

1. Sidewalk Requirement

Sidewalks are required in accordance with the following:

i. Except in the RC and RLS districts, sidewalks shall be constructed on both sides of all new streets. In the RC and RLS districts, sidewalks shall be constructed on at least one side of all new streets.

ii. Sidewalks shall be constructed along the entire frontage of a proposed development with an existing street, unless there already is an existing sidewalk that complies with the standards of this section. A sidewalk that does not comply with the ADA or other standards of this section shall be upgraded to comply.

iii. Except in the TD and DE districts, sidewalks shall be a minimum of five feet wide. In the TD and DE districts, the minimum sidewalk width shall be six feet or the width of the sidewalk along the street frontage adjoining the site, whichever is greater.

2. Exceptions

The Planning Director may modify or waive the requirement to install sidewalks if:

i. The applicant provides a facility that provides equivalent or better pedestrian access, such as a sidepath or similar facility; or

ii. Installation of sidewalk on a single residential lot used for not more than two dwellings that is more than 500 feet away from any existing sidewalks;

iii. Topographic conditions or natural features, such as steep grades do not allow connections to be made without stairs, or because of existing development patterns, and the applicant makes a payment to the Town in-lieu of the installation. All fees collected by the Town pursuant to this section shall be deposited in a dedicated Town fund used only for construction of bicycle pedestrian facilities that provide sufficient benefit to the development providing the in-lieu fee.

Wilmington Urban Area MPO Model Ordinance (2021)

1. Bikeways, Sidewalks, and Greenways

1.02 Applicability

(a) This Article applies to all development within the [JURISDICTION] jurisdiction.

(b) No construction shall commence until all required plans and designs have been reviewed and approved by the [JURISDICTION] or other governmental approving agency.

(c) No [JURISDICTION] services or utilities shall be extended to any development until the applicant has installed the infrastructure specified in this chapter.

1.03 Easements

(a) Easements shall be provided in locations and dimensions required by the [JURISDICTION] in order to:

(i) Allow for adequate pedestrian access.

- (ii) Allow for adequate bicycle access.
- (iii) Allow for adequate right-of-way for street types.
- (iv) Allow for adequate storm drainage facilities.
- (v) Allow for adequate access to service bicycle and pedestrian infrastructure
- (vi) Allow for adequate right-of-way for construction of bicycle and pedestrian infrastructure.

(b) Whenever a piece of land in a proposed site plan includes any part of a greenway designated in the comprehensive plan, bicycle plan, or pedestrian plan, the greenway shall be platted and dedicated as a greenway easement.

1.04 Exemptions and Appeals

(a) Fee-in-Lieu

- (i) Where the [JURISDICTION] determines that construction of public improvements would not be feasible, a fee in lieu may be permitted.
- (ii) Right-of-way and easements may still be dedicated to the [JURISDICTION] to allow access.

(b) Surety

- (i) Required improvements identified in this chapter that are not completed prior to the issuance of a building permit will be bonded in accordance with [JURISDICTION] development standards in an amount of 125% of the estimated construction cost.
- (ii) All required improvements secured by a surety shall be installed prior to the issuance of the first certificate of occupancy.

1.05 Overlay District

(a) Greenway Overlay District

- (i) The purpose of the Greenway Overlay District is to promote health, safety, convenience, and welfare by providing increased connectivity and infrastructure to surrounding parks, neighborhoods, businesses, and bicycle and pedestrian networks.
- (ii) A multi-use path shall be installed by the developer in accordance with the comprehensive plan.
- (iii) Where sidewalks and multi-use paths meet the street ADA compliant ramps shall be installed.
- (iv) Bicycle and pedestrian infrastructures shall be installed in accordance with [JURISDICTION] design standards.

(b) Pedestrian Benefit Zone

- (i) The purpose of the pedestrian benefit zone is to promote safe and convenient pedestrian infrastructure in designated zones with high density.
- (ii) Concrete sidewalks shall be constructed along the entire frontage of all commercial, residential, industrial, and park sites within the pedestrian benefit zone.
- (iii) If concrete sidewalks currently exist but are in poor deteriorated condition, the sidewalk shall be replaced to [JURISDICTION] design standards.

Implementation

Bicycle and pedestrian facilities can be implemented through several methods:

- As part of capital projects, like roadway or utility improvements. Whenever there are improvements to a roadway, such as widening, adding turn lanes, or safety improvements, the capacity to add the recommended bicycle or pedestrian facility should be evaluated at the same time. This will require early coordination with NCDOT to ensure the facilities are included in the planning and environmental phase of the process.
- Through NCDOT, FHWA, and other grants. Project-specific grants should be pursued, especially for high priority projects. NCDOT Multimodal planning grants and FHWA RAISE grants may be pursued for project construction. In addition, the MPO can seek grant funding through NCDOT's paved trails and sidewalks feasibility study grant program to fund a feasibility study for specific projects.
- As development occurs either through actual construction or payment in lieu of construction for later construction. Policies should be implemented to set these requirements. Recommended policies are detailed in the previous sections.

Funding

North Carolina Department of Transportation (NCDOT): NCDOT offers several funding programs for bicycle-related projects. One key program is the Multimodal Planning Grant Program, which provides financial support for municipalities, counties, and planning organizations to develop comprehensive bicycle plans and multimodal plans, as well as provide updates to existing plans.

Safe Routes to School: NCDOT's IMD administers the federally funded Safe Routes to School Program using funds from SAFETEA-LU and the Bipartisan Infrastructure Law. The program aims to encourage school-aged children to walk and bike to school safely through projects that improve safety and reduce traffic and car pollution. Funding amounts range from \$50,000 to \$500,000 per project.

Surface Transportation Block Grant: WMPO receives annual Surface Transportation Block Grant Program (STBG) funds from FHWA. The STBG Direct Attributable program provides funding for bicycle and pedestrian infrastructure. The STBG Carbon Reduction program provides funding for projects reducing carbon emissions. The STBG Transportation Alternatives Set Aside program provides funding for projects that enhance non-motorized transportation, including bicycle and pedestrian facilities.

NC Parks and Recreation Trust Fund: The NC Parks and Recreation Trust Fund (PARTF) provides matching grants for parks, recreational, and public beach access projects.

Safe Streets and Roads for All: USDOT administers the Safe Streets and Roads for All grant program which funds the development of a safety action plan, as well as planning, engineering, and construction activities associated with projects identified in the safety action plan. The safety action plan should focus on solutions to improve roadway safety for all users, including pedestrians and bicyclists.

Highway Safety Improvement Program: FHWA provides a calculated percentage of Highway Safety Improvement Program funds to NCDOT each year. These funds may be used for pedestrian and bicycle

facilities that are designed to improve road safety, including protected bike lanes, intersection improvements, and traffic control devices for pedestrians and bicyclists.

Carbon Reduction Program: FHWA administers the Carbon Reduction Program which provides funding for transportation projects designed to reduce carbon dioxide emissions for roadway sources. These projects may include on and off-road trail projects for pedestrian and bicyclists, as well as micro-mobility projects.

Maintenance

Maintenance of bicycle and pedestrian facilities is crucial for ensuring their safety, functionality, and longevity. Regular upkeep and proactive maintenance practices help preserve the quality of infrastructure, enhance user experience, and promote active transportation. Here are some key aspects to consider when it comes to maintaining bicycle and pedestrian facilities:

- **Inspection and Assessment:** Conduct routine inspections of bicycle and pedestrian facilities to identify any signs of wear, damage, or hazards. This includes assessing the condition of bike lanes, sidewalks, crosswalks, signage, lighting, benches, and other amenities.
- **Repairs and Upgrades:** Address any maintenance needs promptly, including repairing potholes and uneven surfaces on bike paths and sidewalks. Ensure that signage and markings are clearly visible and replace them when necessary.
- **Vegetation and Landscape Maintenance:** Manage vegetation and landscaping along bicycle and pedestrian routes to maintain clear visibility and prevent overgrowth that may impede users. Regularly trim trees and shrubs, clear debris, and ensure that vegetation does not obstruct sightlines or encroach on pathways.
- **Lighting and Safety:** Adequate lighting is essential for ensuring the safety and visibility of bicycle and pedestrian facilities, particularly during low-light conditions or at night. Regularly inspect and maintain lighting fixtures, replace burnt-out bulbs promptly, and ensure that lighting levels meet the required standards.
- **Trash and Litter Control:** Regularly clean and maintain bicycle and pedestrian facilities to keep them free of trash, debris, and litter. This includes emptying trash bins, sweeping pathways, and addressing any dumping or unauthorized waste disposal.

By implementing a proactive and comprehensive maintenance strategy for bicycle and pedestrian facilities, communities can ensure that these vital infrastructure elements remain in good condition, provide a positive user experience, and continue to promote active and sustainable transportation options.

Maintenance Management

Maintenance of bicycle and pedestrian facilities may be managed through several options:

- **Establishing a new maintenance department specifically dedicated to bicycle and pedestrian facilities.** This can ensure proper upkeep and safety of facilities. This department would be responsible for the regular inspection, repair, and improvement of bike lanes, side paths, sidewalks, and other facilities. Key considerations when setting up a new maintenance department for bicycle and pedestrian facilities include department structure and staffing,

budget and resources, maintenance procedures, facility management, and collaboration with other departments.

- Adding bicycle and pedestrian facility management to an existing department. This process will require many of the key considerations identified above, as well as continuous collaboration with the existing department. Key steps in this process may include:
 - Identify which department will be responsible for bicycle and pedestrian facility management. Considerations include facilities and fleet services, parks and recreation, and planning and community development.
 - Assess the departments current resources, such as staff and budget to determine if any existing resources can be used for facility management or if additional resources will be required.
 - Create a proposal outlining the goals and objectives of incorporating facility management into the existing department. The proposal should include outcomes, staffing needs, and project budget. Present the proposal to governing bodies as needed.
 - Secure funding and additional resources needed for implementation of the proposal.
 - Establish policies and procedures, including maintenance guidelines and facility management.
 - Work with staff within the existing department to fully integrate bicycle and pedestrian management into their department.
- Through a contractor. By managing bicycle and facility maintenance through a contractor, you can leverage external expertise and resources while maintaining flexibility and potentially reducing costs. The contractor would be responsible for regular maintenance tasks, repairs, inspections, safety checks, and any other specific requirements. Once a contractor has been selected, performance monitoring measures, including regular inspections, progress meetings, performance reviews, and feedback from users or stakeholders, should be implemented to ensure quality work.

Checklist

The following checklist provides a list of action items for Pender County and WMPO to begin implementation of the plan. This is not a comprehensive list, but rather, provides the high-level action items that should be completed in order to ensure successful implementation of this plan.

Short-term (0-3 years)
Plan Adoption: Pender County and Wilmington Urban Area Metropolitan Planning Organization should adopt the plan. In addition, the Board of Commissioners and other appropriate bodies should adopt the Bicycle and Pedestrian Plan.
Comprehensive Transportation Plan and Metropolitan Transportation Plan Updates: WMPO should add the network recommendations to their Comprehensive Transportation Plan and their Metropolitan Transportation Plan at the next update. Pender County should add the network recommendations to their Comprehensive Transportation Plan.
Overlay Districts: Pender County should adopt bicycle and pedestrian overlay districts along network recommended corridors.
Define Facility Dimensions and Designs: Determine the appropriate dimensions for facility types and any special considerations for design, such as landscaping requirements. Add requirements to the Unified Development Ordinance.

Project Funding Plan: Develop a long-term plan for project implementation and funding for high priority projects, including grants to pursue, responsible party for grant writing, and timeline.

Medium-term (3-5 years)

Maintenance Plan: Establish a maintenance plan that would include the responsible party for bicycle and pedestrian maintenance. See the previous section for potential maintenance management structure.

Developer Requirements: Add developer requirements or fee in lieu provisions to the Pender County Unified Development Ordinance.

Long-term (5-10 years)

Plan Revisions and Updates: Re-evaluate and update the Pender County Bike/Pedestrian Plan as needed. This includes evaluating policy recommendations, development pressures, and network constraints. Establish performance indicators to measure each project's success and impact on the community.

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