

Screening

Scoping

Assessment

Recommendations

Reporting

Monitoring and Evaluation

HEALTH IMPACT ASSESSMENT

INTRODUCTION TO HEALTH IMPACT ASSESSMENTS

According to the Center for Disease Control (CDC) the way we design and build our communities can affect our physical, mental, and social health. Health Impact Assessments (HIAs) can be used to integrate healthy community design and evidence based health strategies into community planning, transportation and land use decision-making processes. Wilmington and New Hanover County have included an HIA as part of the planning process in an effort to integrate healthy design into the Comprehensive Greenway Plan.

A Health Impact Assessment (HIA) is a process used to estimate potential positive and negative health impacts of a proposed policy, plan, program or project on the community it serves. This can be accomplished through quantitative and/or qualitative methods and community engagement. HIAs bring together various stakeholders from the community to assess the goals and objectives, recommendations and performance measures from the analysis.

HIA is a six-step process that includes Screening, Scoping, Assessment, Recommendations, Reporting and Monitoring and Evaluation. These steps are interlinked and can be returned to at any time during the HIA process as information is gathered.

- 1. Screening-determines whether a proposal is likely to have a health impacts and whether the HIA will provide information useful to stakeholders and decision makers
- 2. Scoping- establishes the scope of health effects that will be included in the HIA, the populations affected, the HIA team, sources of data, methods to be used and alternatives to be considered
- 3. Assessment- involves a two-step process that first describes the baseline health status of the affected population and then assess the potential impacts
- 4. Recommendations- suggest alternatives that could be implemented to improve health or actions that could be taken to manage the health effects, if any that are identified
- 5. Reporting- documents and presents the findings and recommendations to stakeholders and decision-makers
- 6. Monitoring and Evaluation- records the adoption and implementation of HIA recommendations, monitors the changes in health and health determinants and evaluates the process, impact and outcomes of an HIA.

SCREENING

The first step of the HIA for the Greenway Plan was assessing if, in fact, the Greenway Plan was likely to have health impacts and if an HIA would be a beneficial component of the Greenway Plan. After discussions with and a training by Katherine Hebert, Davidson Design for Life Coordinator and national expert on HIA, the team considered incorporating an HIA as part of the Greenway Plan to be beneficial and decided to do an HIA.

Introduction to Health Impact Assessments (HIA)

Definition: "HIA is a systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA provides recommendations on monitoring and managing those effects."

Source: National Research Council of the National Academies. Improving health in the United States: the role of health impact assessment. Washington, DC: National Academies Press; 2011.

1. Screening: determines whether a proposal is likely to have health impacts and whether the HIA will provide information Monitoring and evaluation: useful to the stakeholders and records the adoption and decision-makers. 2. Scoping: establishes the implementation of HIA scope of health effects that will recommendations, monitors the be included in the HIA, the changes in health and health populations affected, the HIA determinants, and evaluates the team, sources of data, methods process, impact, and outcomes to be used, and alternatives to The of an HIA. be considered. HIA Process 5. Reporting: documents and 3. Assessment: involves a twopresents the findings and step process that first describes recommendations to the baseline health status of the stakeholders and decisionaffected population and then makers. 4. Recommendations: suggest assesses potential impacts. alternatives that could be implemented to improve health or actions that could be taken to manage the health effects, if and, that are identified.

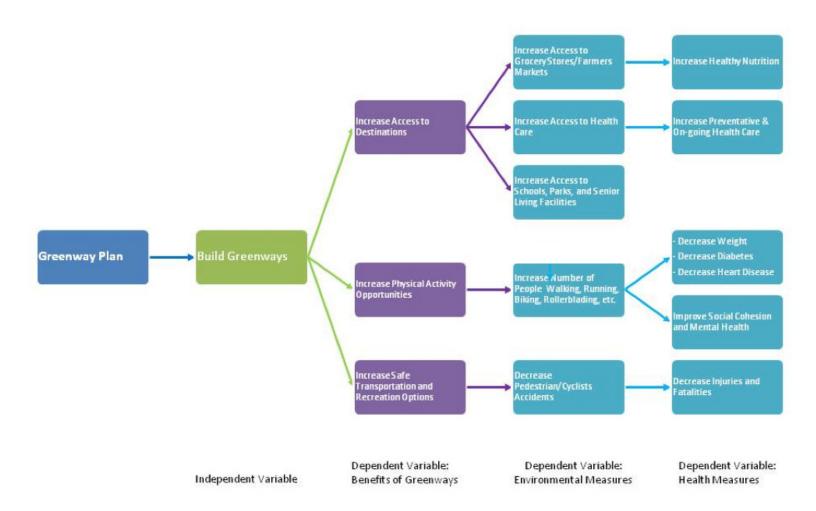
SCOPING

The scoping step establishes the scope of health effects that will be included in the HIA, the populations affected, the HIA team, sources of data, methods to be used and alternatives to be considered.

SCOPE OF POTENTIAL HEALTH IMPACTS

To establish the scope of health impacts to include in the HIA, we began with establishing the benefits of constructing greenways. By increasing access to destinations such as grocery stores and fresh foods, there would be an increase in healthy nutrition. Increasing access to schools, parks, and senior living facilities yields the same health impacts as increasing physical activity opportunities. All of these variables will increase the number of people walking, running, biking, rollerblading, and other greenway activities. Increasing levels of physical activity and access to nutrition will help decrease body weight, diabetes, and heart disease, as well as improve social cohesion and mental health. Increasing safe transportation and recreation options decreases pedestrian/pedal cyclists accidents, which decreases injuries and fatalities.

A Health Impact Logic Model was developed to graphically represent the potential health impacts:



THE HIA TEAM

The HIA team consists of three representatives from the Wilmington Urban Area Metropolitan Planning Organization (WMPO) and University of North Carolina Wilmington, City of Wilmington and New Hanover County.

SOURCES OF DATA

Our data sources include quantitative health behavior data from past community health assessments and data from the Greenway Plan surveys, GIS data, survey data from the Behavior Risk Factor Surveillance System Survey and the Youth Risk Behavior Survey Data, and literature reviews.

METHODS TO BE USED

We evaluated community health assessments, GIS data, literature reviews and other health impact assessments that evaluate the impact of bicycle and pedestrian facilities.

The following processes were conducted:

- HIA training To better understand what an HIA was, how it was conducted, and
 its potential benefits; planning and public health professionals from Wilmington
 and New Hanover County travelled to the Town of Davidson for a two-day, oneon-one health impact assessment training given by Katherine Hebert, Davidson
 Design for Life (DD4L) Project Coordinator.
- Review of other HIAs In order to see what different examples of HIAs looked like, several existing and adopted HIAs were reviewed to include: an example from Clark County, WA that assessed the health impacts of their bicycle and pedestrian master plan; an example from Aberdeen, NC that assessed the health impacts of their pedestrian transportation plan; and an example from Haywood County, NC that assessed the health impacts of their Comprehensive Pedestrian Plan.
- Collection of baseline health data To take stock of the existing state of health in the study area, health data was collected and reviewed to include levels of physical activity, bicycle and pedestrian injury/fatality statistics, obesity rates, prevalence of heart disease and other obesity-related diseases, and disability rates.
- Geographic analysis In order to assess the effect of geographic distance on access to healthy living choices within the study area, a distance analysis was conducted to include 0.5-mile and 1.5-mile buffers around grocery stores and farmers' markets, health care facilities, school, parks, and senior living facilities.
- Comment form questions In order to get an assessment of the public's view of
 the connection between the Greenway Plan and their health, the Comprehensive
 Greenway Plan comment form that was conducted as part of this Greenway Plan
 was reviewed. This comment form had several questions that asked respondents
 how they used or viewed greenways in terms of health (see Appendix B for all
 responses).
 - When asked would you use greenways more often if you were closer to them, or if there were more of them, 95% responded 'yes'.

- When asked to prioritize how they would use greenways, respondents selected 'fitness or recreation' as the first priority.
- When asked what the most important benefits and uses of a greenway system are, respondents selected 'exercise' as the first priority.
- Stakeholder meetings/Focus Groups In order to gauge support and interest from local public experts on if and how they felt the Greenway Plan would have health impacts, stakeholder meetings were conducted with representatives from the New Hanover Regional Medical Center, the University of North Carolina at Wilmington, and Wilmington Health Associates.

ASSESSMENT

Participation in regular physical activity has been shown to help control body weight, strengthen bones and muscles, reduce risk for heart disease, Type 2 Diabetes, and some cancers, decrease stress level, increase chances of living longer and improve older adults' abilities to engage in daily activities. Nearly half (46.1%) of adults in New Hanover County do not engage in the recommended level of physical activity (CDC, 2009). Access to greenways can increase the percentage of people who exercise for 30 minutes at least 3 times per week by 25.6% (CDC, 2001). This translates to improved health and reduced disease risk for a significant portion of the population. In order to capture the impact of greenways on health in New Hanover County, we must first examine the baseline health variables, including the prevalence of overweight and obesity, heart disease, diabetes, asthma, social cohesion and bicycle and pedestrian crashes/injuries.

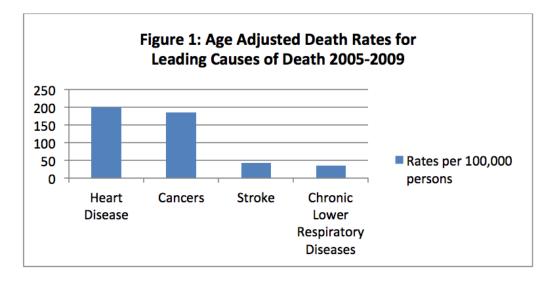
BASELINE HEALTH STATISTICS

Overweight & Obesity: North Carolina has the 10th highest obesity prevalence in the nation. Nearly 65% of adults in New Hanover County are overweight or obese. The percentage of North Carolina adults who are obese has more than doubled in the last two decades, from approximately 13% in 1990 to 30% in 2009 (NHC Community Health Assessment, 2011). This is an increase of more than 1.9 million adults. This epidemic is not limited to adults. The rate of obesity among NC adolescents aged 12 to 19 years has more than tripled over the past three decades, and the rate among children ages 6 to 11 years has more than doubled. Since 2005, New Hanover County has consistently seen obesity prevalence among children ages 2-18 exceed 30% (see Table 1) (NHC Community Health Assessment, 2011). Persons who are obese have annual medical costs that are estimated to be \$1,429 higher than those of a healthy body weight. Annual costs for NC are more than \$24.1 billion in medical care and lost productivity due to overweight and obesity. In 2007, \$8,183,870 (approximately 8% of total dollars spent) of New Hanover County Medicaid spending was attributed to overweight and obesity (NHC Community Health Assessment, 2011).

Table 1. Prevalence of Overweight and Obesity among Children Ages 2 – 18 in New Hanover County as Indicated by Data from the NC Nutrition and Physical Activity Surveillance System.

	2005	2007	2009
New Hanover County, children 2-18 years of age	30.8	32.2	33.4

• Heart Disease: The leading cause of death in New Hanover County is heart disease (see Figure 1). New Hanover County has a higher rate of death from heart disease than the state average (200.5 vs. 191.7 per 100,000 persons). Data from the Behavior Risk Factor Surveillance System (BRFSS) reveal that the percentages of adults with a history of heart disease, or who have had a heart attack, or who experience high blood pressure, all increased between 2007-2011. Being physically active on a regular basis reduces stress, blood pressure and cholesterol, decreasing one's risk for developing heart disease. Furthermore, physical activity decreases risk for the 2nd and 3rd leading causes of death in New Hanover County, cancer and stroke.



• <u>Diabetes:</u> North Carolina has the 13th highest prevalence of diabetes among adults in the United States. Diabetes is the 6th leading cause of death in New Hanover County. Being physically active and maintaining a healthy body weight dramatically reduce one's risk for developing Type 2 diabetes. Studies demonstrate that access to greenways increase physical activity levels, which can help with maintaining a healthy body weight and decrease risk for diabetes (CDC, 2001). Minorities suffer disproportionately from Diabetes. New Hanover County's White male death rate of diabetes is 18.9 per 100,000 compared to New Hanover County's African American male rate of 42.2. New Hanover County's White female rate is 10.5 per 100,000 persons, which is lower than the African American female rate of 38.3 (NHC Community Health Assessment, 2011).

Pedestrian and Cyclist Accidents/Injuries: From 2007-2012, there were 151 bicycle crashes and 257 pedestrian crashes in New Hanover County. Data from PedBikeInfo.org reveal that New Hanover County has the 6th highest number of pedestrian crashes in the state. Higher numbers are expected in more populated areas; however, examination of crash rate (crashes/10,000 residents) reveals that New Hanover County is 2nd only to Mecklenburg County (4.24 vs. 4.25 average yearly crashes per 10,000 residents). New Hanover County has the highest annual rate of bicycle crashes of all 100 counties (see Table 3). Additionally, the City of Wilmington has the 2nd highest annual bicycle crash rate of all NC cities (3.45) average yearly crashes /10,000 residents). Increasing the number of greenways and ensuring a connected system of facilities provides alternative routes for bikers and walkers and increases the number of people walking and cycling, which increases motorist awareness and reduces the likelihood of crashes.

Table 2. Counties with the highest average yearly pedestrian crash rate from 2005-2009.

County	County 5-yr Crash Count Mean Yearly	
Mecklenburg	1864	4.25
New Hanover	408	4.24
Cumberland	608	3.84
Guilford	832	3.55

Table 3. Counties with the highest average yearly bicycle crash rate from 2005-2009.

County	5-yr Crash Count	Mean Yearly Crash Rate/ 10,000 Residents
New Hanover	253	<mark>2.63</mark>
Orange	130	2.01
Robeson	116	1.78
Durham	193	1.48

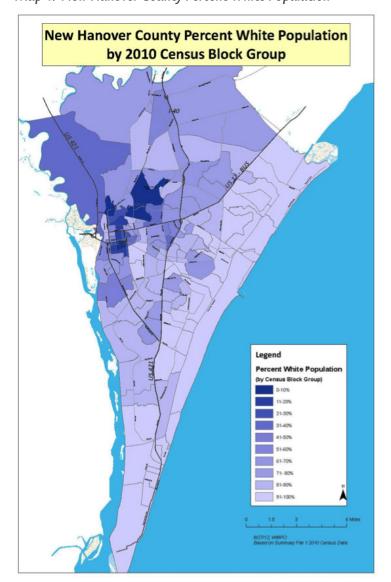
POPULATIONS OF SPECIAL INTEREST AND SOCIAL **DETERMINANTS OF HEALTH**

The conditions in which people are born, grow, live, work and age influence their health. These factors, called social determinants, are primarily responsible for inequities in physical activity level and health seen across various groups of people, such as low income versus high income. We will examine the baseline socio-economic conditions in New Hanover County for the following social determinants: income, race/ethnicity, age, disability and access to healthy foods and safe places to be physically active.

POPULATIONS OF SPECIAL INTEREST

- Income: Income level is a key predictor of a person's physical activity level and health. Physical activity greatly reduces one's risk for developing chronic diseases and promotes wellness. The low income population engages in less physical activity than other demographic groups. The median household income in New Hanover County is \$44,719, which is very close to the median value for North Carolina (\$43,754). New Hanover County and North Carolina report a similar prevalence of those living below the poverty level (16% vs. 16.2%, respectively). Over 44% of children in New Hanover County are eligible for free or reduced lunch (NHC Community Health Assessment, 2011). When income data are examined at the level of Census tracts, the lowest income areas are tracts located in downtown and northern Wilmington. Low income communities suffer disproportionately from chronic diseases related to physical inactivity; however, these are the very communities that are most likely to lack parks and greenways (Ogden & Carroll, 2010, Gordon-Larsen et al., 2006, Powell, Slater & Chalupka, 2004). In addition, parks in lower income neighborhoods are less likely to have well-designed and maintained equipment (Cradock et al., 2005). The addition of greenways in these areas would directly address these barriers to physical activity and could significantly improve the health of this population.
- Race/Ethnicity: Minorities are less likely to engage in the recommended amount of daily physical activity. Overall, 79% of the New Hanover County population is white, while 14.8% are African American and 6.1% are other races (NHC Community Health Assessment, 2011) (see Map 1 on the following page). Census tract data indicate the highest prevalence of minority populations in downtown and northern Wilmington. The addition of greenways in these areas could increase residents' physical activity levels and help eliminate some of existing racial disparity.
- Age-Children and Older Adults: According to the 2010 Physical Activity, Nutrition and Obesity Quick Facts, today's youth may be the first generation to live a shorter, less healthy life than their parents. Childhood obesity is the main culprit. The rising prevalence of obesity corresponds with increased time spent in sedentary activities and decreased time being physically active. According to data from the Youth Risk Behavior Survey, nearly 42% of high school students and 44% of middle school students report watching 3 or more hours of TV daily. Nearly 24% of high school students and 30.7% of middle school students report playing video or computer games daily (CDC, 2009). Time spent in sedentary activities is indirectly related to time spent being physically active. Increasing access to safe places to be physically active, such as greenways, increases physical activity levels of community members and assists with weight control. Additionally, greenways connecting neighborhoods and schools can increase physical activity among children by providing a safe, active transportation option.

Physical activity declines with age. See Figure 2 for the age distribution of New Hanover County residents according to data from the American Communities Survey. Nearly 20% of the county's population is 18 years or younger, while the fastest grown segment of the population is 65+ years of age. New Hanover County has a higher percentage of persons greater than 65 years (13.9%) than the state as a whole (12.9%) (NHC Community Health Assessment, 2011). The



Map 1. New Hanover County Percent White Population

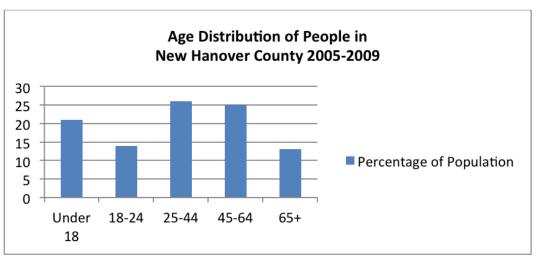


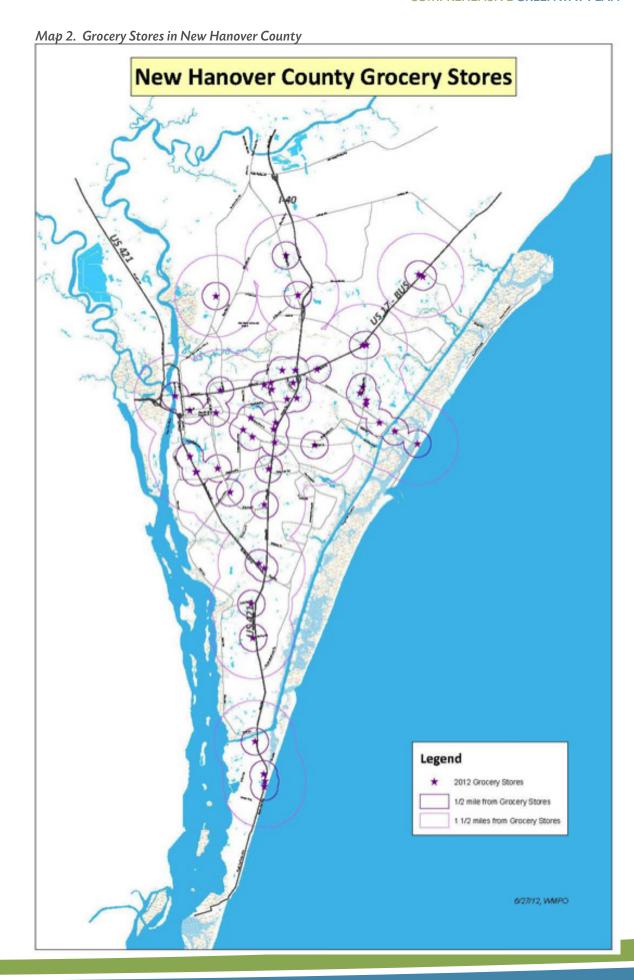
Figure 2. Over 25% of the county's population is 25-44 years old; however, the fastest growing segment is those aged 65+.

- addition of greenways near retirement homes could provide safe opportunities for seniors to engage in additional physical activity. Physically active seniors are more likely to be able to complete daily activities independently, exhibit a lower risk of falling, and have better cognitive function.
- Disability: In the Wilmington Metropolitan Statistical Area, 23.3% of the population is living with some form of disability (physical, emotional or social). This prevalence ranks Wilmington in the top 10 metropolitan statistical areas for the nation in terms of disability estimate. Disability rates are higher among older populations. However, Wilmington has the highest disability prevalence among those 18-44 years old of all metropolitan statistical areas (21.9%) (Okoro et al., 2001). Those living with disabilities experience obesity and related chronic diseases at higher rates. For instance, among children 10-17 years of age, youth with developmental disabilities (DD), learning disabilities (LD), autism, and attention deficit hyperactivity disorder (ADHD) have nearly twice the rate of obesity compared to non-disabled youth. Additionally, persons with disabilities experience the highest rates of heart disease, diabetes, stroke, obesity and physical inactivity when compared to all racial/ethnic groups (Black, Asian, Hispanic, White, Native American/Alaskan Native) (Drum et al., 2011). Increasing inclusion through access to safe, ADA-compliant greenways can increase physical activity among persons with disabilities and significantly reduce risk for chronic disease.

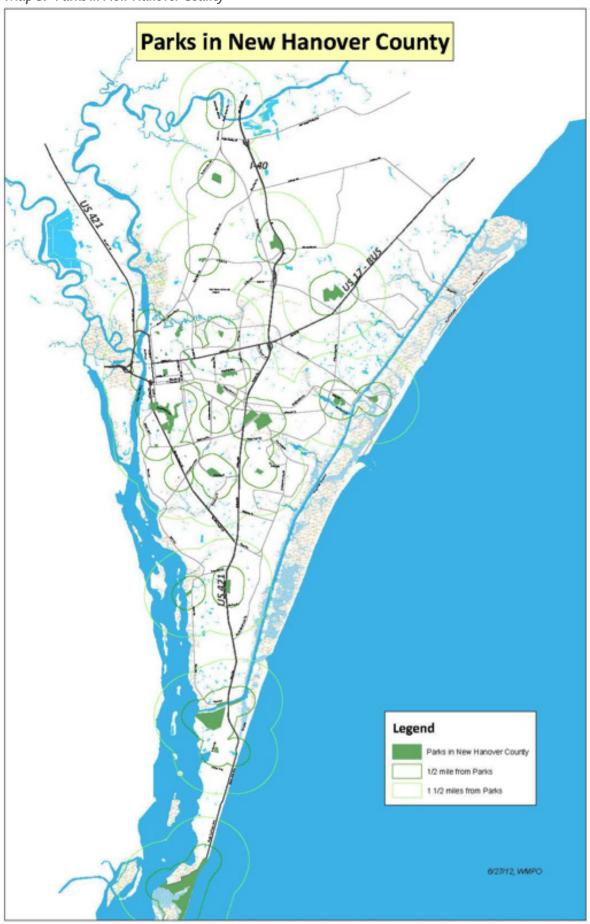
ACCESS TO HEALTHY FOODS AND SAFE PLACES TO BE PHYSICALLY ACTIVE

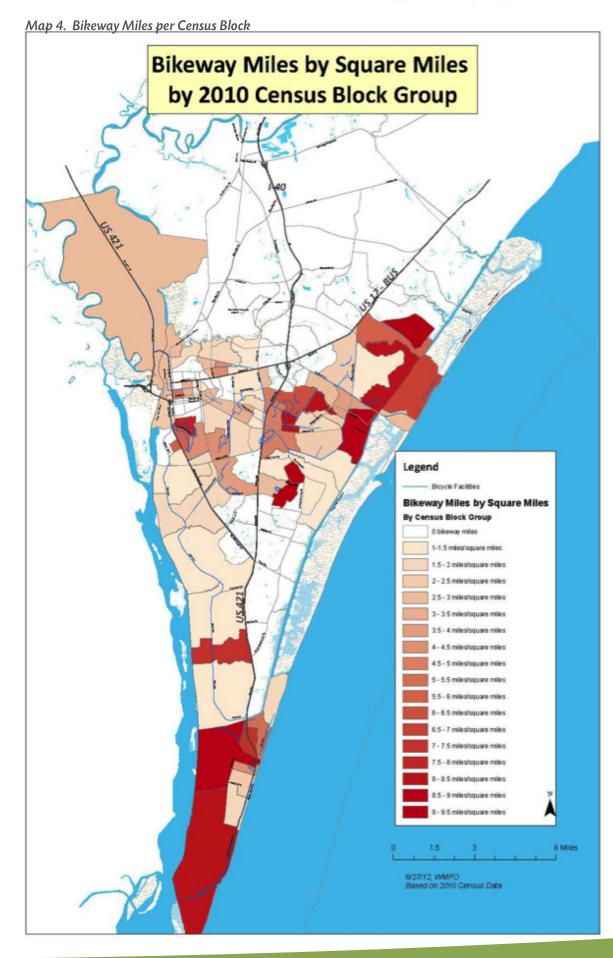
Access to healthy foods and safe places to be physically active are indicated in Maps 2-5. Those who live within 1.5 miles of grocery stores can reasonably bike there if bicycle facilities and greenways are available. Likewise, those living within 1.5 miles of parks can reasonably bike to parks. Increasing bikeway miles will thus increase access to both healthy foods and safe places to be physically active.

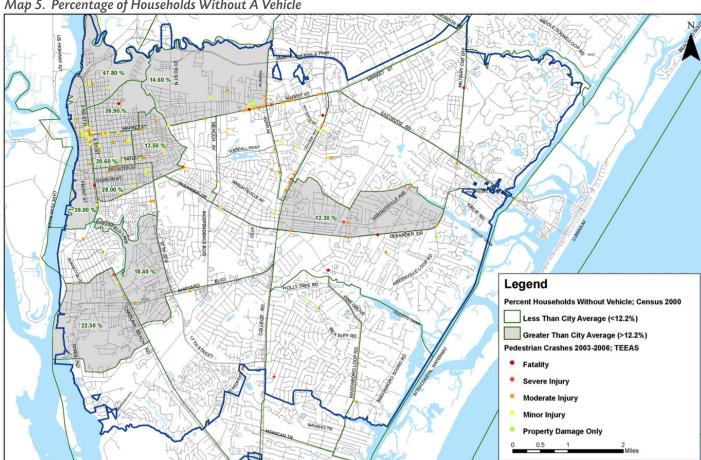
Map 5 highlights census blocks where the percentage of households without a vehicle exceeds the county average. Increasing walking and biking facilities in these areas where residents rely on alternate transportation can improve health by increasing access to healthy foods, jobs, and safe places to be physically active.



Map 3. Parks in New Hanover County







Map 5. Percentage of Households Without A Vehicle

RECOMMENDATIONS

Studies have been conducted to look at the relationship and to determine causal effects between health and socio-economics, age, disabilities, and most recently the built environment, also known as community design. Specifically, the Centers for Disease Control found that access to greenways can increase the percentage of people who exercise for 30 minutes at least 3 times per week by 25.6%. Research has also shown that regular physical activity can help decrease the risk for an array of health conditions including heart disease, stroke, and cancer-which are the top three leading causes of death in New Hanover County.

In view of the fact that regular physical activity paired with safe, accessible community facilities has been found to have positive impacts on health conditions, this HIA makes the following recommendations:

Plan and construct a greenway system:

- that is 1.5 mile walk/bike radius from services such as grocery stores, health care providers, schools, parks, and senior housing to provide access for special populations such as seniors, youth, disabled, and low-income populations.
- through low-income areas to address barriers to physical activity and improve the health of this population.

- that is ADA-compliant so that populations with disabilities can have safe access to facilities to engage in physical activity and reduce risk for chronic disease
- that promotes access to grocery stores and fresh foods

Encourage the use of the greenway by:

- Promoting education and awareness of recommended levels of physical activities, the health benefits of walking/biking, and other positive health impacts of greenways
- Improving crossings at signalized intersections around the greenway.

Continue to study the health impacts of the greenway by:

- Developing base line data for a study
- Identify resources for a long-term assessment

REPORTING

The results of this HIA were taken into account in developing this plan, and its recommendations are to be included in presentations to the public, stakeholders, and decision-makers.

MONITORING

Monitoring and Evaluation – records the adoption and implementation of HIA recommendations, monitors the changes in health and health determinants and evaluates the process, impact and outcomes of an HIA

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Public Comment Form Results

COMMUNICATIONS + PUBLIC OUTREACH

OVERVIEW

This appendix includes a description of the Communications Strategy that was implemented during the greenway planning process as well as the results of the public comment form. The comment form was distributed through a variety of mechanisms, as described in the Communications Strategy, which resulted in the input of over 3,600 area residents.

COMMUNICATIONS STRATEGY

A communication plan was implemented concurrent to the development of this greenway plan, and will continue after plan adoption. The communication plan centers on a multifaceted campaign to inform, educate and engage the public to facilitate the acceptance of input and feedback on greenway development in order to develop plan priorities and disseminate information following plan adoption.

INTENDED GOALS

- 1. To complete the Greenway Plan using an open, transparent and inclusive planning process that conveys the meaning of greenways and their benefits to the community, and provides an opportunity for citizens to give feedback on what aspects of a future greenway network are most important to them
- 2. Upon the conclusion of the Greenway Plan, create an awareness and understanding of the importance of greenways to the sustainability and livability of the community and to educate the public and elected officials on funding alternatives recommended to implement the plan.

AUDIENCE

- General Population
- Civic Clubs
- Schools
- Businesses
- Stakeholder Groups
- Media
- Development Partners
- Elected Officials

STRATEGIES

MEET WITH GREENWAY PLAN STEERING COMMITTEE

The Steering Committee met four times during the preparation of the Comprehensive Greenway Plan: during the kick-off meeting, after opportunities and constraints were identified, after the draft plan was developed, and after the final plan was developed. The purpose of these meetings was to solicit input from Steering Committee members and to provide updates on the progress of the plan. An Executive Committee met more frequently to discuss and guide the plan development.

CONDUCT MEDIA PARTNER WORKSHOP

The Executive Committee hosted a media work session with the media partners to introduce the project, discuss the purpose and needs for the greenway plan, outline a schedule and establish dialogue and communication with our the media partners. This session provided an opportunity for the media partners to discuss their needs and determine ways to partner to disseminate the information. The Greenway Advisory Committee should continue to partner with the media outlets and utilize some of their free promotional tools to disseminate information.

CONDUCT KICK-OFF EVENT

The Executive Committee hosted a kick-off event to "officially" begin the planning process and to provide information to the citizens and media partners. During this event elected officials, community leaders and the consultant presented the vision, process and schedule for plan development and adoption process.

CREATION OF BROCHURES, FLYERS AND MARKETING MATERIALS

The Executive Committee developed brochures, flyers and other marketing materials to provide information to the public. These materials include the slogan "Move. Play. Connect." to market the greenway plan. These brochures, flyers and other marketing materials were available on-line, distributed to all stakeholders and made available to libraries, government buildings, gyms and health clubs, etc. to disseminate information regarding the plan. The adopted plan will also include a brochure that will identify the plans recommendations.

ONLINE PUBLIC COMMENT FORM

Alta/Greenways created an online public comment form (using www.surveymonkey. com) that was open from February 2012 until July 2012. While comment forms are not statistically valid, they do offer perspective from hundreds of civically active residents.

PROJECT WEBSITE

www.wilmingtongreenway.com

Alta/Greenways launched and is hosting a project website that provides up-to-date information about the planning process. This website is a repository of information about the project and provides the most current information about the planning process, public meetings, background information, interim reports and links to planning documents. The project web site provides regular updates and offer links to important information, such as the times and locations of public workshops.

FACEBOOK PAGE

www.facebook.com/greenwayplan

Alta/Greenways has launched a Facebook page that enables the greenway planning process to be readily linked with social media in order to provide greater access to existing social networks. The Executive Committee assigned a representative to be responsible for daily posts to the Facebook page.

PRINT MEDIA

The Executive Committee prepared press releases, periodic Op-Ed pieces and advertisements. The Committee should consider advertising the website link and emphasizing the opportunity to submit the comment form. These print ads were included in local newspapers, magazines and other print materials.

RADIO/TELEVISION

The Executive Committee developed Public Service Announcements (PSAs) that were displayed on billboards, government and local television stations and radio. These PSAs, solicitation of public comments and other information should be distributed to WECT, WWAY, Big Talker, etc.

ATTENDANCE AT PUBLIC EVENTS

The Executive Committee attended public events and disseminated information regarding the plan development and adoption process. The committee hosted a table or booth during public events and presented brochures, flyers and other marketing materials. During the plan development process, the committee members guided participants to the website in an effort to receive feedback through the on-line survey and interactive mapping tool. These events should included runs and road races, bicycling events, community events, networking events, festivals, farmers markets, etc.

CONDUCT STAKEHOLDER INTERVIEWS AND PRESENTATIONS TO COMMUNITY ORGANIZATIONS, COMMITTEES, LOCAL **BUSINESSES, AND PUBLIC AGENCIES**

The Steering Committee understands that public input is essential to the development of the Comprehensive Greenway Plan. In an effort to receive public input, Alta/Greenways and Sage Design conducted stakeholder interviews with various stakeholders in the community to receive input. Additionally, the Executive Committee established a speaker's bureau who presented about the Comprehensive Greenway Plan and process. The following community organizations and public agencies provided input and learned about the plan during special presentations and interview sessions:

- 1. Bicycle and Pedestrian Advisory Committee (BPAC) (WMPO)
- 2. Cape Fear Audubon Society
- 3. Cape Fear Center For Inquiry
- 4. Cape Fear Community College (CFCC)
- 5. Cape Fear Cyclists
- 6. Cape Fear Economic Development Council
- 7. Cape Fear Futures
- 8. Cape Fear Green Building Alliance

- 9. Cape Fear Group of the Sierra Club
- 10. Cape Fear Public Utility Authority (CFPUA)
- 11. Cape Fear River Watch
- 12. Town of Carolina Beach
- 13. Chamber of Commerce Infrastructure Committee
- 14. Citizen Advisory Committee (CAC) (WMPO)
- 15. Corning Incorporated
- 16. Downtown Rotary Club
- 17. Eagles Island Coalition
- 18. Friends School of Wilmington
- 19. GE
- 20. Town of Kure Beach
- 21. North Carolina Department of Transportation (NCDOT)
- 22. New Hanover County Schools
- 23. New Hanover County Planning Staff
- 24. New Hanover County Parks Staff
- 25. New Hanover Regional Medical Center
- 26. Obesity Prevention Committee
- 27. Pharmaceutical Product Development (PPD)
- 28. Progress Energy
- 29. Residents of Old Wilmington, Inc.
- 30. St. Mary School
- 31. St. Marks School
- 32. Technical Coordinating Committee (TCC) (WMPO)
- 33. Tourism Development Authority
- 34. Transportation Advisory Committee (TAC) (WMPO)
- 35. University of North Carolina Wilmington (UNCW)
- 36. Wave Transit
- 37. Wilmington Area Hospitality Association
- 38. Wilmington Civitan Club
- 39. Wilmington Christian Academy
- 40. Wilmington Health Associates and Hospital
- 41. Wilmington Housing Authority
- 42. Wilmington Downtown, Inc.
- 43. Wilmington Film Commission
- 44. Wilmington Parks Advisory Committee
- 45. Wilmington Parks Staff
- 46. Wilmington Planning Staff
- 47. Wrightsville Beach Parks Staff
- 48. Wrightsville Beach Board of Aldermen

CONDUCT PUBLIC INPUT SESSIONS

Alta/Greenways and the Steering Committee conducted two rounds of public open house workshops, for a total of six (6) sessions (three in April 2012 and three in September 2012). The first set of public workshops provided an overview of the planning process and solicited initial input for the development of the greenway plan. The second set of public meetings offered a recommended comprehensive network of greenways and gathered input and feedback regarding routes. All public workshops used an open-house format. A variety of stations were set up in order to maximize involvement and input of participants. Alta/Greenways supplied materials for the workshops including sign-in sheets, maps, comment forms, markers, and other equipment necessary to gain input and feedback from residents. The Steering Committee was responsible for advertising the workshops and securing the proper venues for the sessions. Advertising included press releases, mass e-mails across local listserves, promotion on Facebook and the project website, etc.

CREATION OF A COMPREHENSIVE GREENWAY PLAN VIDEO

The Executive Committee prepared a Comprehensive Greenway Plan video that includes film from other communities, interviews, testimonials, and information about the Wilmington/New Hanover County Comprehensive Greenway Plan.

PUBLIC COMMENT FORM RESULTS

The charts and tables on the following pages show results from the public comment form for this plan. Comment forms were distributed through a variety of mechanisms, as described in the Communications Strategy. Although not a statistically valid survey, the results of this comment form still represent the opinions of nearly 3,600 people in the region.

1. How important to you is the goal of creating more greenways in Wilmington and New Hanover County? Select one.

	Response Percent	Response Count
Very Important	79.9%	2,872
Somewhat Important	17.0%	612
Not Important	3.1%	111
	answered question	3,595
	skipped question	36

2. How often do you use a greenway now? Select one.

	Response Percent	Response Count
Never	15.3%	549
Few times a year	32.6%	1,172
Few times per month	32.7%	1,175
Several times a week	19.4%	697
	answered question	3,593
	skipped question	38

3. Would you use greenways more often if you were closer to them, or if there were more of them?

	Response Percent	Response Count
Yes	95.0%	3,382
No	5.0%	178
	answered question	3,560
	skipped question	71

4. What is your preferred greenway/blueway transportation/recreation mode? Select all that apply.

	Response Percent	Response Count
Walking	75.1%	2,647
Biking	77.0%	2,715
Rollerblading	6.2%	217
Canoeing/kayaking	24.1%	851
Wheelchair or other mobility assistance device	2.0%	70
	Other (please specify)	281
	answered question	3,525
	skipped question	106

5. If you canoe or kayak, please tell us where, and what would make that experience better?

Response Count

787

answered question	787
skipped question	2,844

6. How do you (or how would you) use greenways? Rank your top 3 choices.

	First Priority	Second Priority	Third Priority	Rating Average	Response Count
For fitness or recreation	60.4% (1,857)	27.7% (852)	11.8% (363)	1.51	3,072
For transportation to a destination	29.4% (484)	33.1% (545)	37.6% (619)	2.08	1,648
As a social activity	9.8% (171)	29.5% (516)	60.8% (1,064)	2.51	1,751
To get outside/enjoy nature	30.4% (877)	41.5% (1,198)	28.1% (811)	1.98	2,886
			answered	d question	3,411
			skipped	l question	220

7. In your opinion, what are the most important benefits and uses of a greenway system? Select all that apply.

Response Count	Response Percent	
1,878	54.4%	Transportation
2,896	83.8%	Recreation
3,092	89.5%	Exercise
1,079	31.2%	Community-building and events
1,703	49.3%	Connectivity to surrounding area
1,917	55.5%	Habitat and environmental protection
1,073	31.1%	Economic stimulation/tourism
799	23.1%	Education and interpretation
114	her (please specify)	
3,45	answered question	
176	skipped question	

8. What destinations would you most like to get to by greenway? Rank your top 3 choices.

Response Count	Rating Average	Third Priority	Second Priority	First Priority	
934	1.77	25.6% (239)	26.2% (245)	48.2% (450)	Place of Work
533	1.71	21.0% (112)	29.5% (157)	49.5% (264)	School
520	1.84	24.8% (129)	34.4% (179)	40.8% (212)	College/University
2,041	1.79	22.3% (455)	34.6% (706)	43.1% (880)	Beaches
785	2.20	39.9% (313)	40.0% (314)	20.1% (158)	Restaurants
236	2.11	39.8% (94)	31.8% (75)	28.4% (67)	Public Transportation
623	2.20	43.3% (270)	33.7% (210)	23.0% (143)	Shopping
1,918	1.87	25.5% (490)	36.4% (698)	38.1% (730)	Parks
672	2.33	50.9% (342)	31.3% (210)	17.9% (120)	Entertainment
1,153	2.11	40.3% (465)	30.4% (350)	29.3% (338)	Other Greenways
438	2.39	53.2% (233)	32.2% (141)	14.6% (64)	Libraries or Recreation Centers
3,434	d question	answered			
197	d question	skipped			

9. What do you think are the biggest factors that discourage greenway use? Rank your top 3 choices.

	First Priority	Second Priority	Third Priority	Rating Average	Response Count
Lack of safe connections to greenways	52.2% (1,214)	26.4% (614)	21.4% (499)	1.69	2,327
Lack of information about existing greenways	35.6% (481)	30.7% (415)	33.6% (454)	1.98	1,350
Unsafe street crossings	29.8% (547)	46.0% (845)	24.3% (446)	1.95	1,838
Motor vehicle traffic	33.5% (593)	32.9% (581)	33.6% (594)	2.00	1,768
Lack of interest	33.6% (134)	35.6% (142)	30.8% (123)	1.97	399
Lack of time	25.5% (110)	39.6% (171)	35.0% (151)	2.09	432
Lack of nearby destinations	21.0% (186)	33.6% (297)	45.4% (401)	2.24	884
Personal safety concerns	21.9% (194)	25.1% (222)	52.9% (468)	2.31	884
			answered	d question	3,464
			skipped	d question	167

10. What type of greenway trails would you like to see more of in this area? Please select one.

	Response Percent	Response Count
Paved trails	36.7%	1,275
Unpaved trails	8.5%	295
Water trails (for canoeing/kayaking)	5.1%	179
All of the above	47.7%	1,658
None	2.0%	71
	answered question	3,478
	skipped question	153

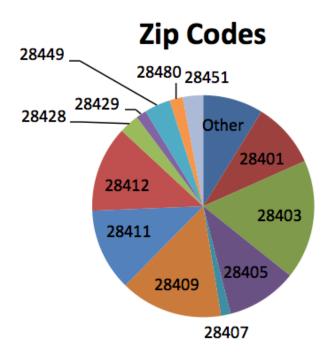
11. What amenities are most important to you for greenways? Select all that apply.

	Response Percent	Response Count
Benches	41.9%	1,368
Directional signs	49.0%	1,600
Greenway maps/kiosks	49.5%	1,618
Interpretive signs (featuring local history/environment)	25.9%	846
Drinking fountains	42.9%	1,400
Adequate lighting	52.8%	1,725
Trash cans	47.8%	1,563
Pet waste stations	42.8%	1,398
Restrooms	48.9%	1,597
911 call boxes	34.5%	1,128
Bicycle racks	30.9%	1,011
	Other (please specify)	171
	answered question	3,267
	skipped question	364

12. Are there specific locations within New Hanover County (and its municipalities) that you believe would be ideal for greenways? Please be as specific as possible.

	Response Count
	1,356
answered question	1,356
skipped question	2,275

13. What is your residential zip code?



14. If you are from outside the area, please indicate if you work in one of the following areas.

	Response Percent	Response Count
Wilmington	71.2%	668
Wrightsville Beach	7.2%	68
Carolina Beach	5.8%	54
Kure Beach	2.9%	27
New Hanover County	12.9%	121
	answered question	938
	skipped question	2,693

15. If you are a visitor to the area, please indicate where you visit. Select all that apply.

Response Count	Response Percent	
36	72.2%	Wilmington
31	61.6%	Wrightsville Beach
20	40.3%	Carolina Beach
13	26.4%	Kure Beach
12	23.5%	New Hanover County
3	Other (please specify)	
51	answered question	
3,12	skipped question	



Overview

Existing Programs and Resources by Geography

Program Recommendations

PROGRAM RESOURCES

OVERVIEW

This report provides a set of high priority programmatic recommendations for the four non-infrastructure "E's" of bicycle and pedestrian planning: Encouragement, Education, Enforcement, and Evaluation. Marketing, education, and evaluation programs are an essential complement to bicycle and pedestrian facilities planning. These activities help to raise the profile and public understanding of facilities investments, increase walking and bicycling mode share and public support, and help to create a local culture that values walking and bicycling. These initiatives can be undertaken by local agencies and community organizations.

EXISTING PROGRAMS AND RESOURCES BY GEOGRAPHY

STATE PROGRAM AND RESOURCES

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT)

The official website of NCDOT provides numerous resources for traveling by bicycle. Links to bicycle club websites, links to bicycle shops, tips for bicycling and announcements for special events are all included on the site. Information about both road and mountain biking is provided, as well as state, regional and local route maps. http://www.ncdot.gov/bikeped/bicycle/

CAROLINA YOUTH MOUNTAIN BIKE LEAGUE

The Carolina Youth Mountain Bike League (CYMBL) is a program of Blue Ridge Adventures and Falling Creek Camp that provides opportunities for youth to participate in competitive mountain bike races throughout the Carolinas. The CYMBL mission is to promote mountain biking as a lifelong sport, model sportsmanship for student racers and promote healthy lifestyles.

http://www.cymbl.org/default.html

EAT SMART MOVE MORE NC

Eat Smart Move More NC is a statewide coalition that promotes increase opportunities for healthy eating and physical activity in North Carolina. The group provides resources for local communities related to best practices and health statistics, as well as funding opportunities. In September 2010, New Hanover County Health Department received grant funds from Eat Smart Move More NC to implement a multi-use path on Colwell Avenue, and provide bicycle safety instruction and youth gardening programs in two target areas. http://www.eatsmartmovemorenc.com/index.html

NORTH CAROLINA ACTIVE TRANSPORTATION ALLIANCE

The North Carolina Active Transportation Alliance (NCATA) is a membership-based advocacy organization promoting active transportation opportunities throughout the state of North Carolina. Information related to statewide policy, biking and walking transportation programs in NC cities, and biking and walking events is posted on their website. https://sites.google.com/site/ncactive/

NORTH CAROLINA PADDLE TRAILS ASSOCIATION

The NC Paddle Trails Association has a mission to "empower communities in the local development, maintenance and restoration of paddle trails in North Carolina." The group advocates and provides information related to paddle trail development, facilitates trail map development, advocates access to waterways and provides support for local paddling advocacy groups.

http://www.ncpaddletrails.info/index.asp

NORTH CAROLINA BLUEWAYS

NC Blueways is an online resource created by the NC Paddle Trails Association, in conjunction with the NC State Trails and Tourism Extension. The website offers informational videos, forums and other resources related to paddle trail development, blueway access and safety.

http://www.ncsu.edu/ncblueways/index.html

REGIONAL PROGRAM AND RESOURCES

CAPE FEAR PADDLERS ASSOCIATION

The Cape Fear Paddlers Association promotes kayaking and canoeing in the waters of the Cape Fear Region. The group participates in organized paddling trips, paddle sweeps, races and other events, as well as coordinates with local retailers to promote and support boat demonstrations, clinics, and more.

http://www.capefearpaddlers.org/

SAFE KIDS CAPE FEAR

Safe Kids Cape Fear is a local chapter of the national Safe Kids Coalition and is housed at the New Hanover County Health Department. The organization is dedicated solely to prevention of childhood injury and focuses on the community of New Hanover, Brunswick and Pender counties. Many Safe Kids Coalition chapters provide services related to youth bicycle safety and promoting helmet use among children. While such programs are not currently offered by Safe Kids Cape Fear, the organization has a direct link to the bicycle and helmet safety resources provided by the national coalition.

http://www.nhcgov.com/Health/health-promotion/Pages/injury-prevention.aspx

THE CAPE FEAR RIVER WATCH

The Cape Fear River Watch organizes monthly environmental seminars, river clean-up outings, maintenance, monitoring, research, and training for River Watch members to "adopt" rivers, streams, and tributaries.

http://www.capefearriverwatch.org/

WILMINGTON CAPE FEAR COAST, NC

The "official tourism website of Wilmington and NC's Cape Fear Coast" offers userfriendly trip planning services for visitors to the communities of Historic Wilmington, Carolina Beach, Kure Beach and Wrightsville Beach. Biking and hiking are featured activities. The website provides links to local biking and hiking organizations, as well as desti-

http://www.capefearcoast.com/activities/wilmington/outdoor_recreation.html

WILMINGTON URBAN AREA METROPOLITAN PLANNING ORGANIZATION (MPO)

The Bicycle and Pedestrian Transportation page of the Wilmington Urban Area's MPO website offers information about bicycle and pedestrian planning projects in the area. Additionally, multiple bike route maps are available for download. On Earth Day 2012, the agency partnered with local jurisdictions, community groups and volunteers to launch an ongoing safety campaign named "See Share Be Aware." Targeted at motorists, as well as bicyclist and pedestrians, the campaign is promoting safe practices for sharing the road among multiple user groups.

http://www.wmpo.org/WMBPC/ and http://www.seesharebeaware.com

LOCAL PROGRAM AND RESOURCES

CITY OF WILMINGTON, NC

The City of Wilmington's official website includes several bicycle- and pedestrian-focused webpages as part of "Community Services." Information about trail projects, such as the Cross-City Trail, trail maps and announcements for biking and walking events, such as Run Ride Roll, are available on the site. The site also provides links to state and local bicycle and pedestrian organizations.

http://www.crosscitytrail.com/

NEW HANOVER COUNTY HEALTH DEPARTMENT/ NEW HANOVER COUNTY PLANNING AND INSPECTIONS

The Health Department of New Hanover County focuses on "healthy people, healthy environment, and healthy community." The agency operates with a broad mission and multiple program areas. The department houses Safe Kids Cape Fear and has contributed to the development of greenways and bicycling programs. Similarly, New Hanover County Planning and Inspections played a key role in development of this plan, and is prepared to be a resource in implementation of related programs. Local bicycle events, routes and maps are available on their website.

http://www.nhcgov.com/Health/Pages/default.aspx http://www.nhcgov.com/PlanInspect/Pages/BicycleInformation.aspx

WILMINGTON, NC ROADRUNNERS

Founded in 1977, the Wilmington Road Runners Club supports running and jogging interests in the New Hanover County community. The more than 250 members range from competitive runners to leisurely joggers and the club supports routes along both roads and trails.

http://wilmingtonroadrunners.org/

CAPE FEAR CYCLISTS

The Cape Fear Cyclists serves as a bicycling advocacy group for Wilmington, NC and its surrounding communities, including New Hanover, Brunswick, and Pender counties. The organization spearheads the local Bicycle Friendly Community campaign. Bike rides and bike routes are available on the club's website.

http://www.capefearcyclists.org/index.php?option=com_frontpage@Itemid=1

CAPE FEAR SORBA

Cape Fear SORBA is the local chapter of the regional affiliate, Southern Off Road Bicycle Association, or SORBA, which is a member of the International Mountain Bike Association (IMBA). Founded in 2009, Cape Fear SORBA advocates for bicycling, supports mountain biking opportunities and manages trails in both New Hanover and Brunswick counties.

http://blog.capefearsorba.com/

SIR BIKES-A-LOT

Sirbikesalot.com is an information hub for mountain bikers for Wilmington, NC and surrounding communities. The website includes photos, videos and descriptions of trails and parks open to mountain biking, as well as a forum in which enthusiasts can exchange tips and organize rides.

http://sirbikesalot.com/index.php

ADDITIONAL POTENTIAL PARTNERS

In addition to the existing partners and resources already described, the following institutions and organizations are likely partners in implementing programs in the Wilmington area.

- Incorporated towns and cities in the Wilmington Urban Area MPO region Towns and cities are important parties in initiating and supporting programmatic efforts through staff time, funding, and publicity.
- Any local walking/bicycling/trails committees Communities with Bicycle, Pedestrian, and/or Trails/Greenways Committees can help coordinate efforts and may be able to connect needs with interested volunteers.
- Public health agencies and nonprofits Public health professionals can help to implement and evaluate recommendations that will help residents increase daily physical activity.
- Major employers Major employers in the region can contribute to commuter incentive programs and provide volunteers or sponsorship for events. Potential partners within this category include: New Hanover Regional Medical Center, New Hanover County School System, University of North Carolina (Wilmington), New Hanover County, Celico Partnership, PPD Development, GE, Verizon, Cape Fear Community College, Corning Inc, and the City of Wilmington.
- Colleges/universities The Wilmington Urban Area MPO region has two universities, Cape Fear Community College and University of North Carolina Wilmington.
- Local police departments and county sheriff's offices Law enforcement professionals can help support safety campaigns through strategic enforcement and educational events
- School districts School districts and schools are natural partners for Safe Routes to School efforts as well as for education programs related to student safety.

- Parent Teacher Associations (PTAs) PTAs can be effective partners in implementing Safe Routes to School efforts and other school-oriented traffic safety initiatives.
- Parks and Recreation Parks and Recreation departments are natural partners for public events and classes such as organized walks.
- YMCA, Boys and Girls Clubs, and other youth-oriented service providers These groups can partner on programs that benefit children, such as after-school programs and summer camps.
- Chambers of commerce, business improvement districts, downtown development associations - These groups may be interested in supporting initiatives that bring residents and visitors to the downtowns and business districts. Currently, groups such as the Greater Wilmington Area Chamber of Commerce and Wilmington Downtown, Inc. play a central role in promoting tourism to the area.
- Economic and/or tourism development organizations Groups such as Wilmington Downtown, Inc. and the Wilmington and Beaches Convention and Visitors Bureau may be interested in supporting initiatives that bring visitors to the region.
- Senior centers and retirement communities More and more organizations that work with seniors are interested in projects that help their clients live active, healthy lives.
- Hospitals and private health professionals Private sector partners with an interest in promoting health and wellness can serve as local champions and funders of education and awareness campaigns.

PROGRAM RECOMMENDATIONS

ENCOURAGEMENT AND EDUCATION

SAFE ROUTES TO SCHOOL REGIONAL PLAN

The "Connecting Schools Initiative" could be part of this effort.

Safe Routes to School Programs are bolstered by the development of a collaborative approach to the program, rather than separate efforts led by individual schools. A region-wide Safe Routes to School Plan allows communities to set a benchmark that all elementary schools in the area take part in the program over a specified period of time. The WMPO Strategic Business Plan, for example, indicates that the WMPO will complete one Safe Routes to School Plan per year. Communities should contact their regional Safe Routes to School Coordinator to leverage resources as they develop plans for implementation of this program. The current SRTS Coordinator for North Carolina Department of Transportation is Ed Johnson at (919) 707-2604. The North Carolina State Advocacy Organizer of the Safe Routes to School National Partnership is Terry Lansdell at (704) 332-1796.

Program Resources:

- National Center for Safe Routes to School: http://www.saferoutesinfo.org/
- National Safe Routes to School Partnership: http://www.saferoutespartnership.org/
- National Safe Routes to School Partnership (NC): http://www.saferoutespartnership.org/state/srts-in-your-state/northcarolina
- NCDOT Safe Routes Website: http://www.ncdot.gov/doh/preconstruct/traffic/ congestion/CM/msta/

Sample Safe Routes to School Programs:

- Encouragement Program (SC): http://active-living.org/Walking--Wheeling-Wednesday.html
- Travel Plan (GA): http://www.saferoutesga.org/content/completed-travel-plans
- Walking School Bus (MO): http://www.pednet.org/programs/walking-school-bus.
 asp

WALKING MAPS

One of the most effective ways of encouraging people to walk is through the use of maps and guides to show where you can walk, and to guide people to enjoyable routes and destinations for walking. The Wilmington Urban Area MPO and Cape Fear Cyclists already have bicycling route maps. The walking maps would serve as a complement to the existing bicycling maps and delineate safe areas to access greenways for both pedestrians and bicyclists. The map should be reprinted as needed and actively distributed to residents and visitors; it should also be updated on a regular basis as new facilities are implemented.

As a next step, partners should collaborate on creating one or more guided tour routes based on themes such as a historic tour and/or a public art tour. Live tours should be hosted by knowledgeable tour guides (annually or more frequently as demand permits) and publicized widely. The tour routes should be preserved in a brochure and/or a self-guided (e.g. iPod-based) tour as well so that people can participate even if they are unable to attend the guided tour.

Sample Guided Walks and Maps:

- Bedford County Walking Tours (Bedford, PA): http://www.visitbedfordcounty.com/walkingtours.html
- Austin Historic Walking Tours (Austin, TX): http://www.austintexas.org/visitors/ plan_your_trip/historic_walking_tours
- Walking Route Maps (Wilsonville, OR): http://www.ridesmart.com/Index. aspx?page=190

OPEN STREET EVENTS

Open (or "Car-free") Streets events have many names: Sunday Parkways, Ciclovias, Summer Streets, and Sunday Streets. The events are periodic street "openings" (i.e., "open" to users besides just cars; usually on Sundays) that create a temporary park that is open to the public for walking, bicycling, dancing, hula hooping, roller-skating, etc. They have been very successful internationally and are rapidly becoming popular in the United States. Open street events promote health by creating a safe and attractive space for physical activity and social contact, and are cost-effective compared to the cost of building new parks for the same purpose. Events can be weekly events or one-time occasions, and are generally very popular and well attended. Open street events attract a local audience and should be hosted in each community within the Wilmington Urban Area MPO region.

For future expansion of the program, organizers should consider lessons learned and best practices from other communities. Some recommendations include:

 Make sure that there are programmed, family-friendly activities along the route; an "open street" alone is not sufficient to draw participants (and especially not on a repeat basis).

- These events lend themselves to innovative partnerships and public/private funding. Health care providers whose mission includes facilitating physical activity are often major sponsors. Businesses may also support the event if it brings customers to their location.
- The cost of organizing the event can be mitigated through volunteer participation, as this type of event lends itself to enthusiastic volunteer support. However, this will require a high level and quality of volunteer recruitment and management to be sustainable in the long run.
- Police costs to manage the road closure will be one of the largest costs. Work with the police to develop a long-term traffic closure management strategy that uses police resources where needed but also allows well-trained volunteers to participate in managing road closures.
- The greatest value to the community comes when a ciclovia event happens on a regular basis (e.g. monthly during pleasant weather months). For this to be successful, different routes and/or different activities should be considered.

Program Resources:

- Open Streets Guide (includes networking opportunities and organizers guide): http://openstreetsproject.org/
- Videos of Open Streets events: http://www.streetfilms.org/tag/ciclovias/

Sample Programs:

- Atlanta Streets Alive (GA): http://www.atlantabike.org/atlantastreetsalive
- Bull City Open Streets (NC): http://bullcityopenstreets.com/
- 2nd Sunday on King Street (SC): http://susanlucas.typepad.com/secondsundayonkingstreet/

WEEKEND WALKABOUTS

Weekend Walkabouts are regularly occurring events that promote walking while also bringing attention to pedestrian infrastructure. Weekend Walkabouts can be held either monthly from May to October or quarterly to include one walk per season, depending on staff availability and marketing opportunities. The events' walking routes should highlight safe and inviting places to walk in the public realm (rather than private or enclosed facilities such as walking tracks) and should be 3 miles or less in length. These events are ideal for families and seniors.

Weekend Walkabouts may be organized based on themes for each walk, such as an architectural tour, a "Steeple Chase" tour (visiting historic churches), a tour of parks, neighborhood strolls, etc. To generate added marketing potential, community leaders or local celebrities could be chosen to lead each walk. For each event, at least one volunteer or staff member should be positioned at both the front and the rear of the walking group. The pace should remain at 2-2.5 miles per hour or less. A refreshment break with water should be offered at the halfway point for any walk of 2 or more miles.

In the Wilmington Urban Area MPO region, there is particular interest in improving access to greenways. Weekend Walkabouts could serve as one tool for identifying and promoting safe routes to greenways. Additionally, Weekend Walkabouts are one avenue for marketing the Walking Maps, as previously mentioned, by showcasing recommended routes.

Program Resources:

- Spartanburg, SC Weekend Walkabouts: http://active-living.org/Walkabouts-and-Rideabouts-3.html
- Jane's Walk: www.janeswalk.net

BIKE MONTH ACTIVITIES

Cities and towns across the country participate in National Bike Month annually, during May. The League of American Bicyclists (LAB) hosts a website for event organizers. The website contains information on nationwide and local events, an organizing handbook, and promotional materials.

The Wilmington Urban Area MPO should serve as a regional facilitator and promoter of National Bike Month events and activities. Jurisdictions within the region will host events and activities annually, with the support of local bicycling groups and shops. Bike Month activities are important for achieving (or retaining/improving, in the case of the City of Wilmington) Bicycle Friendly Community status from the League of American Bicyclists. Activities may include:

- Bike to Work Day events, such as morning-commute energizer stations with food, encouragement, information, and sponsored goodies for participants; rally with raffles, food, and vendors; etc
- Short, themed community bicycle rides
- Participation in the national Ride of Silence bike ride to bring awareness to cyclist safety
- Mountain biking skills clinic and tour of mountain biking trails
- Bicycle parking valet, hosted by volunteers, to offer free bicycle parking at special events
- Bicycle Commuter Course taught by nationally certified League Cycling Instructors
- Bike to the Beach events that capitalize on the access to the coast and attract both local residents and visiting tourists as participants

Program Resources:

- National Bike Month: http://www.bikeleague.org/programs/bikemonth/
- NC Bike Month Events: http://ncactive.org/content/may-bike-month

Sample Programs:

- goTriangle (Raleigh/Durham region, NC): http://www.gotriangle.org/bike-walk/ BTWW?/btww
- Greenville, SC Bike Month events: http://www.greenvillesc.gov/ParksRec/trails/bikemonth.aspx
- Atlanta, GA Bike Month events: http://www.atlantabike.org/May



Promotion of bike month can build off of the Greenway Plan's slogan "Move. Play. Connect.", for use in print and online materials, for example.

BICYCLE TOURISM

Coastal communities have unique assets to offer to visitors and cycle tourism is a popular and growing niche. Efficiently identifying opportunities and creating targeted marketing plans can help a coastal town or county become a bicycling destinations and reap the benefits of this low-impact, sustainable tourism segment.

Interested communities and organizations in the Wilmington MPO region should convene a working group to complete an opportunity analysis and action plan for fostering cycle tourism. The working group should start by educating themselves about the market sector (what cycle tourists want; submarkets within the overall niche and how they differ; demographics of cycle tourists) and develop a shared understanding of the benefits of bicycle tourism to communities. Examples of two submarkets are the long-distance touring cyclists, or "through-riders," and short-distance riders with a home-base, or "day rider." Next, the group should analyze a) current assets, b) current challenges, c) potential improvements, and d) current and potential partners. The presence of inns or bed and breakfasts and bicycle rental businesses are examples of potential assets within this tourism strategy. Finally, an action plan should be created to prioritize efforts that will make the biggest difference, followed by a media outreach strategy to market the region to potential bicycle tourists.

Examples of program components that may be included in an action plan are:

- Identify bicycle-friendly accommodations: Establish criteria for identifying and promoting hotels or inns that agree to provide secure bicycle parking or allow bikes in rooms, provide laundry and/or clothes drying area, provide basic repair tools, have a supply of bicycle maps on hand, or offer other bicycle friendly amenities. Promote the businesses through regional tourism marketing campaigns.
- Branding campaign: Reinforce the bicycle tourism program by installing welcome signs for cycling tourists as they enter the Wilmington Urban Area. Signs catering to "through-riders" are installed on roadways that are bicycle-friendly routes for entering the area.
- Signature event: Hosting a high-quality recreational cycling event (such as a century or double century) in the region can attract cyclists and have a positive economic impact on hotels, restaurants, and service businesses.
- Conduct a Bicycle Share Feasibility Study for Wilmington, UNCW, and/or local businesses.

Sample programs:

- Chamber-led promotion of bicycle tourism in region: Bike/Run Central Texas: http:// copperascove.com/bike-run/
- Identifying bicycle-friendly accommodations: http://www.healthytransportation. org/bfahotel.html
- Three-day Tour de Lane event in Eugene, OR, multiple supported tour options and evening entertainment: http://tourdelane.com/

CAMPUS COMMUTER PROGRAM

College and University students, faculty, and staff are a reachable audience with commute patterns to and from and around campuses that are conducive to active transportation. Many institutions of higher education are realizing the benefits that active transportation programs offer towards campus-wide transportation demand management and parking services. University of North Carolina Wilmington (UNCW) is a designated Bicycle Friendly University and has the opportunity to build upon existing momentum and support for travel by bicycle.

A campus commuter program provides resources and information for commuting to campus by biking, walking, or transit and offers incentives to students, faculty and staff that commute by means other than a car. Both Cape Fear Community College (CFCC) and UNCW should implement campus commuter programs. Components of the programs could include:

- Emergency Ride Home Providing an "emergency ride home" ensures that commuters who have an unexpected change in schedule, emergency, or face severe weather have an alternate means of returning home.
- Bike to Campus Day Following the model of "Bike to Work Day," this is an annual
 marketing strategy to encourage newcomers to bicycle commuting to try it for a day.
 It may include coffee/refreshment areas with bike mechanic services, the college/
 university President biking to campus, incentive gifts, a team bike commute challenge, or other activities.
- Cash Incentives Participating commuters may be enticed to try bicycling or walking at least on occasion by either direct cash incentives (at CFCC) or by savings from no longer paying for parking permits (at UNCW). If commuters are concerned about giving up their parking permit permanently, there are ways to alleviate this concern (such as charging all users daily for parking, offering a limited number of day-use parking passes for people who give up their permanent pass, allowing people who give up parking passes the opportunity to move to the front of the waiting list if they change their minds, etc.).
- Route Planning Services A campus commuter program can offer assistance in identifying safe routes for bicycling or walking to campus or in trip-linking with transit and ridesharing.
- Celebratory Events and Awards Annual events celebrating individuals who take
 part in the commuter program and providing awards for dedicated biking or walking
 commuters provides further incentive for participants and raises awareness of the
 programs offerings.

Sample Programs:

- University of South Carolina: http://www.sc.edu/healthycarolina/travelight.html
- University of North Carolina Greensboro: http://www.bestworkplaces.org/list-of-bwc-workplaces/the-university-of-north-carolina-at-greensboro/

ENFORCEMENT AND EVALUATION

FRIENDS OF BLUEWAYS AND GREENWAYS GROUP

A Friends of Blueways and Greenways organization can help to create community pride and a sense of ownership in the local blueway and greenway network while also reducing the potential for public safety issues and promoting responsible user behavior. The group must primarily be a citizen-led initiative that may eventually become a registered non-profit corporation if desired. Numerous other partners can support and partner with the Friends group, however, both to create the group and to help it be successful in the long run. A Friends of Blueways and Greenways group would serve as a complement to and co-collaborator with the regional Bicycle and Pedestrian Advisory Committee.

Major campaigns for Friends of Blueways and Greenways may include:

1. Annual Blueway and Greenway Clean-Up Days

This effort would harness and organize volunteers to install and maintain plantings, remove trash, install benches, signs and other amenities, and create a sense of community pride in the facility. Different groups could be invited to participate for specific events, such as scout troops, college service groups, and schoolchildren (as part of a Safe Routes to School program or for Earth Day)

2. Greenway Ambassadors

Greenway Ambassadors are trained residents who regularly walk or bicycle along the greenway to identify maintenance or safety concerns, report illegal trail dumping, erosion, or vandalism, and make local jurisdictions aware of any security issues or other needs early so they can be dealt with promptly. The presence of trained Ambassadors, who should wear specific t-shirts or other identifying garments, can serve an "Eyes on the Street" function (similar to a "Block Watch" program) to alert the entire community that the facility is being monitored, and that legitimate users take an active role in monitoring the trail.

3. Share the Greenway Outreach

Conflicts between greenway users can be a major issue on popular, well-used path systems. Some communities have launched successful "share the path" events to help educate users about safety and courtesy. These programs educate users about expected behavior and how to limit conflicts. Volunteers often give out brochures and engage with users in a non-confrontational way. Media outreach should be included as well. Common strategies include a bicycle bell giveaway, handing out maps and information, posting signs, tabling, and 'stings' that reward good behavior.

4. Blueway and Greenway Celebration Days

Regular festivals and organized outings will help Wilmington area residents experience the blueways and greenways in a fun and supportive atmosphere. Possible themes include a fun run/walk, a family bike parade for Mother's Day or Father's Day, a paddlefest, a "Bikes and Blueways" Day involving activities for multiple user groups, or a greenway bike ride with the Mayor during Bike Month (in May).

Sample Program:

• Murfreesboro Friends of the Greenway http://www.murfreesborotn.gov/default. aspx?ekmenu=316@rid=6161

ANNUAL EVALUATION PROGRAM

Evaluation programs measure and evaluate the impact of projects, policies and programs. Typical evaluation programs range from a simple year to year comparison of US Census Journey to Work data to bicycle and pedestrian counts and community surveys. Such programs evaluate not only the impacts of specific bicycle and pedestrian improvement projects but can also function as way to measure progress towards reaching local goals, such as increased bicycle and pedestrian travel for trips one mile or less.

The Annual Evaluation Program for Wilmington and New Hanover County should use a variety of techniques to comprehensively evaluate progress toward the goals of this plan and the impacts of infrastructure investments. These include systematic observation of bicyclists and pedestrians on greenways and selected on-road facilities throughout the area using momentary time sampling techniques (e.g., counts), intercept surveys on greenways, Random Digit Dial (RDD) surveys of county residents, annual focus group meetings, and interviews with businesses near greenways. In addition, infrastructure investments should be tracked and compared to established goals annually through use of a Greenways Report Card, described on the following page.

The results of these techniques will provide ongoing data for the region on the number of cyclists and pedestrians using greenway and on-road facilities, the types and interests of those users, the economic impacts of the greenway system, and the changing public opinion related to the greenways program.

This report recommends, at minimum:

- Contract with a university to do the evaluation and impact study
- A budget of a minimum of 10% of the greenway construction budget should be allocated to evaluation
- Before and after bicycle, pedestrian, and motor vehicle counts on all major roadway, bikeway, and pedestrian infrastructure projects.
- Annual bicycle and pedestrian counts conducted at a minimum of 25 locations, including trail and greenway locations.
- Annual intercept surveys of greenway users at selected greenway locations.
- Annual community surveying through Random Digit Dialing and focus group meetings.
- Annual analysis and reporting of all collected data.

Program Resources

- National Bicycle and Pedestrian Documentation Project http://bikepeddocumentation.org/
- Greenville Hospital System Swamp Rabbit Trail: Year 1 Findings Report

GREENWAYS REPORT CARD

This Plan has developed many action steps related to greenway development. It can be a useful benchmarking activity to create an annual or biannual report measuring accomplishments. This report could be produced internally with help of the Greenway Advisory Committee and the WMPO Bike/Ped Committee. The report should include relevant walking and bicycling metrics (new bicycle and pedestrian facility miles, major completed projects, new programs, pedestrian and bicycle crashes) and may also include information on user satisfaction, public perception of safety, or other qualitative data that has been collected related to greenway usage. If available, bicycle and pedestrian count results should also be included.

Sample Program:

 City of San Francisco (CA) http://www.sfbike.org/download/reportcard_2006/ SF_bike_report_card_2006.pdf

SEE SHARE BE AWARE CAMPAIGN

The See Share Be Aware is a multi-organizational campaign effort towards creating a safer roadway environment in the Lower Cape Fear for motorists, cyclists, and pedestrians.

Sample Issue-specific Safety Programs:

- Greenville, SC Lights for Life: http://bikegreenville.blogspot.com/2011/10/lights-for-life.html
- Give me Three (CA): http://givemethree.squarespace.com/
- Spartanburg, SC Pedestrian Crosswalk Safety: http://www.active-living.org/Pedestrian-Safety-2.html





Overview

City of Wilmington Land Development Code

New Hanover County Subdivision Ordinance

City of Wilmington Technical Standards

New Hanover County Zoning and Technical Standards

Town of Wrightsville Beach Ordinances and Technical Standards

Town of Carolina Beach Ordinances and Technical Standards

Town of Kure Beach Ordinances and Technical Standards

Additional Policy Considerations

POLICY REVIEW

OVERVIEW

Existing land development, zoning and subdivision ordinances and technical standards have a significant effect on pedestrian and bicycle transportation and trail development in Wilmington and New Hanover County. The existing policies should be strengthened to improve accommodations for non-motorized transportation and recreation facilities. This appendix contains a review of existing policies and features suggested policy revisions for consideration.

TABLE D.1: CITY OF WILMINGTON LAND DEVELOPMENT CODE

Ordinance	Existing Ordinance Text (Abridged)	Additional Comments			
Ordinance	Suggested revisions or additions shown in red	Additional Comments			
ARTICLE 1. IN G	ARTICLE 1. IN GENERAL				
Sec. 18-4. Purpose.	This chapter is intended to consolidate all of the city's major land development and land use regulations. The regulations in this chapter are designed to promote efficient traffic circulation; to promote walking and bicycling as a healthy transportation option for residents of all ages and abilities while protecting the safety of participants, to minimize the risk of fire, panic, and other damages; to protect public health, safety, and the general welfare; to provide adequate light and air; the protection of residential neighborhoods, shopping districts, parks and recreational facilities and natural resources from adverse impacts of inappropriate uses or site development features and to facilitate the adequate provision of transportation, potable water, sanitary sewerage, schools, parks, and other public facilities				
ARTICLE 2. ADM	MINISTRATIVE OFFICIALS AND AGENCIES				
	No comments				
ARTICLE 3. ENFO	ORCEMENT AND REVIEW PROCEDURES				
Sec. 18-60. Site plan review.	(10) Location and dimensions of on-site pedestrian and vehicular access ways, shared-use trails, vehicular and bike parking areas, loading and unloading facilities, designs of ingress and egress of vehicles to and from the site onto public streets, and curb and sidewalk lines;				
Sec. 18-66. Pre-application conferences.	(6) Proposed street right-of-way, trail access and connectivity and lot layout.	This is a key element to add to the pre-application stage as this is when opportunities can be easily spotted and included in subsequent planning and design			
Sec. 18-133. Purpose.	The requirements for a site inventory are intended to accomplish the following purposes: (a) To identify existing features prior to submittal of an application for any land-disturbing activity that requires a permit. (f) To promote and maintain connectivity and access for pedestrians and bicyclists in community (g) Add and encourage connections for pedestrians and bicyclists to transit	This is both a key opportunity to express the value and importance of walking and bicycling as well as ensure that walking and biking considerations are a part of any initial site development conversation. The earliest stage of development provides key opportunities to add connectivity to the community and conversely to block possible connections and create barriers than may be insurmountable for those travelling by foot or bike.			
Sec. 18-136. Site inventory map.	(n) Automobile, bicycle, pedestrian, or transit facilities. Indicate the presence or non-presence of existing or proposed thoroughfares, bike routes, bike parking, pedestrian sidewalks or trails, and transit facilities.	The mention of 'non-presence' raises the concern that 'non-presence' of pedestrians or bicyclists in the current situation could be used as justification for not providing facilities when the low participation levels may be related to the current lack of facilities not suggesting that this is how this wording is being used but that it may be worth double checking.			

O 1:	Existing Ordinance Text (Abridged)	Allin IC
Ordinance	Suggested revisions or additions shown in red	Additional Comments
ARTICLE 4. NO	NCONFORMITIES AND VESTED RIGHTS	
	No comments	
ARTICLE 5. ZON	ING DISTRICT REGULATIONS	
Sec. 18-185. MX, Mixed Use District	In addition to a mixture of compatible uses, developments in this district shall provide amenities and walkways to increase pedestrian and bicycling activity, decrease reliance on individual vehicles, foster transit usage, enhance the environmental quality and attractiveness of Wilmington and New Hanover County, improve the overall quality of life, and provide for the welfare of the citizens	
Sec. 18-185. MX, Mixed Use District	(d) General RegulationsAll internal non-residential buildings are encouraged to be located within ten (10) feet of street rights-of-way to enhance the pedestrian orientation of the development. Buildings set back large distances from roads and shared-use trails are strongly discouraged	
Sec. 18-185. MX, Mixed Use District	(d) General RegulationsThe entire MX site, including all phases and subdivided lots, shall be fully integrated through common design themes and pedestrian, bicycling and vehicular connections	
Sec. 18-185. MX, Mixed Use District	(d) General Regulations. A wayfinding sign is a sign whose message is exclusively limited to guiding the circulation of motorists or pedestrians on the site.	This is not the usual definition for 'wayfinding sign' as used for bicycling design suggest broaden to the more standard usage
Sec. 18-185. MX, Mixed Use District.	Alternatives to this standard may be considered through the mixed use development process, provided that pedestrian access is maintained at least every four hundred fifty (450) feet. Access may be provided through buildings or service alleys	Need to confirm that this 450 feet (less than 1/10th mile) is adequate to allow for comfortable pedestrian distances. Also, note that buildings may have restricted opening hours and service allys may be unwelcoming for many pedestrians and such factors as lighting and security may need to be considered also.
Sec. 18-185. MX, Mixed Use District	a. Pedestrian and bicycling accessibility/concentration of development (critical mass) in a compact, walkable area. i. Uses are encouraged to be sufficiently concentrated to promote convenient pedestrian access. Larger projects are encouraged to concentrate uses in multiple nodes. Concentration within a fifteen hundred (1,500) foot perimeter is preferred. ii. Pedestrian and bicycling circulation shall be clearly defined and shall connect all uses. iii. Bicycle and pedestrian access to adjacent developments is strongly encouraged in areas where vehicular access is not provided. iv. Sidewalks are required on each side of rights-of-way or private streets throughout the development and are encouraged to be located in front of businesses and houses and not concentrated in parking areas. v	"iii. Bicycle and pedestrian access to adjacent developments is strongly encouraged in areas where vehicular access is not provided." Similar wording on line 26 (below) stated 'required' rather than 'encouraged'

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
Sec. 18-185. MX, Mixed Use District	ii. Pedestrian facilities. Bonus item: Provision of an internal network of sidewalks in addition to those located along streets and buildings. These facilities shall be in addition to minimum requirements and shall be at least one thousand five hundred (1,500) linear feet. These additional facilities shall be shared-use trails in residential areas, trails connecting residential areas to open space and mixed use areas or non-invasive bicycle and pedestrian trails through environmental preserve areas.	
Sec. 18-185. MX, Mixed Use District	Common spaces shall shape the design and character of the project through a connecting system of pedestrian areas that create a relationship among the various components of the built environment. The pedestrian spaces may include artwork, sculpture and water features to improve their appeal. These spaces shall be designed to create interaction among workers, residents and shoppers.	It is unclear whether it is intended to limit these spaces to pedestrianonly. If so, provisions may need to be included to allow bicyclists to cross as these type of spaces can cause bicycle access problems or require lengthy bicycle detours.
Sec. 18-185. MX, Mixed Use District	c. The size or capacity of pedestrian amenities should be proportional to their expected use, including use by employees, customers, residents, and other visitors.	Not sure of the definition of 'pedestrian amenities' the minimum sign may be dictated by the operating space requirements of the number of users is low rather proportional to their use.
Sec. 18-185. MX, Mixed Use District	d. Amenities should be consistent with the character and scale of surrounding developments. For example, similarity in awning height, bench style, planter materials, street trees and pavers is recommended to foster continuity in the design of pedestrian areas. Materials should be suitable for outdoor use, easily maintained and have a reasonably long life cycle (e.g. ten (10) years before replacement).	Unclear whether this space is to be designed for bicycle use also.
Sec. 18-194. CB, Community Business District	(a) Purpose. The Community Business District is created to accommodate a broader range of commercial services to meet the daily needs of the surrounding neighborhoods. Development in the CB district will reflect pedestrian, bicycling and automobile-oriented types and will be located as directed by adopted plans and policies, and typically accommodate larger scale retail and commercial service uses than the Neighborhood Business (NB) District.	
Sec. 18- 202. RFMU, Riverfront Mixed Use District	c. Multi-modal transportation opportunities. Public boating, walking, bicycling, or water taxi services and the facilities necessary for such uses. i. Pedestrian accessibility and concentration of development (critical mass) within a compact, walkable area. Pedestrian and bicycling circulation shall be clearly defined with paving materials and/or landscaping and shall connect all uses. ii. Bicycle and/or pedestrian connectivity to adjacent or nearby developments is required in areas where vehicular access is not provided. iii. Sidewalks are required on each side of rights-of-way and private streets throughout the development and are to be installed along all building frontages. Sidewalks shall maintain a minimum width of sixteen (16) feet. Sidewalk width may be reduced on internal private streets with TRC approval. Sidewalks may be limited to a single side of rights-of-way or private streets or sidewalk width may be reduced when right-of-way or private street abuts streams, ponds, or wetlands or when contextual design constraints dictate, as determined by the TRC	"ii. Bicycle and/or pedestrian connectivity to adjacent or nearby developments is required in areas where vehicular access is not provided." Note the use of 'required' where above 'encouraged' is used. Note the exception which in (iii.) where it may be possible to have sidewalk on only one side due to constraints

	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in <mark>red</mark>	Additional Comments
202. RFMU, Riverfront Mixed Use District.	Public spaces shall be pedestrian-oriented and shall shape the design and character of the project through a connecting system of pedestrian areas that create a relationship among the various components of the built environment. The pedestrian areas shall be integrated with features such as landscaping, gardens, benches, artwork, sculpture and water features to improve their appeal. Public space areas shall provide adequate amenities for comfort and convenience such as seating, lighting, directional signage, bicycle racks, drinking fountains, shelters, trash receptacles, and public restrooms.	It is unclear whether it is intended to limit these spaces to pedestrian-only although bicycle racks are mentioned. If bicycling is not permitted, provisions may need to be included to allow bicyclists to cross as these type of spaces can cause bicycle access problems or require lengthy bicycle detours.
RO, Residential a Office District.	(f) Driveway access controls. The intent of this section is to provide for cross-access and shared driveways between compatible land uses to reduce conflict points and minimize traffic flow interruptions on Oleander Drive. Cross-access easements create a service drive providing vehicular access between two (2) or more contiguous parcels so that motorists and/or pedestrians do not need to reenter Oleander Drive to gain access to adjacent uses. Cross-access between adjacent properties reduces vehicular conflict points between motorists on the main street and motorists entering and leaving driveways. Reduced traffic conflicts result in fewer accidents and improved traffic flow on Oleander Drive. When driveway easements and cross access easements are created to serve more than one (1) lot, an owners association or binding contract for the purpose of maintenance is encouraged.	This discussion of access management does not mention the role it plays in pedestrian and bicycling safety also and seems to only consider the issues related to traffic flow and vehicular conflict points.
213.3. South	f. The owners or developers shall provide pedestrian and bicycling access as an interconnected network of sidewalks and shared-use trails throughout the study area.	
213.3. South 17th Street/ Independence	vii. Pedestrians and bicyclists. A comprehensive pedestrian and bicycle network of sidewalks and shared-use trails shall link uses to each other to minimize walking distances and reduce dependence on the automobile for travel within the PD and adjoining areas to the extent feasible. Street furniture such as trash containers and benches shall be permanently secured.	
	b. For phased projects, the submitted site plan shall show the generalized location of vehicular, pedestrian and bicycling accesses to additional phases.	
Conditions to approval of petition	Any such conditions should relate to the relationship of the proposed use to surrounding property, proposed support facilities such as vehicular and bicycle parking areas and driveways, pedestrian, bicycling and vehicular circulation systems, screening and buffer areas, the timing of development, street and right-of-way improvements, water and sewer improvements, stormwater drainage, the provision of open space	
	EMENTAL DEVELOPMENT REGULATIONS	

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
Sec. 18-257. Commercial district mixed use (CDMU) within the O&I-1, CB, and RB Districts.	(a) The dwelling units shall be part of a mixed use development established to provide innovative opportunities for an integration of diverse but compatible uses into a single development that is unified by distinguishable design features with amenities, walkways and shared-use trails to increase pedestrian and bicycling activity. Such a development shall be in single ownership or unified control of a property owners association.	
Sec. 18-257. Commercial district mixed use (CDMU) within the Octl-1, CB, and RB Districts.	(b) Strip commercial development characterized by single story uncoordinated, unconnected buildings with large street frontage parking lots is specifically prohibited. Strip malls or multi-family buildings with uncoordinated, unconnected out parcels are prohibited. All structures shall be fully integrated into the mixed use project through common design themes (including but not limited to lighting, benches, landscaping, other decorative features but not necessarily building design), integration with a variety of uses, non-linear arrangement, common spaces, pedestrian walkways, shareduse trails, vehicular access connections and other features.	
Sec. 18- 282. Large- scale retail developments	(6) Public sidewalks and internal pedestrian circulation: a. Sidewalks at least five (5) feet in width shall be provided along all sides of the lot that abut a public street. b. Continuous internal pedestrian walkways, no less than five (5) feet in width, shall be provided from the public sidewalk or right-of-way to the principal customer entrance of the site. At a minimum, sidewalks shall connect focal points of pedestrian activity such as, but not limited to, transit stops, street crossings, building and store entry points, and shall feature adjoining landscaped areas that include shrubs, trees, benches, ground covers or other such materials for no less than fifty (50) percent of its length. c. Sidewalks, no less than eight (8) feet in width shall be provided along the full length of the building along any facade featuring a customer entrance, and along any facade abutting public parking areas.	
Sec. 18- 282. Large- scale retail developments.	b. A minimum three (3) feet high hedge or landscaped berm with appropriate pedestrian access points shall be required along the perimeter of all vehicular use	
"Sec. 18-289. Multi-Family District Mixed Use (MFMU) within the MF- M, MF-MH, and MF-H Districts"	(a) Commercial units shall be part of a mixed use development established to provide innovative opportunities for an integration of diverse but compatible uses into a single development. The development shall be unified by distinguishable design features with amenities and walkways to increase pedestrian activity. Such a development shall be in single ownership or unified control of a property owners association.	

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
Sec. 18-303. Shopping center.	(f) Public sidewalks and internal pedestrian circulation: (1) Sidewalks at least five (5) feet in width shall be provided along all sides of the lot that abuts a public street. (2) Continuous internal pedestrian walkways, no less than five (5) feet in width, shall be provided from the public sidewalk or right-of-way to the principal customer entrance of the site. At a minimum, sidewalks shall connect focal points of pedestrian activity such as, but not limited to, bike parking, transit stops, street crossings, building and store entry points, and shall feature adjoining landscaped areas that include shrubs, trees, benches, ground covers or other such materials for no less than fifty (50) percent of its length. (3)	
Sec. 18-341. General	c. The project includes public access traversing the project connecting to the Riverwalk with easements approved by the City Attorney spaced at intervals of approximately two hundred (200) feet, or intervals dictated by established or approved street patterns. These pedestrian ways must be landscaped and integrated with public spaces along the river front; and d. The project contains a minimum of ten (10) percent pedestrian-oriented public space connected and integrated with the Riverwalk. Public spaces shall provide amenities for comfort and convenience for pedestrians such as seating, lighting, directional signage, bicycle racks and trash receptacles.	Similar to several other locations, it is unclear whether it is intended to limit these spaces to pedestrianonly. If so, provisions may need to be included to allow bicyclists to cross as these type of spaces can cause bicycle access problems or require lengthy bicycle detours.
ARTICLE 7: SUBI	DIVISION REGULATIONS	
Sec. 18-346. Compliance with official plans and policies	All subdivisions shall comply with the principles, goals and/or objectives of and all officially adopted plans and policies of the City of Wilmington then in effect. Such plans and policies include, but are not limited to: thoroughfare plans, master parks and recreation plan, greenway plans, land development code, future land use plans, corridor plans, special area plans, and those adopted hereafter.	
Sec. 18-367. Cul-de-sac	(a) In an attempt to promote street connectivity, the use of culs-de-sac are discouraged whenever possible. When a street must be designed to be permanently closed at one (1) end, it shall have a permanent cul-de-sac at the closed end, the right-of-way and pavement of which shall meet the requirements as specified in the Technical Standards and Specifications Manual. Culs-de-sac shall not be longer than five hundred (500) feet. Longer cul-de-sac lengths may be authorized provided the subdivision review board determines there is no option for	"When a street must be designed to be permanently closed at one (1) end, it shall have a permanent cul-de-sac at the closed end" 'permanently closed' presumably means 'to motorized vehicles'. However, while the cul-de-sac may be closed to motor vehicles, it is recommended that it should nonetheless be designed to be open to bicyclists and pedestrians through the provision of trail easements. Even if the adjoining property is undeveloped at this time, the easement can be provided for future connections in anticipation of future development.
Sec. 18-368. Curbs	The subdivider shall construct curbs on all streets shown on the final plat. The design and construction of curbs shall be in accordance with the Technical Standards and Specifications Manual. Curbs may be designed with openings to permit runoff to be directed to landscaped areas and vegetated swales and filters where feasible. Curbs may also be designed with openings to permit non-motorized access and connections to trails.	

Ordinance	Existing Ordinance Text (Abridged)	Additional Comments
Sec. 18-369. Easements.	(e) Deeds of easement. Easements to be dedicated to the City of Wilmington or the Cape Fear Public Utility Authority for the operation, use, replacement and maintenance of public utilities, including but not limited to shareduse trails, water mains, sanitary sewer mains, storm drainage lines, and all appurtenances, together with the means of access to them, shall be dedicated for the public use by a separate deed of easement	This section currently only addresses easements related to utilities, drainage and vegetation buffers. The idea of easements for shared-use trails is a very important addition, particularly for situations where new cul-de-sacs may be created.
Sec. 18-371. Grading	The subdivider shall clear and grade proposed streets to their full right-of-way width, except where a lesser degree of grading is approved as necessary to protect tree critical root zones. Where slopes from edges of rights-of-way are required to meet yard grades, such slopes shall be placed on private property.	The area in question is also the likely location of any sidewalk and associated grading. (It is unclear from the use of the word 'streets' whether or not sidewalks are being considered in this requirement.) The guidance related to the critical tree root zones should likely be examined to ensure that the sidewalk provisions (facilities and connectivity) are considered when considering root zone issues.
Sec. 18-372. Permanent monuments.	(c) Existing public right-of-way. When a lot or lots within a subdivision abut an existing public street, highway or thoroughfare, the subdivider shall be responsible for the installation of all improvements to that portion adjacent to and which is to be utilized by that subdivision.	Suggest that the wording be expanded to clarify that this includes sidewalk and trail improvements even though it is probably implied in the existing wording. "which is to be utilized by that subdivision"" Does this portion of the wording raises the possible issue of off-site improvements? (See comment in cover e-mail)
Sec. 18-372. Permanent monuments.	(d) Pedestrian crosswalks. Where deemed necessary by the subdivision review board, a pedestrian crosswalk at least fifteen (15) feet in width may be required through a block to provide convenient public access to a public or common area such as a park, open space area, school or a water area.	The need for crosswalks goes beyond 'providing convenient public access' but should be considered a safety feature to assist in safer crossings for users. In addition, it seems that may need to be more specific criteria for requiring and location a pedestrian crossing than the wording seems to envision.
Sec. 18- 373. Private areas within subdivisions.	(a) The subdivision review board shall be assured, prior to final plat approval, that adequate provisions have been made through legal covenants and restrictions which shall govern a homeowners' association, or through other legal agreements, that the responsibility as to the maintenance of the streets, paths or shared-use trails, utilities or other areas designated as private areas or as a common area will be accomplished by a source other than by public maintenance.	While this may address maintenance of a trail, it does not address access. There may be a need for some sort of agreement so that the outside public can use a private trail running through a community. Such a trail may be needed to provide a connection or as part of the overall network.

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
Sec. 18- 374. Public transportation system	The public transportation system terminal facilities (to include turnout lanes, shelters, pedestrian and bicycling connections and access, bike parking, signs and markings), as designated by the subdivision review board, shall be constructed, provided and installed in accordance with the City's Technical Standards and Specifications Manual and acceptable traffic engineering specifications and standards.	
Sec. 18-376. Sidewalks, walkways, and bikeways.	(a) Sidewalks, walkways and other pedestrian ways shall be provided by the subdivider within or adjacent to a subdivision, as deemed necessary by the subdivision review board, upon reasonable evidence that the sidewalks, walkways or other pedestrian ways would be essential for pedestrian access to community facilities, that such is necessary to provide safe pedestrian movement outside the street or street rights-of-way area or that such is an extension or could reasonably become an extension of existing sidewalks, walkways and other pedestrian ways. All sidewalks, walkways, and other pedestrian ways shall be aligned as required by the subdivision review board and designed and constructed to conform to the City's Technical Standards and Specifications Manual. Sidewalks and shared-use trails shall be indicated on all preliminary plans.	"upon reasonable evidence that the sidewalks, walkways or other pedestrian ways would be essential for pedestrian access to community facilities" It is unclear whether this wording is intended only to relate to situations where there are no existing facilities or whether it's required to 'prove' that such facilities are 'essential'. If the latter, it is suggested to alter wording so that bike and pedestrians access/connectivity is always essential unless it is somehow proven technically infeasible/extraordinarily cost-prohibitive. It is possible that the wording relates to a separate issue which is making sidewalk connections beyond the property frontage requiring the developer to extend new sidewalk beyond the frontage to make connections to existing sidewalks or establish new connections would be very positive."
Sec. 18-376. Sidewalks, walkways, and bikeways.	 (b) Sidewalks shall be required to be constructed in the following circumstances: (1) On a minimum of one (1) side of the right-of-way of all thoroughfares such as freeways, expressways, arterials or collector streets, which are adjacent to the property to be developed. (2) On each side of the right-of-way of all thoroughfares such as freeways, expressways, arterials or collector streets that run through property to be developed if the subdivider intends to construct any portion of the thoroughfare as access to his development. (3) On each side of the right-of-way of all local streets extending through the property to be developed. 	(1) Consider requiring both sides. Providing it on one side only, causes the need for users to have to cross over particularly undesirable infrastructure to use. It also puts bicyclists who need to use it, riding opposite to the direction of traffic which is particularly undesirable at intersections and driveways.

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
Sec. 18-376. Sidewalks, walkways, and bikeways.	(c) The subdivision review board may exempt sidewalk installation in specific cases upon a finding that sidewalks are unnecessary for the protection of the public safety or welfare due to conditions peculiar to the site, to avoid impacting wetlands, or as part of a low impact design development plan.	It might be useful to clarify situations and criteria that must be met to determine whether an exception to not provide sidewalks is in the interest of public safety or welfare. It is suggested to include the possibilities for mitigation of the issues as a factor in determining whether an exemption is warranted. It should also be noted that exemption from sidewalk requirements may have a particular impact on bicycling as sidewalks frequently provide valuable connectors in areas where the onroad choices are unsafe or make most riders uncomfortable.
Sec. 18-376. Sidewalks, walkways, and bikeways.	(d) Reserved.	New text could be added in this reserved section related to walking and biking such as: driveway grading and sidewalk; and bike parking requirements;.
Sec. 18-378. Streets.	(a) Responsibility for Street and Transportation Improvements. When a lot or lots within a subdivision abut an existing public street, highway or thoroughfare, the subdivider shall be responsible for the installation of all improvements to that portion of the street, highway or thoroughfare adjacent to and utilized by that subdivision.	Recommend adding wording to clarify this includes responsibility for sidewalk and trail facilities. Possible to also consider expanding the title also: "Responsibility for Street, Transportation and Access Improvements" to convey idea of role beyond motorized transportation.
Sec. 18-378. Streets.	(d) Private Streets. Streets designated as private in accordance with paragraph (b) above may be allowed in subdivisions when, in the opinion of the subdivision review board, they provide adequate ingress and egress onto collector streets, and they provide sufficient assurance through legally established homeowners or similar owners associations, deed restrictions, and/or covenants, or other maintenance agreements, that said street shall be properly maintained and said agreements perpetually carried with the land. The subdivision review board shall reserve the authority, when the public welfare and safety warrant, to require the public dedication of street rights-of-way within developments. All private streets shall be designed and constructed to meet or exceed the public street standards as specified by the Technical Standards and Specifications Manual.	The issue of allowing private streets in place of public streets has direct impact on bicycling and pedestrian issues. When a property is developed privately it can impact such issues as access, connectivity, safety, and facility design for bicyclists and pedestrians. The implications for bicyclist and pedestrian issues need to be part of any decisions related to whether a property is to be developed privately instead of publicly. It is recommended to clarify 'adequate ingress and egress' to ensure that this also includes pedestrian and bicycling access.

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
Sec. 18-378. Streets.	(f) Street Classification Local street systems shall be designed to accommodate their use by through traffic. However, design of streets shall be such to discourage excessive use of residential streets for through traffic. Excessive shall be interpreted to be only those instances where a local street would carry a volume of cars per day greater than one hundred twenty-five (125) percent of its estimated capacity. However, when, in the opinion of the subdivision review board, the design of a local street, as delineated on the subdivision plat, will encourage and/or increase through traffic beyond the capacity of a general local street, the street shall be reclassified to the appropriate higher classification and said street shall be designed and constructed to meet the standards of the reassigned classification.	The 'through traffic' considerations appear to relate to motorized transportation only. Local streets could provide very comfortable connections and access for bicycling and pedestrian 'through traffic'.
Sec. 18-378. Streets.	Reserved. (i) Access to Adjacent Properties. The arrangement of streets in proposed subdivisions shall make provisions for the continuation of existing streets in adjoining areas or their proper projection where adjoining land is not subdivided and where they may be deemed necessary for public requirements. For large subdivisions adjacent to large tracts of unsubdivided property, street projections shall be required into the adjacent unsubdivided tracts at a maximum distance of every one thousand (1,000) feet. The street arrangement shall be such as not to cause a hardship to owners of adjoining property when developed and when they seek to provide for convenient access thereto. The use of residual strips of land in order to prevent the extension of proposed or existing streets or access thereto is prohibited.	
Sec. 18-378. Streets.	(i) Access to Adjacent Properties. The arrangement of streets in proposed subdivisions shall make provisions for the continuation of existing streets in adjoining areas or their proper projection where adjoining land is not subdivided and where they may be deemed necessary for public requirements	
Sec. 18-378. Streets.	(k) Street Connectivity Requirements. The City of Wilmington hereby determines and recognizes that an interconnected street system is necessary in order to protect the public health, safety and welfare, in order to ensure that streets will function in an interdependent manner, in order to provide adequate access for emergency and service vehicles, in order to enhance nonvehicular travel such as pedestrians and bicycles and in order to provide continuous and comprehensible traffic routes. For reference, see Institute for Transportation Engineers, ITE Transportation Planning Council Committee 5P-8, Traditional Neighborhood Development Street Design Guidelines (June 1997)	

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
Sec. 18-378. Streets.	All proposed streets shall be continuous and connect to existing or platted streets without offset with the exception of cul-de-sacs as permitted and except as provided below. The street network for any subdivision shall achieve a connectivity ratio of not less than 1:40. The phrase "connectivity ratio" means the number of street links divided by the number of nodes or link ends, including cul-de-sac heads. A "link" means and refers to that portion of a street defined by a node at each end or at one (1) end. Approved stubs to adjacent property shall be considered links. Alleys shall not be considered links. A "node" refers to the terminus of a street or the intersection of two (2) or more streets, 17 except that intersections that use a roundabout shall not be counted as a node. For the purposes of this section, an intersection shall be defined as: any curve or bend of a street that fails to meet minimum curve radius in accordance with the Technical Standards and Specifications Manual, or any location where street names change as reviewed and approved by the technical review committee. For purposes of this subsection, the street links and nodes within the collector or thoroughfare streets providing access to a proposed subdivision shall not be considered in computing the connectivity ratio. Residential streets shall be designed so as to minimize the block length of local streets, to provide safe access to residences with minimal need for steep driveways and to maintain connectivity between and through residential neighborhoods for autos and pedestrians. Where necessary to provide access or to permit the reasonable future subdivision of adjacent land, rights-of-way and improvements shall be extended to the boundary of the development. A temporary turnaround may be required where the dead end street exceeds five hundred (500) feet in length. The platting of partial width rights-of-way shall be prohibited except where the remainder of the necessary right-of-way has already been platted, dedicated or established by	
Sec. 18-380. Street lights.	The City shall install street lights within subdivisions in accordance with the standards of the City. In instances where underground wiring is specified, the subdivider shall reimburse the City for the initial contribution required under the utility company's street lighting service schedule (customer participation) at the time of installation.	
Sec. 18-381. Traffic-control devices.	The City shall install traffic signals, traffic signs, dead-end barricades and markings in accordance with the standards of the City. The subdivider shall pay to the City the costs associated with the installation of dead-end barricades and markings.	

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
Sec. 18-383. Recreation space.	(1) Recreation areas shall be defined for active or passive recreation use as follows: a. Active recreation consists of areas such as park land chosen without regard to natural features for the explicit purposes of enhancing design, such as village commons, or providing space for outdoor recreation activities which may include, but are not limited to, tennis courts, ball fields, swimming pools, and tot lots with play equipment. No more than twenty-five (25) percent of the required active recreation may be located in an indoor facility such as, but not limited to, exercise rooms, clubhouses, and gymnasiums. Parking spaces associated with these uses, whether required or not, shall not be counted towards satisfying the required active recreation space provision.	
Sec. 18-383. Recreation space.	c. The subdivision review board may allow the development to provide a combination of some open space and pay a fee to the City in lieu thereof when conditions exist where providing the entire amount of required open space is not reasonable and the recreational needs of the development can be adequately met. The maximum amount of open space that can be considered for payment in lieu is twenty thousand (20,000) square feet. The developer of any subdivision permitted to develop under this option 20 shall pay a fee in lieu thereof, to be used by the City to acquire recreation areas serving the development within the immediate area of the subdivision. Such fee shall be determined and paid as provided in the "Payments in Lieu of Dedication" provisions of this section.	
Sec. 18-383. Recreation space.	(4) Greenways. If open space is a greenway, the land shall be a continuous linear parcel through the subdivision of at least thirty (30) feet in width.	Connectivity
Sec. 18-383. Recreation space.	(5) Location. The dedicated land shall be located so as to reasonably serve the recreation and open space needs of residents of the immediate neighborhood within the subdivision for which the land dedication is made and can be combined with an adjacent park. The location of dedicated land shall be in conformance with any adopted open space plans.	
Sec. 18-383. Recreation space.	(6) Access. All dwelling units in the subdivision shall have free, easy and convenient ingress and egress to and from the park, recreation and open space areas provided within the development by means of improved streets or dedicated walkways. Rights-of-way for such access shall be shown on the preliminary plans and final plats	
Sec. 18-383. Recreation space.	(7) Topography. The average slope of the portion of dedicated land deemed usable for active recreation shall not exceed the average slope of the entire subdivision to be developed, and in no case shall the slope of the land dedicated be greater than fifteen (15) percent.	
Sec. 18-383. Recreation space.	(10) Encroachments. The park, recreation and open space areas required by this section shall exclude roadways, parking areas and other accessory uses except recreational facilities.	exception: bike parking
Sec. 18-383. Recreation space.	(11) Consistency with master parks plan. If any portion of any subdivision proposed for residential development lies within an area designated on the officially adopted city or county master parks plan as a park, such area shall be included as part of the area set aside to satisfy the requirements of this section. This area shall be dedicated to public use	greenways master plan

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
Sec. 18-383. Recreation space.	(12) Recreational facilities. The board may require the installation of recreational facilities after considering: a. the character of the park, recreation and open space area b. the estimated age and the recreation needs of person likely to reside in the development c. the proximity, nature, and excess capacity of existing municipal recreational facilities d. the cost of the recreational facilities	
Sec. 18-383. Recreation space.	(1) General provisions. When the board determines (upon the recommendation of the City Manager) that the park, recreation and open space needs of a subdivision may also be adequately met by facilities constructed or to be constructed on city owned property or property to be acquired by the city within a reasonable time that is located close enough to such subdivision to reasonably serve its residents, the board may authorize the subdivider to make a payment to the city in lieu of dedication of park, recreation, or open space. The board may also authorize a combination dedication and partial payment in lieu of dedication when such is determined to be in the best interest of the citizens of the area to be served.	
Sec. 18-384. Property owner associations.	(5) If all or any portion of the property, held by the association is being disposed of, or if the association is dissolved, the passive and active recreation and open space shall be first offered for dedication to the City.	Does this also include privately-owned and operated trails?
Sec. 18-384. Property owner associations.	(6) The right of use of the passive and active recreation or open space and all private improvements shall be guaranteed to each resident of the subdivision. The declaration of covenants and restrictions that will govern the association shall be submitted for review by the City Attorney and recorded prior to the recording of any final plats for the subdivision and reference to the deed book and page provided on the plat.	
Sec. 18-385. Reservation of public sites.	It is recommended that subdividers reserve sites for public facilities, such as schools and fire stations, and to provide the City an opportunity to buy such sites at the fair market value for a period of six (6) months from the date of approval of the Preliminary Plat.	This does not provide any guidance on facility site selection: in the case of such facilities as schools, the ability of students, staff, and others to walk and bike to the facility will be a function of where the site is located and accessibility by foot and bike.
Sec. 18-386. Transportation plans.	All preliminary and final plans for subdivisions should be in compliance with the Greater Wilmington Urban Area Thoroughfare Plan,and all other roadway, traffic management, transit, pedestrian, bicycle, greenway and trail plans that have been adopted by the Wilmington City Council or the North Carolina Board of Transportation. Transportation facilities, including sidewalks, paths and shared-use trails, identified in these adopted plans shall be shown on all plats, preliminary and final.	There is an opportunity here to expand the concept of the term 'transportation' so that it clearly includes all modes
Sec. 18-398. Applicability of minimum design standards.	"The Technical Standards and Specifications Manual shall be the prime source of design standards for improvements made to subdivisions. The following listing gives the major topics covered by the manual: (a) Asphalt paving. (b) Bikeways"	It is suggested to update (b) Bikeways in accordance with the recently released AASHTO Guide for the Development of Bicycle Facilities (201)

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
Sec. 18-401. Bikeways.	 (a) If the subdivider elects to incorporate bikeways within a subdivision, he shall be responsible for providing the required markings and the acquisition and erection of all signs, signals or other items in order to create safe bicycling conditions as deemed necessary by the subdivision review board. (b) The subdivision review board may require the subdivider to make provisions for a bikeway, i.e., increased right-of-way, etc., to be installed at the City's expense. 	(a) does not provide guidance on when 'bikeways' should be incorporated into a subdivision: the term 'elects to incorporate' could be modified to provide more guidance and positive encouragement for providing facilities when they would prove valuable.
Sec. 18-402. Blocks.	(d) Pedestrian and bicycling access. Where deemed necessary by the subdivision review board, a pedestrian and bicycling access at least fifteen (15) feet in width may be required through a block or connecting streets or cul-desacs to provide convenient public access to a public or common area such as a park, open space area, school or a water area.	Alternatively, replacing term 'pedestrian and bicycling access' with 'shared-use access' or 'share pedestrian and bicycling access'. Suggest broadening requirement so that this
Sec. 18-419. Preliminary plan.	(17) Sidewalks shall be indicated on the preliminary plan in accordance with provisions of section 18-376.	
Sec. 18-421. Final plat.	6) The location and dimensions of all rights-of-way, utility or other easements, riding trails, natural or required buffers, pedestrian or bicycle paths, shared-use trails, and areas to be dedicated to public use, with the purpose of each stated. This must include all facilities developed as required by any adopted transportation plans, as referenced in Sec. 18-386. Transportation Plans.	The term 'pedestrian and bicycle path' has not been the standard term used elsewhere in the ordinance: there needs to be consistency in the use of the terms related to pedestrian and bicycle facilities so that their uses are understood and interpreted correctly.
Sec. 18-433. Development standards.	(6) Pedestrian and bicycling access to open space shall be provided to all parcels without direct access to open space.	This statement is silent on the standard and type of facilities should there be some sort of statement about facilities being in accordance with the same design standards required elsewhere?
Sec. 18-433. Development standards.	(e) The following disturbances may be allowed in primary conservation areas: (1) improvements that would either protect or enhance the enjoyment of the conservation area. Such measures not causing significant impact include, but are not limited to, walkways, shared-use trails, self-guided trails, and protective fences. (2) access to other parts of the parcel. If a part of the parcel may be developed but would be inaccessible due to the existence of a conservation area, a road and/or utilities may be constructed through the conservation area. The road and/or utilities shall be designed to minimize the impact to the conservation area to the greatest extent practical.	This text does not address whether bicycles and bicycling are permitted in a 'primary conservation area'. New wording has assumed that since they are a low-impact mode of transportation, bike access would be permitted.
ARTICLE 8. LAN	DSCAPING AND TREE PRESERVATION	
Sec. 18-474. Criteria for permit issuance.	(d) The protected tree is posing an identifiable threat to pedestrian, bicyclist or vehicular safety;	

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
Sec. 18-481. Interior area landscaping.	For purposes of this section, a parking facility shall include any areas of a development devoted to pedestrian, bicycling or vehicular use, including but not limited to parking areas, loading spaces,	
Sec. 18-481. Interior area landscaping.	(c) Up to fifteen (15) percent of a landscaped island may be devoted to pedestrian walkways, as needed.	No comment would not seem necessary to call out facilities for bicycling in this situation
ARTICLE 9. OFF-	STREET PARKING AND LOADING; DRIVEWAYS	
Sec. 18-526. Off-street parking standards	 (a) Purpose. The purpose of this section is to provide off-street parking standards that will alleviate congestion in the streets and allow for the efficient storage of motor vehicles while, concurrently, reducing any adverse environmental impacts to the urban area. (b) Parking must be provided for new construction of principal buildings and certain instances of alterations to existing sites and conversions of buildings from one (1) district use or occupancy to another district or district use" 	Seems to be envisioning motor vehicle parking only: suggest adding the term 'auto' or 'motor-vehicle' to 'parking'
Sec. 18-528. Off-street parking space schedule.	(f) Bicycle parking. Each new multi-family, commercial, or office development or major redevelopment requiring twenty-five (25) or more automobile parking spaces shall make provisions for parking a minimum of five (5) bicycles. Each additional one hundred (100) automobile parking spaces above the twenty-five (25) minimum shall require provisions for parking an additional five (5) bicycles up to a bicycle parking system that can accommodate a maximum of twenty (20) bicycles. The bicycle parking provisions shall allow for bicyclists to secure their vehicle against theft. Bicycle parking facilities shall be provided within twenty (20) feet of the primary entrance to the facility. In the event of multiple entrances, bicycle-parking facilities shall be dispersed for easy access to the multiple entrances.	This requirement does not make reference to standards for the parking facilities to be provided (other that 'secure against theft') provide guidance on racks, lighting, cover, etc.
Sec. 18-528. Off-street parking space schedule.	a. Bicycle parking. The technical review committee may authorize a reduction in the number of required off-street parking spaces for developments or uses that provide bicycle parking in addition to the required number of bicycle parking spaces or that make special provisions to accommodate bicyclists. Examples of accommodations include bicycle lockers, employee shower facilities and dressing areas for employees.	This is positive but might be more useful if more specific guidance was required regarding number of parking spaces/facilities provided.
ARTICLE 10. EXC	CEPTIONALLY DESIGNED PROJECTS	
Sec. 18-544. Scaled criteria.	(i) Greenways. Establish interconnecting greenway corridors and opportunities for future connection. The plans must assure connection and access across the property for any relevant greenway corridor that is part of a greenway network, current or future. The land of this corridor may be dedicated (deeded) to the City or a conservation agency or held in common ownership by a homeowners association and must be a minimum of thirty (30) feet in width or of a wider width as necessary to be consistent with the intended use, planned use on adjacent properties, or use identified in any City or County greenway plans. The project plan shall include a maintenance plan to be included in the homeowners association documents if ownership is held by a homeowners association.	It in unclear whether the term 'greenway' is used as an alternative term for a shared-use trail (i.e. which would allow both bike and pedestrian access) or if the intended meaning is different

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
ARTICLE 11. SITE	E DESIGN STANDARDS	
Sec. 18-557. Limitations on outdoor display and storage of merchandise.	It is the intent of this ordinance to allow the limited display and storage of merchandise, but not where the display and/or storage of such items impedes the flow of pedestrian, bicycling or vehicular traffic, or creates an unsafe condition. The display and storage of merchandise shall meet the following conditions:	
Sec. 18-557. Limitations on outdoor display and storage of merchandise.	(d) At least five (5) feet along the parking lot side of the display shall be maintained free of obstruction to allow for pedestrian, bicycling and handicap movement, such that pedestrians, bicyclists and handicapped pedestrians do not have to enter the parking lot, loading zone or drive aisle to walk around the display and storage area. Handicap ramps and landscaping shall not be located within the five (5) foot clear pedestrian area.	
Sec. 18-557. Limitations on outdoor display and storage of merchandise	(e) The area of outdoor display shall not encompass the width of the entrance and/or exit doors to the facility as projected straight out from the facility. For example, if the width of the entrance and/or exit doors is ten (10) feet, then there shall be at least a ten (10) foot clearance from the doors as projected straight out and away from the facility. The displays shall not obstruct the view of pedestrians, bicyclists and handicapped pedestrians entering or exiting while in this ten (10) foot corridor from vehicles in the parking lot or loading zone.	
Sec. 18-557. Limitations on outdoor display and storage of merchandise	(f) The technical review committee may approve storing or displaying items in a parking area that is adjoining the building only if a revised site plan is submitted that clearly delineates the area for storage or display and eliminates the area for parking. The material or merchandise may not be located in required parking spaces and vehicular, bicycling and pedestrian movement may not be inhibited.	
Sec. 18-557. Limitations on outdoor display and storage of merchandise.	(g) This regulation shall not apply to businesses that are five thousand (5,000) square feet or less, and shall not apply to the following principal uses: auto and truck dealers, auto renting and leasing, boat dealers, camper equipment, farmer's market, flea market, fruit and vegetable market, heavy equipment rental and leasing, lawn and garden stores, lumber yards, manufactured housing, and outdoor recreation products. Shopping carts and shopping cart corrals are exempt from this ordinance. However, this exemption does not allow storing or displaying items in drive aisles, loading zones, fire lanes or where safe movement of pedestrians, handicapped pedestrians, bicyclists or vehicles is compromised.	
ARTICLE 12. SIGI	n regulations	
Sec. 18-566. Purpose.	(3) Do not create traffic hazards by confusing or distracting motorists, or by impairing the driver's ability to see pedestrians, bicyclists, obstacles, or other vehicles, or to read traffic signs or by impairing pedestrian or bicyclist's ability to see other vehicles.	
Sec. 18-575. Signs permitted in the Central Business District	No sandwich board sign may be placed where the unobstructed space for the passageway of pedestrians is reduced to less than four (4) feet.	

Ordinance	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional Comments
ARTICLE 13. FL	OOD PLAIN MANAGEMENT	
	No comments	
ARTICLE 14. PU	IBLIC INFRASTRUCTURE	
	No comments	
ARTICLE 15. DE	FINITIONS	
Sec. 18-812. Definitions.	Bikeway: A new right-of-way or portion of an existing right-of-way restricted for the exclusive use by bicycles, with the exception of areas designated for motorized vehicles and pedestrian cross-flow	This definition of 'bikeway' may need to be examined more closely. This does not match the AASHTO definition for this term nor the common usage of 'bikeway' and describes a facility exclusive to bikes. AASHTO definition of 'Bikeway': A generic term for any road, street, path, or way which in some manner is specifically designated fir bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.
Sec. 18-812. Definitions.		Suggesting addiing definitions for pedestrian, sidewalk, trail, and shareduse trail. (Suggest using MUTCD definitions).
Sec. 18-812. Definitions.	(tt) Way-finding sign: A sign on which the message is exclusively limited to guiding the circulation of and providing direction for motorists, pedestrians and bicyclists within the site.	This definition limits the information on the sign to within the site this should be reexamined as it is not the standard definition for 'way-finding'

TABLE D.2: NEW HANOVER COUNTY SUBDIVISION ORDINANCE

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
ARTICLE I: IN G	ENERAL	
Section 15 Purpose	The purpose of this ordinance is to regulate and control the subdivision of land within New Hanover County to promote the public health, safety, and general welfare of the County. The ordinance is designed to promote the orderly development of the County; for the coordination of streets, highways, sidewalks and trails within proposed subdivisions with existing or planned streets, highways, sidewalks, trails and with other public facilities; for the dedication or reservation of rights of-way or easements for street, trail, and utility purposes; and for the distribution of population and traffic which shall avoid congestion and overcrowding and which will create conditions essential to public health, safety, and the general welfare. This ordinance is designed further to facilitate adequate provision for water, sewerage, walking, biking, parks, schools and playgrounds	This opening paragraph of a very good location to emphasize the importance of considering walking and biking access and safety for users of all ages and abilities as a healthy transportation mode for county residents.

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Section 20 Definitions	Roads/Streets – A right-of-way with infrastructure for vehicular, pedestrian and bicycling movement which is designed, dedicated, and constructed for public or private use to a standard commensurate with its function. The functional classifications of roads/streets are as follows: (1) Arterial - Arterial road systems provide a higher speed, high volume network for travel between two points of interest. The design covers a broader range of roadways, from two lane to multi lane, and is oriented more toward efficient mobility rather than property access. Example: Market Street, College Road (2) Collector - Collectors serve several purposes: collecting traffic for movement between arterial and local streets, providing limited access to abutting properties, and access and connections for pedestrians and bicyclists. These streets not only serve traffic movements between arterials and local streets, but through traffic within local areas. Collector streets are public facilities that are free of gates or other obstructions. Collector streets shall intersect with existing or planned collector or arterial streets. Driveway cuts serving individual property are discouraged and shall be minimized. Collector streets include sidewalks on one or both sides of the travelway and often include bicycle facilities such as bike lanes or off-road multi-use paths. Example: Torchwood Blvd, Bayfield Drive (3) Cul-de-sac - A street open at one end that is planned, constructed, and operated for the sole purpose of property access. Cul-de-sacs shall include a turnaround at the closed end of the street to permit reverse direction. In the interest of public service delivery response, the total length of a cul-de-sac shall be minimized. Example: Amelia Court (4) Alley - Alleys provide side or rear access to individual parcels that front on a higher order street. They are characterized by narrow right-of-way and travelway widths to accommodate passenger vehicles and residential services at slow speeds. Alleys generally connect at both ends	These definitions and descriptions of purpose seem to only consider the efficient movement of motorized traffic and do not mention the needs for access, connectivity and safe/comfortable movement for walking and biking users of each of these facilities. Even when bicycling is referenced (as for collectors), the reference seems to be incidental to the stated purpose of the street. The definition of the term 'collector' has been expanded to try and broaden the purpose. However, these revisions to the definitions could be expanded further.
Section 20 Definitions	Sight Distance - Area at intersecting street that establishes a clear line of sight for a waiting vehicle to see oncoming traffic and make turning movements into or out of street or driveway safely or for traffic to see entering or waiting vehicles.	Need a specific definition of 'sight distance' is it defined elsewhere in ordinances

Ordinance	Existing Ordinance Text (Abridged)	Additional comments and
Section	Suggested revisions or additions shown in red	suggestions
ARTICLE II: DEF	INITIONS AND INTERPRETATIONS	
Section 20 Definitions	"Subdivision (3) the public acquisition by purchase of strips of land for the widening or opening of streets, for the establishment of pedestrian and bicycling connections and corridors or for public transportation system corridors; "	
Section 22 Word Interpretation	(8) The word "street" includes the words "road" and "highway".	Does this include areas dedicated to non-motorized users? Are areas beyond the pavement/curb part of this definition? For example, in the very next definition listed below, it is unclear whether sidewalk is to be shown on the preliminary plat as it is not explicitly called out in the definition of 'street'
ARTICLE III: PLA	AT PREPARATION AND APPROVAL PROCEDURE	
Section 32 Preliminary Plat	32-2 Contents of the Preliminary Plat (12) The rights-of-way of streets, location or streets within the rights of-way, trails within easements, street widths, street names, and street designation public or private, where applicable. (13) A typical roadway cross-section showing proposed street construction within the proposed right-of-way to include sidewalks, trails and drainage design, where applicable	
Section 33 Final Plat	33-1 Contents of the Final Plat (4) The width, names and designations (public or private) of all proposed streets and trails and the width, purpose and designation of other rights-ofway or easements which shall be properly located	
Section 33 Final Plat	33-1 Contents of the Final Plat (15) The proposed location of planned multi-use trails and greenways as shown on the Wilmington/New Hanover County Comprehensive Greenway Plan.	Suggested additional requirement
ARTICLE IV: DE	SIGN STANDARDS	
Section 41 Specific Requirements	(d) Pedestrian Access - Where deemed necessary by the Technical Review Committee, a pedestrian access at least 15 feet in width may be required through a block or connecting streets or cul-de-sacs to provide convenient public access to a public or common area such as a park, open space area, school or a water area.	Suggest revising the wording "where deemed necessary" to change the emphasis. Suggest replace with the following: "unless deemed infeasible"
Section 41 Specific Requirements	(3) Buffer Easements - The County may require an easement as much as 50 feet in depthfor subdivisions adjacent to railroads, major streets, highways and thoroughfares This easementshall have the following restriction notice on the face of the plat: "This easement is established for the purpose of the planting of trees or other types of vegetation or the preservation of existing vegetation; the erection of structures herein and through access by motorized vehicles is prohibited."	The wording for the 50-foot buffer does not mention the possibility of trails or sidewalks in that area only it's use for landscaping. The easement wording is silent on the topic of pedestrians and bicyclists. The wording precludes 'structures' which could possibly refer to sidewalk/trail facilities. Are facilities for bikes and peds permitted in this buffer area? If not, the buffer could possibly create significant access and connectivity problems.

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Section 41 Specific Requirements	(7) Streets (e) Access to Adjacent Properties: The arrangement of streets in proposed subdivisions shall make provisions for the continuation of existing streets and trails in adjoining areas or their proper projectionFor large subdivisions adjacent to large tracts of unsubdivided property, street and trail projections shall be required into the adjacent unsubdivided tracts at a maximum distance of every 1000 feetThe use of residential strips of land in order to prevent the extension of proposed or existing streets or trails or access thereto is prohibited.	Where the ordinance requires allowing for provide streets access and connections to future development, similar planning should be included for all existing trails.
	(f) Street Connectivity Requirements Where necessary to provide auto access or to permit the reasonable future subdivision of adjacent land, rights-of-way and improvements shall be extended to the boundary of the development. A temporary turnaround may be required where the dead end exceeds 500 feet in length. The platting of partial width rights-of-way shall be prohibited except where the remainder of the necessary right-of-way has already been platted, dedicated or established by other means. New subdivisions may be exempt from the connectivity ratio standard as set forth in this section, provided the appropriate reviewing agency determine there is no option for providing stub streets or connectivity due to existing documented environmental features such as wetlands or natural water bodies or existing adjacent developed property. Where necessary to provide pedestrian and bicycling access for existing trail and pedestrian connections or to permit the reasonable future shared-use trail on adjacent land, rights-of-way, easements and improvements shall be extended to the boundary of the development.	
Section 41 Specific Requirements	 (g) Intersections - Street intersections shall be laid out as follows: 1. Streets shall intersect as nearly as possible at right angle and no street shall intersect at less than seventy-five (75) degrees. 2. Intersections with a major street shall be at least eight hundred (1000) feet apart measured from centerline to centerline. 3. Where a public or private street intersects a U.S. or N.C. numbered highway, or a N.C. secondary road, the intersection design shall be in accordance with the standards of the N. C. Department of Transportation, Division of Highways. 4. Street jogs with centerline offsets of less than two hundred (200) feet shall be prohibited. 	Possible location to add an additional item, (5), which could provide guidance or requirements regarding location of shared-path trail crossings in relation to intersections
Section 41 Specific Requirements	(h) Cul-de-sacs A street designed to be permanently closed at one end shall have a permanent turnaround at the closed end, the right-of-way and pavement of which shall meet the requirements specified by NCDOT. Where a street is designed to be permanently closed at one end, an access easement (16 feet in width) shall be provided to walking and biking connectivity to the adjacent street or property. Cul-de-Sacs shall not be longer than 500 ft. Longer Cul-de-sacs may be authorized provided	Cul-de-sac design is a primary contributor to lack of bike and pedestrian connectivity and lengthier trips. However, by providing easements and trail connections to the adjacent street or property, the community can be greatly improved for non-motorized travel.
Section 41 Specific Requirements	(8) Street Trees - If street trees are planted they shall be planted inside the property lines where they are less subject to injury, decrease the chance of accidents, and enjoy more favorable conditions for growth. Trees in islands within dedicated rights-of-way are excepted. The sight triangle area for any entrance, driveway or intersection must be kept clear of trees, plantings and overhanging vegetation.	See Article VII comment regarding sight triangle

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Section 41 Specific Requirements	"(13) Transit Facilities Transit system facilities (to include turnout lanes, shelters, trail and sidewalk access, signs and markings), as designated by the County, may be constructed"	
ARTICLE V: IMF	PROVEMENTS	
Section 52 Required Improvements	52-4 Streets: Public Streets: (a) Standards shall include sidewalk, trails, pedestrian crossings, drainage, bridge, right-of-way, and pavement design	
Section 52 Required Improvements	52-4 Streets: Private Streets: (c) Streets designated as private may be allowed in subdivisions once they are reviewed and approved by the County's Technical Review Committee (TRC). In their review, the TRC will consider unique physical conditions of the property including but not limited to connectivity, topography, geometric design, storm water, tree preservation, ingress and egress, pedestrian and bicycling access and connectivity, reduction of speed to desirable or safe levels and other safety measures and that sufficient language is provided through a legally established property owner's association that the streets will be properly maintained.	The issue of allowing private streets in place of public streets has direct impact on bicycling and pedestrian issues. When a property is developed privately it can impact such issues as access, connectivity, safety, and facility design for bicyclists and pedestrians. The implications for bicyclist and pedestrian issues need to be part of any decisions related to whether a property is to be developed privately instead of publicly.
Section 52 Required Improvements	52-4 Streets: Private Streets: (e) Private road stubs and dead end streets shall be constructed/paved to the property boundary and shall not contain gates or obstructions to qualify for connectivity standards as stated in Section 41-1 (7)(f).	Private road stubs and dead end streets create opportunity for pedestrian and bicycling connections, even during the undeveloped stages. In addition, if at any time during the future the land in question is to be vacated (ownership reverted to the adjacent properties), the bicycling and pedestrian connections or opportunity to connect need to addressed and the opportunity not lost to maintain non-motorized through access.
Section 52 Required Improvements	(4) Standards for Park, Recreation and Open Space Areas:(d) 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.	What is the definition of 'greenway'? Does this envision both pedestrian and bicycling access?
Section 52 Required Improvements	(4) Standards for Park, Recreation and Open Space Areas: (f) Access: All dwelling units in the subdivision shall have free, easy and convenient ingress and egress to and from the park, recreation and open space areas provided within the development by means of improved streets, dedicated walkways or shared-use trails. Rights-of-way or easements for such access shall be shown on the preliminary plans and final plats.	
Section 52 Required Improvements	52-9 Street Lights The city or other agency, as applicable, shall install streetlights within subdivisions in accordance with the standards of the city or county. In instances where underground wiring is required, the subdivider shall be responsible for the initial contribution required under the utility company's street lighting service schedule (customer participation) at the time of installation.	While this does not explicitly discuss the purpose of street lighting, it is one of the contributing factors to whether residents are comfortable using walking and biking facilities when it is dark. It may therefore be worthwhile examining whether the city or county standards are adequate to address the needs of sidewalk and trail users at night.

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Section 52 Required Improvements	52-10 Entrance Signs and Lighting Signs delineating the subdivision name and any lighting associated with such sign shall be constructed in compliance with Section 94-1 of the Zoning Ordinance. Sign location shall be shown on the Preliminary Plat.	The location and size of any signs can be a safety feature for those walking and biking if they block or limit the pedestrian or bicyclists view or impede them being seen.
Section 52 Required Improvements	"52-11 Sidewalks, Trails and Bikeways Sidewalks, walkways and other pedestrian ways shall be provided by the subdivider within or adjacent to a subdivision, upon reasonable evidence that the sidewalks, walkways or other pedestrian ways would be essential for pedestrian access to community facilities, that such is necessary to provide safe pedestrian movement outside the street or street rights-of-way area or that such is an extension or could reasonably become an extension of existing sidewalks, walkways and other pedestrian ways. All sidewalks, walkways, and other pedestrian ways shall be aligned as required by the appropriate governing body, and designed and constructed to conform to NCDOT Specifications. Sidewalks shall be indicated on all preliminary plans. (1) Sidewalks shall be required to be constructed in the following circumstances: (a) On a minimum of 1 side of the right-of-way of all arterial or collector streets that are adjacent to the property to be developed; (b) On each side of the right-of-way of all arterial or collector streets that run through property to be developed if the subdivider intends to construct any portion of the thoroughfare as access to the subject development; and (c) On one side of the right-of-way of all local streets extending through the property to be developed in the R-15 and R-10 zoning districts. (d) On both sides of the right-of-way of all local streets extending through the property to be developed in the R-7, R-5, and R-3 zoning districts. (e) Except as required above, low density developments in R-20 shall be exempt from the sidewalk requirement. (2) The Technical Review Committee may exempt sidewalk installation in specific cases upon a finding that sidewalks are unnecessary for the protection of the public safety or welfare due to conditions peculiar to the site. (3) Bikeways The Technical Review Committee, may require the subdivider to make provisions for bikeways within subdivisions, i.e., increased right-of-way, etc. If the subdivider incorporates bikeways wit	"upon reasonable evidence that the sidewalks, walkways or other pedestrian ways would be essential for pedestrian access to community facilities" It is unclear whether this wording is intended only to relate to situations where there are no existing facilities or whether it's required to 'prove' that such facilities are 'essential'. If the latter, it is suggested to alter wording so that bike and pedestrians access/connectivity is always essential unless it is somehow proven technically infeasible/ extraordinarily cost-prohibitive. It is possible that the wording relates to a separate issue which is making sidewalk connections beyond the property frontage requiring the developer to extend new sidewalk beyond the frontage to make connections to existing sidewalks or establish new connections would be very positive. For (1) (a) and 1 (c) suggest requiring sidewalk on both sides rather than creating a minimum standard of one side. Providing sidewalk on one side only, causes the need for users to have to cross over and discourages and inconveniences use for many. In the case of 1 (a), this may require crossing particularly undesirable infrastructure. It is particularly undesirable infrastructure. It is particularly undesirable infrastructure. It is particularly undesirable infrastructure. Providing sidewalk on one side also positions bicyclists opposite to the direction of traffic. This is particularly undesirable at intersections and driveways.

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
ARTICLE VI: AD	MINISTRATION	
Section 61 Planned Unit Development	The standards and requirements of this ordinance may be modified by the Planning Board in the case of a plan and program for a group, cluster, or planned unit development, which, in the judgment of the Planning Board provides adequate public spaces and improvements for circulation, recreation, light, air, and service needs of the tract when fully developed and populated, and which also provides such covenants or other legal provisions as will assure conformity to and achievement of the Land Development Plan.	
ARTICLE VII: AI	PPENDICES & CERTIFICATES	
	"MATRIX TABLE FOR PRIVATE ROAD ROW SPECIFICATIONS Sight Distance Triangle at Intersections 10'x70'"	This basic intersection sight triangle may need further examination and expansion to ensure that it is addressing the needs of pedestrians and bicyclists to see and be seen.

TABLE D.3: CITY OF WILMINGTON TECHNICAL STANDARDS

CHAPTER 11 - STREETS AND SIDEWALKS

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions		
ARTICLE I IN GENERAL				
Sec. 11-2 Removal of obstructions and encroach- ments gener- ally	(a) The city manager, upon receipt of a report of the city engineer that there are obstructions or encroachments upon any of the streets, sidewalksto give written notice to any person causing such obstruction or encroachment to remove same within thirty (30) days, or to appear before the councilwhy such obstruction should not be removed. Upon the owner's failure to remove, on the appointed day the council shall consider and determine whether the reported obstruction or encroachment is an obstruction or encroachment and ought to be removed, and if the council shall order such obstruction or encroachment removed, the city clerk shall thereupon, within two (2) days, in writing, notify the chief of police of the acts of the council, and the chief of police shall forthwith notify the owner, or agent of such owner, to conform to the order of the council within ten (10) days from the time such notice is given. If such owner is unknown, or a nonresident, then such notice shall be published three (3) times in some daily paper published in the city. Any person refusing or failing to remove such obstruction or encroachment within ten (10) days after such notice from the chief of police shall be subject to a penalty as provided in section 11-1 for each day such obstruction or encroachment shall continue after the limit fixed for its removal.	The number of days allowed to remove the obstruction or encroachment seem lengthy considering how big an impact some of these issues could have if the problems are not remedied and resolved quickly. For some users, their access could be very impaired as those who are most dependent on it's use likely have fewer alternatives.		
Sec. 11-2 Removal of obstructions and encroach- ments gener- ally	(c) The requirements of this section are intended to apply to any obstruction of any nature, kind and description upon any street, sidewalk, wharf or any other public place in the city.	Does this requirement also apply to trails on access easements also?		
Sec. 11-4 Railing around lot below street level	The owner or agent of every lot, piece or parcel of ground, within the city, that is more than eighteen (18) inches below any street of the city, and bordering thereon, shall erect, and at all times maintain, along the edge of such lot, piece or parcel of land next to such street or sidewalk, a secure railing or fence, sufficiently high and strong enough to keep persons from falling from the street or sidewalk into such low lot.	Providing a buffer from such a fence or drop-off can enhance safety and improve the overall pedestrian experience and provide a more comfortable experience which encourages participation.		

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 11-7 Maintenance of cellar doors, cover- ing, etc.	Every cellar door, cellar covering, skylight, coal chute or other opening through the pavement or sidewalks of any street of the city which shall have been constructed shall be maintained by the owner in a safe condition which is satisfactory to the city engineer. It is not the city's purpose to allow the construction of new openings in the sidewalk or street areas of the city, but it will allow such openings as presently exist to remain; provided, that they are kept in good and safe condition. Such cellar doors, or cellar coverings shall be placed upon the same level exactly as the surface of such pavement or sidewalk and shall be of approved, substantial materials, fitted to rest upon sills of stone, steel or concrete, fixed in the pavement or sidewalk where there are pavements, and where there are no pavements, the sills of any cellar door shall be so placed as not to project above the surface of such cellar door, which shall be constructed upon the same level with the sidewalk; provided, that within the fire limits of the city, every cellar door or cellar covering shall be constructed of iron or steel or other fireproof material.	It is recommended to add additional wording emphasizing that the quality and condition of the travel surface can have a significant impact on the overall accessibility and safety level of a sidewalk. Surfaces need to smooth and free of tripping hazards. In addition, it is important that they are stable, firm and slip resistent. Pedestrians are sensitive to obstables and uneven surfaces and improving the overall experience encourages participation. Good lighting is also a factor that improves safety, particularly in the situations where there may be existing cellar doors, cellar coverings, etc.
Sec. 11-9 Temporary closing of streets, etc.	(a) Authority of city manager. The city manager may, when in his judgment the occasion warrants, block off, or cause to be blocked off, any street or sidewalk or any portion of any street or sidewalk, and may allow obstructions on streets or sidewalks for such periods of time as, in his judgment, may be reasonably necessary. The city manager may delegate the authority to block off streets and sidewalks to the various department heads as necessary in the performance of their duties.	
Sec. 11-9 Temporary closing of streets, etc.	(b) Obstructions and signs. When any street or portion of the same is blocked off as provided for in subsection (a), it shall be lawful to place in the street at or near the approaches to the blocked off area appropriate traffic-control devices indicating that such street or portion thereof is blocked off, and that motor or other vehicles shall not pass along such street past such traffic-control devices.	
Sec. 11-11 Permit to move build- ings	Required. No person shall move, or assist in moving, any structure or building over any street, bridge or paved sidewalk in the city unless a written permit therefor shall have been issued by the city engineer. The city engineer may refuse to grant a permit when, in his opinion, after having examined the object to be moved, it is of such bulk or is of such weight as to constitute an undue hazard to the street pavements, curbs, signs, street plantings or other items within the public right-of-way.	It is suggested to emphasize preventing damage and providing complete restoration to sidewalks in such situations: the safety of pedestrians and bicyclists are more directly impacted by surface damage to facilities as they are more sensitive and their safety is more effected by variations and irregularities to surfaces.

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 11-12 Parades	(a) No parade shall take place within the city without a permit in writing from the city manager, designating the dates and streets over which said parade shall pass.	It is suggested to include a requirement to clarify any sidewalks and trails which will be impacted and how access will be maintained. For some users such as the elderly and those with mobility impairments, blocking their routes can cause be a significant hardship.
Sec. 11-13 Obstruct- ing streets, sidewalks or crossings	It shall be unlawful for any person to obstruct traffic on a street, sidewalk or crossing of the city, or interfere with other persons (including pedestrians and bicyclists) lawfully using said streets, sidewalks or crossings.	
Sec. 11-15 Playing ball in streets; use of skates, skateboards and similar devices	(b) No person shall operate, ride or use any motive device propelled or designed for propulsion by human power upon any public street, public sidewalk, public park or public vehicular area located in the central business district or upon the Riverwalk. The term "motive device propelled or designed for propulsion by human power" includes: tricycles, coasters, scooters, skateboards, roller skates, roller blades, sleds and wagons, but shall not include bicycles as defined in section 5-1 of the Code (when operated on city streets) and wheelchairs or other devices operated or used by handicapped or disabled persons. For the purposes of this section, the central business district shall be the Central Business Zoning District as established and modified from time to time under chapter 18 of this Code, and that area bounded by the western line of Seventh Street, the southern line of Market Street, the western line of Third Street and the northern line of Chestnut Street. For the purposes of this section, Riverwalk, a public park, is defined in section 7-1.1(a) of this Code.	Recommend re-examination of the prohibition of tricycles on public roads, sidewalks and parks. For many with mobility issues, an adult tricycle is an adaptive version of a conventional two-wheeled bicycle that allows them to participate in this healthy activity and for some it provides them with mobility that they may not have through any othjer means. As the population ages, more adult tricycles will likely be found in conventional use.
Sec. 11-15 Playing ball in streets; use of skates, skateboards and similar devices	(c) No person shall operate, ride or use any motive device propelled or designed for propulsion by human power on any public street outside the central business district except for the purpose of crossing the street.	Unclear about the meaning: does this include bicycles? Adult tricycles? Bicycles with electric assists?
ARTICLE II STR	REETS GENERALLY	
	No comment	
ARTICLE III SIC	DEWALKS GENERALLY	

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 11-44 Solid waste receptacles on sidewalks and plazas	The city engineer may issue a permit for the placement of privately-owned receptacles for trash and garbage at specified locations along publicly-owned rights-of-way on a sidewalk, sidewalk area, shoulder or plaza, provided the location and placement of the receptacles do not endanger the public health and safety. No more than two (2) receptacles shall be permitted along any one side of a street within any four hundred (400) lineal feet of right-of-way. Upon issuance of a permit, the owner shall accept full responsibility and liability for maintaining and emptying the receptacles, and shall comply with all conditions to the permit.	Receptacles that encroach on the pedestrian's path of travel can be problematic, particularly for the visually and mobility impaired. Where possible, sidewalks and walkways should be kept clear of anything that could block the path, obscure the driver's view or pedestrian visibility or become a tripping hazard. Providing a buffer area for storage can improve pedestrian safety and enhance the overall walking experience.
Sec. 11-45 Benches, chairs, planters, and other street furniture on sidewalks and plazas	(1) The use of benches, chairs, or planters, and other street furniture should be designed to enhance and blend in with the surroundings. Street furniture shall not be permitted if it endangers the public health and safety or prohibits pedestrian passage along the public right-of-way entrance to any establishment.	Accessible street furniture should not limit the available and necessary space for pedestrian travel. The inclusion of comfortable seating is helpful for many pedestrians, particularly the mobility and older users: however, the same seating should not prove an obstable for such users so the siting whould be examined closely to maximimize the value and utility. Good visibility is vital for pedestrians and bicyclists so that they can see and be seen: the siting of large decorative planters needs to be examined closely also.
Sec. 11-45 Benches, chairs, planters, and other street furniture on sidewalks and plazas	(2) The placement of street furniture must be within the four (4) feet closest to the building, with benches and planters placed flush against building fronts. The placement of furniture may not extend beyond the sidewalk or pedestrian way frontage of the associated business.	Similar to previous comments,
Sec. 11-45 Benches, chairs, plant- ers, and other street furniture on sidewalks and plazas	(3) No street furniture may be placed in any location whereby the clear, unobstructed space for the passageway of pedestrians is reduced to less than four (4) feet (as measured from the street edge of the sidewalk). Trees, poles, signs, hydrants, trash receptacles, tree grates, etc. are all considered obstructions.	Similar to previous comments: where possible, sidewalks and walkways should be kept clear of anything that could block the path, obscure the driver's view or pedestrian/bicyclist visibility or become a tripping hazard.

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 11-46 Newsracks on public rights- of-way	(a) Purpose. The purpose of this section is to establish a comprehensive set of regulations applicable to newsracks located within the public right-of-way and on other public property. There are a number of important public purposes served by regulation of newsracks. First, newsrack regulation is intended to improve public safety. Since newsracks are usually located within the public right-of-way, they pose a potential hazard to pedestrians and other users of public sidewalks. If they are located too close to driveways or intersections, they can block the view of oncoming traffic. If they are located too close to the curb, they can unreasonably hinder ingress and egress from parked vehicles. If located too close to fire hydrants, mailboxes, traffic control devices, public bus benches and other public conveniences, they can unreasonably hinder access to and use of those facilities.	The text seems to mostly call out safety issues related to the location of newsracks and motorists: it is likely that such newsracks are an even greater obstable and hazard for pedestrians and bicyclists. Similar to previous comments: where possible, sidewalks and walkways should be kept clear of anything that could block the path, obscure the driver's view or pedestrian visibility or become a tripping hazard.
ARTICLE IV SIE	DEWALK AND DRIVEWAY CONSTRUCTION	
Sec. 11-56 Repair of sidewalks and driveways	(a) The city may make repairs to damaged sidewalks, with no assessment to abutting property owners when at least two (2) of the following conditions are met: (b) When it is determined that the abutting property owner is responsible for a sidewalk or driveway repair, the city engineer shall notify the property owner thereof and direct the owner to make the repair to the satisfaction of the city engineer within thirty (30) days. If the repair is not made within thirty (30) days, the city council, by resolution, may require the repair to be made and the cost thereof to be assessed against the abutting property owner. The cost of such sidewalk shall become a lien upon the property as provided in section 19.29 of the charter.	Proper sidewalk maintenance may be as important as the original design of the facility. A sidewalk that becomes inaccessible or unsafe due to lack of or poor maintenance is just as inconvenient and uncomfortable for users, especially those with visual and mobility impairments. The 30 days after the notice seems lengthy considering how big an impact some of these issues could have if not remedied and resolved quickly. For some users, their access could be very impaired as those who are most dependent on it's use likely have fewer alternatives.

Ordinance Section Sec. 11-57 Construction of sidewalks and drive- ways; permits, supervision; compliance with specifica- tions Sec. 11-57 Construction of sidewalks and drive-	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red (b) Historic and downtown business districts—Generally. In the historic district zone and downtown business district brick sidewalks and driveways will be allowed consisting of smooth, hard-burned clay bricks with an appropriate concrete base conforming to the design standards of the city engineering division. (c) Same—Repairs to brick sidewalks and driveways. In the event that repairs are required after brick sidewalks or driveways are installed due to utility replacement or other construction work, the owner of the abutting property shall pay the portion of the repair cost which exceeds the cost of repair using standard concrete four (4) inches in thickness for sidewalks and six (6) in thickness for driveways. (f) The permittee shall set all valve boxes, meter boxes and like structures flush to the grade of the finished sidewalk or driveway. Permittees shall be responsible for all sidewalks and driveways during construction and when completed the sidewalk or driveway shall be	Additional comments and suggestions Efforts should be made to avoid brick settling and they should be easy to reset or replace if they cause a tripping hazard. Also, bricks can cause vibrations that are painful for pedestrians who use mobility aids and, therefore, it may be appropriate to use bricks only for sidewalk borders in certain situations. There are stamping molds that create the visual appearance of bricks and pavers; these have the advantages of traditional concrete without some of the maintenance issues and roughness associated with bricks and pavers. Similar to previous comments regarding cellar doors, it is recommended to add additional wording emphasizing that the quality and
and drive- ways; permits, supervision; compliance with specifica- tions	construction and when completed the sidewalk or driveway shall be properly protected and cured as directed by the city engineer before being opened for traffic.	emphasizing that the quality and condition of the travel surface can have a significant impact on the overall accessibility and safety level of a sidewalk. Surfaces need to smooth and free of tripping hazards.
ARTICLE V EXC	CAVATION AND USE OF RIGHTS-OF-WAY	
Sec. 11-61 Purpose	The purpose of this article is to provide for the proper management of public street and utility rights-of-way in order to preserve the health, safety, and welfare of the citizens of the city. Specifically, this article is intended to provide for the reasonable regulation of persons making excavations in public street and utility rights-of-way and of the owners of public and private utility facilities located in the public rights-of-way, and the time, place and manner in which excavations are made, the public right-of-way is restored, and utility facilities are located and worked upon.	Suggest adding wording to the effect that planning for pedestrians and bicyclists through and along the excavation zone needs to include access to entrances, bus stops, and crosswalks. In addition, the pedestrians and bicyclists need to be separated from conflicts with any equipment or stockpiled materials. Pedestrians and bicyclists continue to need a safe, accessible and convenient path of travel during the excavation process through complete restoration.

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 11-62 Definitions	Public right-of-way: The surface, the space above the surface and the area below the surface of any public street, highway, lane, path, alley, sidewalk, trail, boulevard, drive, bridge, tunnel, park, parkway, waterway, utility easement or other public rights-of-way now or hereafter held by the city. The term "public right-of-way" also shall include any street maintained by the North Carolina Department of Transportation ("DOT street") to the extent that any excavation or utility work in, on or under the DOT street may effect a sidewalk, bike path, trail, utility facility or other improvement owned or maintained by the city.	
Sec. 11-66 Denial of permits under this article	No permit shall be issued under this article where in the opinion of the city engineer the number of public streets, sidewalks, or public places to be opened, disturbed or encumbered is more than necessary to allow the orderly and efficient installation, construction or repair of utility facilities or other facilities and the protection of the public safety. In making such determination, the city engineer shall consider any emergency situations.	Suggest also addressing the need to provide safe and accessible temporary access for the duration of the permit granted.
Sec. 11-68 Excavations affecting underground utilities	(c) Any person excavating in any street, highway, public space, including but not limited to any public right-of-way, or private easement of a utility shall take reasonable steps to protect any underground utility facility when excavating within the area defined as the "location of underground utilities" in G.S. § 87-101(5), as same shall be amended from time to time. At the time of the adoption of this ordinance, the location of underground utilities means a strip of land not wider than the width of an underground utility plus two and one-half (2½) feet on either side of the underground utility. This protection shall include hand-digging, air-jetting or vacuum excavation, or other means of safe excavation designed to avoid damage to the utility facility marked until the utility facility is exposed or is determined to be below the proposed excavation. Where a proposed excavation lies adjacent and/or parallel to an existing utility facility and within or partially within the tolerance zone, the existing utility facility shall be exposed by the above methods prior to beginning the excavation. Once the utility facility is exposed and the location markings are found to be correct, the excavation may proceed with mechanized equipment.	Similar to previous comment, suggest also addressing the need to provide safe and accessible temporary access for the duration of the permit granted.
Sec. 11-75. - Permit application	Any person desiring a permit, as required by section 11-74, shall file an application therefore with the city engineer. The application shall describe the nature and location of the excavation and include such other information as may be required by the city engineer to ensure compliance with this article.	

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 11-84	(a) Whenever the city or the city acting in concert with the North	Utility work can make a facility
Removal and	Carolina Department of Transportation or its successor shall construct,	unsafe or completely unusable for
relocation of	maintain or repair any public improvement in a public right-of-way	some, particularly those with the
utility fa-	or shall widen, modify, close, relocate, grade or resurface any pub-	most mobility issues and visually
cilities; street	lic street, sidewalk, or other public way in which a utility shall have	impaired users. Suggest adding
closures	installed any utility facility, and such work requires the removal or	wording about minimizing the
	relocation of the utility facility or a portion thereof, it shall be the duty	duration of work and ensuring the
	of the utility, upon reasonable notice by the proper authority, and at	provision of safe, accessible and convenient alternative access as
	no cost to the city, to remove or relocate as necessary its utility facility; provided, however, this requirement shall not preclude the utility from	well as advance warning for users
	being eligible for reimbursement from any federal, state, or other funds	during the utility relocation.
	provided or to be provided by any entity other than the city for locating	daring the atmey relocation.
	or relocating, moving or removing the utility's facilities. Notice to the	
	utility of the need to remove or relocate facilities shall be reasonable in	
	relation to the scope of work required to be performed by the util-	
	ity, and generally shall not be less than ninety (90) days unless it is not	
	practicable to give such notice or the scope of work to be performed	
	by the utility is limited and a shorter notice period gives the utility suf-	
	ficient time to do the work. Where such notice is given, then a utility	
	shall perform such work as the notice requires or as the utility deems	
	necessary for the extension of new facilities or the repair of existing	
	facilities within said street prior to the time the city begins paving or	
ARTICLE VI RE	repaving of the street.	
		Conservation of distinguishing a stress
Sec. 11-91 General stan-	Any person making an excavation or performing utility work in the	Suggest additional line items
dard of use	public right-of-way shall take reasonable actions and precautions to ensure that such work and the utility facilities do:	
dard or use	(a) Not endanger or interfere with the health, safety or lives of persons;	
	(a-1) Provide safe, accessible and convenient temporary access for pe-	
	destrians and bicyclists for the duration through complete restoration;	
	(2-2) Provide access to entrances, bus stops and crosswalks for the	
	duration;	
Sec. 11-	(a) Any person making an excavation or performing utility work in the	Temporary construction signs
94 Traffic	public right-of-way shall provide at all times proper signs, signal lights,	cause safety and access problems
control; lane	flagmen, barricades, and other warning devices for the protection of	for pedestrians and bicyclists nad
closure	pedestrian, bicycling and vehicular traffic in conformance with the lat-	should not be placed in the middle
	est manual on uniform traffic control devices for streets and highways	of sidewalks for vehicular traffic
	and amendments or supplements thereto.	warning. Poorly placed temporary
	(b) Except in an emergency situation, no person shall close any portion	signs can be particularly problem-
	of the public right-of-way to vehicular, pedestrian, bicycling or other	atic where they block the view of
	traffic unless such closure is specifically allowed in any permits for the	child pedestrians and where they
	work. Temporary safe access is required for pedestrians and bicyclists.	block routes for the visually or
I	I	mobility impaired.

Ordinance Section Sec. 11-96 Restoration of public right-of-way, streets and sidewalks	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red (a) General standards. Any person performing an excavation or performing utility work in the public right-of-way, upon completion thereof, shall be responsible for the restoration of the public right-of-way to the condition in which it was before such work or excavation was commenced, as nearly as practicable, at such person's expense. Without limiting the generality of the foregoing such person shall: (1) Promptly and properly refill any excavations according to the lawful, publicly available specifications and policies of the city; (5) Restore and replace any city-owned improvements destroyed, disturbed or damaged by such work including but not limited to signs,	Additional comments and suggestions
Sec. 11-96 Restoration of public right-of-way, streets and sidewalks	sidewalks, trails and bike paths (b) Restoration of pavement. The person making an excavation or performing utility work in the public right-of-way shall restore any pavement damaged by the excavation or work unless the city agrees to perform the restoration work. Nothing in this section shall relieve the person making an excavation or performing utility work from the responsibility to maintain the excavation or installation in a safe condition until it is repaved or otherwise restored. If the city agrees to restore the pavement, the person making an excavation or performing utility work shall pay to the city all applicable street cut application, and long-term resurfacing fees and all repair fees or the estimated cost of the restoration work, whichever is the higher amount. Where the nature and number of excavations or utility cuts significantly degrade the pavement surface within one (1) or more traffic lanes or portions of a block, the city engineer may require resurfacing sufficient to address the degradation such as resurfacing block to block and curb to curb.	Poor or slow restoration can cause particular problems for visually and mobility impaired users. Suggest adding wording about minimizing the duration of work.
ARTICLE VII RA	AILROADS	
Sec. 11-107 Application for permission to lay tracks	Any railroad company that may desire to lay or construct any railroad tracks in, on, along or across any street or public place of the city shall, before beginning such work, make application in writing to the council for permission to do such work, in which application shall be shown the streets, places or portions thereof which such company may desire to use as aforesaid, and to what width, and at what grade.	Railroad tracks that cross streets or trails at an angle can cause steering problems for bicyclists

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 11-109 Conditions for construction and main- tenance of railroad over streets	Every railroad company constructing or maintaining any railroad over the streets of the city shall do so upon the following conditions, whether expressed or not in the permission given: (1) The company in question shall properly place, grade and complete the street and pave the same between the lines of rails, including the space between the double tracks and for eighteen (18) inches upon the outside of each rail, with such material, in such manner and at such grade as shall be directed by the council. (2) The railroad company in question or its successors shall be required to keep such street between the rails, including the space between double tracks and for eighteen (18) inches upon the outside of each rail, in good condition and repair, as may be required by the council, as long as the same shall be used by such railroad company. Flange width should be minimized where possible.	Similar to previous comment, railroad tracks that cross streets or trails at an angle can cause steering problems for bicyclists. Depending on the angle of the crossing, the width and depth of the flangeway opening and pavement unevenness, a bicycle wheel can be turned from it's course and the bicyclist toppled. Flange width should be minimized where possible.

TABLE D.4: NEW HANOVER COUNTY ZONING AND TECHNICAL STANDARDS

Ordinance	Existing Ordinance Text (Abridged)	Additional comments
Section	Suggested revisions or additions shown in red	and suggestions
ARTICLE I: IN (GENERAL	
	No comments	
ARTICLE II: DE	FINITIONS	
	No comments	
ARTICLE III: ES	TABLISHMENT OF DISTRICTS	
	No comments	
ARTICLE IV: N	ON-CONFORMING SITUATIONS	
	No comments	
ARTICLE V: DIS	STRICT REGULATIONS	
53.5	Density bonus chart	Suggest adding bonus point option related to walking and bicycling facilities, access and connectivity
	(J) Parking: Off-street parking shall be provided in accordance with Article VIII of this Ordinance, except that design of parking lots or shared parking facilities may be approved with minor dimensional deviations, when the TRC concurs and provided the number of required spaces is not reduced.	This may be an opportunity to consider encouraging users to bicycle instead of bringing a motor vehicle, thereby reducing the parking need or the pressure on it's use. When considering bicycle parking, both short-term and long-term bike parking should be addressed.
	3. Contents of the Master Land Use Plan shall include the following: o. Pedestrian and bicycle access, connections and circulation systems	
	(N) Thoroughfare Requirements - The development shall have direct access, as required in Section 69.9, to and from an existing major or minor arterial as indicated in the Wilmington Area MPO Functional Classification Map. All interior drives shall be designed so as to provide adequate access for emergency service vehicles. (2/16/87) and future connectivity to adjoining undeveloped properties.	This may be an opportunity to suggest providing connections and easements so as to allow walking and biking access in the future also.
53.6-3	c. Prepare application and submit by application deadline. The application shall include: ii. Map showing location of existing public water and sewer lines, roadway classification, existing or planned bicycle and pedestrian facilities including sidewalks, trails and bike parking, schools, parks and shopping districts within a ½ mile radii of the outermost project boundary.	
53.6-4	3) A district may not extend across any major or minor arterial roadway unless the district proposes multiple, unified development phases of mixed uses having safe, signalized vehicular, pedestrian and bicycle facilities to connect the projects.	Suggest adding discussion related to setting up for future possible walking and bicycling access and connectivity also.
53.6-5	3) As to the relation to major roads and mass transit facilities, sidewalk and trail connectivity, utilities and other facilities and services.	

Ordinance Section 53.6-7	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red 9) Open Space(4/6/10): Open space shall be provided within all exceptional design zoning districts and except as provided in section (c) below shall equal a minimum of 35% of the gross site area of the district. Open space is an area of land set aside, dedicated, or reserved for public or private use or enjoyment that shall be functional for uses including but not limited to: an area of environmental preservation and enhancement, park, internal courtyard, plaza, playground, playfield, atrium or greenway pedestrian and non-motorized vehicle easement. Open space may be natural or recreational.	Additional comments and suggestions Open space can also serve to create valuable short cuts and nonmotorized connectivty that can encourage walking and bicycling.
53.6-13 (table)	 Smart Location Option 1: Locate project on an infill site. Option 2: Locate project on an adjacent site with pre-project connectivity. Option 3: Locate project near existing or planned adequate transit service. Option 4: Locate project near existing neighborhood shops, schools, services, and facilities. 	Suggest including consideration of walking and bicycling access for staff and students to schools also as an important siting location issue.
53.6-13 (table, additional requirements)	Bicycle and Pedestrian Access Include a pedestrian or bicycle through-connection in at least 90% of any new culde-sacs, except where prohibited by topographical conditions	This should include connections from cul-de-sacs to future, as yet unplanned, development also.
	2. Housing and Jobs/Commercial Opportunity Proximity Option 1: Include a residential component equaling at least 30% of the project's total building square footage, and locate and/or design the project such that the geographic center is within a ½ mile walk distance of pre-project full-time equivalent jobs equal to or greater than the number of dwelling units in the project	Suggest considering a bicycling-to- jobs distance also in considerations (1-mile bike distance).
	5. Transit Facilities Locate development within ¼ mile of an existing or planned transit route. Provide or identify covered and at least partially enclosed shelters, adequate to buffer wind and rain, with at least one bench, at each transit stop. Provide kiosks, bulletin boards, and/or signs devoted to providing local public transit information as part of the project, including basic schedule and route information at each public transit stop within or bordering the project.	Suggest considering a bicycling-to-transit distance also in considerations (1-mile bike distance).

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Associ- ated Technical Standards for Section 53.6	Additional Requirement 1: Bicycle and Pedestrian Access Bicycle Storage for Multifamily Residential: In order to meet this requirement, the project must provide secure bicycle racks on-site with at least one bicycle space per ten (10) dwelling units and no fewer than four (4) spaces per project site. Bicycle Storage for Retail: The project must provide secure visitor, customer and/or employee bicycle racks on site, with at least one bicycle space per 5,000 square feet of retail space, but no fewer than one bicycle space per business or four bicycle spaces per project site, whichever is greater. Bicycle Storage for Commercial Non-Retail: The project must provide secure employee and/or visitor bicycle racks on-site with at least one bicycle space per 10,000 square feet of commercial non-retail space but not fewer than four bicycle spaces per building.	Guidance does not seem to distinguish between short-term (or visitor) and long-term (employee) bicycle parking. Both types of parking area generally needed and they may differ in location, design, access and security. Refer to ABPB Bicycle Parking Design Guidelines.
58.2: Procedures	(2) A site development plan for the proposed district showing the following features: (C) A traffic and circulation plan showing ingress and egress to and from the highway and the internal plan of circulation; (C-2) An access and connectivity plan showing bicycling and pedestrian ingress and egress from the surrounding communities and the internal plan of circulation and bike parking	Suggested additional line item
59.4-6 (3)	(D) Passive public recreational facilities such as pervious trails and pathways, where owned by public entities or homeowners associations, may be permitted within the buffer.	Clarification may be needed on who may use and have access to these facilities. It is desirable that all facilities are open to all users to complete connections in the network.
59.7-3(2)	(E) Traffic and Parking Plan to include a statement of impact concerning local traffic near the tract, proposed right-of-way dedication, plans for access to and from the tract, location, width and right-of-way for internal streets and location, arrangement and access provisions for parking areas; A transportation information sheet is required for any development that will generate more than 100 trips during the peak hour, a traffic impact study may also be required. The study shall be prepared in accordance with Standards and Guidelines approved by the County and shall be submitted at least four weeks prior to the first scheduled meeting of the project's review.	
59.9-4	(10) Parking requirements -	Seems to be only considering vehicular parking although it does not explicitly say that. Suggest adding bike parking component and options

Ordinance	Existing Ordinance Text (Abridged)	Additional comments
Section	Suggested revisions or additions shown in red	and suggestions
59.9-4	(11) General site design - Each of the following components shall be included in RFMU developments. The site plan submitted for review shall include a narrative describing how the project will incorporate each of these components: (C) Multi-modal transportation opportunities - Public boating, walking, bicycling, or water taxi services and the facilities necessary for such uses. 1. Pedestrian accessibility and concentration of development (critical mass) within a compact, walkable area. Pedestrian connectivity and circulation shall be clearly defined with paving materials and/or landscaping and shall connect all uses. 2. Bicycle and/or pedestrian connectivity to adjacent or nearby developments is required, when feasible. 3. Sidewalks are required on each side of rights-of-way and private streets throughout the development and are to be installed along all building frontages. Sidewalks shall maintain a minimum width of twelve (12) feet. Sidewalk width may be reduced on internal private streets with TRC approval. Sidewalks may be limited to a single side of rights-of-way or private streets or sidewalk width may be reduced when right-of-way or private streets abuts streams, ponds, or wetlands or when contextual design constraints dictate, as determined by the TRC.	If at all possible, sidewalks should be provided on both sides of the street: when sidewalks are only on one side of the street, this weakens connectivity and often requires pedestrians to cross the street to meet their travel needs. As a result their level of exposure to conflicts is increased. For many users, this makes the trip more inconvenient discouraging participation while for others, such as the elderly or the visibility or mobility impaired, the inconvenience makes the facility unusable.
59.9-4	(D) Integrated design of the project a. Primary building entrances shall be oriented toward public sidewalks along primary street or riverwalk frontages. Development along new or existing public streets should provide inviting facades and through appropriate scale and quality materials should foster a walkable and enjoyable pedestrian environment.	
59.9-4	(F) Connection to the surrounding community - RFMU projects shall be designed as an integral part of the surrounding community and not as an isolated development. RFMU developments shall not be gated and shall be interconnected to any surrounding developments with pedestrian and vehicular connections. Developments shall include plans for future pedestrian and vehicular connections to adjacent undeveloped properties.	
59.9-5	 (1) Purpose - It is intended that RFMU developments incorporate public spaces, including but not limited to: natural wetlands, forested areas, atriums, parks, the riverwalk, internal courtyards, plazas, or other undisturbed or improved spaces. 1. Each RFMU project shall contain a minimum ten (10) percent functional public space, in addition to a riverwalk as defined in 59.9-5(2) of this section. Rights-of-way, other than street sidewalks, may be included within public space calculations only if the right-of-way serves a primarily pedestrian (or bicycling) function. 	

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Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
59.9-5(1)	2. Public spaces shall be pedestrian-oriented and shall shape the design and character of the project through a connecting system of pedestrian areas that create a relationship among the various components of the built environment. The pedestrian spaces shall include features such as landscaping, gardens, benches, artwork, sculpture and water features to improve their appeal. These spaces shall also provide a pleasant gathering place for transit users. Public space areas shall provide adequate amenities for comfort and convenience such as seating, lighting, directional signage, bicycle racks, drinking fountains, shelters, trash receptacles, or public restrooms.	Suggest adding bicyclists to the orientation for public space: the presence of bicyclists has a generally calming effect on the motorized traffic while the encouragement of bicycling may decrease motorized traffic and vehicular parking needs.
59.9-5(1)	3. To ensure that public spaces are well used, they shall be visible, easily accessible by the public and barrier free with multiple points of entry from public areas (streets, terminate with pedestrian access to the river. Public spaces may be either natural or recreational "Recreational" public spaces are intended to provide active or passive recreation opportunities. Public spaces shall have linkages that reinforce pedestrian and bicycling movement. Merchandise and eating areas shall be designed to be contiguous with public spaces and pedestrian ways. sidewalks, walkways, the riverwalk, and bike paths). Public space shall be oriented to maximize exposure to the water and scenic views. Streets perpendicular to the river shoreline shall be designed as land-scaped corridors that terminate with pedestrian and bicycling access to the river. Public spaces may be either natural or recreational Public spaces shall have linkages that reinforce pedestrian movement. Merchandise and eating areas shall be designed to be contiguous with public spaces and pedestrian and bicycling ways.	
59.9-5	(2) Riverwalk - Riverfront properties possess the unique opportunity to provide public space adjacent to and along the Cape Fear River corridor. A riverwalk not only provides public access to the river but also accents significant community asset and draws activity to and along the river corridor. To serve the purpose of public access to the riverfront, all RFMU developments shall dedicate the land necessary to provide for the construction of a continuous and contiguous public riverwalk along the river's edge for a length as defined by the development's boundaries adjacent to the riverfront.	
59.9-5(2)(A)	a. Developments shall provide public access connections to a riverwalk, perpendicular to the shoreline at intervals of no more two-hundred (200) feet. These walkways should be intensively activated with ground level retail activities, landscaping, and be designed with a series of public spaces to accentuate the pedestrian experience. This access shall be granted through an easement or other property interest as approved by the County Attorney. The access shall meet ADA Design Standards.	PROWAG

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
59.9-5(2)	(B) Riverfront facilities shall provide multi-modal transportation opportunities, including public boating, walking, bicycling, and public bus or water taxi uses and the facilities necessary for such uses (including bicycle parking). Private dock space shall not restrict public access to the riverwalk	
59.9-6(1)	(C) Development schedule including proposed phasing; (D) Traffic and Parking Plan to include a statement of impact concerning local traffic near the tract, proposed right-of-way dedication, plans for access to and from the tract, location, width and right-of-way for internal streets and location, arrangement and access provisions for parking areas; plans for pedestrian and bicycling access to the tract. A transportation information sheet is required for any development that will generate more than 100 trips during the peak hour, a traffic impact study may also be required. The study shall be prepared in accordance with Standards and Guidelines approved by the County and shall be submitted at least four weeks prior to the first scheduled meeting at the project's review.	
ARTICLE VI: SUP	PPLEMENTARY DISTRICT REGULATIONS	
Section 60	Section 60: Visibility at Intersections in Residential Districts On a corner lot in any residential district, nothing shall be erected, placed, planted or allowed to grow in such a manner as materially to impede vision between a height of three (3) and ten (10) feet above the finished grades of the intersecting streets in the area bounded by the street rights-of-way of such corner lots and a line joining points along said streets rights-of-way fifty (50) feet from the point of inter- section.	
61-5	(7) Ingress, egress, circulation, and parking plans shall describe measure proposed to assure safety and minimize traffic impacts on surrounding areas. In addition, the plans shall describe ingress and egress for pedestrians and bicyclist, including location of short-term and long-term bicycle parking.	
67B-3	(4) Adequate sight angles - At all points of egress from off-street parking areas to a road, unobstructed visibility shall be maintained at an elevation of between three (3) and seven (7) feet of the pavement level, within the two areas formed by two right angle triangles on the sides of the driveway. Each triangle shall have a base measuring 15 feet along the edge of the driveway and a height measuring 30 feet along the edge of the road right-of-way. At the corners of road intersections, unobstructed visibility shall be maintained at an elevation between three (3) feet and seven (7) feet of the pavement level within an area required by the regulations adopted by the Department of Transportation, State of North Carolina, in "Subdivision Roads: Minimum Construction Standards" (May 1, 1983) and any subsequent amendments thereto or the regulations adopted by the governing body, whichever are the greater.	

Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
	4114 5488 65 61 61 15
(4) No foliage shall be allowed to extend from public or private proper-	
ty into any portion of a street right-of-way below a height of 8 ft above	
the grade of the sidewalk at the property line or if no sidewalk grade	
·	
DVISIONS FOR USES ALLOWED AS SPECIAL USES	
A Farmers Market or produce stand, whether enclosed in a structure(s) or proposed as open lot sales of farm produce, shall be allowed in residential zoning districts by special use permit	
(2) The inclusion of a safe and enforceable management plan for pedestrian, bicycling and vehicular traffic, (including vehicular and bicycle parking) both on the proposed site and along the adjacent roadway.	
F-STREET PARKING AND LOADING	
80-5: Separation from Walkways, Sidewalks and Streets All parking, loading, and service areas shall be separated from walkways, sidewalks and streets by curbing or other suitable protective devices to prevent vehicles from intruding into these areas.	Consideration should be given to not blocking sight lines in these situations also.
IGN STANDARDS AND REGULATIONS FOR SIGNS	
Section 90: Purpose The purpose of this section is to coordinate the type, placement, and physical dimensions of signs within the different zoning districts; to recognize the commercial communication requirements of all sectors of the business community; to promote both renovation and proper maintenance of signs; and to guarantee equal treatment under the law through accurate record keeping and consistent enforcement. The general objectives of these standards are to promote the health, safety, welfare, convenience and enjoyment of the public, and in part, to achieve the following: (1) Safety - To promote the safety of persons and property by providing that signs: (A) Do not create a hazard due to collapse, fire, decay, collision, or abandonment; (B) Do not obstruct fire-fighting or police surveillance; and (C) Do not create traffic hazards by confusing or distracting motorists, or by impairing the driver's ability to see pedestrians, bicyclists, obstacles, or other vehicles, or to read traffic signs. (D) Do not block or impede access or sight triangles for pedestrians or	Suggested additional line item.
	ty into any portion of a street right-of-way below a height of 8 ft above the grade of the sidewalk at the property line or if no sidewalk grade has been established the height shall be measured vertically above the center of the roadway. The Zoning Administrator may cause or order corrective action to prevent any such condition from existing. **DVISIONS FOR USES ALLOWED AS SPECIAL USES** A Farmers Market or produce stand, whether enclosed in a structure(s) or proposed as open lot sales of farm produce, shall be allowed in residential zoning districts by special use permit (2) The inclusion of a safe and enforceable management plan for pedestrian, bicycling and vehicular traffic, (including vehicular and bicycle parking) both on the proposed site and along the adjacent roadway. **P-STREET PARKING AND LOADING** 80-5: Separation from Walkways, Sidewalks and Streets All parking, loading, and service areas shall be separated from walkways, sidewalks and streets by curbing or other suitable protective devices to prevent vehicles from intruding into these areas. **GN STANDARDS AND REGULATIONS FOR SIGNS** Section 90: Purpose The purpose of this section is to coordinate the type, placement, and physical dimensions of signs within the different zoning districts; to recognize the commercial communication requirements of all sectors of the business community; to promote both renovation and proper maintenance of signs; and to guarantee equal treatment under the law through accurate record keeping and consistent enforcement. The general objectives of these standards are to promote the health, safety, welfare, convenience and enjoyment of the public, and in part, to achieve the following: (1) Safety - To promote the safety of persons and property by providing that signs: (A) Do not create a hazard due to collapse, fire, decay, collision, or abandonment; (B) Do not obstruct fire-fighting or police surveillance; and (C) Do not create traffic hazards by confusing or distracting motorists, or by impairing the dr

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
91-12	(1) Signs in Public Right-of-Way - No sign shall be permitted on or protrude into a public right-of-way, street or passageway except as provided specifically for herein	
	(3) Signs Constituting Traffic Hazards - No sign shall be permitted whereby its location, nature or type constitutes or tends to constitute a hazard to the safe and efficient operation of vehicles or the safe and unimpeded access of pedestrian and bicyclists upon any public right-of-way, street or passageway. No sign shall be permitted that would obstruct the line of sight of motorists, pedestrians or bicyclists at intersections, driveways, or along any public right-of-way, street or passageway. No sign shall be permitted, as specified in NCGS §136-32.2 that would obstruct or resemble traffic signs or signals, or would tend to be confused with a flashing light of an emergency vehicle.	
Section 93 (11)	(E) No sign shall block any sight distances of any intersection for motorized traffic, bicyclists or pedestrians.	
ARTICLE XI: AM	IENDMENTS	
	No comments	
ARTICLE XII: BC	ARD OF ADJUSTMENT	
	No comments	
ARTICLE XIII LEG	GAL PROVISIONS	
	No comments	

TABLE D.5: TOWN OF WRIGHTSVILLE BEACH ORDINANCES AND TECHNICAL STANDARDS

TITLE XV: LAND USAGE

ITTLE XV: LAND USAGE		
Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
154. SUBDIVISIO	DNS	
154.01 Definitions	No comment	
154.02 Ex- traterritorial jurisdiction	No comment	
154.10 Approval of subdivision plats required	No comment	
154.11 Plat approval not to constitute acceptance of dedication	No comment	
154.12 Transfer of lots in unapproved subdivision plats	No comment	
154.13 Plat approval re- quired before extension of service	No comment	
154.14 Co- ordination of street system	The arrangement of streets in new subdivisions shall provide for the continuation of the principal existing streets in adjoining subdivisions or, when adjoining property is not subdivided, their proper projection insofar as necessary for public requirements by providing new streets of a width deemed necessary by the Planning Board and approved by the Board of Aldermen. In general, the streets shall be at least as wide as existing streets; except, that in no case shall the width be less than the minimum specified in § 154.31. The street and alley arrangement shall be such as to cause no hardship to owners of adjoining property when they plat their own land and seek to provide for convenient access to it and shall provide for continuing a reasonable number of through utility lines. When a new subdivision adjoins unsubdivided land susceptible to being subdivided, the new streets shall be carried to the boundaries of the tract proposed to be subdivided, except where it is determined by the Planning Board and approved by the Board of Aldermen that certain streets may not be required to be so extended.	Suggest expanding "Coordination of street system" to "Coordination of street, sidewalk and trail system". The revised section could be expanded to better address such issues as planning for current or future connectivity of adjacent and closeby trails, the provision of easements and expansion of trails connecting from cul-de-sacs, deadend streets and stubbed streets to adjacent properties.

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
154.15 Parcels of land to consist of multiples of normal blocks	When a parcel of land is subdivided into tracts larger than normal for building lots, the parcels shall be divided, so far as practicable, into normal block multiples so as to allow for the opening of major streets and the making of satisfactory arrangements with the town for the ultimate extension of streets.	
154.16 Pre- liminary plats	No comment	
154.17 Contents of preliminary plats	The preliminary plat shall be drawn to a scale not smaller than one inch to 100 feet and shall show: (E) Adjoining properties. The names of all adjoining subdivisions with lines of abutting lots, the owners' names and property lines of adjoining properties not subdivided, and the locations, names, and widths of existing streets, sidewalks, trails and similar facts regarding property which is immediately adjacent.	
	(G) Dedications. All parcels of land intended to be dedicated for public use, reserved in the deeds for the use of all property owners in the proposed subdivision or reserved in any manner for any other purpose, together with the purpose or conditions or limitations of the reservations, if any.	Suggest expanding to include easements for planned or future pedestrian and bicycling connections.
154.18 Conformity of plat to requirements	Preliminary plats shall be checked for: (C-2) Connections to adjacent and close-by trails and sidewalks	Suggest adding line item requiring additional information about the pedestrian and bicycling access and connections. This is an important stage in the early planning process to draw attention the existence of close by trails and sidewalks: opportunities may be recognized which if missed may be too late to avail of at a later stage.
154.19 Approved plats to be kept on file	No comment	
154.20 SERVICE FACILITIES REQUIRED PRIOR TO FINAL AP- PROVAL.	No comment	
154.21 FINAL PLAT.	No comment	

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
154.22 CON-	(B) The final plat shall be accompanied by a notarized certificate signed	
TENTS OF	by the owner of the property so subdivided attesting to the fact that he	
FINAL PLAT.	ordered the work done, that all public streets, sidewalks, trails, alleys,	
	and other open spaces so designated therein are thereby dedicated for	
	that use, and that all public and private easements shown therein are duly granted for the uses stipulated.	
SUBDIVISION RI		
154.30 Mini-	No comment	
mum require-	ino comment	
ments		
154.31 Street	(E) Culs-de-sac. Culs-de-sac and dead-end streets shall terminate in a	This is an oppportunity to seek or
plans, rights-	circular right-of-way having a minimum radius of 40 feet. This provi-	provide easements or connections
of-way, and	sion may be modified by the Planning Board, subject to final approval	to adjacent property from cul-de-
blocks	by the Board of Aldermen. The culs-de-sac shall not exceed 400 feet in	sacs (for existing or possible future
	length.	use).
	(I) Walking and bicycling connections, connectivity, access	Suggest adding an additional line
		item that encourages access and
		connectivity for pedestrians and
		bicyclists
154.32 Re-	No comment	
quirements		
for streets		
154.33 Lot	No comment	
sizes and side		
lines	Al	
154.34 Setback lines,	No comment	
unusable		
lots, and land		
elevation		
154.35	No comment	
Modification		
of certain		
requirements		
GROUP HOUSIN	NG DEVELOPMENTS	
154.45 Pur-	No comment	
pose		
154.46 Com-	No comment	
monly owned		
areas		
154.47 Den-	No comment	
sity		

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
154.48 Unit ownership an condominiums	No comment	
154.49 Site plans	Site plans for all group housing developments shall show the location of the buildings, streets, alleys, trails, sidewalks, walks, parking areas, recreation areas, tree cover, and planting. The site plan shall number and show the dimensions of all building sites and all streets, trail and utility easements to be dedicated to the public. All areas on the site plan other than public streets, parking areas, easements or private building sites shall be shown and designated as common areas.	
154.50 Public access, easements, and private party walls	Building lots may abut or be provided with frontage on common areas, properly restricted through a property owners association to assure adequate access, if in the opinion of the town, a public street is within an acceptable distance and would allow adequate community services. Easements over the common area for access, ingress, and egress from and to public streets and walk-ways and easements for enjoyment of the common areas, as well as for parking, shall be granted to each owner of a residential site. All common walls between individual residences shall be party walls and provisions for the maintenance thereof and restoration in the event of destruction or damage shall be established.	Suggest adding guidance regarding the width of easements (10 foot minimum) so that they are comfortable and accessible for a range of users and uses.
154.51 Utilities and improvements required	All planned developments shall include town water and sewer utilities, sidewalks, streets, and parking. All utilities, sidewalks, streets, and parking shall be on dedicated rights-of-way and all streets and parking shall be paved and shall have proper curb, gutter, and storm drainage.	Trails are not mentioned: they can be located on dedicated public right-of-ways but could also be located on access easements or some similar-type arrangement.
155. ZONING		
155.001 Purpose	The zoning regulations and districts as set forth in this chapter have been made in accordance with a comprehensive plan and designed to lessen congestion in the streets; to secure safety from fire, panic, and other dangers; to promote health and the general welfare; to provide adequate light and air; to prevent the overcrowding of land; to avoid undue concentration of population; to facilitate the adequate provisions of transportation, water, sewerage, schools, parks, provide safe and comfortable access and connectivity for pedestrians and bicyclists, and other public requirements. These regulations have been made with reasonable consideration, among other things, to the character of the districts, of their peculiar suitability for particular uses, and with a view to conserving the value of buildings and encouraging the most appropriate use of land throughout the town.	Although, walking and bicycling are embedded in the term 'transportation', these activities can get overlooked so it may be worth being more specific regarding the goals related to these modes of transportation.

Ordinance	Existing Ordinance Text (Abridged)	Additional comments
Section	Suggested revisions or additions shown in red	and suggestions
155.002 Definitions	"PARKING LOTS." Lands outside of the public right-of-way, properly improved in accordance with § 155.060 OFF-STREET PARKING REQUIREMENTS, with suitable ingress from and egress to a public street, for the sole use of parking motor vehicles and bicycles.	The wording 'for the sole use of parking motor vehicles' seems to exclude use of parking lots for bicycle parking which is likely not intended.
	"STREET." A thoroughfare which affords the principal means of access to abutting property and has been accepted for maintenance by the town or the state Highway Commission	Suggest using the MUTCD definition as it is clearer about the various elements that make up the street. "A general term for denoting a public way for purposes of vehicular travel, including the entire area within the right-ofway."
155.003	No comment	
Jurisdiction; within the town		
155.004	No comment	
Jurisdiction; outside the town		
155.005 Compliance with chapter	No comment	
155.006 Of- ficial zoning map	No comment	
155.007 Zoning map; identification, amendment, and replace-	No comment	
ment		
155.008 Interpretation of district boundaries	No comment	
155.009 Non- conforming situations	No comment	

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
155.010 Open space requirements	(8) Walkways no more than 36 inches wide elevated no more than six inches above grade composed of pervious materials, including but limited to wood and pervious pavers, provided that they are erected for the sole purpose of providing access to residences, piers, or permitted establishments located on the same property or located adjacent to the same property.	A 36 inch (or 3 foot) width is below the recommended minimum for sidewalk design: such a facility will be inaccessible and unusable for some users (i.e. those who have to use a device for mobility). It will also be uncomfortable for any user when they have to pass or meet someone coming from the opposite direction.
155.011 Reduction of lot and yard areas prohibited	No comment	
155.012 Public access to property	No comment	
155.013 Projections into public streets and street right-of-way	(A) No signs, canopies, wooden or metal marquees, or other similar structures shall project beyond any street right-of-way line, except where accessory to and on the same premises as used within the five business districts designated by this chapter. Billboards are prohibited in all districts. Any of the above structures within the five designated business districts must be positioned so that the farthest extended part of such structures shall be at least 7-1/2 feet from the existing right-of-way line measured from the building side of the right-of-way line. All signs, canopies, wooden or metal marquees, or other similar structures shall be placed so that the lowest part is no closer to the sidewalk, ground, and the like than eight feet. A flexible valance may extend one additional foot toward the sidewalk or ground for a clear height of seven feet above the sidewalk.	Generally, the clear recommended vertical height recommended is 8 feet (as described). However, the flexible valance does encroach into the vertical operating space possibly needed by a bicycle rider (i.e. they may be standing on pedals as they ride).
155.014 Visibility on corner lots	On a corner lot nothing shall be erected, placed, or allowed to grow in a manner so as materially to impede vision above a height of three feet in a triangular area formed by a diagonal line between two points on the right-of-way lines, 20 feet from where they intersect.	These sight triangle dimensions seem low and may not cover many of the possible sight blocking situations.
155.015 Fire districts	No comment	
155.016 Interpretation of chapter	No comment	
155.017 CONFLICTS WITH OTHER REGULA- TIONS.	No comment	

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
CONDITIONAL	USES	
155.025 STANDARDS FOR CONDI- TIONAL USE PERMITS.	(5) That adequate utilities, access roads, sidewalks and trails, drainage, parking, or necessary facilities have been or are being provided.	
155.026 SITE PLAN REVIEW REQUIRE- MENTS.	No comment	
155.027 PROCEDURE FOR AP- PROVAL OF SITE PLAN; PLANNING BOARD AC- TION FOR A CONDI- TIONAL USE PERMIT.	No comment	
155.028 IMPROVE- MENTS OF SITE PLAN FOR A CON- DITIONAL USE PERMIT.	No comment	
155.028 IMPROVE- MENTS OF SITE PLAN FOR A CON- DITIONAL USE PERMIT.	No comment	

Ordinance	Existing Ordinance Text (Abridged)	Additional comments
Section 155.029 INFORMA- TION TO BE SHOWN ON SITE PLAN.	Suggested revisions or additions shown in red (B) The site plan shall contain the following information: (4) Location of all structures, streets, entrances, and exits on the site and on contiguous property directly across the street. (4-B) Location of all sidewalks and trails on adjoining and closeby properties and on contiguous property directly across the street	and suggestions Suggested additional line item for the list
	 (9) Parking, loading, and unloading areas shall be indicated with dimensions, traffic patterns, access aisles, and curb radii. (9-B) Bicycle parking shall be indicated with dimensions, access and additional features such as coverage and lighting 	Suggested additional line item for the list
	(10) Improvements such as roads, curbs, bumpers, trails, and sidewalks shall be indicated with cross sections, design details, and dimensions	
155.030 PER- FORMANCE STANDARDS.	In reviewing any site plan, the Planning Board and the Board of Aldermen shall consider: (A) Pedestrian and vehicular traffic movement within and adjacent to the site with particular emphasis on the provision and layout of parking areas, bicycle parking, off-street loading and unloading, movement of people, goods, and vehicles from access roads, within the site, between buildings, and between buildings and vehicles. The Board shall ensure that all parking spaces are usable and are safely and conveniently arranged. Access to the site from adjacent roads shall be designed so as to interfere as little as possible with traffic flow on these roads and to permit vehicles a rapid and safe ingress and egress to the site as well as to allow safe ingress and egress by pedestrians and bicyclists (F) Signs shall be designed so as to be aesthetically pleasing, harmonious with other signs on the site, and located so as to achieve their purpose without constituting hazards to vehicles, bicyclists and pedestrians.	
DISTRICT USE A	ND DIMENSIONAL REQUIREMENTS	
155.044 COMMER- CIAL DIS- TRICT I.	(D) Off-street parking. (I) Off-street parking is not required in this district for the following permitted uses. Where it is nevertheless provided, it shall be so designed and so located as to comply with the provisions set forth in § 155.060 et seq., of this chapter.	
155.045 COMMER- CIAL DIS- TRICT II.	(A) Generally. This district is established to embrace the existing and growing commercial, tourist, and short term residential uses.	It may be useful to add wording encouraging walking and biking: pedestrians and bicyclists in a commercial district can introduce people to businesses that they may not otherwise notice or may not find easy to patronize due to motorized vehicle parking issues. Pedestrians and bicyclists can bring more customers and vitality to commercial districts.

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
155.046 COMMER- CIAL DIS- TRICT III.	(A) Generally. This district is established to permit those specialized uses which will fulfill the special needs of daily commuters and periodic short term visitors.	Similar to the previous comment, encouraging walking and biking in this type of commercial district can introduce people to businesses that they may not otherwise notice or may not find easy to patronize due to motorized vehicle parking issues. Pedestrians and bicyclists can actually bring more customers and vitality to commercial districts.
155.051 COMMER- CIAL DIS- TRICT V.	(e) A sidewalk a minimum of five feet wide by six inches thick of reinforced concrete shall be constructed within the highway or street right-of-way immediately adjacent to the front property line. Such sidewalk shall extend across the entire property frontage that adjoins such right-of-way and may extend to connect to closeby existing sidewalk.	The wording seems to suggest that the sidewalk would stop at edge of the property rather than requiring or encouraging extensions to connect to available closeby facilities.
OFF-STREET PAI	RKING AND LOADING	
	(a) Sidewalks, bicycle facilities, transit service, and transit amenities are in place such that together with the number of parking spaces that are proposed, transportation is adequately served or the commercial establishment(s) existing or previously existing on the subject property have historically utilized on-street public parking for a significant portion of customer parking and there is sufficient on-street public parking available within a 400-foot radius of the mixed-use development to meet the demand for the commercial component of the mixed use in the proposed project is equal to and not less than 100% of the previous commercial use as determined by heated square footage; and	Refer to the APBP Bicycle Parking Guidelines (2nd Edition) for information on design details and other recommendations relared to both short-term and long-term bicycle parking.
SIGNS		
155.072 EX- EMPT SIGNS	(G) Temporary political signs, provided such signs shall not be luminated, shall not be located within a public street right-of-way or within a required sight triangle, shall not be attached to trees or utility poles, shall not be roof-mounted, shall not be taller than four feet and shall have a maximum size of six square feet; provided that either side of a two-sided sign may be up to six square feet. All such signs must be removed within 14 days after the applicable election.	Specific sight triangle dimensions? (Is there a reference to elsewhere in the ordinances?)

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
155.075 SIGNS PER- MITTED IN ALL DIS- TRICTS.	(5) Subdivision signs. Subdivision signs advertising the sale of lots or buildings within new subdivisions on which they are located are permitted, provided:(g) That they do not block or impede access or sight triangles for pedestrians or bicyclists	Suggested additional line item
155.085 CONSTRUC- TION OF FREESTAND- ING SIGNS.	No comment	
FENCES AND WA	ALLS	
155.090 IN- TENT.	This subchapter regulates fences located between the property line and the setback line on any lot. Fences elsewhere on the property (for example, an outdoor shower privacy screen) are considered part of the primary or accessory structure and are not regulated by this subchapter. The intent of this subchapter is to insure that physical boundaries between properties do not interfere significantly with visibility or air movement on adjoining properties or create sight distance problems or safety issues for pedestrains and bicyclists.	
155.093 CORNER LOT VISIBILITY.	No fence shall be erected or maintained in a manner as materially to impede vision between a height of three feet and ten feet in a triangular area formed by a diagonal line between two points on the property lines, 20 feet from where they intersect, as demonstrated below.	As per previous similar comment, these sight triangle dimensions seem very low and may not cover many of the possible sight blocking situations.
LANDSCAPING		
155.180 PUR- POSE.	The specific purposes are: (E) To protect pedestrian and bicyclist safety and access by ensuring planting in appropriate locations that do not impede access, impair views or cause safety problems	Suggested additional line item
MIXED USE COA	MMERCIAL-RESIDENTIAL	

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
155.205 CONCEP- TUAL PLAN REVIEW.	Purpose statement: It is the intent of the site analysis data and conceptual development plan process to This process is intended to take into consideration the general form of the land, density, and ratio of residential to commercial use before and after development as well as the spatial relationships of the proposed structures, open spaces, landscaped areas, and general access and circulation patterns as they relate to the proposed development and the surrounding area (both motorized and non-motorized), as well as any other criteria deemed relevant by the Board of Aldermen.	
155.207 PRO- CEDURES.	 (5) The conceptual development plan application shall include a written statement which addresses the following: (c) The relationship of the development to neighboring developments and undeveloped land; (c-2) The relationship of the development to neighboring pedestrian and bicycling facilities, routes and connections; 	Suggested additional line item
155.211 CER- TAIN CON- STRUCTION WITHIN THE FRONT BUILDING SETBACK AL- LOWED FOR MIXED USE DEVELOP- MENT.	Notwithstanding anything in the town's ordinances to the contrary, in approving a mixed use conditional use permit pursuant to §§ 155.205 through 155.210, the Board of Aldermen may allow for the construction of (i) vertical public accesses (e.g., stairwells, elevators) for means of ingress and egress,(A) Does not materially impede vehicle, bicycle or pedestrian vision from any adjacent street or highway;	Unclear about the vertical public accesses: is this a feature that may project from a building (rather like a doorway or a porch)?

TABLE D.6: TOWN OF CAROLINA BEACH ORDINANCES AND TECHNICAL STANDARDS

PART II - CODE OF ORDINANCES

	DE OF ORDINANCES	
Ordinance	Existing Ordinance Text (Abridged)	Additional comments
Section	Suggested revisions or additions shown in red	and suggestions
Chapter 11 - F	ARKS AND RECREATION	
ARTICLE I IN G	ENERAL	
	No comment	
ARTICLE II REC	REATION COMMITTEE	
	No comment	
ARTICLE III AL	DITORIUM AND COMMUNITY FACILITIES	
	No comment	
ARTICLE IV FR	EEMAN PARK	
	No comment	
ARTICLE V PAI	RKS ORDINANCE	
Sec. 11-77 Conduct prohibited in town-owned parks	Obstructing any walkway, bike path, street or driveway.	Suggest having specific definitions elsewhere for paths/sidewalks/trails/shared use paths and then using standard nomenclature throughout per the set definitions.
Sec. 11- 78 Safety equipment at town-owned skate parks.	Safety equipment at city skate parks. No person shall ride or use a skateboard, in-line skates or freestyle bicycle at any town owned or operated skate park unless that person is wearing a helmet, elbow pads and knee pads [reference subsection 11-42(c)]. Bicycles, scooters and motorized vehicles are not allowed within the skate park facility without the prior permission of the town manager.	The definition of 'freestyle bicycle' is unclear Is this a BMX-type bicycle and is it regulated differently anywhere else outside of the skateparks? Suggest adding this term also to the standard definitions for clarification. The 'prior permission' for bicycles seems unclear and potentially problematic for those using bicycles as their form of transportation to the facility.
	PLANNING AND DEVELOPMENT	
ARTICLE I IN G		
	No comment	
ARTICLE II RES		
	No comment	
ARTICLE III SU	BDIVISION REGULATIONS	
Sec. 12-37 Definitions	Public way shall mean any public road, street, highway, walkway, sidewalk, trail, drainage, or part thereof.	

Ordinance Section Sec. 12-41 Purpose	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red This article is designed and enacted to provide for the orderly development of the town and its environs through the regulation of the subdivision of land. The regulations contained in this article are intended to coordinate proposed development with existing development and with officially adopted plans for the future development of the town; to ensure the provision of adequate facilities for transportation, water, sewerage, and other public facilities in subdivisions; to ensure safe access and connectivity for pedestrians and bicyclists, to ensure the proper legal description, monumentation, and recording of subdivided land; and to create conditions essential to public health, safety, and general welfare.	Additional comments and suggestions Suggest expanding the stated intention to explicitly address walking and bicycling access & connectivity as these can get overlooked in the term 'transportation'. Consideration of walking and bicycling transportation is of a particular long-term consequence in the planning of subdivisions.
Sec. 12-42 Intent	It is the general intent of this article to regulate the division of land so as to: (6a) Plan for future access and connectivity for non-motorized access	Similar to the previous comment, suggest expanding the intent to be more explicit about the access and connectivity issues related to walking and biking during the subdividing process.
Sec. 12-74 Same— Preparation; contents	(2) Existing conditions (h) Location of existing and platted property lines. Location, width, and names of all platted roads, railroads, utility rights-of-way, public areas, sidewalks, trails, existing buildings or structures, and planning region boundary lines. Existing sewers, water mains, drains, culverts, or other underground facilities within the tract or within the right-of-way of boundary roads, with pipe sizes, grades, and invert elevations from public records. Location of these facilities in adjoining tracts or subdivisions if proposed for use or extension;	
Sec. 12-74 Same— Preparation; contents	(3) Proposed conditions: (a) Layout and elevation of roads, alleys, sidewalks, trails, and public crosswalks, with widths noted; road names or designation; grades and cross sections;	
Sec. 12-85 Minor subdi- visions	(d) Preparation and contents (6) The widths, and names where appropriate, of all proposed streets and alleys, sidewalks, trails, and of all adjacent streets, alleys, and easements which shall be properly located.	
Sec. 12-96 Street ar- rangement— Generally	Streets shall be designed and located in relation to existing and planned streets; to topographical conditions and natural terrain features such as streams, lakes or other water-ways, and existing tree growth; to public convenience, safety, access, and connectivity for all modes; and in appropriate relation to the proposed uses of land to be served by such streets	

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 12-97. - Same—Spe- cific standards	(a) All streets shall be properly integrated with the existing and proposed system of thoroughfares and dedicated rights-of-way as established on officially adopted plans (a.2) All sidewalks and trails shall be properly integrated with the existing and proposed system of sidewalks and trails as established on officially adopted plans.	Suggested additional line item
Sec. 12-97 Same—Specific standards	(d) The rigid rectangular gridiron street pattern need not necessarily be adhered to, and the use of curvilinear streets, cul-de-sacs, or U-shaped streets shall be encouraged where such use will result in a more desirable layout.	This may be an opportunity to suggest providing connections and easements so as to allow walking and biking access. In particular, creation of cul-de-sacs may make trips for those users much longer or even impossible and discourage participation.
Sec. 12-97 Same—Specific standards	(e) Proposed streets shall be extended to the boundary lines of the tract to be subdivided, unless prevented by topography or other physical conditions, or unless in the opinion of the planning and zoning commission such extension is not necessary or desirable for the coordination of the layout of the subdivision with the existing layout or the most advantageous future development of adjacent tracts.	Not providing connections be- cause they are deemed 'not necessary or desirable' can have very long-term impacts in terms of access and connectivity. Is there a specific policy that includes spe- cific criteria for whese situations are permitted and are alternatives considered?
Sec. 12-99 Access to major streets	Where a subdivision borders on or contains an existing or proposed major street, the planning and zoning commission may require that access to such streets be limited by one (1) of the following means: (1) The subdivision of lots so as to back onto the major street and front onto a parallel local street; no access shall be provided from the major street and screen planting shall be provided in a strip of land along the rear property line of such lots; (2) A series of cul-de-sacs, U-shaped streets, or short loops entered from and designed generally at right angles to such a parallel street, with the rear lines of their terminal lots backing onto the major street; (3) A marginal-access or service street (separated from the major street by a planting or grass strip or having access thereto at suitable points) (4) The number of residential streets entering a major street shall be kept to a minimum.	While the intention may be to prevent vehicular connections and access between subdivisions and major roads, the wording may prevent pedestrian and bicycling access, particularly where the culde-sacs become the design. While it is useful to limit the number of street access points on the major street, this limitation does not apply in the same way to nonmotorized connections.

Ordinance	Existing Ordinance Text (Abridged)	Additional comments
Section	Suggested revisions or additions shown in red	and suggestions
Sec. 12-102 Street design specifications	(d) Street grades: Pedestrian ways: twelve (12) percent unless steps of acceptable design are provided.	Recommending considering both running grade and maximum grade for pedestrians. See FHWA guidance and discussion on this issue: Designing Sidewalks and Trails for Access, Chapter 4 - Sidewalk Design Guidelines and Existing Practices
Sec. 12-105 Blocks	(d) Pedestrian ways: Pedestrian ways of not more than ten (10) feet in width may be required between rear lot lines where deemed necessary by the planning and zoning commission to provide safe and convenient pedestrian circulation between the individual lots, streams, lakeshores or other waterways, parklands or other public areas; or may be required near the center and entirely across any block over nine hundred (900) feet in length where deemed essential by the planning and zoning commission to provide adequate pedestrian circulation or access to schools, recreation areas, shopping centers, churches, or transportation facilities.	Unclear whether this allows for bike access need definition and standard nomenclature
Sec. 12-108 Easements	(a) Utility easements (b) Drainage easements	Recommend to also list access easements
Sec. 12-130 Sidewalks	The planning and zoning commission may require the subdivider to construct a concrete sidewalk on one (1) side of all frontage streets and on one (1) or both sides of all other streets within the subdivision. The construction of all sidewalks shall be in accordance with plans and standard specifications approved by the planning and zoning commission.	Construction of sidewalks on one side only has a disproportionate impact on some facility users, particularly those with mobility issues. It also inconveniences all users, thus discouraging use and participation in general.
ARTICLE IV FLO	OOD DAMAGE PREVENTION	
Sec. 12-169 Objectives	The objectives of this article are: (8) Minimize disruption and restore bicycling and pedestrian access and connectivity	Suggested additional line item for list.
ARTICLE V RES	SERVED	
	No comment	
ARTICLE VI SC	DIL EROSION AND SEDIMENTATION	
	No comment	
ARTICLE VII RI	1	
	No comment	
ARTICLE VIII R	1	
	No comment	

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 12-365 Duties	The duties of the ERC shall include:	Suggest that within the listed duties, the economic and business benefits of walking and bicycling are included in any analysis and promotional work.
	STREETS AND SIDEWALKS	
Sec. 15-4 Damaging streets	It shall be unlawful for any person to drag or run, or cause to be dragged or run, any harrow or other implement, engine, machine, or tool upon any street, sidewalk or trail of the town which shall be liable in any way to injure or cut the surface thereof.	The safety of pedestrians and bicyclists is more directly impacted by surface damage to facilities as they are more sensitive to variations and irregularities.
ARTICLE II EXC	CAVATION	
Sec. 15-22 Permit application	All persons desiring a permit in order to make an opening in any street, sidewalk, alley, boardwalk, or other public place, as set forth insection 15-21, shall make written application therefor, which application shall show the location of the proposed opening, the purpose therefor and the approximate number of square yards of surface to be cut. Such application shall be accompanied by a fee established by the town council.	Openings can make a facility unsafe or completely unusable for some, particularly those with the most mobility issues. In addition, openings cause particular problems for the visually impaired users. Suggest adding wording about minimizing the duration of work and ensuring the provision of safe, accessible and convenient alternative access as well as advance warning for users.
Sec. 15-24 Supervision, inspection of work	All excavations and work in streets, sidewalks, alleys, boardwalks, or other public places of the town shall be under the general supervision and control of the director of public works, whose duty it shall be to inspect the same from time to time during the progress of the work. When the work has been completed, he shall make a final inspection and see that the street, sidewalk, or public place is restored to a condition as good in all respects as that before the excavation or work was begun, and that all debris, materials, tools, and equipment are removed.	Is there a requirement to show how safe, accessible and convenient alternative access as well as advance warning for users will be provided during the work and until full restoration is completed?
ARTICLE III OE	structions	
Sec. 15-37 Definitions	Sidewalk: Area designed to accommodate pedestrian travel that abuts both a street designed for vehicular travel.	Suggest adding standard definition of sidewalk in the definitions that is then used throughout.

Ordinance	Existing Ordinance Text (Abridged)	Additional comments
Section	Suggested revisions or additions shown in red	and suggestions
Sec. 15-38 Display of goods	(b) For businesses located on the boardwalk, the temporary display of merchandise, goods or commodities may take place adjacent to the business structure offering the sale of said merchandise, goods or commodity, and shall not exceed the width of the business structure; and, said merchandise, goods, or commodity on display for sale shall allow for a minimum of four (4) feet six (6) inches for pedestrian travel. The minimum area for pedestrian travel shall be measured perpendicular from the boardwalk buffer zone, an area designated for existing obstructions such as light poles, trash cans, benches, and flower boxes. For the purposes of this section, the buffer zone shall be a two-foot area measured as one (1) foot on either side of the center line of the boardwalk, which typically has obstructions that may prevent accessibility. (c) For businesses in the CBD, not located on the boardwalk, display of goods may be allowed on adjacent sidewalks if a minimum clearance of three (3) feet is provided for pedestrian travel. A two-foot buffer zone, from the face of the street side curb shall not be included as part of the accessible area for pedestrians.	The three-foot wide sidewalk provision in (c) is inadequate for wheelchairs, wheelchairs passing, etc the buffer may make it operational but with any spillover into the space, it becomes difficult or uncomfortable for some users to negotiate this facility. Increasing the minimum clearance value to four (4) feet plus buffer would likely lead to considerable improvement.
Sec. 15-39 Building materials	Any person erecting a building may, with permission from the town, place building material for immediate use on the streets in such a way that does not interfere with the usual traffic or with pedestrian and bicycling safety and access. Particular attention needs to be paid to the needs of the mobility and visually impaired.	
Sec. 15-40 Construction near sidewalk	Before building or remodeling at any place where the same is in close proximity to the sidewalk, an overhead covered passageway shall be constructed so as to leave the sidewalk unobstructed and provide safe and easy passage.	Frequently temporary access provided during construction, can be problematic or even impossible to use for some, especially those with mobility impairments. Need to confirm that the width of the temporary passageway is adequate for all users including wheelchair users (Is there a value called out in another ordinance that could be linked here).

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
ARTICLE VI PA	rades; demonstrations	
Sec. 15-99 Picketing	Picket lines and picketing shall be subject to the following additional regulations: (1) Picketing may be conducted only on the sidewalks reserved for pedestrian movement, and may not be conducted on the portion of a street used primarily for vehicular traffic."	Does not include discussion about not impeding or blocking access for sidewalk users: some users may step out into the road which can be unsafe while for other users, such as the mobility and visually impaired, the facility may become very difficult or impossible to use. Suggest clarifying that passable (define) width needs to be maintained.
Sec. 15-117 Reasons for denial	"The chief of police shall issue a permit for the proposed parade unless he finds that: (3) The conduct of the parade will substantially interrupt the safe and orderly movement of other traffic contiguous to its route; (4) The conduct of the parade will unduly inconvenience or block access for bicyclists and pedestrians.	Suggested additional line item.
ARTICLE VII ST	REETS AND SIDEWALKS, CURBS AND GUTTERS	
Sec. 15-124 Sidewalks, drives and wheelchair ramps	The minimum width of a sidewalk shall be five (5) feet in NCDOT right-of-ways except in the following cases, and when approved by the town in writing.	Any time the width is below five feet, it will become more difficult for some users to use the sidewalk (e.g. passing when travelling opposite directions, particularly for wheelchair users). Are there stated policy criteria for decisions related to approving narrower sidewalks?

Ordinance	Existing Ordinance Text (Abridged)	Additional comments
Section	Suggested revisions or additions shown in red	and suggestions
Sec. 15-126 Authority to require curb, gutter and sidewalk	When improved property, or redeveloped property is located within the town limits, the town shall require the owner or owners of improved, or re-developed property to install, curb and gutter at the existing road edge, or within the width of the existing road in which the developer will be required to also add asphalt in keeping with the uniform appearance of existing road way. Sidewalks to be installed within the right-of-way behind the curb and gutter. With a minimum width of four (4) feet for residential, and a minimum of five (5) feet along and within the central business district, or State roads maintained by the North Carolina Department of Transportation. If the installed sidewalk cannot fit on the existing right-of-way the property owner/owners will be required to provide the town with an easement to maintain sidewalk.	Four-foot wide sidewalks are less desirable and comfortable and if they become narrower or pinched at some point (due to utility pole or some other fixture) they will be inaccessible for many. Any time width is below five feet, it will become difficult or impossible for some users to use the sidewalk. It makes it difficult to pass when travelling opposite directions, particularly for wheelchair users. Wheelchair users may not be able to turn around. At minimum, periodic passing areas (5 feet in width) spaced at reasonable intervals are recommended to make the facility more usable.
APPENDIX A	- ZONING	
ARTICLE 1 GEN	neral provisions	
Sec. 1.2 Purpose and vision policy	(a) Purpose. The zoning regulations and districts as set forth herein are designed to lessen congestion in the streets; secure safety from fire, panic, and other dangers; promote health and the general welfare; provide adequate light and air; prevent the overcrowding of land; avoid undue congestion of population; facilitate the adequate provision of transportation, water, sewerage, schools, parks, provide safe and comfortable access and connectivity for pedestrians and bicyclists, and other public requirements. They have been designed with consideration given to the character of each district and its suitability for various uses, with a view toward conserving the value of buildings and property, and for encouraging the most appropriate use of land throughout the community.	Although, bicycling and walking are embedded in the term 'transportation', there needs can easily get overlooked so it may be useful to be more specific regarding the goals related to them.

Ordinance	Existing Ordinance Text (Abridged)	Additional comments
Section	Suggested revisions or additions shown in red	and suggestions
Sec. 1.2 Purpose and vision policy	We, the residents, business, and property owners of the Town of Carolina Beach, shall seek to preserve and enhance our community as both an appealing destination resort and year round place in which to live. We will continually strive to protect and nurture the natural and man-made features of our community which make it so unique. These features include our boardwalk/amusement area, marina and boat basin, Carolina Beach Lake, Carolina Beach State Park, and our stable, permanent single-family residential neighborhoods. As the inherent value of our community continues to increase over the coming years, and the forces of investment and change influence that growth, the town's mission shall be to positively direct growth such that the quality of each of these features is continually enhanced within the context of a small, family-oriented beach resort town.	There are opportunities to add wording and ideas to this vision that would complement the existingvision: making walking and biking accessible, safe and comfortable; encouraging participation by residents and visitors of all ages and abilities; reaping the benefits of a safer, healthier population; attracting residents and visitors interested in a healthy, active lifestyle; creating a safe place where young people can walk and bike to their destinations.
ARTICLE 2 ZO	NING DISTRICTS AND MAP	
	No comment	
ARTICLE 3 ZO	NING DISTRICT REGULATIONS	
Sec. 3.9 Dimensional standards for the various zoning dis- tricts	(3) Sight distance at intersections. On corner lots, no planting, fence, wall, sign or structure shall obstruct the vision more than thirty (30) inches in height within a triangular area formed by thirty (30) feet measured along the intersecting streets rights of way and joined together by a connecting straight line. Structures deemed essential for public utilities, as determined by the public works or public utilities director, may be exempt.	Sight distance at intersections is a principal element in the safety of pedestrians and bicyclists: they need to see and be seen. Whenever structures are deemed exempt, the safety of all users need to be considered: e.g. child pedestrians in particular may be hidden from view at pedestrian crossings by signal boxes.
ARTICLE 4 OV	ERLAY DISTRICTS AND OTHER SPECIAL DISTRICTS	
	No comment	
ARTICLE 5 RES	ERVED	
	No comment	
	OOD ZONE AND CAMA PROVISIONS	
Sec. 6.1 Flood zone provision purpose	It is the purpose of this section to promote the public health, safety, access, and general welfare and to minimize public and private losses due to flood conditions by restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion or in flood heights or velocities and further regulate such uses along with control of alteration of flood plains or other resources so as to achieve this end.	Flooding also can make facilities unusable periodically or make them dangerous during a particular flood event. In places where flooding is chronic, this can impact the reliability of the facility for use.
ARTICLE 7 OFF	-STREET PARKING AND LOADING REQUIREMENTS	

Ordinance Section Sec. 7.1 Off- street parking standards	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red (a) Purpose. The purpose of this section is to provide off-street parking standards which will alleviate traffic congestion in the streets and promote safe and unrestricted traffic flow; provide for the efficient storage of vehicles and bicycles while minimizing the detrimental effects of off-street parking on adjacent properties, control the impacts of stormwater drainage and soil erosion and promote visual enhancement through adequate landscaping, and assure the proper and adequate develop-	Additional comments and suggestions This may be an opportunity to consider encouraging users to bicycle instead of bringing a motor vehicle, thereby reducing the parking need or the pressure on it's use. When considering bicycle parking, both short-term and
Sec. 7.1 Off- street parking standards	ment of off-street parking throughout the town and its environs. (d) Off-street parking space schedule.	long-term bike parking should be addressed. No bike parking requirement is called out in the schedule. This may also be an opportunity to consider having a bike parking equivalency and allow businesses to reduce the vehicular parking provided.
Sec. 7.2 Off- street loading requirements	Purpose. The purpose of this section is to provide off-street loading standards which will lessen congestion in the streets and promote safe and unrestricted traffic flow and to provide for the safe and efficient use of property to serve the loading and unloading needs of commercial facilities while not impacting pedestrian and bicycling access, connectivity or safety.	
Sec. 8.1 Purpose	This article is established for the purpose of regulating, controlling, preserving and setting forth methods of continued maintenance assurances of all regulated vegetation located within the municipal limits of the Town of Carolina Beach, NC, and furthermore establishes authority to regulate and control the degree of impervious surfaces constructed on properties and the placement and configuration of fill soil and materials on properties located within said municipality.	Vegetation can impact pedestrian and bicyclist safety as well as the usability of facilities. Grass, weeds, brush and tree limbs can obscure or limit a driver's view of pedestrians and bicyclists at street and trail crossings and vice versa. Overgrown limbs can hang or protude into the their user space making the use uncofortable or unsafe. Tree roots can cause considerable damage to travelling surfaces: the safety of bicyclists and pedestrians is much more impacted by the quality of the surface than for motorized users. Fallen branches and other vegeative debris pose simialr problems.

0 1:		A I I'm
Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 8.9 Design specification standards	The following definitions shall apply to the regulation and control of landscaping within this article: (18) Vision clearance: In order to maintain an acceptable and safe line of sight for motor vehicle drivers, no buildings, fences, walls, posts, signs, lights, shrubs, trees or other type of obstructions not specifically exempted shall be permitted in the space between thirty (30) inches in height from the grade of the street. A sight distance triangle shall be the visually unobstructed area of a street/driveway corner as determined by measuring a distance of thirty (30) feet along the intersecting curb lines, or edges of pavement of the intersecting street/driveway if curbs are not present, and connecting the two (2) points by a straight line to form a triangular shaped area over the corner.	"This definition only covers the vision clearance for the motorized user: similar vision clearances apply to pedestrians and bicyclists who need to both see and be seen. Their line of sight may originate from a different location but they have similar type needs to make crossing and turning decisions. Controlling vegetation so as to provide adequate clear sight triangles is critical for safety of all road users, so the wording should contemplate pedestrians and bicyclists also."
Sec. 8.8 Tree/land- scape plan	The landscape plan shall contain the following information: (16) Show location of sight triangles at intersections and driveways.	Suggest additional line item
Sec. 8.9 Design specification standards	Section 2: Sidewalk and curb and gutter. (1) All new development and redevelopment that exceeds fifty (50) percent or more of the current tax or appraised value shall include curb, gutter, and sidewalks. Single-family and two-family dwellings are excluded from this requirement (b) Sidewalks: Sidewalks may be required to be installed within the right-of-way behind the curb and gutter. Sidewalks shall have a minimum width of: i. Four (4) feet for residential areas including new subdivisions; ii. Five (5) feet along and within the central business district, or state roads maintained by the NCDOT. If the installed sidewalk cannot fit on the existing right-of-way the property owner/owners will be required to provide the town with an easement to maintain sidewalks.	It is unclear why single-family or two-family dwellings would be excluded from the requirement to provide sidewalk. This can contribute to the undesirable situation where there are gaps and a lack of connectivity. Similar to the previous comments, four-foot wide sidewalks are less desirable and comfortable and if they become narrower at some point (due to utility pole or some other fixture) they will be inaccessible for many. Any time width is below five feet, it will become difficult or impossible for some users to use the sidewalk. It makes it difficult to pass when travelling opposite directions, particularly for wheelchair users. Wheelchair users may not be able to turn around. At minimum, period passing areas (5 feet in width) spaced at reasonable intervals are recommended to make the facility more usable.

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 8.9 Design specification standards	Required sidewalk shall be based upon one or more of the following: a. Reasonable evidence that the sidewalk would be essential for pedestrian access to community facilities; b. That such is necessary to provide safe pedestrian movement outside the street or street rights-of-way area; c. That such an extension could reasonably become an extension of existing sidewalks and/or other pedestrian ways.	
ARTICLE 9 DR	AINAGE AND STORMWATER RUNOFF STANDARDS	
	Not reviewed as it referenced to another source	
ARTICLE 10 FE	NCE REGULATIONS	
Sec. 10.3 Location of fences to prevent haz- ardous traffic situations	No fence shall be erected in any location that interferes within a sight distance triangle of motorists utilizing public or private roadways. A sight distance triangle shall be the visually unobstructed area of a street/driveway corner as determined by measuring a distance of thirty (30) feet along the intersecting curb lines, or edges of pavement of the intersecting street/driveway if curbs are not present, and connecting the two (2) points by a straight line to form a triangular shaped area over the corner.	This definition only covers the vision clearance for the motorized user: similar vision clearance provisions are needed for the non-motorized facility users also: pedestrians and bicyclists need to both see and be seen. Their line of sight may originate from a different location but they have similar type needs to make crossing and turning decisions in the fences. Fences which block sight lines at driveways can be particularly problematic for the interaction between motorists and bicylists due to the more rapid closing speed.
ARTICLE 11 SIG	GN REGULATIONS	
Sec. 11.1 Purpose and intent	It is the intent of the Town Council of the Town of Carolina Beach to protect public interest, safety and welfare and, to that end, the purposes of this article are specifically declared to be as follows: (5) To ensure that siting and location of a sign (permanent, temporary or portable) is such that it does not bock the view or restrict access for pedestrians and bicyclists on their use of facilities	
Sec. 11.2 Administra- tion	Signs not requiring a permit: The following types of signs are exempt from permit requirements:	It is assumed that even when permit is not required, the safety and access needs must still be met. Temporary signs cause safety and access problems for pedestrians and bicyclists. Poorly placed temporary signs can be particularly problematic where they block the view of child pedestrians crossing at intersections.

Ordinance	Existing Ordinance Text (Abridged)	Additional comments
Section	Suggested revisions or additions shown in red	and suggestions
Sec. 11.4 Prohibited	The following signs are prohibited within the jurisdictional limits of the	
signs/displays	town: (m) No sign shall block any vision clearance (i.e. a 30 foot × 30 foot	
signs/ displays	sight triangle at intersections and driveways).	
ARTICLE 12 DE	EVELOPMENT STANDARDS FOR PARTICULAR USES	
	No comment	
ARTICLE 13 RE		
	No comment	
ARTICLE 14 CO	DNDITIONAL USE PERMIT APPROVAL PROCESS	
	No comment	
ARTICLE 15 RE	SERVED	
	No comment	
ARTICLE 16 PL	ANNED UNIT DEVELOPMENT	
Sec. 16.1	Residential, business, and industrial planned unit developments are	
Purpose	conditional uses intended to encourage innovation, flexibility of design,	
	and better land use by allowing deviations from the standard require-	
	ments of the town's specific zoning districts. The purpose of providing	
	for these conditional uses is to promote:	
	(5) Improved access, efficiency, and connectivity for non-motorized	
Sec. 16.2 Re-	transportation including walking and bicycling	
view criteria	The following review criteria are established as general guidelines for the planning and zoning commission and the town council in their	
View criteria	deliberations and decision making regarding planned unit develop-	
	ments:	
	(8) The availability and adequacy of primary streets and thoroughfares	
	to support traffic to be generated within the proposed planned unit	
	development, and including the promotion of bicycling, walking and	
	other alternatives to the automobile for community members of all	
	ages and abilities.	
	NING AND SITE PLAN APPROVALS	
Sec. 17.1	(b) It is further the purpose of this article to ensure regulations are	Suggest adding line item:
Purpose and	enforced that will:	Provide for access and connectivity
intent	(1) Ensure the health, safety, and welfare of the community and its natural environment;	for safe, efficient and comfortable travel by pedestrians and bicyclists
	(4) Provide for effective traffic movement without congestion and	without hazards
	hazards;	Without Hazards
Sec. 17.5	(b) Site plan criteria. All site plans shall include the following:	
Site plan	(11) Adjacent right-of-ways labeled with the street name and R/W	
] '	width, adjacent and close by sidewalks and trails labeled with width and	
	name,if applicable.	

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 17.9 Site-specific development plan	(c) Requirements for site specific development plans and phased development plans. A site specific development plan and phased development plan shall meet the site plan requirements as listed in Article 17 Site Plan Requirements and Approvals. In addition, the submittal shall include all of the following:	Suggest including discussion of walking and bicycling provisions as well as access and connectivity needs and benefits.
ARTICLE 18 N	ON-CONFORMING SITUATIONS	
	No comment	
ARTICLE 19 Al	DMINISTRATION, ENFORCEMENT AND REVIEW	
	No comment	
ARTICLE 20 R	ESERVED	
	No comment	
ARTICLE 21 BO	DARD RESPONSIBILITIES AND ADMINISTRATIVE MECHANISMS	
	No comment	
ARTICLE 22 Z	ONING ORDINANCE TEXT AND MAP AMENDMENTS	
	No comment	
ARTICLE 23 D	efinitions	
Sec. 23.1 General	Except as specifically defined herein, all words used in this ordinance shall have their customary dictionary definitions. Certain words or terms used herein are defined as follows: (8) The word "street" includes the word "alley," "road," "avenue," "lane," "cul-de-sac," "collector," "arterial," "highway" or "thoroughfare," whether designated as public or private	Suggest the following additional definitions be added: sidewalk, pedestrian, trail. Suggest using the latest MUTCD definitions.
Sec. 23.3 Definitions	Street classifications: Determined in accordance with the following definitions and the thoroughfare plan for the Town of Carolina Beach on file with the Carolina Beach Zoning Administrator.	Classifications seem to only consider use by motorized vehicles and do not mention lower speed, non-motorized users.
Sec. 23.3 Definitions	Street types: (1) Public (2) Private	Same as previous comment
Sec. 23.3 Definitions	Vision clearance. In order to maintain an acceptable and safe line of sight for motor vehicle drivers, no parking spaces, fences, walls, posts, signs, lights, shrubs, trees or other type of obstructions not specifically exempted shall be permitted in the space between thirty (30) inches above ground level and ten (10) feet above ground level within a sight distance triangle. A sight distance triangle shall be the visually unobstructed area of a street/driveway corner as determined by measuring a distance of thirty (30) feet along the intersecting curb lines, or edges of pavement of the intersecting street/driveway if curbs are not present, and connecting the two (2) points by a straight line to form a triangular shaped area over the corner.	Similar to several other locations cited, this definition only references vision clearance for the motorized user. Similar vision clearance provisions are needed for the non-motorized facility users also: pedestrians and bicyclists need to both see and be seen. Their line of sight may originate from a different location but they have similar type needs to make crossing and turning decisions. Suggest also providing definitions of 'sight distance' or 'sight triangle'

TABLE D.7: TOWN OF KURE BEACH ORDINANCES AND TECHNICAL STANDARDS

Ordinance	Existing Ordinance Text (Abridged)	Additional comments
Section	Suggested revisions or additions shown in red	and suggestions
Chapter 7.5 - I	LANDSCAPING AND VEGETATION PRESERVATION	
ARTICLE I IN G	GENERAL	
	N/A	
ARTICLE II PUI	RPOSE AND FUNCTIONS	
Sec. 7.5-17 Functions	Landscaping and the regulation of placement and arrangement of impervious and fill material accomplishes the following functions: 2. Screens objectionable views within and between uses;	Suggest also mentioning some or all of the general benefits of landscaping for pedestrians as part of this list: shade for pedestrians, more pleasant environment generally which may encourage walking participation, can calm driving speeds and provide layer of protection for pedestrians next to moving traffic
ARTICLE III RE	MOVAL OF REGULATED VEGETATION	
Sec. 7.5-20 Removal of regulated vegetation	(g) Unless the applicant is engaged in new construction, no vegetation removal, increased impervious area or the placement of fill soil or materials approval shall be issued unless one or more of the following criteria are met: (4) The regulated vegetation is posing an identifiable threat to pedestrian or vehicular safety;	Suggest expanding so that the various issues related to vegetation and pedestrian bicycling safety are clear which may assist those making planting or pruning decisions: (1) Impeded sight lines for both motorized and non-motorized road users; (2) Sign visibility which may be warning or directing motorized vehicles how to operate or alerting them to the presence of bicyclists and pedestrians; (3) Side road visibilibility where pedestrians or bicyclists may be waiting or crossing; (4) Overhangs or protusions into pedestrian and bicycling space which may may it uncomfortable or unsafe to use facilities; (5) Tripping hazards resulting from tree roots which may be a particular problem to the less mobile, visually impaired and wheeled users of facilities; (6) Sight distance on curves which can be particularly impaired by vegetation

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
	TREETS, SIDEWALKS AND OTHER PUBLIC PLACES	4114 34565410113
ARTICLE I IN G	<u> </u>	
Sec. 14-1 Obstructing streets, etc., permit required	It shall be unlawful for any person to place any brick, stone, lumber or other building material upon any of the streets, sidewalks or other public places of the town without having first obtained a proper permit in writing so to do from the building inspector. Permits shall be issued under such restrictions as may be prescribed by the town building inspector in the interest of public safety, and in accordance with the provisions of this Code and other ordinances of the town.	Suggest adding requirements or guidance related to requiring alternative safe access during construction when these items are placed on the sidewalk, reduction of the duration of disruption, providing warning signs soon enough in advance so that users can make decisions about which side of the road to travel (and not have to turn around, a particular issue for some users), and the quality of the restoration.
Sec. 14-4 Conditions of permit	(4) The sidewalk or so much of the sidewalk as the permittee in question is not authorized to use shall be kept in safe and good passable condition for users of all ages and abilities, included those with mobility issues and visual impairments.	Possibly also suggest a definition of 'passable' in part by being clearer about who needs to be able to pass, that sets a standard. 'Passable' needs to encompass a range of abilities and needs.
Sec. 14-5 Damages to streets, side- walks, curbs and gutters	(c) The bond required shall be deposited with the town treasurer which shall consist of a certified check or cash for such sum as the building inspector may think sufficient, but not less than five hundred dollars (\$500.00) nor more than two thousand five hundred dollars (\$2,500.00) before the commencement of such work.	The bond values set seem rather low considering how big an impact some of these issues could have on users of the facilities if the problems are not remedied and resolved quickly. For some users, their access could be very impaired as those who are most dependent on it's use likely have fewer alternatives.
Sec. 14-6 Removal of obstructions and encroach- ments	Upon a report that there are obstructions or encroachments on any of the streets, sidewalks, wharves or other public places in the town, the town shall give written notice to any person causing such obstruction or encroachment to remove same immediately. Upon the owner's failure to remove such obstruction the town shall order such obstruction or encroachment removed. Any person refusing or failing to remove such obstruction or encroachment within ten (10) days after such notice from the town shall be subject to a civil penalty for each day such obstruction or encroachment shall continue after notification for its removal. Each day such obstruction is continued after the limit fixed for such removal shall constitute a separate and distinct offense.	This comment is similar to previous comment on the low-seeming bond values, except in this case the 10 days after the notice seems lengthy considering how big an impact some of these issues could have if not remedied and resolved quickly. For some users, their access could be very impaired as those who are most dependent on it's use likely have fewer alternatives.

Ordinance	Existing Ordinance Text (Abridged)	Additional comments
Section	Suggested revisions or additions shown in red	and suggestions
Sec. 14-7 Failure to remove obstructions	(a) Abatement. If any owner fails to remove such obstruction or encroachment within the time limit provided in section 14-6 the town may remove such obstruction or encroachment and the owner of such obstruction or encroachment shall pay to the town the actual cost of the removal of such obstruction or encroachment in addition to any penalty. The cost of such removal, if not paid, shall constitute a lien against the property	Similar to comment on the bond value and the 10 days for removing the obstruction, rapid restoration of access for facility users could be made a feature of the abatement process.
Sec. 14-7 Failure to remove obstructions	(f) Forbidden objects. It shall be unlawful for any person or corporation to have upon the right-of-way or public place within the Town of Kure Beach any rock gardens, boulders, walls, benches, fences, holly trees, cactus, yucca plants or any bushes or plants that are poisonous or which have sharp edges or points or which create tripping hazards for users, particularly the mobility and visually impaired. These objects make facility use uncomfortable for all users.	
Sec. 14-9 Protection of pedestrians on sidewalk by persons constructing buildings	Any owner or contractor who shall build or cause to be built any building abutting on a public sidewalk or public right-of-way shall upon completion of the first story cause a roofed passageway to be built over the sidewalk or sidewalk area for the protection of pedestrians.	Temporary access provided for the duration of construction, can be problematic or even impossible to use for some, especially those with mobility impairments. Need to confirm that the width of the temporary passageway is adequate for all users including wheelchair users (Is a value called out in another ordinance that could be linked here?). In addition, need to confirm that the covered walkway provides ample sight distance at intersections and crosswalks for pedestrains, bicyclists and motorists.
Sec. 14-11 Inspection of streets and sidewalks for defects; record, report and repair	It shall be the duty of the director of public works and the building inspector to inspect, or have inspected, from time to time and with reasonable frequency, the condition of the sidewalks and streets within the town and to keep a record of any discovered defects. Upon discovery of any defect or need of repair to any public sidewalk or street, they shall take such action as they deem advisable to effect repair.	Is identifying causes of the problems part of this inspection process? For example, if the problem is caused by tree roots, is there a process whereby the inspector reports that and there is some sort of mitigation effort to prevent recurrances of the problem at this location? Similarly, identification of erosion and drainage issues leading to subsequent sidewalk damage may benefit from attention to mitigation.

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 14-13 Obstruction by merchan- dise, boxes, etc.	It shall be unlawful for any person to obstruct entirely or in part any sidewalk or street in the town by selling or offering for sale at auction or otherwise any goods, wares or merchandise thereon, or to use any sidewalk or street for the placing thereon of any barrel, box, cask, crate, wood, or other substance, except where expressly permitted by Nothing herein shall be so construed as to prevent any merchant from occupying not to exceed one-half of any sidewalk, in receiving or forwarding goods, wares and merchandise, provided no such goods, wares and merchandise remain on such sidewalk for a longer time than two (2) hours during any day.	Blocking half the sidewalk for two hours could make the facility completely unusable for some, particularly those with the most mobility issues. In addition, it causes a particular problem for the visually impaired users . Should the wording be made more explicit about minimizing the time that the facility is blocked or the frequency it is blocked by a particular business?
ARTICLE II STR	REETS	
	No comments	
ARTICLE III SIC	DEWALKS	
	No comments	
ARTICLE IV EX	CAVATIONS AND EMBANKMENTS	
Sec. 14- 66 Permit required	It shall be unlawful for any person to dig any hole, ditch trench, make any excavation of any kind or make any embankment in or on any street, alley or utility right-of-way in the town without first securing a permit therefor in writing from the town. It shall be unlawful for anyone to allow an opening, excavation or embankment to remain after a notification from the town to remove such embankment or to properly repair such street, plaza, sidewalk, alley or utility right-of-way.	Holes and trenches can make a facility unsafe or completely unusable for some, particularly those with the most mobility issues. In addition, holes and trenches cause particular problems for the visually impaired users. Suggest some additional wording about minimizing the duration of the hole or trench, the provision of safe, accessible and convenient alternative access as well as advance warning for users?
Sec. 14-67 Permit application	Where application is made for permission to install utility lines within the street right-of-way, the person applying for such permit shall submit with his application a plan showing the nature, extent, depth, location within the right-of-way of the proposed utility line, the location of all adjacent sidewalks, trails and pedestrian crossings, the location of existing utilities, and other specific information as may be required by the town.	
Sec. 14-68 Contents of application	A permit for the digging of any hole, ditch, trench or excavation of any kind, or the making of any embankment in or on any street, street right-of-way sidewalk, plaza, alley or utility right-of-way in the town issued pursuant to an application filed, as provided in section 14-67, shall describe the work that is to be done pursuant to such permit and shall also include such other terms and conditions as the town may deem proper.	Is there a requirement to show how safe, accessible and conve- nient alternative access as well as advance warning for users will be provided for the duration of the work and the full restoration?

Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 14-70 Restoration of	(b) When the excavation shall have been made in the traveled way of	Suggest adding a requirement to
earth	any street or alley which is unpaved, the person making such excavation shall be responsible for stabilizing and restoring the surface so that it	demonstrate how safe, accessible and convenient alternative access,
earth	may be traversed by vehicles in an efficient and safe manner, and to the	and advance warning for users will
	satisfaction of the town.	be provided until full restoration is
		complete.
ARTICLE V STR	REET NAMES	
	No comments	
Chapter 15 - S	UBDIVISIONS	
ARTICLE I IN G	ENERAL	
Sec. 15-1 Definitions ARTICLE II ADI	Street shall mean a dedicated and accepted public right-of-way for vehicular traffic.	In the ordinance, the definition continues into descriptions of many types of streets (not listed in table. However, the descriptions lack mention of pedestrians or cyclists. Suggest expanding definitions to cover non-motorized users.
ARTICLE II ADI		
ADTICLE	No comments	
ARTICLE III PL		
Sec. 15-88.	After having received the preliminary plat from the subdivider, the subdivision administrator shall submit a copy of the preliminary plat to	
- Review by other agencies	the district highway engineer as to proposed streets, highways, trails,	
other agencies	and drainage systems.	
ARTICLE IV CC	NTENTS OF PLAT	
Sec. 15-121.	(18) The following data concerning streets: (d) Pavement widths	Suggest modifying wording to
- Informa-		require showing any existing
tion to be		adjacent or close by sidewalks and
contained in		trails on both the prelimininary
or depicted		and final plats.
on preliminary		
and final plats		

definitions
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Ordinance Section	Existing Ordinance Text (Abridged) Suggested revisions or additions shown in red	Additional comments and suggestions
Sec. 15-140 Streets	(i) Cul-de-sacs. Permanent dead end streets with cul-de-sacs shall not exceed thirteen hundred (1300) feet in length unless necessitated by topography	This may be an an alternative opportunity to suggest providing connections and easements so as to allow walking and biking access, as the creation of the cul-de-sacs may make trips for those users much longer or even impossible and discourage participation.
ARTICLE VI PL	Anned residential developments	
	No comments	
Chapter 19 - Z		
ARTICLE I IN G	ENERAL	
Sec. 19-1 Definitions		Suggest additional standard definitions be added to the list: pedestrian, sidewalk, street, trail, shareduse path. It is suggested to use the definitions from the MUTCD.
Sec. 19-4 Purpose and authority	(a) The zoning regulations and districts as herein set forth have been made in accordance with a comprehensive plan for the purpose of promoting the health, safety, morals, and the general welfare of the community. They are designed to lessen congestion in the streets, to secure safety from fire, panic and other dangers to provide adequate light and air, to prevent the overcrowding of land, to avoid undue concentration of population, to facilitate access and connectivity for pedestrians and bicyclists, to facilitate the adequate provisions of transportation, water, sewerage, and other public requirements	
ARTICLE II ADI		
	No comments	
	STRICT REGULATIONS	
Sec. 19-83. - Site plan requirements	Site plans shall be prepared by qualified professionals based upon current land records information. The plan shall be drawn to an accurate scale and legible sizes as required by each parcel and contain the following information: (6) Vehicular and pedestrian circulation, and connections including existing and proposed rights-of-way with cross-sections, design details and dimensions;	
ARTICLE IV SU	PPLEMENTAL DISTRICT REGULATIONS	

Section Suggested revisions or additions shown in red and	
	dditional comments nd suggestions
	ne parking requirements do not clude provisions for requiring
	cycle parking, both short-term
	nd long-term. In addition, it may
	e a benefit to allow bike parking
	be counted towards some of the
parking (both short-term and long-term), and accessibility to other nearby parking should be considered.	arking requirements listed.
	milarly, these parking require-
	ents do not include provisions
	or bicycle parking, both short-
	rm and long-term. Suggest
	onsidering bike parking to be ounted towards some of the
	arking requirements listed.
ARTICLE V NONCONFORMING USES	
No comments	
ARTICLE VI SIGNS	
Sec. 19-370 The purpose of the following sign requirements is to promote and	
Intent protect the public health, welfare and safety by regulating existing and	
Intent protect the public health, welfare and safety by regulating existing and proposed outdoor advertising signs, and outdoor signs of all types. It is	
Intent protect the public health, welfare and safety by regulating existing and proposed outdoor advertising signs, and outdoor signs of all types. It is intended to protect property values, create a more attractive economic	
Intent protect the public health, welfare and safety by regulating existing and proposed outdoor advertising signs, and outdoor signs of all types. It is intended to protect property values, create a more attractive economic and business climate, and enhance and protect the scenic and natural	
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ADDITIONAL POLICY CONSIDERATIONS

Below are lists of design issues that have a direct impact on walking and bicycling design which did not appear to be addressed in regards to pedestrians and bicyclist needs during the review of the Wilmington and New Hanover ordinances (topics with asterisks are explained in greater detail below):

CITY OF WILMINGTON

- Driveway design and grades*
- Access management*
- Sight distance*
- Extending improvements off site
- Bike parking standards
- Turning radii

NEW HANOVER COUNTY

- Driveway design and grades*
- Access management*
- Sight distance for pedestrians and bicyclists*
- Signs
- Turning radii

In addition, while the ideas of impeding motor traffic and safe and efficient travel for motorists were mentioned routinely in connection with design requirements, the concepts of safety, access, encouragement of walking or bicycling as modes of transportation did not appear at all. There appeared to be many opportunities to revise the fundamental concepts being expressed through the general wording.

*Driveway design and grades: Where driveways cross sidewalks, the design needs to consider the cross-slopes for sidewalk users, including wheeled users. Rapid changes in cross slopes caused by driveways entering the roadway, can make a sidewalk inaccessible or hazardous for many users. The FHWA provides some good guidance and specifications on this topic: http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalks/chap4b.cfm

*Access management: Each driveway and entrance is a potential conflict point for pedestrians and bicyclists travelling along the corridor. Managing the number, width, spacing and location of access points while considering the needs of the pedestrians and bicyclists, can improve safety for all users. In reference to crashes at driveways, the latest AASHTO Bike Guide (4th edition) states: "Though the issue is motorist behavior, access control to limit the number of driveways on bicycling corridors and improving corner sight distance at driveways may reduce these types of crashes."

*Sight distance: The issue of pedestrians and bicyclists being able to see and be seen is very important to user safety and comfort. There are a number of elements that need to be addressed as there are different sight distance needs for each of these type of users plus there are different types of sight distances (stopping, intersection, decision). The already referenced AASHTO Bike Guide (4th ed.) has well-developed detail on the issues related to

WILMINGTON/NEW HANOVER COUNTY

sight distance for bicyclists. There are opportunities to add guidance and requirements regarding sight distance in the ordinance where sign and landscaping requirements are discussed.

Non-standard use of terms (for paths/trails/sidewalk/walkwalk/greenway/shared-use trails): When these differing terms come up, it is unclear as to which user they refer. There should be a clearly defined term for 'paths' identifying the planned user groups (pedestrians/bicyclists/multi-use/etc.)



Federal Funding Sources

State Funding Sources

Local Funding Sources

Private Foundations and Organizations

Summary Table

FUNDING STRATEGIES

OVERVIEW

Due to the cost of most construction activities, it may be necessary to consider several sources of funding, that when combined, would support full project construction. This appendix outlines likely sources of funding for the identified projects at the federal, state, local government level and from the private sector.

FEDERAL FUNDING SOURCES

Federal funding is typically directed through State agencies to local governments either in the form of grants or direct appropriations, independent from State budgets, where shortfalls may make it difficult to accurately forecast available funding for future project development. Federal funding typically requires a local match of approximately 20%, but there are sometimes exceptions, such as the recent American Recovery and Reinvestment Act stimulus funds, which did not require a match. Since these funding categories are difficult to forecast, it is recommended that the local jurisdiction work with its MPO on getting bicycle and pedestrian projects listed in the State Transportation Improvement Program (STIP), as discussed below.

The following is a list of possible Federal funding sources that could be used to support construction of many bicycle and pedestrian improvements. Most of these are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits. However, it should be noted that the FHWA encourages the construction of bicycle and pedestrian facilities as an incidental element of larger ongoing projects. Examples include providing paved shoulders on new and reconstructed roads, or building sidewalks, trails and marked crosswalks as part of new highways.

MOVING AHEAD FOR PROGRESS IN THE TWENTY-FIRST **CENTURY (MAP-21)**

The largest source of federal funding for bicycle and pedestrian is the US DOT's Federal-Aid Highway Program, which Congress has reauthorized roughly every six years since the passage of the Federal-Aid Road Act of 1916. The latest act, Moving Ahead for Progress in the Twenty-First Century (MAP-21) was enacted in July 2012 as Public Law 112-141. The Act replaces the Safe, Accountable, Flexible, Efficient Transportation Equity Act - a Legacy for Users (SAFETEA-LU), which was valid from August 2005 - June 2012.

MAP-21 authorizes funding for federal surface transportation programs including highways and transit for the 27 month period between July 2012 and September 2014. It is not possible to guarantee the continued availability of any listed MAP-21 programs, or to predict their future funding levels or policy guidance. Nevertheless, many of these programs have been included in some form since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, and thus may continue to provide capital for active transportation projects and programs.

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

There are a number of programs identified within MAP-21 that are applicable to bicycle and pedestrian projects. These programs are discussed below. More information: http://www.fhwa.dot.gov/map21/summaryinfo.cfm

TRANSPORTATION ALTERNATIVES

Transportation Alternatives (TA) is a new funding source under MAP-21 that consolidates three formerly separate programs under SAFETEA-LU: Transportation Enhancements (TE), Safe Routes to School (SR2S), and the Recreational Trails Program (RTP). These funds may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, multi-use paths, and rail-trails. TA funds may also be used for selected education and encouragement programming such as Safe Routes to School, despite the fact that TA does not provide a guaranteed set-aside for this activity as SAFETEA-LU did. Unless the Governor of a given state chooses to opt out of Recreational Trails Program funds, dedicated funds for recreational trails continue to be provided as a subset of TA. MAP-21 provides \$85 million nationally for the RTP.

Complete eligibilities for TA include:

- **1. Transportation Alternatives** as defined by Section 1103 (a)(29). This category includes the construction, planning, and design of a range of bicycle and pedestrian infrastructure including "on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990." Infrastructure projects and systems that provide "Safe Routes for Non-Drivers" is a new eligible activity. For the complete list of eligible activities, visit: http://www.fhwa.dot.gov/environment/transportation_enhancements/legislation/map21.cfm
- **2. Recreational Trails.** TA funds may be used to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other non-motorized and motorized uses. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

Recreational Trails Program funds may be used for:

- Maintenance and restoration of existing trails
- Purchase and lease of trail construction and maintenance equipment
- Construction of new trails, including unpaved trails
- Acquisition or easements of property for trails
- State administrative costs related to this program (limited to seven percent of a State's funds)

Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a State's funds)

NC's dedicated annual RTC funds for 2012 total \$1,506,344. See this link for funding levels in subsequent years: http://www.fhwa.dot.gov/MAP21/funding.

3. Safe Routes to School. The purpose of the Safe Routes to Schools eligibility is to promote safe, healthy alternatives to riding the bus or being driven to school. All projects must be within two miles of primary or middle schools (K-8).

Eligible projects may include:

- Engineering improvements. These physical improvements are designed to reduce potential bicycle and pedestrian conflicts with motor vehicles. Physical improvements may also reduce motor vehicle traffic volumes around schools, establish safer and more accessible crossings, or construct walkways, trails or bikeways. Eligible improvements include sidewalk improvements, traffic calming/speed reduction, pedestrian and bicycle crossing improvements, on-street bicycle facilities, offstreet bicycle and pedestrian facilities, and secure bicycle parking facilities.
- Education and Encouragement Efforts. These programs are designed to teach children safe bicycling and walking skills while educating them about the health benefits, and environmental impacts. Projects and programs may include creation, distribution and implementation of educational materials; safety based field trips; interactive bicycle/ pedestrian safety video games; and promotional events and activities (e.g., assemblies, bicycle rodeos, walking school buses).
- Enforcement Efforts. These programs aim to ensure that traffic laws near schools are obeyed. Law enforcement activities apply to cyclists, pedestrians and motor vehicles alike. Projects may include development of a crossing guard program, enforcement equipment, photo enforcement, and pedestrian sting operations.
- 4. Planning, designing, or constructing roadways within the right-of-way of former Interstate routes or divided highways. At the time of writing, detailed guidance from the Federal Highway Administration on this new eligible activity was not available.

Average annual funds available through TA over the life of MAP-21 equal \$814 million nationally, which is based on a 2% set-aside of total MAP-21 allocations. Current projected obligations for NC are available at this website: ttp://www.fhwa.dot.gov/ MAP21/funding.cfm.] Note that state DOT's may elect to transfer up to 50% of TA funds to other highway programs, so the amount listed on the website represents the maximum potential funding.

Remaining TA funds (those monies not re-directed to other highway programs) are disbursed through a separate competitive grant program administered by NCDOT. Local governments, school districts, tribal governments, and public lands agencies are permitted to compete for these funds.

SURFACE TRANSPORTATION PROGRAM

The Surface Transportation Program (STP) provides states with flexible funds which may be used for a variety of highway, road, bridge, and transit projects. A wide variety of bicycle and pedestrian improvements are eligible, including on-street bicycle facilities, off-street trails, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities. Modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is also an eligible activity. Unlike most highway projects, STP-funded bicycle and pedestrian facilities may be located on local and collector roads which are not part of the Federal-aid Highway System. 50% of each state's STP funds are suballocated geographically by population; the remaining 50% may be spent in any area of the state.

HIGHWAY SAFETY IMPROVEMENT PROGRAM

MAP-21 doubles the amount of funding available through the Highway Safety Improvement Program (HSIP) relative to SAFETEA-LU. HSIP provides \$2.4 billion nationally for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. MAP-21 preserves the Railway-Highway Crossings Program within HSIP but discontinues the High-Risk Rural roads set-aside unless safety statistics demonstrate that fatalities are increasing on these roads. Bicycle and pedestrian safety improvements, enforcement activities, traffic calming projects, and crossing treatments for non-motorized users in school zones are eligible for these funds.

CONGESTION MITIGATION/AIR QUALITY PROGRAM

The Congestion Mitigation / Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and particulate matter which reduce transportation related emissions. States with no nonattainment areas may use their CMAQ funds for any CMAQ or STP eligible project. These federal dollars can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Purely recreational facilities generally are not eligible.

Note: CMAQ does not currently apply to Wilmington (2012).

NEW FREEDOM INITIATIVE

MAP-21 continues a formula grant program that provides capital and operating costs to provide transportation services and facility improvements that exceed those required by the Americans with Disabilities Act. Examples of pedestrian/accessibility projects funded in other communities through the New Freedom Initiative include installing Accessible Pedestrian Signals (APS), enhancing transit stops to improve accessibility, and establishing a mobility coordinator position.

More information: http://www.fta.dot.gov/grants/13093_3549.html

PILOT TRANSIT-ORIENTED DEVELOPMENT PLANNING

MAP-21 establishes a new pilot program to promote planning for Transit-Oriented Development. At the time of writing the details of this program are not fully clear, although the bill text states that the Secretary of Transportation may make grants available for the planning of projects that seek to "facilitate multimodal connectivity and accessibility," and "increase access to transit hubs for pedestrian and bicycle traffic."

FEDERAL TRANSIT ADMINISTRATION PROGRAMS

Federal Transit Administration (FTA) funding is available for projects designed to improve access to transit. Individual grant programs vary on the specific goals, but eligible improvements include crossing improvements, pedestrian signals, sidewalks and trails. Programs of the FTA are described in the following section.

FTA JOB ACCESS AND REVERSE COMMUTE PROGRAM

The Job Access and Reverse Commute (JARC) program was established to address the unique transportation challenges faced by welfare recipients and low-income persons seeking to obtain and maintain employment. Capital, planning and operating expenses for projects that transport low income individuals to and from jobs and activities related to employment, and for reverse commute projects. In North Carolina, these funds have been granted for sidewalks and pedestrian signals. More information: http://www.fta. dot.gov/funding/grants/grants_financing_3550.html

FTA URBANIZED AREA FORMULA PROGRAM

FTA capital/Operating grant for urbanized areas over 50,000. This grant can be used for pedestrian or bicyclist access to transit. More information: http://www.fta.dot.gov/ funding/grants/grants_financing_3561.html

FORMULA GRANTS FOR OTHER THAN URBANIZED AREAS

This program is formula-based and provides funding to states for supporting public transportation in rural areas with populations of less than 50,000. This grant funds routes to transit, bike racks, shelters, and equipment for public transportation vehicles. More information: http://www.fta.dot.gov/funding/grants/grants_financing_3555.html

TRANSPORTATION FOR ELDERLY PERSONS AND PERSONS WITH DISABILITIES

This program can be used for capital expenses that support transportation to meet the special needs of older adults and persons with disabilities, including providing access to an eligible public transportation facility. More information: http://www.fta.dot.gov/ funding/grants/grants_financing_3556.html

BUS AND BUS RELATED FACILITIES

This is capital assistance for new and replacement buses, related equipment and facilities. It has traditionally been designated to specific projects at a federal level. This grant can be used for pedestrian or bicycle access to transit and bus racks. More information: http:// www.fta.dot.gov/funding/grants/grants_financing_3557.html

METROPOLITAN AND STATEWIDE PLANNING

This program provides funding for statewide and metropolitan coordinated transportation planning. Federal planning funds are first apportioned to State DOTs. State DOTs then allocate planning funding to MPOs. Eligible activities include pedestrian or bicycle planning to increase safety for non-motorized users, and to enhance the interaction and connectivity of the transportation system across and between modes. http://www.fta. dot.gov/funding/grants/grants_financing_3563.html

PARTNERSHIP FOR SUSTAINABLE COMMUNITIES

Founded in 2009, the Partnership for Sustainable Communities is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to "improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide." The Partnership is based on five Livability Principles, one of which explicitly addresses the need for bicycle and pedestrian infrastructure ("Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health").

The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including both TIGER I and TIGER II grants). North Carolina jurisdictions should track Partnership communications and be prepared to respond proactively to announcements of new grant programs. Initiatives that speak to multiple livability goals are more likely to score well than initiatives that are narrowly limited in scope to pedestrian improvement efforts. More information: http://www.epa.gov/smartgrowth/partnership/

COMMUNITY DEVELOPMENT BLOCK GRANT FUNDS

State level Community Development Block Grant Recovery (CDBG-R) funds are allocated through the NC Department of Commerce, Division of Community Assistance to local municipal or county governments for projects that enhance the viability of communities by providing decent housing and suitable living environments and by expanding economic opportunities, principally for persons of low- and moderate-income.

Federal CDBG grantees may "use Community Development Block Grants funds for activities that include (but are not limited to): acquiring real property; reconstructing or rehabilitating housing and other property; building public facilities and improvements, such as streets, sidewalks, community and senior citizen centers and recreational facilities; paying for planning and administrative expenses, such as costs related to developing a consolidated plan and managing Community Development Block Grants funds; provide public services for youths, seniors, or the disabled; and initiatives such as neighborhood watch programs."

State CDBG funds are provided by the U.S. Department of Housing and Urban Development (HUD) to the state of North Carolina. Some urban counties and cities in North Carolina receive CDBG funding directly from HUD. Each Year, CDBG provides funding to local governments for hundreds of critically-needed community improvement projects throughout the state. Approximately \$50 million is available statewide to fund a variety of projects. More information: http://www.nccommerce.com/en/CommunityServices/CommunityDevelopmentGrants/CommunityDevelopmentBlockGrants/

LAND AND WATER CONSERVATION FUND

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

RIVERS, TRAILS, AND CONSERVATION ASSISTANCE PROGRAM

The Rivers, Trails, and Conservation Assistance Program (RTCA) is a National Parks Service (NPS) program providing technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance-there are no implementation funds available. Projects are prioritized for assistance based on criteria including conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. This program may benefit trail development in North Carolina locales indirectly through technical assistance, particularly for community organizations, but is not a capital funding source. More information: http://www.nps. gov/ncrc/programs/rtca/ or contact the Southeast Region RTCA Program Manager Deirdre "Dee" Hewitt at (404) 507-5691.

NATIONAL SCENIC BYWAYS DISCRETIONARY GRANT **PROGRAM**

The National Scenic Byways Discretionary Grants program provides merit-based funding for byway-related projects each year, utilizing one or more of eight specific activities for roads designated as National Scenic Byways, All-American Roads, State scenic byways, or Indian tribe scenic byways. The activities are described in 23 USC 162(c). This is a discretionary program; all projects are selected by the US Secretary of Transportation.

Eligible projects include construction along a scenic byway of a facility for pedestrians and bicyclists and improvements to a scenic byway that will enhance access to an area for the purpose of recreation. Construction includes the development of the environmental documents, design, engineering, purchase of right-of-way, land, or property, as well as supervising, inspecting, and actual construction. More information: http://www. bywaysonline.org/grants/

FEDERAL LANDS HIGHWAY PROGRAM

The Federal Lands Highway Program (FLHP) is a coordinated program of public roads and transit facilities serving Federal and Indian lands. Funding for pedestrian improvements is available through the Public Lands Highway - Discretionary, and Forest Highways Programs.

PUBLIC LANDS HIGHWAY - DISCRETIONARY

The Public Lands Highway - Discretionary (PLH-D) Program is intended for the planning, design, construction, reconstruction of improvement of roads and bridges that are within or adjacent to, or provide access to public lands and Indian reservations. PLH-D funding has been used for bike trails, walkways, and transportation planning activities. More information: http://flh.fhwa.dot.gov/programs/plh/discretionary/

DEPARTMENT OF ENERGY

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

STATE FUNDING SOURCES

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) STATE TRANSPORTATION IMPROVEMENT PROGRAM

NCDOT's Policy to Projects process uses data regarding pavement condition, traffic congestion and road safety, as well as input from local governments and NCDOT staff, to determine transportation priorities. This approach ranks projects for all modes of transportation in priority order, based on the department's goals and also determines which projects are included in the department's State Transportation Improvement Program (STIP), a federally mandated transportation planning document that details transportation improvements prioritized by stakeholders for inclusion in the Work Program over the next seven years. The STIP is updated every two years.

The STIP contains funding information for various transportation divisions of NCDOT including: highways, aviation, enhancements, public transportation, rail, bicycle and pedestrians, and the Governor's Highway Safety Program. Access to many federal funds require that projects be incorporated into the STIP. STIP is the largest single source of funding within SAFETEA-LU and NCDOT.

To access the STIP: http://www.ncdot.org/planning/development/TIP/TIP/. For more about the STIP process: http://www.ncdot.org/performance/reform/

SPOT SAFETY PROGRAM

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

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

A Safety Oversight Committee (SOC) reviews and recommends Spot Safety projects to the Board of Transportation (BOT) for approval and funding. Criteria used by the SOC to select projects for recommendation to the BOT include, but are not limited to, the frequency of correctable crashes, severity of crashes, delay, congestion, number of signal warrants met, effect on pedestrians and schools, division and region priorities, and public interest.

More information: http://www.ncdot.org/doh/preconstruct/traffic/safety/Programs/

HIGH HAZARD ELIMINATION PROGRAM

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

More information: http://www.ncdot.org/doh/preconstruct/traffic/safety/Programs/

NCDOT DISCRETIONARY FUNDS

The Statewide Discretionary Fund is administered by the Secretary of the Department of Transportation. This \$10 million fund can be used on any project at any location within the State. Primary, urban, secondary, industrial access, and spot safety projects are eligible for consideration, by the Secretary upon direct appeal from a North Carolina jurisdiction.

NCDOT CONTINGENCY FUND

The Statewide Contingency Fund is a \$10 million fund administered by the Secretary of Transportation. The Division Engineer elicits written requests from municipalities, counties, businesses, schools, citizens, legislative members and NCDOT staff. The appeals are reviewed on their merits by the Contingency and Small Urban Funds Committee, which makes recommendations for funding to the Secretary. Written requests must provide technical information such as justification, location, improvements being requested, timing, etc. for thorough review.

More information: http://www.ncdot.gov/doh/preconstruct/traffic/teppl/Topics/F-19/F-19_mm.pdf

SMALL URBAN FUNDS

Each NCDOT Highway Division administers \$2 million of funds for small-scale improvement projects in urban areas. Projects must be within 2 miles of city limits and have a maximum cost of \$250,000. Requests for small urban funds may be made by municipalities, counties, businesses, school and industrial entities. A written request should be submitted to the Division Engineer providing technical information such as justification, location, improvements being requested, timing, etc. for thorough review.

SPOT IMPROVEMENT PROGRAM

The Division of Bicycle and Pedestrian Transportation (DPBT) budgets \$500,000 per year for "spot" safety improvements throughout North Carolina. Eligible improvements include drain grate replacement, bicycle loop detectors, pedestrian signals and other small-scale improvements. These funds are used for small-scale projects not substantial enough to be included in the STIP. Proposals should be submitted directly to the Division of Bicycle and Pedestrian Transportation.

SMALL CONSTRUCTION FUNDS

The purpose of these funds is to finance improvements on the State System (US, NC, and SR routes) to be used for projects anywhere in the counties. These funds are used to fund a variety of transportation projects for municipalities, counties, businesses, schools, and

industries throughout the state. There is a \$250,000 maximum amount per request per fiscal year. Any project with a total cost greater than \$150,000 requires a resolution or a letter of support for the project from the local jurisdiction.

More information: http://www.nctransportationanswers.org/ourforms/SMALLCONSTRUCTIONFORM.pdf

GOVERNOR'S HIGHWAY SAFETY PROGRAM

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

More information: http://www.ncdot.org/programs/ghsp/

BICYCLE AND PEDESTRIAN PLANNING GRANT INITIATIVE

The Bicycle and Pedestrian Planning Grant Initiative is a matching grant program administered through NCDOT that encourages municipalities to develop comprehensive bicycle plans and pedestrian plans. The Division of Bicycle and Pedestrian Transportation (DPBT) and the Transportation Planning Branch (TPB) sponsor this grant. All North Carolina municipalities are eligible and are encouraged to apply. Funding allocations are determined on a sliding scale based on population. Municipalities who currently have bicycle plans or pedestrian plans, either through this grant program or otherwise, may also apply to update their plan provided it is at least five years old.

More information: http://www.ncdot.gov/bikeped/planning/

INCIDENTAL PROJECTS

Bicycle and pedestrian accommodations such as bike lanes, sidewalks, intersection improvements, widened paved shoulders and bicycle and pedestrian-safe bridge design are frequently included as incidental features of highway projects. Most pedestrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of federal and state roadway construction funds or with a local fund match.

ROAD RESURFACING

When space allows the inclusion of a bicycle lane onto a road without requiring significant drainage, Right-of-Way, or grading work, NCDOT can install the improvement during road resurfacing projects. If a project is feasible, the NCDOT can inform the affected community and offer them the opportunity to contribute to the marginal cost associated with these improvements.

EAT SMART, MOVE MORE NORTH CAROLINA COMMUNITY GRANTS

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

More information: http://www.eatsmartmovemorenc.com/Funding/CommunityGrants.html

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

The North Carolina Department of Environment and Natural Resources Division of Coastal Management offers the Public Beach and Coastal Waterfront Access Funds program, awarding \$500,000 to \$1 million a year in matching grants to local governments for projects to improve pedestrian access to the state's beaches and waterways. Eligible applicants include the 20 coastal counties and municipalities therein that have public trust waters within their jurisdictions.

More information: http://www.nccoastalmanagement.net/Access/about.html

THE NORTH CAROLINA DIVISION OF PARKS AND RECREATION

The North Carolina Division of Parks and Recreation and the State Trails Program offer funds to help citizens, organizations and agencies plan, develop and manage all types of trails ranging from greenways and trails for hiking, biking and horseback riding to river trails and off-highway vehicle trails.

More information: http://www.ncparks.gov/About/grants/main.php

THE NORTH CAROLINA PARKS AND RECREATION TRUST FUND (PARTF)

The Parks and Recreation Trust Fund (PARTF) provides dollar-for-dollar matching grants to counties, incorporated municipalities and public authorities, as defined by G.S. 159-7. Through this program, several million dollars each year are available to local governments to fund the acquisition, development and renovation of recreational areas. A local government can request a maximum of \$500,000 with each application. An applicant must match the grant dollar-for-dollar, 50% of the total cost of the project, and may contribute more than 50%. The appraised value of land to be donated to the applicant can be used as part of the match. The value of in-kind services, such as volunteer work, cannot be used as part of the match.

More information: http://www.ncparks.gov/About/grants/partf_main.php

ADOPT-A-TRAIL PROGRAM

The Adopt-A-Trail (AAT) Program is a source of small funds for trail construction, maintenance, and land acquisition for trails. The program funds \$108,000 annually in North Carolina, and awards grants up to \$5,000 per project with no local match required. Applications are due in February. More information is available from Regional Trails Specialists and the Grants Manager.

More information: http://www.ncparks.gov/About/grants/docs/AAT_info.pdf

POWELL BILL FUNDS

Annually, Powell Bill State street-aid allocations are made to incorporated municipalities that establish their eligibility and qualify as provided by G.S. 136-41.1 through 136-41.4. Powell Bill funds shall be expended only for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways. Funding allocations are based on population and mileage of town-maintained streets.

More information: https://connect.ncdot.gov/municipalities/State-Street-Aid/Pages/default.aspx

CLEAN WATER MANAGEMENT TRUST FUND (CWMTF)

This fund was established in 1996 and has become one of the largest sources of money in North Carolina for land and water protection. At the end of each year, a minimum of \$30 million is placed in the CWMTF. The revenue of this fund is allocated as grants to local governments, state agencies and conservation non-profits to help finance projects that specifically address water pollution problems. Funds may be used for planning and land acquisition to establish a network of riparian buffers and greenways for environmental, educational, and recreational benefits.

More information: http://www.cwmtf.net/#appmain.htm

STATE ADMINISTERED COMMUNITY DEVELOPMENT BLOCK GRANTS

State level funds are allocated through the NC Department of Commerce, Division of Community Assistance to be used to promote economic development and to serve low-income and moderate-income neighborhoods. Greenways and pedestrian improvements that are part of a community's economic development plans may qualify for assistance under this program. Recreational areas that serve to improve the quality of life in lower income areas may also qualify. Approximately \$50 million is available statewide to fund a variety of projects.

More information: www.hud.gov/offices/cpd/communitydevelopment/programs/stateadmin/or (919) 733-2853.

NORTH CAROLINA HEALTH AND WELLNESS TRUST FUND

The North Carolina Health and Wellness Trust Fund (HWTF) in partnership with Blue Cross and Blue Shield of North Carolina (BCBSNC) offers the Fit Community Grants, designed to help communities become Fit Community designees. Up to eight communities that demonstrate a compelling need, proven capacity and promising opportunity for policy and environmental change in addressing physical activity and/or healthy eating behaviors will be awarded two-year grants up to \$60,000 each.

More information: http://www.fitcommunitync.org

URBAN AND COMMUNITY FORESTRY GRANT

The North Carolina Division of Forest Resources Urban and Community Forestry grant can provide funding for a variety of projects that will help toward planning and establishing street trees as well as trees for urban open space. The goal is to improve public understanding of the benefits of preserving existing tree cover in communities and assist local governments with projects which will lead to a more effective and efficient management of urban and community forests. Grant requests should range between \$1,000 and \$15,000 and must be matched equally with non-federal funds. Grant funds may be awarded to any unit of local or state government, public educational institutions, approved non-profit 501(c)(3) organizations and other tax-exempt organizations. First-time municipal applicant and municipalities seeking Tree City USA status are given priority for funding.

For more about Tree City USA status, including application instructions, visit: http://ncforestservice.gov/Urban/urban_grant_overview.htm

LOCAL GOVERNMENT FUNDING SOURCES

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

CAPITAL IMPROVEMENT PROGRAM

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

CAPITAL PROJECT ORDINANCES

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

LOCAL IMPROVEMENT DISTRICTS (LIDS)

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

MUNICIPAL SERVICE DISTRICT

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

TAX INCREMENT FINANCING

Project Development Financing bonds, also known as Tax Increment Financing (TIF) is a relatively new tool in North Carolina, allowing localities to use future gains in taxes to finance the current improvements that will create those gains. When a public project (e.g., sidewalk improvements) is constructed, surrounding property values generally increase and encourage surrounding development or redevelopment. The increased tax revenues are then dedicated to finance the debt created by the original public improvement project. Streets, streetscapes, and sidewalk improvements are specifically authorized for TIF funding in North Carolina. Tax Increment Financing typically occurs within designated development financing districts that meet certain economic criteria that are approved

by a local governing body. TIF funds are generally spent inside the boundaries of the TIF district, but they can also be spent outside the district if necessary to encourage development within it.

INSTALLMENT PURCHASE FINANCING

As an alternative to debt financing of capital improvements, communities can execute installment or lease purchase contracts for improvements. This type of financing is typically used for relatively small projects that the seller or a financial institution is willing to finance or when up-front funds are unavailable. In a lease purchase contract the community leases the property or improvement from the seller or financial institution. The lease is paid in installments that include principal, interest, and associated costs. Upon completion of the lease period, the community owns the property or improvement. While lease purchase contracts are similar to a bond, this arrangement allows the community to acquire the property or improvement without issuing debt. These instruments, however, are more costly than issuing debt.

TAXES

Many communities have raised money for general transportation programs or specific project needs through self-imposed increases in taxes and bonds. For example, Pinellas County residents in Florida voted to adopt a one- cent sales tax increase, which provided an additional \$5 million for the development of the overwhelmingly popular Pinellas Trail. Sales taxes have also been used in Allegheny County, Pennsylvania, and in Boulder, Colorado to fund open space projects. A gas tax is another method used by some municipalities to fund public improvements. A number of taxes provide direct or indirect funding for the operations of local governments. Some of them are:

SALES TAX

In North Carolina, the state has authorized a sales tax at the state and county levels. Local governments that choose to exercise the local option sales tax (all counties currently do), use the tax revenues to provide funding for a wide variety of projects and activities. Any increase in the sales tax, even if applying to a single county, must gain approval of the state legislature. In 1998, Mecklenburg County was granted authority to institute a one-half cent sales tax increase for mass transit.

PROPERTY TAX

Property taxes generally support a significant portion of a municipality's activities. However, the revenues from property taxes can also be used to pay debt service on general obligation bonds issued to finance greenway system acquisitions. Because of limits imposed on tax rates, use of property taxes to fund greenways could limit the municipality's ability to raise funds for other activities. Property taxes can provide a steady stream of financing while broadly distributing the tax burden. In other parts of the country, this mechanism has been popular with voters as long as the increase is restricted to parks and open space. Note, other public agencies compete vigorously for these funds, and taxpayers are generally concerned about high property tax rates.

EXCISE TAXES

Excise taxes are taxes on specific goods and services. These taxes require special legislation and funds generated through the tax are limited to specific uses. Examples include lodging, food, and beverage taxes that generate funds for promotion of tourism, and the gas tax that generates revenues for transportation related activities.

OCCUPANCY TAX

The NC General Assembly may grant towns the authority to levy occupancy tax on hotel and motel rooms. The act granting the taxing authority limits the use of the proceeds, usually for tourism-promotion purposes.

FEES

A variety of fee options have been used by local jurisdictions to assist in funding pedestrian and bicycle improvements. Enabling actions may be required for a locality to take advantage of these tools.

STORMWATER UTILITY FEES

Greenway trail property may be purchased with stormwater fees, if the property in question is used to mitigate floodwater or filter pollutants.

Stormwater charges are typically based on an estimate of the amount of impervious surface on a user's property. Impervious surfaces (such as rooftops and paved areas) increase both the amount and rate of stormwater runoff compared to natural conditions. Such surfaces cause runoff that directly or indirectly discharge into public storm drainage facilities and create a need for stormwater management services. Thus, users with more impervious surface are charged more for stormwater service than users with less impervious surface. The rates, fees, and charges collected for stormwater management services may not exceed the costs incurred to provide these services.

IMPACT FEES

Developers can be required to pay impact fees through local enabling legislation. Impact fees, which are also known as capital contributions, facilities fees, or system development charges, are typically collected from developers or property owners at the time of building permit issuance to pay for capital improvements that provide capacity to serve new growth. The intent of these fees is to avoid burdening existing customers with the costs of providing capacity to serve new growth so that "growth pays its own way."

In North Carolina, impact fees are designed to reflect the costs incurred to provide sufficient capacity in the system to meet the additional needs of a growing community. These charges are set in a fee schedule applied uniformly to all new development. Communities that institute impact fees must develop a sound financial model that enables policy makers to justify fee levels for different user groups, and to ensure that revenues generated meet (but do not exceed) the needs of development. Factors used to determine an appropriate impact fee amount can include: lot size, number of occupants, and types of subdivision improvements. A developer may reduce the impacts (and the resulting impact fee) by paying for on- or offsite pedestrian improvements that will encourage residents/tenants to walk or use transit rather than drive. Establishing a clear nexus or connection between the impact fee and the project's impacts is critical in avoiding a potential lawsuit.

EXACTIONS

Exactions are similar to impact fees in that they both provide facilities to growing communities. The difference is that through exactions it can be established that it is the responsibility of the developer to build the greenway or pedestrian facility that crosses through the property, or adjacent to the property being developed.

IN-LIEU-OF FEES

As an alternative to requiring developers to dedicate on-site greenway or pedestrian facility that would serve their development, some communities provide a choice of paying a frontend charge for off-site protection of pieces of the larger system. Payment is generally a condition of development approval and recovers the cost of the off- site land acquisition or the development's proportionate share of the cost of a regional facility serving a larger area. Some communities prefer in-lieu-of fees. This alternative allows community staff to purchase land worthy of protection rather than accept marginal land that meets the quantitative requirements of a developer dedication but falls short of qualitative interests.

See the WalkWilmington Pedestrian Plan (4.1.5 Pedestrian Benefit Zones) for more information on this topic.

BONDS AND LOANS

Bonds have been a very popular way for communities across the country to finance their pedestrian and greenway projects. A number of bond options are listed below. Contracting with a private consultant to assist with this program may be advisable. Since bonds rely on the support of the voting population, an education and awareness program should be implemented prior to any vote. Billings, Montana used the issuance of a bond in the amount of \$599,000 to provide the matching funds for several of their TEA-21 enhancement dollars. Austin, Texas has also used bond issues to fund a portion of its bicycle and trail system.

REVENUE BONDS

Revenue bonds are bonds that are secured by a pledge of the revenues from a specific local government activity. The entity issuing bonds pledges to generate sufficient revenue annually to cover the program's operating costs, plus meet the annual debt service requirements (principal and interest payment). Revenue bonds are not constrained by the debt ceilings of general obligation bonds, but they are generally more expensive than general obligation bonds.

GENERAL OBLIGATION BONDS

Cities, counties, and service districts generally are able to issue general obligation (G.O.) bonds that are secured by the full faith and credit of the entity. A general obligation pledge is stronger than a revenue pledge, and thus may carry a lower interest rate than a revenue bond. The local government issuing the bonds pledges to raise its property taxes, or use any other sources of revenue, to generate sufficient revenues to make the debt service payments on the bonds. Frequently, when local governments issue G.O. bonds for public enterprise improvements, the public enterprise will make the debt service payments on the G.O. bonds with revenues generated through the public entity's rates and charges. However, if those rate revenues are insufficient to make the debt payment, the local government is obligated to raise taxes or use other sources of revenue to make the payments. Bond measures are typically limited by time, based on the debt load of the local government or the project under focus. Funding from bond measures can be used for right-of-way acquisition, engineering, design, and construction of pedestrian and bicycle facilities. Voter approval is required.

SPECIAL ASSESSMENT BONDS

Special assessment bonds are secured by a lien on the property that benefits from the improvements funded with the special assessment bond proceeds. Debt service payments on these bonds are funded through annual assessments to the property owners in the assessment area.

STATE REVOLVING FUND LOANS

Initially funded with federal and state money, and continued by funds generated by repayment of earlier loans, State Revolving Funds (SRFs) provide low interest loans for local governments to fund water pollution control and water supply related projects including many watershed management activities. These loans typically require a revenue pledge, like a revenue bond, but carry a below market interest rate and limited term for debt repayment (20 years).

FUNDS FROM PRIVATE FOUNDATIONS AND ORGANIZATIONS

Many communities have solicited greenway and pedestrian infrastructure funding assistance from private foundations and other conservation-minded benefactors. Below are several examples of private funding opportunities available in North Carolina.

LAND FOR TOMORROW CAMPAIGN

Land for Tomorrow is a diverse partnership of businesses, conservationists, farmers, environmental groups, health professionals and community groups committed to securing support from the public and General Assembly for protecting land, water and historic places. The campaign is asking the North Carolina General Assembly to reject legislation that threatens to reduce funding of conservation focused trust funds. Land for Tomorrow will enable North Carolina to reach a goal of ensuring that working farms and forests; sanctuaries for wildlife; land bordering streams, parks and greenways; land that helps strengthen communities and promotes job growth; historic downtowns and neighborhoods; and more, will be there to enhance the quality of life for many generations. In 2011, the Land for Tomorrow Campaign suffered an 85 percent budget cut and future program funding is uncertain.

More information: http://www.landfortomorrow.org/

THE ROBERT WOOD JOHNSON FOUNDATION

The Robert Wood Johnson Foundation was established in 1972 and today it is the largest U.S. foundation devoted to improving the health and health care of all Americans. Grant making is concentrated in four areas:

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

For more information about what types of projects are funded and how to apply, visit http://www.rwjf.org/grants/

NORTH CAROLINA COMMUNITY FOUNDATION

The North Carolina Community Foundation, established in 1988, is a statewide foundation seeking gifts from individuals, corporations, and other foundations to build endowments and ensure financial security for nonprofit organization and institutions throughout the state. Based in Raleigh, North Carolina, the foundation also manages a number of community affiliates throughout North Carolina, which makes grants in the areas of human services, education, health, arts, religion, civic affairs, and the conservation and preservation of historical, cultural, and environmental resources. The foundation also manages various scholarship programs statewide.

More information: http://www.nccommunityfoundation.org/Grants.

WALMART STATE GIVING PROGRAM

The Walmart Foundation financially supports projects that create opportunities for better living. Grants are awarded for projects that support and promote education, workforce development/economic opportunity, health and wellness, and environmental sustainability. Both programmatic and infrastructural projects are eligible for funding. State Giving Program grants start at \$25,000, and there is no maximum award amount. The program accepts grant applications on an annual, state by state basis January 2nd through March 2nd.

Online resource: http://walmartstores.com/CommunityGiving/8168.aspx?p=8979

THE RITE AID FOUNDATION GRANTS

The Rite Aid Foundation is a foundation that supports projects that promote health and wellness in the communities that Rite Aid serves. Award amounts vary and grants are awarded on a one year basis. A wide array of activities are eigible for funding, including infrastructural and programmatic projects.

Online resource: http://www.riteaid.com/company/community/foundation.jsf

Z. SMITH REYNOLDS FOUNDATION

This Winston-Salem-based Foundation has been assisting the environmental projects of local governments and non-profits in North Carolina for many years. They have two grant cycles per year and generally do not fund land acquisition. However, they may be able to offer support in other areas of open space and greenways development.

More information is available at http://www.zsr.org.

BANK OF AMERICA CHARITABLE FOUNDATION, INC.

The Bank of America Charitable Foundation is one of the largest in the nation. The primary grants program is called Neighborhood Excellence, which seeks to identify critical issues in local communities. Another program that applies to greenways is the Community Development Programs, and specifically the Program Related Investments. This program targets low- and moderate-income communities and serves to encourage entrepreneurial business development.

More information: http://www.bankofamerica.com/foundation.

DUKE ENERGY FOUNDATION

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

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

The grant program has three focus areas: Environmental and Energy Efficiency, Economic Development, and Community Vitality. The Foundation can support programs that support conservation, training and research around environmental and energy efficiency initiatives.

More information: http://www.duke-energy.com/community/foundation.asp.

PNC FOUNDATION

The PNC Foundation supports a variety of nonprofit organizations with a special emphasis on those that work to achieve sustainability and touch a diverse population, in particular, those that support early childhood education and/or economic development.

More information: https://www.pncsites.com/pncfoundation/foundation_grantProcess.html

AMERICAN GREENWAYS EASTMAN KODAK AWARDS

The Conservation Fund's American Greenways Program has teamed with the Eastman Kodak Corporation and the National Geographic Society to award small grants (\$250 to \$2,000) to stimulate the planning, design and development of greenways. These grants can be used for activities such as mapping, conducting ecological assessments, surveying, holding conferences, developing brochures, producing interpretive displays, incorporating land trusts, and building trails. Grants cannot be used for academic research, institutional support, lobbying or political activities. Currently, the grant program is on hold until further notice.

More information: http://www.conservationfund.org/kodak_awards.

THE TRUST FOR PUBLIC LAND

Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the Trust for Public Land is the only national nonprofit working exclusively to protect land for human enjoyment and well being. TPL helps conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities.

More information: http://www.tpl.org

NATIONAL TRAILS FUND

American Hiking society created the National Trails Fund in 1998 as the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting, and maintaining foot trails in America. The society provides funds to help address the \$200 million backlog of trail maintenance. National Trails Fund grants help give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. To date, American Hiking has granted more than \$240,000 to 56 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from \$500 to \$10,000 per project. Projects the American Hiking Society will consider include:

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

More information: http://www.americanhiking.org/

THE CONSERVATION ALLIANCE

The Conservation Alliance is a non-profit organization of outdoor businesses whose collective annual mem-bership dues support grassroots citizen-action groups and their efforts to protect wild and natural areas. One hundred percent of its member companies' dues go directly to diverse, local community groups across the nation - groups like Southern Utah Wilderness Alliance, Alliance for the Wild Rockies, The Greater Yellowstone Coalition, the South Yuba River Citizens' League, RESTORE: The North Woods and the Sinkyone Wilderness Council (a Native American-owned/operated wilderness park). For these groups, who seek to protect the last great wild lands and waterways from resource extraction and commercial development, the Alliance's grants are substantial in size (about \$35,000 each), and have often made the difference between success and defeat. Since its inception in 1989, The Conservation Alliance has contributed \$4,775,059 to grassroots environmental groups across the nation, and its member companies are proud of the results: To date the groups funded have saved over 34 million acres of wild lands and 14 dams have been either prevented or removed-all through grassroots community efforts.

The Conservation Alliance is a unique funding source for grassroots environmental groups. It is the only environmental grant maker whose funds come from a potent yet largely untapped constituency for protection of ecosystems - the non-motorized outdoor recreation industry and its customers. This industry has great incentive to protect the places in which people use the clothing, hiking boots, tents and backpacks it sells. The industry is also uniquely positioned to educate outdoor enthusiasts about threats to wild places, and engage them to take action. Finally, when it comes to decision-makers - especially those in the Forest Service, Nation-al Park Service, and Bureau of Land Management, this industry has clout - an important tool that small advocacy groups can wield.

The Conservation Alliance Funding Criteria: The Project should be focused primarily on direct citizen action to protect and enhance our natural resources for recreation. The Alliance does not look for mainstream educa-tion or scientific research projects, but rather for active campaigns. All projects should be quantifiable, with specific goals, objectives and action plans and should include a measure for evaluating success. The project should have a good chance for closure or significant measurable results over a fairly short term (one to two years). Funding emphasis may not be on general operating expenses or staff payroll.

More information: http://www.conservationalliance.com/grants.

BLUECROSS BLUESHIELD OF NORTH CAROLINA FOUNDATION

BlueCross BlueShied (BCBS) focuses on programs than use an outcome approach to improve the health and well being of residents. The Health of Vulnerable Populations grants program focuses on improving health outcomes for at-risk populations. The Healthy Active Communities grant funds projects that enhance the physical environment to create spaces and places for physical activity. Eligible grant applicants must be located in North Carolina, be able to provide recent tax forms and, depending on the size of the nonprofit, provide and audit.

More information: http://www.bcbsncfoundation.org/grants/.

ANNUAL AZALEA CELEBRATION

NC Beautiful has promoted environmental education, beautification, and stewardship in North Carolina for 40 years and holds the Annual Azalea Celebration to help non-profit organizations enhance their community spaces. Winning applicants receive 100 azalea

plants free of charge to beautify school- and church grounds, parks, greenways, public rights-of-way, and community and senior centers. In addition, recipients who sustain their projects and keep their azaleas healthy for a 3-year period are eligible to receive cash awards and additional plants through the A.J. Fletcher Award.

More information: http://www.ncbeautiful.org/programs/celebration.html

BIKE BELONG GRANTS

The Bikes Belong Grant program funds important and influential projects that leverage federal funding and build momentum for bicycling in communities across the U.S. These projects include greenways and rail trails accessible by pedestrians and bicyclists. Applicants can request a maximum amount of \$10,000 for their project, and priorities are given to areas that have not received Bikes Belong funding in the past three years.

A new Bikes Belong opportunity is Community Partnership Grants. These grants are designed to foster and support partnerships between city or county governments, non-profit organizations, and local businesses to improve the environment for bicycling in the community. Grants will primarily fund the construction or expansion of facilities such as bike lanes, trails, and paths. The lead organization must be a non-profit organization with IRS 501(c)3 designation or a city or county government office.

More information: http://www.bikesbelong.org/grants/

THE CINERGY FOUNDATION

The Cinergy Foundation places special emphasis on projects that help communities help themselves. The Foundation supports local community, civic and leadership development projects. The Cinergy Foundation also views community foundations as positive vehicles for sustaining the long-term health of a community and promoting philanthropic causes. Infrastructure needs by a community will not be considered.

The Cinergy Foundation supports health and social service programs which promote healthy life styles and preventative medical care. United Way campaigns are included in Health and Social Services funding.

More information: http://www.cinergy.com/foundation/categories.asp

LOCAL TRAIL SPONSORS

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

VOLUNTEER WORK

Residents and other community members are excellent resources for garnering support and enthusiasm for a greenway corridor or pedestrian facility. Furthermore volunteers can substantially reduce implementation and maintenance costs. Individual volunteers from the community can be brought together with groups of volunteers from church groups, civic groups, scout troops and environmental groups to work on greenway development on special community workdays. Volunteers can also be used for fund-raising, maintenance, and programming needs.

CORPORATE DONATIONS

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

TRAIL/GREENWAY SPONSORSHIPS

Wilmington, New Hanover County, and local communities can actively seek sponsorships for events, services, parks, and trail facilities from individuals, foundations, corporations, nonprofit organizations, service clubs, and other entities. The purpose of such sponsorships is to increase the ability to deliver services to the community and/or provide enhanced levels of service beyond general funds.

In appreciation of such support, the government agencies that benefit should provide sponsors with suitable acknowledgement of their contributions. However, such recognition should adhere to the aesthetic values and purpose of the parks, facilities, and services. In addition, such recognition should not detract from the visitor's experience or expectation, nor should it impair the visual qualities of the site or be perceived as creating a proprietary interest.

Below are links to exemplary park/trail sponsorship policies and materials:

- Municipal Parks and Recreation Sponsorship Policy Example: http://www.portlandonline.com/shared/cfm/image.cfm?id=155570
- Trail Sponsorship Brochure Example: http://mtsgreenway.org/events-calendar/greenway-365-sponsorship-brochure
- Corporate Sponsorship and Naming Rights Guidelines: http://www.mrsc.org/subjects/parks/parksponsor.aspx

SUMMARY TABLE

Grant Name	Funding Agency	Funding Info/Application	Description	Funding \$	Matching \$
			Federal		
Transportation Alternatives	Map-21	http://www.fhwa.dot.gov/environment/ transportation_enhancements/legislation/ map21.cfm	This category includes the construction, planning, and design of a range of bicycle and pedestrian infrastructure including "on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990."	NC's annual appointment in 2012 \$23,667,416	
Recreation Trails	Map-21	http://www.fhwa.dot.gov/MAP21/ funding.cfm.	TA funds may be used to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses.	NC's dedicated annual RTC funds for 2012 total \$1,506,344	
Safe Routes to School	Map-21	http://www.saferoutesinfo.org/funding- portal/federal-funding-101	The purpose of the Safe Routes to Schools eligibility is to promote safe, healthy alternatives to riding the bus or being driven to school. All projects must be within two miles of primary or middle schools (K-8).	NC's dedicated annual STRS funds for 2012 \$4,699,856	
Planning, designing, or constructing roadways	Map-21	http://www.fhwa.dot.gov/MAP21/ funding.cfm.]	Planning, designing, or constructing roadways within the right-of-way of former Interstate routes or divided highways.	Average annual funds available through TA over the life of MAP-/21 equal \$814 million nationally, which is based on a 2% set-aside of total MAP-21 allocations.	
Surface Transportation Program	Map-21	http://www.fhwa.dot.gov/MAP21/ funding.cfm.	The Surface Transportation Program (STP) provides states with flexible funds which may be used for a variety of highway, road, bridge, and transit projects. A wide variety of bicycle and pedestrian improvements are eligible, including on-street bicycle facilities, off-street trails, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities.	Competitive grant application process & has a maximum award of \$300 million per state	
Highway Safety Improvement Program	Map-21	http://www.fhwa.dot.gov/MAP21/ funding.cfm.	HSIP is for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways.	HSIP provides \$2.4 billion nationally	
Congestion Mitigation/Air Quality Program	Map-21	http://www.fhwa.dot.gov/MAP21/ funding.cfm.	The Congestion Mitigation/Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and particulate matter which reduce transportation related emissions	NC's annual appointment in 2012 \$51,338,810	N/A to Wilmington in 2012

Grant Name	Funding Agency	Funding Info/Application	Description	Funding \$	Matching \$
New Freedom Initiative	Map-21	http://www.fta.dot.gov/ grants/13093_3549.html	MAP-21 continues a formula grant program that provides capital and operating costs to provide transportation services and facility improvements that exceed those required by the Americans with Disabilities Act.		
Pilot Transit- Oriented Development Planning	Map-21	http://www.fta.dot.gov/documents/ MAP-21 Fact Sheet - Transit-Oriented Development Planning Pilot.pdf	MAP-21 establishes a new pilot program to promote planning for Transit-Oriented Development.		
Federal Transit Adminstration Programs	Federal Transit Administration	http://www.fta.dot.gov/grants_263.html	Federal Transit Administration (FTA) funding is available for projects designed to improve access to transit.		
Job Access and Reverse Commute Program	Federal Transit Administration	http://www.fta.dot.gov/funding/grants/ grants_financing_3550.html	The Job Access and Reverse Commute (JARC) program was established to address the unique transportation challenges faced by welfare recipients and low-income persons seeking to obtain and maintain employment.		
Paul S. Sarbanes Transit in Parks Program	Federal Transit Administration	http://www.fta.dot.gov/funding/grants/ grants_financing_6106.html	This program addresses the challenge of increasing vehicle congestion in and around our national parks and other federal lands. Eligible recipients include state, tribal, or local governmental authorities with jurisdiction over land in the vicinity of an eligible area acting with the consent of the Federal Lands Management Area.		
Urbanized Area Formula Program		http://www.fta.dot.gov/funding/grants/ grants_financing_3561.html	FTA capital/Operating grant for urbanized areas over 50,000. This grant can be used for pedestrian or bicyclist access to transit.		
Formula Grants for Other Than Urbanized Areas	Federal Transit Administration	http://www.fta.dot.gov/funding/grants/ grants_financing_3555.html	This program is formula-based and provides funding to states for supporting public transportation in rural areas with populations of less than 50,000. This grant funds routes to transit, bike racks, shelters, and equipment for public transportation vehicles.		

Grant Name	Funding Agency	Funding Info/Application	Description	Funding \$	Matching \$
Transportation for Elderly Persons and Persons with Disabilities	Federal Transit Administration	http://www.fta.dot.gov/funding/grants/ grants_financing_3556.html	This program can be used for capital expenses that support transportation to meet the special needs of older adults and persons with disabilities, including providing access to an eligible public transportation facility.		
Bus and Bus Related Facilities		http://www.fta.dot.gov/funding/grants/ grants_financing_3557.html	This is capital assistance for new and replacement buses, related equipment and facilities. It has traditionally been designated to specific projects at a federal level. This grant can be used for pedestrian or bicycle access to transit and bus racks.		
Metropolitan and Statewide Planning	Federal Transit Administration	http://www.fta.dot.gov/funding/grants/ grants_financing_3563.html	This program provides funding for statewide and metropolitan coordinated transportation planning. Federal planning funds are first apportioned to State DOTs. State DOTs then allocate planning funding to MPOs.		
Partnership for Sustainable Communities	EPA, HUD, USDOT	http://www.epa.gov/smartgrowth/ partnership/	the Partnership for Sustainable Communities is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to "improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide."		
Community Development Block Grants	U.S. Department of Housing and Urban Development	http://www.nccommerce. com/en/CommunityServices/ CommunityDevelopmentGrants/ CommunityDevelopmentBlockGrants/	Funds are allocated through the NC Department of Commerce, Division of Community Assistance to local municipal or county governments for projects that enhance the viability of communities by providing decent housing and suitable living environments and by expanding economic opportunities, principally for persons of low- and moderate-income. Can be used for "building public facilities and improvements, such as streets, sidewalks, community and senior citizen centers and recreational facilities"	\$50 million for the state	
Land and Water Conservation Fund	U.S. Department of Environment and Natural Resources	http://www.ncparks.gov/About/grants/ lwcf_main.php	The Land and Water Conservation Fund (LWCF) provides grants for planning and acquiring outdoor recreation areas and facilities, including trails. Funds can be used for right-of-way acquisition and construction. The program is administered by the Department of Environment and Natural Resources as a grant program for states and local governments. Maximum annual grant awards for county governments, incorporated municipalities, public authorities, and federally recognized Indian tribes are \$250,000. The local match may be provided with in-kind services or cash.		
River Trails and Conservation Assistance Program	U.S. National Park Service	http://www.nps.gov/ncrc/programs/ rtca/	This program provides technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance—there are no implementation funds available.		

Grant Name	Funding Agency	Funding Info/Application	Description	Funding \$	Matching \$
National Scenic Byways Discrectionary Grant Program	U.S. Department of Transportation	http://www.bywaysonline.org/grants/	Eligible projects include construction along a scenic byway of a facility for pedestrians and bicyclists and improvements to a scenic byway that will enhance access to an area for the purpose of recreation. Construction includes the development of the environmental documents, design, engineering, purchase of right-of-way, land, or property, as well as supervising, inspecting, and actual construction.		
Federal Lands Highway Program (FLHP)	Public Lands Highway	http://flh.fhwa.dot.gov/programs/plh/ fh/	The Federal Lands Highway Program (FLHP) is a coordinated program of public roads and transit facilities serving Federal and Indian lands.		
Public Lands Highway - Discretinoary (PLH-D)	Federal Highway Administration	http://flh.fhwa.dot.gov/programs/plh/ discretionary/	The Public Lands Highway - Discretionary (PLH-D) Program is intended for the planning, design, construction, reconstruction of improvement of roads and bridges that are within or adjacent to, or provide access to public lands and Indian reservations.		
Energy Efficiency and Conservation Block Grants	Department of Energy	http://www.eecbg.energy.gov	Focused on reducing energy consumption and fossil fuel emissions, these funds can be used for the development and implementation of transportation programs to conserve energy used in transportation including development of infrastructure such as bike lanes and pathways and pedestrian walkways.		
			State		
State Transportation Improvement Program (STIP)	NC Department of Transportation	To access the STIP: http://www.ncdot. org/planning/development/TIP/TIP/ For more about the STIP process: http:// www.ncdot.org/performance/reform/	NCDOT's Policy to Projects process uses data regarding pavement condition, traffic congestion and road safety, as well as input from local governments and NCDOT staff, to determine transportation priorities. This approach ranks projects for all modes of transportation in priority order, based on the department's goals and also determines which projects are included in the department's State Transportation Improvement Program (STIP), a federally mandated transportation planning document.	Seven Year Work Plan; Amounts vary	
SPOT Safety Program	NC Department of Transportation	http://www.ncdot.org/doh/ preconstruct/traffic/safety/Programs/	The Spot Safety Program provides highly effective low cost safety improvements for intersections, and sections of state maintained roads. It is used to develop smaller improvement projects to address safety, potential safety, and operational issues. Thr program targets hazardous locations for improvements such as traffic signals, turn lanes, improved shoulders, intersection upgrades, positive guidance enhancements (rumble strips, improved channelization, raised pavement markers, long life highly visible pavement markings), improved warning and regulatory signing, roadside safety improvements, school safety improvements, and safety appurtenances (like guardrail and crash attenuators).	\$250,000 (maximum allowable)	
High Hazard Elimination Program	NC Department of Transportation	http://www.ncdot.org/doh/ preconstruct/traffic/safety/Programs/	This Program is used to develop larger improvement projects to address safety and potential safety issues. The program is funded with 90% federal funds and 10% state funds.	\$400,000 to \$1 million	
Discretionary Funds	NC Department of Transportation		This Fund is administered by the Secretary of the Department of Transportation. The funds can be used on any project at any location within the State. Primary, urban, secondary, industrial access, and spot safety projects are eligible for consideration, by the Secretary upon direct appeal from a North Carolina jurisdiction.	\$10 million total for State	
Contingency Fund	NC Department of Transportation	http://www.ncdot.gov/doh/ preconstruct/traffic/teppl/Topics/F- 19/F-19_mm.pdf	This Fund is administered by the Secretary of Transportation. The Division Engineer elicits written requests from municipalities, counties, businesses, schools, citizens, legislative members and NCDOT staff. The appeals are reviewed on their merits by the Contingency and Small Urban Funds Committee, which makes recommendations for funding to the Secretary. Written requests must provide technical information such as justification, location, improvements being requested, timing, etc. for thorough review.	\$10 million total for State	

Grant Name	Funding Agency	Funding Info/Application	Description	Funding \$	Matching \$
Small Urban Funds	NC Department of Transportation		Each NCDOT Highway Division administers \$2 million of funds for small-scale improvement projects in urban areas. Projects must be within 2 miles of city limits and have a maximum cost of \$250,000. Requests for small urban funds may be made by municipalities, counties, businesses, school and industrial entities. A written request should be submitted to the Division Engineer providing technical information such as justification, location, improvements being requested, timing, etc. for thorough review.	\$250,000 maximum	
Spot Improvement Program	NC Department of Transportation		The Division of Bicycle and Pedestrian Transportation (DPBT) budgets \$500,000 per year for "spot" safety improvements throughout North Carolina. Eligible improvements include drain grate replacement, bicycle loop detectors, pedestrian signals and other small-scale improvements. These funds are used for small-scale projects not substantial enough to be included in the STIP. Proposals should be submitted directly to the Division of Bicycle and Pedestrian Transportation.	\$500,000 total for State	
Small Construction Funds	NC Department of Transportation	http://www.nctransportationanswers. org/ourforms/ SMALLCONSTRUCTIONFORM.pdf	The purpose of these funds is to finance improvements on the State System (US, NC, and SR routes) to be used for projects anywhere in the counties. These funds are used to fund a variety of transportation projects for municipalities, counties, businesses, schools, and industries throughout the state. There is a \$250,000 maximum amount per request per fiscal year. Any project with a total cost greater than \$150,000 requires a resolution or a letter of support for the project from the local jurisdiction.	\$250,000 maximum	
Governor Highway Safety Program	NC Department of Transportation	http://www.ncdot.gov/programs/ghsp/	This program funds safety improvement projects on state highways. The funds are considered to be "seed money" and substantial progress in reducing crashes, injuries and fatalities is required to receive continued funding.		The grantee is expected to provide a portion of the project costs and is expected to continue the program after GHSP funding ends.
Bicycle and Pedestrian Planning Grant Initiative	NC Department of Transportation	http://www.ncdot.gov/bikeped/ planning/	This program encourages municipalities to develop comprehensive bicycle plans and pedestrian plans. The Division of Bicycle and Pedestrian Transportation (DPBT) and the Transportation Planning Branch (TPB) sponsor this grant. All North Carolina municipalities are eligible and are encouraged to apply. Funding allocations are determined on a sliding scale based on population.	\$350,000- \$400,000 total for State	Yes; 20%-50% depending on popoulation
Incidental Projects	NC Department of Transportation		Bicycle and pedestrian accommodations such as bike lanes, sidewalks, intersection improvements, widened paved shoulders and bicycle and pedestrian-safe bridge design are frequently included as incidental features of highway projects. Most pedestrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of federal and state roadway construction funds or with a local fund match.		
Road Resurfacing	NC Department of Transportation		When space allows the inclusion of a bicycle lane onto a road without requiring significant drainage, Right-of-Way, or grading work, NCDOT can install the improvement during road resurfacing projects. If a project is feasible, the NCDOT can inform the affected community and offer them the opportunity to contribute to the		
Powell Bill Funds	NC Department of Transportation	https://connect.ncdot.gov/ municipalities/State-Street-Aid/Pages/ default.aspx	These funds are used only for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways. Funding allocations are based on population and mileage of town-maintained streets. Timeframe: Each municipality is required to furnish its own certification of street mileage as of July 1 each year. The most recent annual estimate of population is furnished to the DOT by the State Planning Officer each September.	New Hanover County 2012 Powell Bill Fund Allocation \$1,973,344.60	100%
Public Beach and Coastal Waterfront Access Funds	NC Department of Environment and Natural Resources		The Public Beach and Coastal Waterfront Access Funds program provides matching grants to local governments for projects to improve pedestrian access to the state's beaches and waterways.	\$500,000 - \$1 million total for State	Yes

Grant Name	Funding Agency	Funding Info/Application	Description	Funding \$	Matching \$
Parks and Recreation Trust Fund (PARTF)	NC Division of Parks and Recreation	http://www.ncparks.gov/About/grants/ partf_main.php	Through this program, several million dollars each year are available to local governments to fund the acquisition, development and renovation of recreational areas.	\$500,000 maximum	100%
Recreation Trails Program (RTP)	NC Division of Parks and Recreation	http://www.ncparks.gov/About/trails_ main.php	Recreational Trails Program Funds may be used for: Maintenance and restoration of existing trails; purchase and lease of trail construction and maintenance; Construction of new trails, including unpaved trails; Acquisition or easements of property for trails; Operation of educaitonal programs to promote safety and environmental protection related to trails (limited amount)	\$75,000 maximum	20% (cash or in-kind)
Adopt-A-Trail (AAT)	NC Division of Parks and Recreation	http://www.ncparks.gov/About/ trails_AAT.php	This program is a source of small funds for trail construction, maintenance, and land acquisition for trails. Timeframe: February 1 - Deadline for Submission	\$5,000 maximum	No
Clean Water Management Trust Fund	Established by General Assembly	http://www.cwmtf.net/#appmain.htm	This program finances projects that specifically address water pollution problems. Funds may be used for planning and land acquisition to establish a network or riparian buffers and greenways for environmental, education, and recreational benefit. Timeframe: February 1 - Deadline for Submission	\$30 million total for State	
Community Development Block Grants	NC Department of Commerce, Divison, and Community Assistance	www.hud.gov/offices/cpd/ communitydevelopment/programs/ stateadmin/	These funds are used to promote economic development and to serve low-income and moderate-income neighborhoods. Greenways and pedestrian improvements that are part of a community's economic development plans may qualify for assistance under this program. Recreational areas that serve to improve the quality of life in lower income areas may also qualify.	\$50 million total for State	
Fit Community Grants	Health and Wellness Trust Fund	http://www.fitcommunitync.org	Up to eight communities that demonstrate a compelling need, proven capacity and promising opportunity for policy and environmental change in addressing physical activity and/or healthy eating behaviors will be awarded two-year grants	\$60,000	
Urban and Community Forestry Grant	NC Division of Forest Resources	http://ncforestservice.gov/Urban/urban_ grant_overview.htm	The goal is to improve public understanding of the benefits of preserving existing tree cover in communities and assist local governments with projects which will lead to a more effective and efficient management of urban and community forests.	\$1,000 - \$15,000	100%



Overview

Routine and Remedial Operations

Routine and Remedial Maintenance

Administration and Jurisdictional Responsibilities

Operations and Maintenance Program

Funding the Operations and Maintenance Program

Operations and Maintenance Resources for Conflict Resolution

OPERATIONS AND **MAINTENANCE**

OVERVIEW

Operations and maintenance refers to specific day-to-day tasks and programs performed to assure resources and facilities are kept in good usable condition. This begins with sound design, durable components, and a comprehensive management plan. A management plan should be embraced by the entities responsible for maintaining the greenway and trail network, at the beginning of the implementation process. For the Wilmington MPO region, local jurisdictions will primarily serve as the entities responsible for maintenance. In addition, community groups, residents, business owners, developers and other stakeholders should be engaged in the long term stewardship of the resources preserved and enhanced by this plan. The role of each entity is discussed later in this appendix. This appendix provides general information about operations and maintenance best practices. Each agency can use the information provided as a guide for their particular role in the task.

GUIDING PRINCIPLES FOR EFFECTIVE OPERATIONS AND MAINTENANCE

The regional greenway and trail system should be viewed and maintained as a public resource. Indeed it will become infrastructure similar to the street system or utility networks, serving the community for generations to come. The following guiding principles will help assure the preservation of a first class system:

- Good maintenance begins with sound planning and design
- Foremost, protect life, property and the environment
- Promote and maintain a quality outdoor recreation and transportation experience
- Develop a management plan that is reviewed and updated annually with tasks, operational policies, standards, and routine and remedial maintenance goals
- Maintain quality control and conduct regular inspections
- Include field crews, police and fire/rescue personnel in both the design review and ongoing management process
- Maintain an effective, responsive public feedback system and promote public participation
- Be a good neighbor to adjacent properties
- Operate a cost-effective program with sustainable funding sources

RESOURCE STEWARDSHIP AND ENHANCEMENT

A well-managed greenway and trail system is critical to the long-term success of this plan. This includes stewardship, the oversight of resources, and operations and maintenance activities such as monitoring the condition of greenway and ancillary facilities; monitoring the impact of growth on greenway facilities; and long-term application of policies—such as land-use and development measures—in accordance with the objectives of this plan. Stewardship might range from cleaning up litter to assuring that a project does not visually scar the surrounding landscape.

The stewardship process must consider both private sector—such as land subdivision and development—and public sector activities—such as the construction of roads and utilities. In pursuit of this, coordination among agencies at the local, regional, state, and federal level is vital to assure that these activities are supportive of the plan and complementary to each other. Long term stewardship also calls for the enduring commitment of agency staff, elected officials and concerned citizens all working together. This suggests the need for a shared community vision and value system centered on the protection of greenway, trail, bicycle, pedestrian, and outdoor recreational resources. This plan and similar plans can help coordinate and guide that action.

ROUTINE AND REMEDIAL OPERATIONS

The following task lists describe the general routine and remedial operations responsibilities for all network facilities.

ROUTINE OPERATIONS DEFINED

Routine operations refer to the daily activities required to oversee a greenway and trail system.

Task: Systematic risk management assessment

Safety is central to all maintenance operations, and is the single most important greenway, trail, bicycle, and pedestrian facility maintenance concern. The local jurisdictions should implement a safety program that includes the following preventative measures.

- Schedule and document inspections to determine the amount of use, location, age, type of construction, and condition of railings, bridges, trail surfaces, signage, etc.
 Follow-up with the appropriate corrective measures in a timely manner.
- Evaluate and remove all obstacles or objects that could impede facility usage such as debris, rumble strips, etc. and provide solutions such as alternative routing, removal of obstacle, etc.
- Implement a data base management system, a Crime Tracking System, with police for tracking the specific locations and circumstances of all incidents, such as vandalism, and create a safety follow-up task force to address any problems that develop.
- Implement an emergency response protocol working with law enforcement, EMS agencies, and fire department that includes mapping of access points, design of trails and access roads (to accommodate up to 6.5 tons), and an "address system" such as mile markers to identify locations for all off-road greenway facilities. Onroad facilities should make use of the existing street names and adjacent property

addresses. Where appropriate, 911 emergency phones should be installed in remote areas. Each local emergency response office/unit should have an up-to-date map of all greenway and trail facilities within the local jurisdiction.

Task: Inter-agency design review

Coordination between and commitment of agencies responsible for greenway and trail facilities is crucial to complete the following routine maintenance tasks. In addition to department managers, planners, designers and engineers, police and fire/rescue, and field maintenance personnel should be consulted in the design and review process. Coordination should occur at a local level through carrying out the following tasks.

- Establish a coordinating committee with representatives from each of the participating agencies and stakeholders
- Identify an entity to provide on-going oversight, coordination, and leadership for the overall network
- Review critical public and private sector projects that might impact the greenway, bicycle, and pedestrian projects as they come on line
- Pursue grants and cooperative agreements
- Monitor operations and maintenance and other advocacy functions now and over the years to come.
- Review accident and crime reports and take the necessary upfront actions, on a case by case basis, to assure that greenway, bicycle, and pedestrian facilities do not deteriorate due to safety concerns, crime, or from fear of criminal activity
- Assign one member of each local coordinating committee to serve on the regional Greenways Advisory Committee (see Chapter 4 - Implementation) to ensure shared resources and knowledge among municipalities and coordination with regional multimodal transportation planning

Task: Accurate and Organized Record Keeping

Good record-keeping techniques are essential to a comprehensive operations and maintenance program. This information can be used to eliminate overlap or gaps in maintenance services provided, identify levels of use, and prioritize management needs.

- Daily activities
- Schedule of routine (and remedial) maintenance tasks
- Hazards, incidents, safety issues observed and action taken
- Inspection reports
- Annual maintenance budget, pursuing various funding sources
- Projected costs for subsequent years (short-term, medium term, and long-term) to reflect on project prioritization as shown in Chapter 3: Recommendations
- Internal working database for existing, planned, or proposed projects for greenway and trail system

REMEDIAL OPERATIONS DEFINED

Remedial operations refer to activities required to sustain the quality of the greenway and trail network.

Task: Program Development

- Update informational signage (rules and regulations) to communicate proper usage of all network facility types
- Update directional signage to integrate greenway, bicycle, and pedestrian systems and as new projects are implemented
- Update user maps to reflect any additions or changes to the systems or overall network and also reference the connections between greenway, bicycle, and pedestrian facilities

Task: General Operations

- Provide contact information and institute a local agency response for facility users to report questions, comments, concerns, or complaints regarding the network, and a feedback phone number and Web address
- Continue to provide and establish new public education and citizen participation programs for network users - See Appendix C: Program Resources
- Pursue development of an easy to use management manual and training program and incorporate it into existing and new maintenance programs and procedures within the participating agencies

ROUTINE AND REMEDIAL MAINTENANCE

The following section describes general routine and remedial maintenance responsibilities for all pedestrian and bicycle and greenway and trail facilities. The table to the right provides a task list for facilities within the roadway right-of-way.

Maintenance tasks for facilities such as pedestrian signals, crosswalks, bicycle lanes, and roadway shoulders are identified in the table presented starting on page F-6. These types of pedestrian and bicycle facilities are provided within the roadway right-of-way and should be maintained by either the North Carolina Department of Transportation (NCDOT) or the Public Works Department of local jurisdictions. A local agency staff member should be designated as the main contact for the maintenance of pedestrian and bicycle facilities in the roadway right-of-way. This staff member should coordinate with the appropriate departments to conduct maintenance activities in the field. Funding for an ongoing maintenance program should be included in the operating budget or Capital Improvements Program for each municipality.

MAINTENANCE OF PEDESTRIAN AND BICYCLE FACILITIES WITHIN ROADWAY RIGHTS-OF-WAY				
Task	Frequency	Comments		
Regular Inspection	2 times per year	Includes all on-road bikeways, identify needed repairs of pavement signs, markings, etc		
Shoulder and bike lane sweeping	2 times per year	All roadways with bicycle facilities		
Shoulder and bike lane repairs	As needed	Repair of road surface, including potholes, cracks or other problems on bicycle facilities		
Median island and curb extension repairs	As needed	Repair of curb and gutters, removal of debris		
Shoulder and bike lane resurfacing	During regular roadway repaving	Ensure that pavement width is maintained or increased during repaving projects		
Debris removal from shoulders	As needed	Remove debris from roadways shoul- ders and bike lanes such as limbs, silt, and broken glass		
Snow and ice removal	As needed	Plow snow off of roadway shoulders and bike lanes, and require property owners to shovel sidewalks		
Pedestrian signals	As needed	Replace burned out or broken pedestrian signal heads; adjust pedes- trian signal timing to accommodate MUTCD standard pedestrian walking speed		
Signs and markings	As needed	Repair or replace pedestrian and bicycle warning signs, bicycle route signs, crosswalk markings, bicycle lane markings, and any other similar facili- ties identified during inspection		
Vegetation control	During regular roadway maintenance	Mow grass and trim limbs and shrubs 2 feet back from sidewalk edge		
Litter removal	6 times per year	Could be completed with volunteers		

Note that the schedule is intended to provide general guidance for routine and remedial maintenance activities. The frequency of pedestrian and bicycle facility maintenance within the roadway right-of-way will vary. Maintenance needs will depend upon many factors, including pavement surface type, the use of paint or thermoplastic for markings, and traffic volumes. Local jurisdictions and/or NCDOT should make immediate repairs to any on-road pedestrian and bicycle facilities that are damaged or have hazardous conditions. The local staff member in charge of maintenance should set up a free maintenance hotline for people to provide information about spot maintenance needs in the urban area.

The remainder of this section focuses on general routine and remedial maintenance responsibilities for all greenway and trail facilities. The types of maintenance and a task list for each is described below. To complement the text, the table presented starting on page F-6 illustrates maintenance recommendations.

Maintenance of	Trail Facilities			
		Natural Surface Trail	Paved Multi-Use Trail	On Road Bicycle and Pedestrian Facilities
Routine Mainter	nance Activities			
intenance	Sweeping	N/a	2 times/year	Longevity of Facilities Table
Facility Maintenance	Trash Removal	2-4 times/year	6 times/year	Sidepaths 6 times/year
	Tree and Shrub Trimming and Pruning	Spring and Fall and as needed such as after a storm to maintain 8' high and 6'-8' wide clearance	Spring and Fall as needed, such as after a storm to maintain 10' high (12' high for equestrian) and 12'-14' wide clearance	Spring and Fall and as needed, such as after a storm to maintain 10' high and 2'-14' wide clearance (depending on the facility type)
Vegetation Management	Mowing and Vegetation	N/A	30 times/year	30 times/year
Vegetation	Mulching and Edging	Once/year or as needed	N/A	N/A
	Invasive Species Control	Once/year or as needed in problem areas	Once/year or as needed in problem areas	As scheduled for routine maintenance for adjacent roadway
Remedial Maint	enance Activities			
sement	Replenish gravel, mulch, or other surface materials	Once/year and as needed	N/A	N/A
Facility Repair or Replacement	Repaint/Restripe/Stain	N/A	N/A	N/A
Facility F	Replace asphalt or concrete	N/A	10-12 years	10-12 years

Recommendations
Paved facilities will be swept by machine or spot sweeping of bad areas will be swept by hand or with blowers. Some trails require a combination of methods. Transition areas between unpaved and paved facilities will require extra attention to remove potentially hazardous debris from the paved surfaces.
This includes removing ground debris. Emptying trash containers is discussed in Table 6(b). Volunteers should be utilized for this task, such as Adopt-a-trail programs.
Tree and shrub trimming and pruning should be performed to the City's specifications and should be scheduled according to species type. This service will be performed for the safety of trail users, to maintain safe use of all facilities, without physical obstacles, such as low hanging tree limbs and visual obstructions, such as limited line of sight.
Vegetation along trail corridors should be mowed on a regularly scheduled basis.
Nature trails may require mulch in some areas to maintain a usable trail surface. Edging to prevent encroachment of grass vegetation on trail is also needed.
Vegetation, weed and pest management plans should be put into place to control invasive species and protect endangered plant and animal species and preserve wetlands, riparian buffers, and other resources of special natural, cultural or urban infrastructure value.

				To .
	Remove encroaching debris along paved trail/sidewalk edges	As needed	As needed	Edging-As needed
	Regrade to prevent or eliminate low spots and drainage issues	Only if absolutely necessary	As needed	Responsibility of City Department as part of remedial maintenance of the adjacent roadway
	Addition or repair of culverts, bridges, boardwalks, retaining, walls, etc to prevent or eliminate drainage/erosion issues	N/A	30 years or As needed	30 years or As needed
	Reroute trail, if necessary, to avoid environmentally sensitive or overused areas, safety issues, or construction projects	As needed	As needed	Responsibility of City Department with input from Committee to reroute bicycle and pedestrian facilities if the adjacent roadway is rerouted or closed
Seasonal Maintenance	Remove leaf litter	N/A	As needed	As needed by Department for sidepaths.
Seasonal M	Remove snow and ice	N/A	As needed	As needed by Department for sidepaths.
-	Plant vegetation, such as trees and shrubs	As needed to prevent erosion and introduce native plant materials into the landscape	As needed to prevent erosion or as landscape features during the installation of a trail	Responsibility of Department
nent and Control	Take preventative measures to protect the landscape from the wildlife	As needed	As needed	As needed
Habitat Enhancement and Con	Apply herbicide to eliminate any problem areas	As needed to discourage growth of invasive or problem species, such as poison ivy, kudzu	As needed to discourage growth of invasive or problem species, such as poison ivy, kudzu	As needed to discourage growth of invasive or problem species, such as poison ivy, kudzu
Ϋ́	Apply herbicide to maintain edges and prevent encroaching vegetation, such as along trails and sidewalks	N/A	As needed	As needed

Prioritize removal by the most heavily used facilities and geographic location. Limited development trails should be emphasized as natural	
environments and warnings should be posted that hazardous conditions may exist with the changing seasons.	
+	
Prioritize removal by the most heavily used facilities, such as commuter routes, and geographic location. Limited development trails should be emphasized as natural environments and warnings should be posted that hazardous conditions may exist with the changing seasons.	
emphasized as natural environments and warnings should be posted that nazardous conditions may exist with the changing seasons.	

ROUTINE MAINTENANCE DEFINED

Routine maintenance refers to the day-to-day regimen of litter pick-up, trash and debris removal, weed and dust control, trail sweeping, sign replacement, tree and shrub trimming, and other regularly scheduled activities. Routine maintenance also includes minor repairs and replacements such as fixing cracks and potholes or repairing a broken hand railing.

The following tasks should be performed on a regular basis to keep all network facilities in good, usable condition. Maintenance tasks should be conducted more frequently for greenway, bike, and pedestrian facilities where use is the most concentrated. Methods such as pedestrian and bicycle counts, sketch plan analysis methods for estimating pedestrian and bicycle demand, public survey results, and public meeting comments, such as the results found in Appendix B, can be used to determine which resources are the most heavily used and may require the most maintenance attention. The frequency of required maintenance tasks should be established as new facilities are implemented and should be reviewed and updated annually to reflect any changes in usage, safety issues, etc.

Task: Facility Maintenance

Basic housekeeping of greenway and trail facilities will ensure that the network is clean and functional and will also improve the life of each facility. Volunteer efforts should be utilized in the performance of this maintenance task.

- Sweeping
- Trash removal

Task: Vegetation Management

To maintain a high quality network, regular attention should be given to the surrounding landscape, both natural and man-made. This not only improves the aesthetic quality of the network but also improves the users' sense of safety, as well.

- Tree and shrub trimming and pruning
- Mowing of vegetation
- Mulching and edging
- Invasive species control

REMEDIAL MAINTENANCE DEFINED

Remedial Maintenance refers to correcting significant defects in the network, as well as repairing, replacing or restoring major components that have been destroyed, damaged, or significantly deteriorated from normal usage and old age. Some items ("minor repairs") may occur on a five to ten year cycle such as repainting, seal coating asphalt pavement or replacing signage. Major reconstruction items will occur over a longer period or after an event such as a flood. Examples of major reconstruction remedial maintenance include stabilization of a severely eroded hillside, repaving a trail surface or a street used for biking, or replacing a footbridge. Remedial maintenance should be part of a long-term capital improvement plan.

The following tasks should be performed on an as needed basis to keep network facilities in good, usable condition. The table below depicts the average life of each facility type, as well as general ancillary facilities, with normal wear and tear. The repair or replacement of existing facilities should be reflected in a projected budget for future maintenance costs.

LONGEVITY OF FACILITIES				
Mulch	2-3 years			
Granular stone	7-10 years			
Asphalt	7-15 years			
Concrete	20+ years			
Boardwalk	7-10 years			
Bridge/Underpass/Tunnel	100+ years			

Task: Facility Repair or Replacement

All facilities will require repair or replacement at one time or another. The time between observation and repair/replacement will depend on whether the needed repair is deemed a hazard, to what degree the needed repair will affect the safety of the user, and whether the needed repair can be performed by an in-house maintenance crew or if it is so extensive that the needed repair must be done by outside entities or replaced completely. Some repairs are minor, such as repainting or resurfacing bicycle lanes and can be done in conjunction with other capital projects, such as repaving the adjacent street.

- Replenish gravel, mulch, or other materials
- Repaint/restripe/stain
- Repave/seal
- Replace asphalt or concrete
- Remove encroaching debris along paved trail/sidewalk edges
- Regrade to prevent or eliminate low spots and drainage issues
- Add culverts, bridges, boardwalks, retaining walls, etc. to prevent or eliminate drainage/erosion issues
- Reroute trail, if necessary, to avoid environmentally sensitive or overused areas and any safety issues

Task: Seasonal Maintenance

Seasonal tasks should be performed as needed. When conditions cannot be improved to provide for safe use, the facility should be closed to prevent the risk of injury to facility users. Designated maintenance crews will remove leaf debris, snow, and ice, etc. from all network facilities as soon as possible. Leaf debris is potentially hazardous when wet and special attention should be given to facilities with heavier usage. Ice control and removal of ice build-up is a continual factor because of the freeze-thaw cycle. Ice control is most important on grade changes and curves. Ice can be removed or gravel/ice melt applied. After the ice is gone, leftover gravel should be swept as soon as possible.

 Remove leaf litter from network facilities, via raking, blowing, mulching, etc. as needed to sustain the safe usability of all network facilities and prevent any storm water drainage and/or erosion issues

Task: Habitat Enhancement and Control

Habitat enhancement and control can improve aesthetics, help prevent erosion, and provide for wildlife habitat. Habitat control involves mitigation of damage caused by wildlife.

- Plant vegetation, such as trees and shrubs
- Take preventative measures to protect landscape features from wildlife, such as installing fencing around sensitive or newly planted materials
- Apply herbicide to eliminate any problem plant species, such as poison ivy or kudzu, etc.
- Apply herbicide to maintain facility edges and prevent encroaching vegetation, such as along trails and sidewalks
- Deter interaction between facility users and facility inhabitants, such as feeding the wildlife, etc.

ADMINISTRATION AND JURISDICTIONAL RESPONSIBILITIES

OPERATION RESPONSIBILITIES BY DEPARTMENT

Wilmington MPO

Representatives from the MPO should take on the responsibilities of "Pedestrian Coordinator" and "Bicycle Coordinator." This is discussed in Chapter 4 - Implementation. These duties would include carrying out recommendations from this plan, applying for funding, overseeing planning, design, and construction of the pedestrian and bicycle systems, and coordinating with the Greenway Coordinator and local and regional jurisdictions and NCDOT. These coordinators should work with other MPO staff to conduct tasks such as updating and publishing new local bicycle maps, creating and updating GIS layers of all bicycle facilities, coordinating education, enforcement, and encouragement programs, monitoring the use and safety of pedestrian and bicycle facilities, proposing future alternative routes, and working with adjacent communities and regional organizations to coordinate pedestrian and bikeway linkages.

Parks and Recreation Departments

Duties for the Park and Recreation Department of each jurisdiction would include carrying out the recommendations from this Plan, applying for funding, maintaining softscape trails and conducting routine maintenance of hardscape trails, trail planning and design, trail construction, and overseeing the safety and operations of all greenway facilities. Staff should also conduct tasks such as updating and publishing new maps, creating and updating GIS layers of all greenway facilities, proposing future alternative routes, and working with adjacent communities/counties to coordinate linkages. Staff should also play a role in education and encouragement programs.

Public Works Department / Engineering

The Public Works and/or Engineering Director of each jurisdiction should continue to oversee the construction and remedial maintenance of all hardscape trail, bicycle, and pedestrian facilities. One member of the local staff should handle facility development and construction (including posting bicycle route signs) among his/her other responsibilities. Staff should work with NCDOT to develop a schedule for routine maintenance and a means of identifying locations for spot maintenance improvements.

North Carolina Department of Transportation (NCDOT)

NCDOT should continue to design and build on-road facilities along with maintaining all pedestrian and bicycle facilities within the roadway rights-of-way that are owned by the state (with the exception of sidewalks on local streets). This includes paved shoulders, bicycle lanes, crosswalks, pedestrian signals, and sidewalks on main roadways. NCDOT should work with the Public Works Departments of local jurisdictions to develop a schedule for routine maintenance and a means of identifying locations for spot maintenance improvements.

Police Department/Sheriff's Department

All local police officers should go through training courses so that they are up to date with the most current laws governing bicyclists and pedestrians in North Carolina. Specific laws can be found here: http://www.ncdot.gov/bikeped/lawspolicies/. Bikelaw.com (www.bikelaw.com) provides assistance for conducting bicycle-specific legal training for police officers.

Volunteers

Services from volunteers, student labor, and seniors, or donations of material and equipment may be provided in-kind, to offset construction and maintenance costs. Formalized maintenance agreements, such as adopt-a-trail/greenway or adopt-a-highway can be used to provide a regulated service agreement with volunteers. Other efforts and projects can be coordinated as needed with senior class projects, scout projects, interested organizations, clubs or a neighborhood's community service to provide for the basic needs of the proposed networks. Advantages of utilizing volunteers include reduced or donated planning and construction costs, community pride and personal connections to the local greenway, bicycle, and pedestrian networks. Volunteers should be trained or supervised in the topic area in which they are working.

Maintenance Responsibilities by Facility Type

Maintenance responsibility will continue to be with the Parks and Recreation Departments and the other departments of local jurisdictions depending on the type of facility to be maintained and whether or not it is routine or remedial. A number of other jurisdictions and entities, homeowner associations, and business groups will also have roles in maintaining specific facilities in the pedestrian, bicycle, and greenway networks. While the Greenway Advisory Committee will serve as a regional coordinator, it will be helpful for local jurisdictions to create citizen groups, such as the local coalitions described later in this appendix, that could ultimately play an important role in local coordination and advocacy. A recommended maintenance schedule is included in the tables presented earlier in this appendix.

Nature Trail

These spaces would be maintained by local Parks and Recreation crews or by homeowner associations where appropriate, for dedicated areas added into the system by new development.

Greenway Trail

The local Parks and Recreation and other departments will continue to be the key agencies in the maintenance of facilities along roads, utility corridors, and stream corridors. The Parks and Recreation Department/Division, or where appropriate, homeowners associations, should conduct routine maintenance of greenways. Public Works/Public Services/Community Services should be responsible for remedial maintenance of hard-scape components.

On-road Bicycle Facilities

This system should be maintained by local Public Works/Community Services Departments, NCDOT, and patrolled by local Police Departments. A key to continued success will be the establishment and acceptance of bicycle facility operations and maintenance guidelines and proper training of both supervisory and field personnel regarding on-road bicycle facility upkeep. There should also be interagency coordination and user feedback protocols that assure timely response to citizen complaints and suggestions, including a website and toll-free hotline for pedestrian and bicycle maintenance requests. Bicycle route signs and bicycle racks should also be maintained by NCDOT, depending on the types and locations of facilities.

Pedestrian Facilities (On-road sidewalk/sidepath)

Major sidewalk repairs are made by the Public Works/Community Services Departments of local jurisdictions. Routine sidewalk maintenance should also be performed by the adjacent property owners and tenants, as prescribed by local ordinances. This may include individual owners, business and resident associations and special districts, as applicable. In suburban and rural areas outside the municipal boundaries, sidewalks on main roadways should be maintained by NCDOT and sidewalks on residential streets should be maintained by property owners.

Trailheads and Feature Areas

These areas are to be maintained by the local Public Works/Community Services and Parks and Recreation Departments or the respective homeowners associations if appropriate.

Other Ancillary Facilities

Special furnishings and amenities such as benches and signage will be the responsibility of the appropriate jurisdictional entity such as the local Public Works/Community Services and Parks and Recreation Departments.

ADMINISTRATIVE AND JURISDICTIONAL RECOMMENDATIONS

Actions to implement the following administrative and jurisdictional recommendations are described below. Collaboration between off-road greenways and on-road bicycle and pedestrian facility development should occur between the regional Greenways Advisory Committee (discussed in Chapter 4 - Implementation), the Wilmington MPO, and local Parks and Recreation and Public Works/Community Services Departments.

Greenway

While local jurisdictions bear the responsibility for the majority of greenway planning, operations, and maintenance, funding can be increased to assist in these efforts. In order to increase the revenue generated for operations and maintenance of local greenway facilities, the following actions are recommended.

Action: Develop local coalitions for greenways in each jurisdiction.

Many communities form a local coalition to assist the local jurisdiction in promoting and advocating for greenway development. Often called a 'Friends of the Greenway' organization, the group can sponsor events that raise funds for the trail system. They can host community forums and meetings that increase awareness. They can sponsor events, such as hikes and races, which encourage residents of the community to use the greenways more often. The Friends group may be an all-volunteer organization or may hire staff. Many Friends groups operate under a non-profit, 501c3 status so that they can receive contributions from individuals and private sector groups.

The following is an example list of the duties associated with the Friends of the Little Tennessee River Greenway in Macon County, NC. Friends of the Greenway (FROGs) assist Macon County in the management and development of the Little Tennessee River Greenway in a number of ways:

- Serve the public through the acquisition, restoration, protection, and enhancement of the natural resources.
- Integrate public recreational, historical, and cultural facilities with compatible commercial interest adjoining the Greenway.
- Develop an informational center and educational materials to enhance awareness of environmental and historical value of the Greenway.
- Assist local government in funding through grants, donations, leasing of concessions, and special events.
- Maintain a board and committees that fairly represent a diversity of interests in the community

Friends groups can help to raise awareness and funds for greenway facility development and operation. The mission of these groups can be very simple, for example, the Friends of the Grand Forks Greenway has the following mission:

"The Friends of the Greenway is a volunteer community grass-roots effort to support the development of the Red River and Red Lake River corridors that exist between the Army Corps of Engineers Flood Protection Project within the cities of Grand Forks, ND and East Grand Forks, MN."

Local jurisdictions within the Wilmington MPO region should work to establish a "Friends of the Greenways" coalition that can help to advocate for and promote the full development of the local community-wide greenway system. Local coalitions should coordinate their efforts with the regional Greenways Advisory Committee (see Chapter 4 – Implementation). Through creating local coalitions, municipalities can capitalize on local volunteer time and talent, and identify champions of the greenway system who know how to access local resources and fundraising opportunities.

Action: Hire and train new greenway maintenance crew personnel

• To maintain greenway facilities as presented in the table presented starting on page F-6.

The local Parks and Recreation and Public Works/Community Services Departments currently maintain recreational and trail facilities. Maintenance responsibilities include mowing, weed eating, repair of storm damage, blowing trails, removing leaves, rail painting, installing drainage, pesticide application (with license), etc. To improve maintenance standards for greenway facilities and predict future maintenance needs, the consultant recommends one maintenance crew person for every 15 miles of trail in need of maintenance. As additional mileage is added to the system, staff should be added in part time or full time positions to accommodate greater maintenance needs.

OPERATIONS AND MAINTENANCE PROGRAM

Annual operations and maintenance costs vary, depending upon the facility to be maintained, level of use, location, and standard of maintenance. Operations and maintenance budgets should take into account routine and remedial maintenance over the life cycle of the improvements and on-going administrative costs for the operations and maintenance program. The section below provides an overview of approximate costs for basic bicycle, pedestrian and greenway trail operations and maintenance services. The estimates include field labor, materials, equipment and administrative costs.

ROUTINE OPERATIONS AND MAINTENANCE COSTS

While actual costs will vary depending upon a number of factors, such as future availability of water and labor rates, the estimates can provide a general idea of potential operations and maintenance obligations. Following are typical annual costs for key components:

Nature Trails

Annual maintenance costs range from nominal to \$2,000 per mile/year depending on usage and level of development. For example, East Bay Regional Park District has estimated \$1,000 per mile/year. Volunteers may absorb all or part of this function.

Greenway Trails

Crew sizes tend to range from 0.5 to 5 full time employees (FTE's) per 10 miles of off-street trail. This plan recommends at least one FTE per 15 miles of trail. Annual routine maintenance costs may range from less than \$3,000 to over \$7,000 per mile. Routine cleanup and monitoring of facility conditions should be handled by volunteers and maintenance crews.

On-road Bicycle Facilities

It is assumed that the local Public Works Departments and NCDOT Maintenance Division will be able to maintain the on-roadway bicycle facility system. Some provision should be made however for fifteen regular inspections per year, to include minor repair or replacement of signs, vegetation grooming and other items that an inspector could remedy in the field. Additional attention should be paid to any potholes or other pavement damage.



Capital Crescent Trail, Maryland

CONSIDER IMPLEMENTING A TRASH-FREE GREENWAY SYSTEM

Pack it In, Pack it Out (variably "Carry in, Carry out") is a waste management philosophy that states, "what you bring into a natural area must be taken out of the area when you leave." It may be formulated in other slogans like "Leave No Trace", "Leave Only Footprints." The idea is to remove all forms of litter and biodegradable waste from the area for proper disposal so that the materials will cause no harm to the resources of the ecosystem. Trail facilities still often used with this method are pet waste receptacles and signage (see left).

- Locate pet waste stations at trail heads and occasionally along trail;
 set back a minimum of 3-feet from the edge of the trail.
- Example signage language: "Trash Free Greenway Trash cans are not provided on this trail. Please take your trash home when you leave."
- Removal of trash by user maintains the cleanliness of the trail while
 increasing the operational (manpower/equipment) costs of maintaining the trail, thus allowing that savings to be utilized elsewhere.
- This concept can be first implemented on a trial basis to assess how well it works in Wilmington and New Hanover County.

Some additional sweeping will be required where bicycle lanes and wider shoulders are provided along roads.

Pedestrian Facilities (On Road Sidewalk/Sidepath)

In many cities, the Public Works Department maintains sidewalk facilities on locally owned streets. Local property owners or Homeowner Associations (HOAs) could be made more responsible for routine maintenance of sidewalks with the municipal Public Works Departments responsible for more significant repairs. Crosswalks, pedestrian signals, curb ramps, median crossing islands, and other pedestrian facilities should be maintained by Public Works and NCDOT, depending on right-of-way ownership. It is recommended that NCDOT maintain all sidewalks on NCDOT rights of way. Maintaining these pedestrian facilities is an important part of maintaining the complete right of way for all users. NCDOT should maintain sidewalks and pedestrian crossing facilities on major roadways in areas outside the jurisdiction of the local municipalities. Cracks, surface defects, tree root damage, and other problems should be identified on a regular basis and fixed to ensure that sidewalks remain accessible to all types of pedestrians.

REMEDIAL OPERATIONS AND MAINTENANCE COSTS

Nature Trails

For purposes of this study, remedial work on non-paved trails will be assumed to be negligible, since volunteers may accomplish much of this work. There may be some administrative costs associated with this.

Greenway Trails (and Sidepaths)

A 7-to-15-year life is assumed for asphalt and crushed fine trails after which an overlay may be required. A complete resurfacing after 20-25 years is anticipated. Concrete is assumed to last twice as long.

Bridges, tunnels, retaining walls and other heavy infrastructure are assumed to have a 100-year life or longer.

On-road Bicycle Facilities

Remedial work for on-road bicycle facilities includes asphalt repaving (5' on either side of the street for a two-way bike route, total 10' width) along with curb and gutter, sewergrate and manhole repair. Pothole and crack repair are considered routine. Pavement markings, such as bicycle lane lines, bicycle stencil markings, and edgelines should be reinstalled when other roadway pavement markings are improved. Since this work is done as part of the current street maintenance regime the cost is assumed to be covered.

Pedestrian Facilities (Sidewalk)

Sidewalks should be constructed with concrete, which requires replacement in 50 to 75 years. A rough cost estimate for a linear mile of concrete sidewalk could be provided by the municipal Public Works Departments, including the base material, concrete, and construction work. Costs for design and Right-of-Way (ROW)/easement purchases should also be considered.

FUNDING THE OPERATIONS AND MAINTENANCE PROGRAM

Identifying funding sources, creating funding sources and sustaining reliable funding over the long term is critical to the overall success of operations and maintenance and, ultimately, the success and growth of the regional greenway and trail network. Several types of funding sources can be identified and a combination of these might offer the best solutions. The following are potential sources for operations and maintenance. Appendix E identifies funding sources for project design and implementation.

BUDGET ALLOCATIONS

These are funds coming directly from existing agency and department programs as part of annual budget contributions. Typically this is the base revenue source for operations and management. Note that on most projects around the nation, private donors or other potential partners will want to see a strong long-term public side commitment to management as a condition of awarding grants for capital trail improvements and management programs.

MULTI-OBJECTIVE PARTNERSHIPS

Most trails serve multiple public and private benefits including access for floodway and ditch upkeep, utility access, street maintenance, and enhancement of adjacent private properties. This may pose a number of opportunities for task sharing and cost sharing among the various beneficiaries, particularly with respect to storm drainage management along river, creek, and wetland corridors.

IN-KIND SERVICES

In-kind services involve people, such as volunteers, youth and student labor, and seniors to provide routine maintenance practices to network facilities. In-kind services may also include donations of material and equipment. Another consideration is the adopt-a-trail program, which works with service clubs, scouts, school groups, businesses and others. Adopt-a-trail programs should include credit signage and written agreements with the adopting group. Note, however, that volunteer and in-kind participation will likely meet only a fraction of the operations and maintenance needs and funding of these programs may be sporadic. The management program will still need a base of trained professionals and proper equipment. Use of in-kind services requires staff time for coordination.

CREATING AN ENDOWMENT

An endowment is a set-side account held strictly to generate revenue from investment earnings. The endowment could be held by a non-profit and could be established for the region, rather than for a single municipalities trail system. Funding of the endowment could come from a percent of capital grants and from an endowment campaign. The endowment could also be funded by bequests and deferred giving such as donations of present or future interests in stocks or real estate. To have an effective impact, the endowment should have several million dollars in its "corpus" (asset holding). This endowment could be built up gradually in tandem with project development. Contributions to the fund would be solicited from greenway advocates, businesses, civic groups, and other foundations. Special events could be held whose sole purpose is to raise capital money for the endowment. The resulting fund would support long-term operations and maintenance of the greenway system and can also be used in the acquisition of high-priority properties that may be lost if not acquired by private sector initiative.

EARNED INCOME AND USER FEES

Local jurisdictions should work with their local 'Friends of the Greenway' group to capture and direct fees and revenues that are derived from greenway events and activities into an account that can be dedicated to operating and managing the greenway system. Revenues could be used to support the endowment. User fees for amenities of the greenway system or user permits for trail and open space facilities can add to the revenue stream. Leasing trail rights-of-way for fiber-optic and other utility corridors can also generate earned income. For example, Grand Forks, North Dakota has demonstrated that a properly operated greenway can generate upwards of \$250,000 in direct revenues annually for use in offsetting the cost of operations and maintenance costs.

OPERATIONS AND MAINTENANCE RESOURCES FOR CONFLICT RESOLUTION

- Plan, design, and manage to reduce conflicts among users, with adjacent properties including: reckless and unsafe behavior; incompatible uses; trespassing; disturbances and adverse environmental impacts
- Recognize the different goals of different users, such as equestrians and bicyclists, and separate where feasible

- Provide user education through signage, patrol, volunteers, brochures, and media
- Provide adequate trail mileage and bicycle, pedestrian, and greenway acreage to accommodate user populations
- Solicit input from user groups by providing contact information to report problems and responding promptly and effectively to complaints, concerns, or suggestions
- Monitor, document, and log problem areas and address problems through design and management
- Promote trail etiquette
- Educate bicyclists and hikers on how to pass horses using subdued voice cues rather than bells, horns, or sudden loud noise that might startle a horse
- Avoid excessive regulatory signage
- Employ temporary closure of facilities when conditions dictate or for resource recovery
- Maintain facilities as specified in this appendix
- Distribute or publish a maintenance schedule
- Respond to illegal or disturbing activity quickly

TRAIL ETIQUETTE

The following rules and regulations are **examples only** that can help to guide trail etiquette. This type of information could be displayed in brochures or online. Information displayed on actual trail signage should be considerably more concise.

- Be Courteous: All trail users, including bicyclists, joggers, walkers should be respectful
 of other users regardless of their mode of travel, speed or level of skill. Respect the
 privacy of adjacent landowners.
- 2. Keep Right: Stay to the right as you use the trail or stay in the lane that has been designated for your user group. The exception to this rule occurs when you need to pass another user.
- 3. Pass on the Left: Pass others going in your direction on their left. Look ahead and behind to make sure that your lane is clear before you pull out an around the other user. Pass with ample separation.
- 4. Give Audible Signal When Passing: All users should give a clear warning signal before passing. This signal may be produced by voice, bell or soft horn. Voice signals might include "Passing on the Left!" or "Cyclist on the left!" Always be courteous when providing the audible signal.
- 5. Be Predictable: Travel in a consistent and predictable manner. Always look behind before changing position on the trail regardless of your mode of travel.
- 6. Control Your Bicycle: Always stay alert! Maintain a safe and legal speed at all times.
- 7. **Don't Block the Trail:** When in a group, including your pets, use no more than half the trail so as not to block the flow of other users. If users approach your group from both directions, form a single line or stop and move to the far right edge of the trail to allow safe passage by these users.
- **8. Yield When Entering or Crossing Trails:** When entering or crossing a trail at uncontrolled intersections, yield to traffic already using the other trail.

- 9. The Use of Lights: When using the trail during periods of low visibility each cyclist should be equipped with proper lights. Cyclists should have a white light that is visible from 500 feet to the front, and a red or amber light that is visible from 500 feet to the rear. Other trail users should use white lights (bright flashlights) visible 250 feet to the front, and wear light or reflective clothing.
- 10. Don't Use this Trail Under the Influence of Alcohol or Drugs: It is illegal to use this trail if you have consumed alcohol in excess of the statutory limits, or if you have consumed illegal drugs.
- 11. Clean Up Your Litter: Please keep this trail clean and neat for other users to enjoy. Do not leave glass, paper, cans or other debris on or near the trail. Please clean up after your pets. Pack out what you bring in —and remember to recycle when possible.
- **12.** *Keep Pets on Leashes:* Pets must be kept on a secure and tethered leash. Failure to do so will result in fines and possible detention of the pet.
- 13. Use the Buddy System: Use the trail system with a friend!
- 14. Vegetation Removal: It is illegal to remove vegetation of any type, size, or species from the trail. Please contact ______ should you have concerns about noxious weeds, poisonous vegetation, dying or dead vegetation or other concerns about vegetation growth in the trail.
- 15. Share the Trail! Always exercise due care and caution when using the trail!

WILMINGTON/NEW HANOVER COUNTY Below: Multi-use trail construction along Eastwood Road.



Greenways as Landscape Ecological Habitat, Patches and Corridors

Sustainable Greenway Trails

Sustainable Trail Actions/Design

Construction Considerations for Greenway Trails

Vegetation Management

Online Resources

GREENWAYS AS ECOLOGICAL ASSETS

GREENWAYS AS LANDSCAPE ECOLOGICAL HABITAT, PATCHES AND CORRIDORS

In ecological terms, organisms require areas, or habitat, for shelter/resting, food gathering, reproduction and rearing of young. If one of these areas is missing, the organism eventually becomes stressed. Often the only alternatives for the organism are either to move or die. For terrestrial organisms in the coastal plain of North Carolina habitat can consist of any number of ecosystems including upland forest, floodplain or swamp forest, shrub/ scrub vegetation, freshwater marsh, salt water marsh, etc. Important characteristics of habitat that determine its quality are total area, proximity to other habitat areas, and level of disturbance. Generally speaking, smaller, isolated and more chronically disturbed areas provide less habitat potential than larger, more numerous, less disturbed areas.

It is widely documented by the scientific literature that urbanized areas and urbanization in general, decreases habitat structure, quality, and ecological diversity. Urban areas have been shown to have fewer native species, a higher amount of disturbed habitats in early successional stages, and altered ecosystem functionality compared with natural ecosystems (Sandstrom et al., 2006). Czech et. al. (2000) state that in the United States urbanization is a primary cause for species decline.

However, a relatively broad range of species can use parks, avenues, greenways and other semi-natural areas found in cities and suburbs for habitat (Tomiałojc, 1998; Savard et al., 2000). Such green spaces may also function as dispersal, or movement, corridors for various species (Bolger et al., 2001). In fact, sufficient amounts of green space of relevant quality in cities may actually permit the presence of specialized forest species in urban landscapes (Park and Lee, 2000, Mortberg and Wallentinus, 2000).

In the 1960's ecologists began intensively studying how habitats in disturbed or urbanized areas function (MacArthur and Wilson 1967). The concept of habitat "patches" and "corridors" has become an accepted model for disturbed habitats. Patches are larger areas of habitat where a species may be able to obtain one or all of their habitat requirements of shelter, food, and reproduction. If one of the habitat requirements for a species is not met in a particular patch, then they must travel to another patch in search of the required habitat. Corridors provide pathways between patches for such situations. Green spaces, including greenways, have a key role to play in the ecological sustainability of urbanized areas, because they are able to provide certain habitat needs in order to support biodiversity and a broad range of ecosystem services. Greenways can supply habitat corridors between patches, and in some cases, they can serve as patches (Tratalos et al., 2007; Tzoulas et al., 2007; James et al., 2009).

The physical geometry of habitat patches and corridors affects their overall habitat quality. Large patches with wide, forested or naturally vegetated corridors provide the best habitat in developed/disturbed areas. As patch size and corridor width decreases, so does habitat quality. While corridors that have no vegetative cover are poor in quality, they are better than no corridor at all (Kringen and Merriam 1990).

Therefore, the alignment, amount of vegetative cover present, and width can all affect a greenway's effectiveness as habitat. The alignment is critical, because it determines how well a greenway connects habitat patches. The amount and type of vegetation present affect the types of species that use the habitat, and also affect how their potential predators can use it. The width of the greenway determines which species use it for habitat and for what purpose (shelter, food or breeding).

While many species can potentially use greenways as habitat, scientists have chosen bird species presence to help determine the overall biodiversity, sustainability, and habitat patch quality in greenway studies. Birds are used because they are highly mobile organisms, and depending on the species, they require the existence of a wide variety of habitat at different spatial scales (Angelstam et al., 2004). Birds are also relatively conspicuous and easy to survey.

Recent research conducted at North Carolina State University (NCSU) has shown that wider, forested greenway widths maximize habitat value for development-sensitive species such as neo-tropical migratory birds and forest interior birds (Mason et al. 2007, Sinclair et al. 2005).

Landscape and urban planners can facilitate habitat conservation for development-sensitive birds in greenways by minimizing the width of the trail and any associated mown and landscaped surfaces adjacent to the trail, locating trails near the edge of greenway forest corridors, and giving priority to the protection of greenway corridors at least 100 meters (328 feet) wide with low levels of impervious surface (pavement, buildings) and bare earth in the adjacent landscape.

Additional research performed at NCSU found that greenways may provide stopover habitat for migrating birds in otherwise inhospitable suburban landscapes (Kohut et al. 2009). Researchers examined the effect of greenway forested corridor width, vegetation composition and structure, and adjacent land cover on the species richness and abundance of migrating songbirds during spring and fall migration in Raleigh and Cary, North Carolina. It was found that migrating birds were generally more abundant in wider forest corridors during spring and fall migration. During the spring, migrants preferred greenways with taller trees and a higher percentage of hardwood tree species. In the fall, the birds preferred greenways with lower canopy cover, possibly because of the increased vertical complexity of the vegetation at these sites. The recommendations from the research included:

- Migrants used greenways of all widths, but forested corridors wider than 150 meters (492 feet) were recommended whenever possible to provide stopover habitat for forest-interior migrants.
- Shrub cover should be retained to maintain vegetative complexity.
- Habitat for the greatest diversity of migrants can be provided by constructing greenways in areas of lower development intensity and encouraging residents to retain shrubs and trees on properties bordering greenways.

SUSTAINABLE GREENWAY TRAILS

ECOLOGICALLY SUSTAINABLE TRAIL DESIGN

Trails are our most important tool for linking conservation, recreation and transportation. As such, they must be developed and maintained in ways that avoid negative impacts to the ecological resources of the area. The following guidance is recommended for developing and maintaining trail systems:

- 1. Sustainability of natural systems should be prioritized in design and construction
- 2. Ecologically Sensitive Areas should be preserved or protected whenever possible.
- Develop trails in areas already influenced by human activity, including existing infrastructure rights of way
- 4. Design should avoid or minimize erosion associated both with trail treads and stormwater runoff.
- 5. Use natural infiltration and best management practices for stormwater management
- 6. Stewardship of trails is an ongoing responsibility/activity.

SUSTAINABLE TRAIL ACTIONS/DESIGN

AVOID SENSITIVE ECOLOGICAL AREAS

These areas include:

- Wetlands, lakes, rivers and streams,
- Known and estimated locations of rare and endangered species and their habi-
- Public water supplies,
- Sensitive forest areas,
- Areas of Environmental Concern (CAMA),
- Steep slopes and soils that are identified as restricted for trail or road development, as defined by the Natural Resources Conservation Service,
- Unique or important geologic features or formations,
- Cultural and historic resources

DEVELOP TRAILS IN AREAS ALREADY INFLUENCED BY HUMAN ACTIVITY

Consistent with the third guiding principle, where feasible, it makes most sense to site and maintain trails in areas that have already been influenced by human activity, if you can meet your other objectives while doing so. These include:

- Already existing trails,
- Existing or historic wood roads and logging roads,
- Abandoned railroad corridors,
- Power line or sewer rights-of-way,
- Previously developed or disturbed areas

PROVIDE BUFFERS TO PROTECT SENSITIVE ECOLOGICAL AND HYDROLOGIC SYSTEMS

Maintaining buffers between trails and adjacent sensitive natural areas is essential to ensuring their long-term ecological quality, diversity, and habitat value. Irrespective of how well trails are aligned and designed, they have an impact. These impacts include: habitat fragmentation, soil compaction, increased runoff and erosion, and introduction of nonnative plant species. For these reasons, the use of buffers is an essential part of trail planning and design. Recommended buffer widths, however, will vary in response to a number of conditions, including:

- Sensitivity of the ecological systems being impacted,
- Extent of the natural open space or greenway corridor being traversed,
- Type of trail being proposed and its potential for creating ecological impacts,
- Grade and soil types, and
- Desired trail experience.

Recommended buffer widths may range from 50-200 feet depending on conditions and associated regulatory requirements. One should consult with the U.S. Fish and Wildlife Service and the N.C. Natural Heritage Program to determine appropriate buffers for rare, threatened and endangered species. Consult with N.C. State Historic Preservation Office to determine appropriate buffer widths for historic/cultural resources. Activities within wetland and stream areas are regulated by state and federal regulations.

WHEN TRAILS DO INTERSECT WITH SENSITIVE AREAS DESIGN SHOULD PRIORITIZE PROTECTION

The above discussion notwithstanding, trail development and maintenance across, along, and within sensitive areas is often desirable and justifiable. Streams need to be crossed, slopes traversed, and features interpreted. Allowing controlled access to sensitive ecological areas may be an integral part of educating the public about the value of protecting these resources. Most often, this takes the form of routing a corridor trail on the periphery of a sensitive area (with adequate buffers) and allowing more direct access to specific settings only in very select locations, and with appropriate trail forms (such as boardwalks and bridges) for closer observation. This approach provides reasonable access while limiting the potential for environmental impact and can also be developed in conjunction with an environmental education program. Appropriate leash requirements for pets may also be an important consideration associated with habitat protection and education.

USE NATURAL INFILTRATION AND BEST PRACTICES FOR STORMWATER MANAGEMENT

Whether trails are paved or made of local natural materials, one of the most critical components of trail design and management is to keep the trail away from the water and water off of the trail. On highly developed trails, the use of natural, dispersed infiltration systems such as vegetated swales and "rain gardens" offers ecological and hydrologic advantages over engineered stormwater control structures such as stormdrains and catchbasins.

CONSTRUCTION CONSIDERATIONS FOR GREENWAY TRAILS

There are four major temporary and potentially chronic impacts associated with trail construction and trail use. These are the impacts to existing vegetation, wildlife, water resources, and soil (IMBA, 2007). Careful trail planning, design and maintenance will lessen these impacts and result in a durable trail system that will serve the public needs and provide a quality recreational experience.

VEGETATION

During the initial construction of a trail, vegetation will be disturbed. In addition, trail creation can result in some breaching of the forest canopy. This can increase light penetration to the forest floor and change the microclimate, creating niches for plant species more adapted for sun and heat, or invasive species.

To minimize vegetation disturbance and breaching of the forest canopy it is important to construct the trail only wide enough for the intended use. It is also important to design trails that lead the users to points of interest. Otherwise, trail users often create their own informal trails that may follow poorly executed routes and result in increased trampling of vegetation or sensitive areas.

WILDLIFE

Trails that run through natural areas bring humans into contact with wildlife. Humans, and more often their unleashed pets, can disturb wildlife. Wildlife generally detects humans well before they are with sight. This disturbance disrupts wildlife's daily activities such as foraging, searching for mates, avoiding more significant predators and can reduce the ecological fitness of the wildlife. Repeated disturbance will cause more sensitive wildlife to relocate to more suitable habitat, if it is available.

Some less sensitive wildlife can become habituated to repeated disturbance from humans. In some cases, the wildlife, such as deer, can adapt to the presence of humans with little issue. When designing a trail it is important to avoid areas that are known habitat for particularly sensitive wildlife species. If critical habitat cannot be avoided, full or partial trail closures can be instituted during critical breeding and rearing seasons. Leash laws for dogs should be enacted and enforced and trail users should be well educated about the problem of perpetuating nuisance animal behavior when they provide handouts to wildlife.

WATER RESOURCES

At some point on their alignment, nearly all trails cross or follow water features. Trails that are poorly designed around or through water features can impact wetlands and streams, and become conduits for delivering sediments, nutrients, and pathogens to the water body. Trails that cross streams can also become management headaches, as trail/ stream crossings frequently exhibit bank and/or streambed erosion.

When crossing small headwater streams it is best to align the trail as far upstream as possible in the narrowest section of stream channel. Trail features such as rolling dips, or knick points should be constructed on the trail to drain water before the trail crosses the waterbody. Where possible, trails should follow the contours along the adjacent valley wall and kept off the floodplains, which are generally poorly-drained and wet during long periods of the year. Trails through wetlands should be avoided. If wetlands must be crossed, choose the narrowest point.

SOIL

Excessive soil erosion near a trail is usually the result of water collecting and flowing onto the trail surface with enough volume and velocity to carry away soil. This results in a degraded trail area and potential impacts to adjacent or downstream water resources. Trails that run directly up and down the fall line of a slope are prone to erosion and generally cannot be maintained over time. Therefore, fall line trails should be avoided when possible. It is best to construct "contour" trails that follow along the side slope of a hill. These trails are characterized with a gentle grade and have a series of brief undulations, or elevation changes called grade reversals (USDA, 2007). Contour trails are also outsloped 5% from the face of the hill to aid in sheeting water off the trail during rain events. These trails disperse and shed water in a non-erosive manner. In addition, contour trails can enhance the user experience. The short turns and elevation changes when combined with vegetation can shorten lines of sight. This can give the user a feeling of truly being in a less developed area.

GENERAL SURFACE TREATMENTS FOR GREENWAY TRAIL

If the greenway is to be ADA compliant, then paved surfaces will be required in most areas for access and use. In limited cases, packed gravel fines can be used, where there is little to no slope. However packed surfaces require much more maintenance effort and cost, and may not be desirable.

Concrete or asphalt tread surfaces have traditionally been used for multiuse greenways. When properly constructed and maintained on a regular basis, concrete can last 25 years or more. The high cost of concrete trails is often the most limiting factor since it is one of the most expensive surfaces to install. Asphalt is less expensive than concrete. When installed properly on suitable sub-grade, asphalt products typically have a life span less than half that of a concrete trail, averaging approximately 10 years (Anasazi Trails Inc., 2008). Recent advances in pervious pavement (concrete and asphalt) make them reasonable alternatives to their traditional counterparts. There is no "perfect" surface for a greenway because each greenway segment has different demands placed on it by topography, land-scape position, underlying soils, potential users, etc. Pervious surfaces have advantages and disadvantages, and each must be weighed to determine which surface is appropriate in any given location.

Pervious concrete has functionality and workability similar to that of regular concrete. However, the pervious concrete mix lacks the sand and other fine particles found in regular concrete. This creates a significant amount of void space, which allows water to flow relatively unobstructed through the concrete. Additives are often used to increase the strength of the concrete.

Pervious concrete is durable and has free flowing drainage characteristics. It has a 15-25% void structure, allowing 3-8 gallons of water per minute to pass through each square foot. When it rains, pervious concrete drains, allowing stormwater to infiltrate into the ground.

Pervious concrete provides a safe, firm, level, nonskid surface. Its ability to maintain this safe surface in all conditions including heavy rain, its durability, and its low maintenance requirements meet most greenway application requirements. Its appearance is more "rustic" than asphalt or conventional concrete due to the voids that allow water infiltration, i.e. a better visual fit for a natural setting. Colors are available similar to the color of the native soil and the adjacent environment.

Pervious asphalt is similar to standard asphalt, with a few notable exceptions. The fine aggregate of the mix is removed, resulting in greater void space and permeability. The permeability allows stormwater to infiltrate the asphalt and flow down to the aggregate base below it, promoting stormwater infiltration into the soil. Similar to pervious concrete, pervious asphalt can effectively cleanse and reduce the volume of stormwater runoff, a valuable environmental characteristic. This ability can potentially reduce additional expenditures and land consumption for conventional collection, conveyance, and detention in stormwater infrastructure.

Both pervious concrete and asphalt require vacuuming/sweeping maintenance periodically, in order to ensure that the void space remains open, allowing stormwater to flow through it. The frequency of maintenance depends on the location, the amount of sediment that is being moved by stormwater, the amount of leaves being deposited on the trail and also the amount of potential grass clippings.

Based on three case studies in Middleton, Wisconsin, Columbia, Missouri and the Rio Grande Trail in New Mexico, asphalt's service life span is about half that of concrete The total long-term cost of asphalt vs. concrete is about 70% higher. Based on this simple analysis, even when the higher cost of pervious concrete vs. traditional asphalt is noted, over the long term, pervious concrete may be the better value than traditional asphalt, and it has important environmental and ecological benefits.

VEGETATION MANAGEMENT

NATIVE SPECIES

The presence/absence of vegetation and the type of vegetation present in a greenway affects habitat quality, the greenway's effectiveness as a wildlife corridor, ecological sustainability, and the aesthetic experience for the trail user. Greenways are more effective at providing wildlife habitat and corridors when they have trees and shrubs present. Planting native vegetation along greenways can enhance the trail user's feeling of "getting back to nature." However, planting woody vegetation may not be an option on greenways whose alignments are on sewer or power line rights-of-way based on planting depth requirements. In locations where trees and shrubs are lacking and can be planted, native species are the most ecologically sustainable choice. As a group, native species require less maintenance than horticultural plantings and often provide wildlife with a food source.

Topography and soil moisture regime largely determine where different plant species occur. The land surface topography of New Hanover County generally can be characterized as an area of sandhills along the western side of the county, a broad terrace in the central portion (with uplands and wetlands), and a series of barrier islands along the eastern coastal edge. There is also a large area of riverine tidal wetlands in the northwestern and northern part of the county (LeBlond and Grant, 2003).

EXAMPLES OF COMMON NATIVE TREE AND SHRUB SPECIES THAT OCCUR IN THE SANDHILLS AREAS

Long leaf pine Pinus palustris
Loblolly pine Pinus taeda
Live Oak Quercus virginiana
Black gum Nyssa sylvatica
Sparkleberry Vaccinium arboretum
Wax myrtle Myrica cerifera
Gallberry Ilex glabra

EXAMPLES OF COMMON TREE AND SHRUB SPECIES THAT OCCUR IN THE CENTRAL TERRACE AREAS

Uplands

Loblolly pine Pinus taeda
Southern red oak Quercus falcata
White oak Quercus alba
Pignut hickory Carya glabra

Yellow poplar Liriodendron tulipifera Sweet gum Liquidambar styraciflua

Sweet pepperbush Clethra alnifolia Horse sugar Symplocos tinctoria

Possumhaw Ilex decidua

Wetlands

Green ash Fraxinus pennsylvanica

Red maple Acer rubrum

Bald cypress Taxodium distichum
Swamp chestnut oak
Sweet bay Quercus michauxii
Magnolia virginiana
Wax myrtle Myrica cerifera

INVASIVE SPECIES CONTROL

Invasive species are well established in the project area. They aggressively colonize areas, and force out native species, degrading habitat and aesthetic appearance. Common invasive species include privet (Ligustrum sp.), multiflora rose (Rosa multiflora).

These species cannot be completely eradicated permanently, but they can and should be controlled while trails are being implemented and during long-term maintenance of the greenway trail system.

EDUCATIONAL/CULTURAL OPPORTUNITIES

Greenway access to local educational and cultural points of interest can enhance community awareness and identity. There are a myriad of opportunities for educational and cultural experiences in New Hanover County and the proposed greenway system can serve the public interest as a physical link between them.

The greenway system can provide access to rich natural resources associated with many locations including:

- The North Carolina Aquarium and Fort Fisher State Park
- Carolina Beach State Park
- The Cape Fear River in multiple locations, and the associated riparian zones and streams that are tributaries of the Cape Fear River
- The Upper Smith Creek Significant Natural Heritage Area
- Lakes, the Intracoastal Waterway and the Atlantic Ocean
- Forests, freshwater marshes and brackish and estuarine marsh areas

Historic and cultural sites include:

- Fort Fisher
- Wilmington Historic District-period architecture throughout
- Numerous local museums
- The Riverfront district
- Wilmington National Cemetery
- Relict rice plantations and other productive natural resource lands
- Cultural landscapes including the Gullah/Geechee Cultural Heritage Corridor (http://www.nps.gov/guge/historyculture/index.htm)

With such abundant natural, historic and cultural resources, there are opportunities to include educational signage along the greenway that can provide the user with information that will greatly enrich their experience. Creating way-finding elements along the greenway can promote environmental, cultural and historical awareness and facilitate public appreciation and long-term stewardship of those valuable resources.

ONLINE RESOURCES

National Park Service-How Greenways Work-A Handbook on Ecology http://www. bouldercolorado.gov/files/openspace/pdf_gis/IndependentResearchReports/4657_Labaree_Jonathan.pdf

FHWA Bicycles and Pedestrian Program-Designing Sidewalks and Trails for Access http:// www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalks/ American Trails: http://www.americantrails.org/

Ecologically Sustainable Trails:

http://www.americantrails.org/resources/wildlife/Ecologically-Sustainable-Trails-MA. html

List of articles on trail design and construction by professionals in the field: http://www. americantrails.org/resources/trailbuilding/index.html-

Accessible Trails

http://www.americantrails.org/resources/accessible/index.html

State of Massachusetts, Trails Guidelines and Best Practices Manual. http://www.mass. gov/dcr/stewardship/greenway/docs/DCR_guidelines.pdf

Historic Architecture of New Hanover County http://www.nhcgov.com/PlanInspect/PublishingImages/Cemetery%20pics/Historic%20Architecture%20of%20NHC.pdf

International Mountain Biking Association http://www.imba.com/

MN DNR Trail Planning, Development and Design Guidelines http://atfiles.org/files/pdf/MNdesignSchoenbauer07.pdf

PermaTrak elevated concrete boardwalks http://www.americantrails.org/resources/consultants/businessdir_PermaTrak.html

Constructing wetland boardwalks and trails. http://aswm.org/pdf_lib/2_boardwalk_6_26_06.pdf

Frederick County Parklands – Bikeway and Trail Design Guidelines http://frederickcountymd.gov/documents/451/629/Bikeway%20and%20Trails%20 Design%20Standards.PDF

Boardwalk Construction Guidelines http://www.actontrails.org/BoardwalkDesign.pdf

Recreational Forest Trails: A Plan for Success http://www.ces.ncsu.edu/forestry/pdf/WON/won29.pdf

The Trail Planning Guide, An insight into the process of planning interpretive trails http://www.oete.de/tourism4nature/results/backdocs/The%20Trail%20Planning%20 Guide.pdf

Wetland Trail Design and Construction, US Dept of Transportation. http://www.fhwa.dot.gov/environment/recreational_trails/publications/fs_publications/01232833/found05.cfm

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