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CAROLINA BEACH Bicycle and Pedestrian Plan

PREPARED BY:

vhb

Integrated Mobility Division
N.C. DEPARTMENT OF TRANSPORTATION

Acknowledgements

Thank you to the residents of Carolina Beach for their consistent support of bicyclists and pedestrians and for their role in establishing a vision for a Town that is friendly, welcoming, and safe for all. Thank you to everyone who attended a meeting, workshop, or pop-up, who responded to a survey or provided comments, or who helped shape this plan in other ways. Special thank you to those who participated on the Plan's Steering Committee, the Staff Project Team, the North Carolina Department of Transportation (NCDOT) Integrated Mobility Division (IMD), and the Town Council.

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Introduction

The Town of Carolina Beach Bicycle and Pedestrian Plan ("the Plan") provides guidance for the Town, NCDOT IMD and other local and regional stakeholders in developing improvements to its bicycle and pedestrian infrastructure, programs, and policies. The Plan serves as a decision-making tool to assist leaders in prioritizing, funding, and implementing projects. The Town should evaluate and update this Plan over time.

1.1 Project Background

Recognizing the need for improved and expanded facilities for biking and walking, Carolina Beach staff and the Carolina Beach Bicycle and Pedestrian Committee applied for and were awarded IMD's multimodal planning grant to create a bicycle and pedestrian master plan, combining and updating the Bicycle Multi-Use Transportation Plan (2011) and Pedestrian Plan (2018). This Plan establishes a framework for identifying bicycle and pedestrian infrastructure, policy, and programmatic needs, and reflects input captured from the Carolina Beach community, the Plan Steering Committee, other stakeholders. This Plan meets the content standards set by IMD, and the project recommendations outlined herein will be eligible for inclusion in local and regional long-range plans and project prioritization

1.2 Project Vision and Goals

A walkable and bikeable community offers residents and visitors the choice of active transportation over traditional motorized transportation. Connecting existing facilities, reducing the barriers that may be preventing people from walking or biking, and improving quality of life by creating more safe and appealing public spaces are important goals of any bicycle and pedestrian plan.

To guide the planning process, the Steering Committee and project team developed the following Vision:

To enhance the livability of Carolina Beach by creating an appealing, walkable and bikeable environment for both residents and visitors.

Building on this Vision, the Steering Committee adopted the following goals:

- **To improve and emphasize the safety** of bicyclists and pedestrians in Carolina Beach.
- **To enhance accessibility** through the connectivity of bicycle and pedestrian facilities to various Town destinations, like neighborhoods, local businesses, parks, and beaches.
- **To promote a culture of active living** and establish the Town as a welcoming bicycle and pedestrian destination.
- **To prioritize** future bicycle and pedestrian projects based upon current conditions.

This Plan heavily prioritizes public involvement in the planning process to identify existing barriers to walking and biking and opportunities to connect important community destinations. Importantly, this Plan builds upon existing plans, the work of local champions, and local priorities to continue building a more vibrant and livable Carolina Beach.

1.3 Plan Components

This Plan provides a full framework for taking projects and recommendations to implementation. To do this, the Plan establishes a clear purpose (Section 1), assesses current conditions (Section 2), recommends facility improvements (Section 3), includes program and policy recommendations (Section 4), outlines an implementation strategy (Section 5), and assesses funding opportunities (Section 6).

2

Existing Conditions

This section details existing conditions analysis conducted by the project team, using GIS data, previous plans and projects, historic crash data, public input, and field review. The project team presented the existing conditions mapping and preliminary findings to the Steering Committee and the public in summer 2024. The summary below details the major findings and takeaways from this analysis. An extended existing conditions analysis is included in the Plan Appendix.

2.1 Study Area

The Town of Carolina Beach is home to 6,583 residents on Pleasure Island in New Hanover County, North Carolina, bordered by the Snow's Cut canal (north), the Atlantic Ocean (east), the Town of Kure Beach (south), and the Cape Fear River (west).[i] The Town is a member of the Wilmington Urban Area Metropolitan Planning Organization (WMPO).

Figure 1: Study Area

The Town is a popular resort destination, and during summer months the population of the Town balloons by nearly ten times. Combined with its proximity to the City of Wilmington and natural and recreational resources, the Town of Carolina Beach is a thriving beach community with many opportunities for residents, commuters, and tourists alike. The community has six parks – Carolina Beach State Park, Freeman Park, and four smaller neighborhood parks; the popular Island Greenway, which connects Kure Beach to Snow's Cut Park; and numerous beach access areas.

Residents and visitors use automobiles, golf carts, and bicycles as well as walking to get around town. Parking, especially in the summer season, is limited on the island, so bicycle and pedestrian access is key for people to be able to get to destinations and events on the island. Many children ride their bikes and walk to Carolina Beach Elementary School.

2.2 Transportation Infrastructure

Key Destinations

Identifying important community destinations is a key component of a bicycle and pedestrian network analysis. Carolina Beach has many destinations that residents access, or would like to access, on bike or foot. Beach access areas, Carolina Beach Lake, the Island Greenway, and the Boardwalk are primary destinations. Additional community destinations identified with public and stakeholder feedback are identified in Figure 2.

- The American Legion
- Carolina Beach Boardwalk
- Carolina Beach Elementary School
- Carolina Beach Lake Park
- Carolina Beach Library
- Carolina Beach State Park and Trail
- Food Lion & Publix
- Freeman Park
- Island Greenway & East Coast Greenway
- McDonald Park
- Public beach access
- Snow's Cut Park
- Snow's Cut Boating Access
- Senior Center
- Wilson Street Mini-Park/McDonald Park
- Good Hops Brewing and Disc Golf Course

Figure 2: Points of Interest and Key Destinations

Vehicle traffic during summer months can be prohibitive to conveniently driving between these and other locations. Combined with the relative short distances between many of these locations and the often-temperate climate in Carolina Beach, there is existing and latent demand for residents and visitors to have formal, safe facilities to walk and bike between these locations.

Existing Bicycle and Pedestrian Network

A robust pedestrian network exists between downtown and Carolina Beach Lake. Outside of the immediate downtown area, sidewalk networks are disconnected, creating pedestrian access issues for residents living west of Carolina Beach Elementary School, south of Carolina Beach Lake Park, and north of Harper Ave. N Lake Park Blvd. has sidewalks along the western side and sporadic sidewalks along the eastern side, from Dow Rd. to Harper Ave. Other sidewalks have been installed by various developments across Town.

Marked crossings with various levels of signal control, exist throughout Town, with some crossings along Lake Park Blvd. uncontrolled and some controlled with Rectangular Rapid Flashing Beacons (RRFBs).

Canal Dr., N Carolina Beach Ave., S Lake Park Blvd., and Dow Rd. have four-foot paved shoulders currently used by pedestrians.

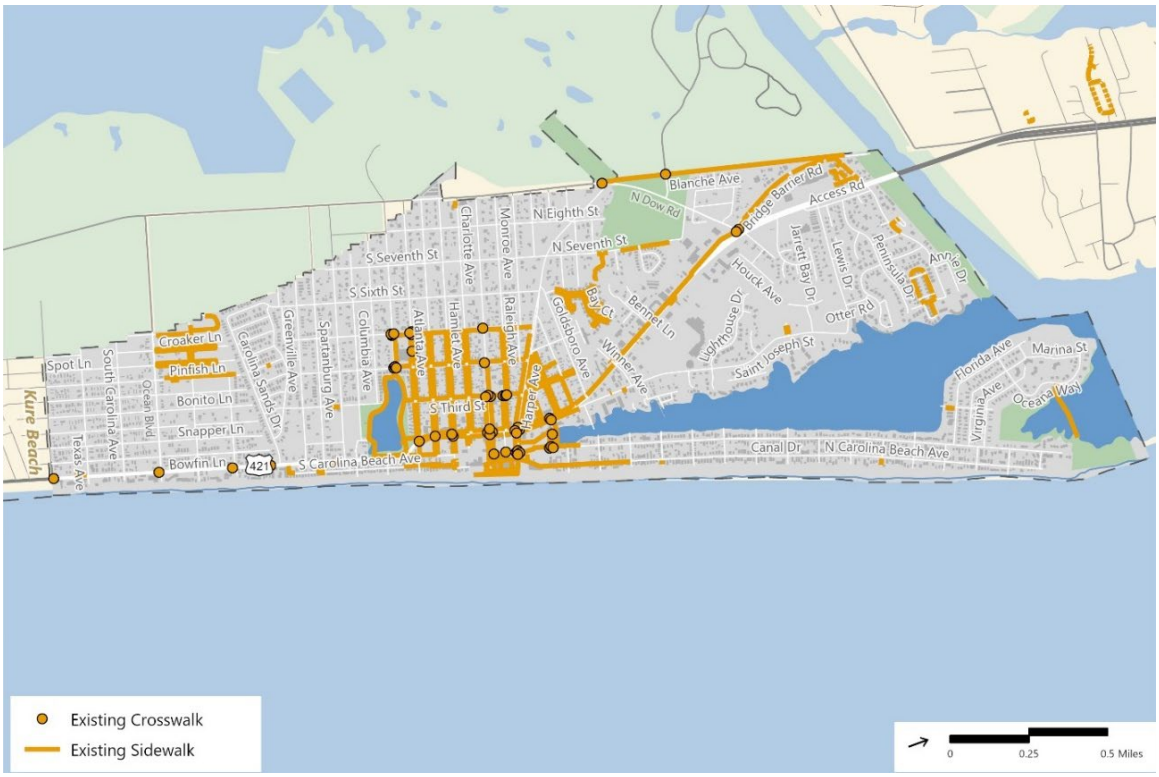


Figure 3: Existing Pedestrian Facilities

The Island Greenway runs along Old Dow Rd., from the intersection of Bridge Barrier Rd. and Spencer-Farlow Dr. to Harper Ave., spanning a quarter mile. To the north, the Island Greenway connects to Snow's Cut Trail, an unpaved trail bordering the Town's northernmost extent and spanning over a mile, that connects a boating access facility to the east and Carolina Beach State Park to the west. To the south, the Island Greenway continues in the roadway along Harper Ave.

to 8th St., where it picks up at Mike Chappell Park and continues off-road to Spot Ln. There is a Rectangular Rapid Flashing Beacon (RRFB)-controlled crossing at the Harper Ave. and Dow Rd. intersection, used for the Island Greenway. The East Coast Greenway is a regional bike route that extends through Carolina Beach, to Kure Beach in the south.

There are marked bike lanes on S Lake Park Blvd., south of Carolina Sands Dr., and along Canal Dr. in the north end.

Cape Fear Blvd. has a multi-use path (MUP) from Dow Rd. to S 3rd St. used by many bicyclists and pedestrians as a primary east/west connection. This MUP connects to sidewalks downtown, but bicyclists re-enter traffic at S. 3rd St., which is heavily impacted by vehicle traffic and parking, especially during summer months. For this Plan, the St Joseph St. MUP, which is being developed from Lake Park Blvd. to Hidden Hills Ln., is considered existing.

Figure 4: Existing Bicycle and Shared Use Facilities

Connectivity is a critical issue that prevents residents from being able to safely access the Town's numerous amenities and destinations. Primary concerns in the existing facilities include:

- East/west facilities
- Safe crossings on Lake Park Blvd. and Dow Rd.
- Continuous, connected facilities on Lake Park Blvd.
- North/south facilities that keep users off Lake Park Blvd

2.3 Community Engagement

This Plan's engagement process included establishing a steering committee to guide Plan development, interviewing stakeholders, and soliciting public input through public tabling, surveys, and workshops.

The Steering Committee included representatives from the Carolina Beach Bike Ped Committee, town staff and council, WMPO, NCDOT, and Carolina Beach Elementary School. The committee met four times during the planning process.

The project team distributed an interview questionnaire to a stakeholder group consisting of representatives from partner organizations. Respondents represented WAVE Transit, Carolina Beach Elementary School PTA, local business owners, and the Kure Beach Bicycle and Pedestrian Committee.

Public input points included review of existing conditions, identifying constraints and opportunities, and reviewing recommendations. The project team hosted a public tabling event at the Carolina Beach Market in June 2024, an online survey from May to July 2024, and two community open houses at Town Hall in September 2024. These methods resulted in more than 1,000 input points.

Figure 5: Photos and Maps from Public Workshops

Community members were very involved in the formation of this Plan's recommendations, and public input was essential to the identification and prioritization of projects. The following sections capture major themes that emerged from the community engagement, as well as specific locations where community members wanted to see improvements. Additional public engagement summaries are included in the Plan Appendix.

Strong Desire for Multimodal Infrastructure and Connectivity

The results of the public engagement in Carolina Beach indicate a clear desire for improved bicycle and pedestrian infrastructure that facilitate greater access to destinations in and around the Town. Safety and a lack of connectivity were major issues raised in the public survey and at public events. Sidewalks and MUPs were consistently mentioned across all engagement platforms, highlighting the importance of the separation of users in Carolina Beach.

Priority Corridors

The community mentioned many locations that should be prioritized for improvements. Community members typically based their prioritization on perceived safety and how often bicyclists and pedestrians share the road with vehicles. The following corridors were repeatedly identified as high priorities for the community:

- Lake Park Blvd.
- St Joseph St.
- Ocean Blvd.
- Carolina Beach Ave./Canal Dr.
- Harper Ave.

Other themes

The results of public engagement in Carolina Beach also pointed to other common themes surrounding bicycle and pedestrian facilities, including concerns about infrastructure and access for golf carts and e-bikes throughout the community. There was also a call for providing alternative routes for bicyclists and pedestrians to get around the Town without using any major roads like Dow Rd. or Lake Park Blvd. Specifically, respondents wished to see neighborhood connections and bicycle boulevards throughout Carolina Beach.

2.4 Key Takeaways

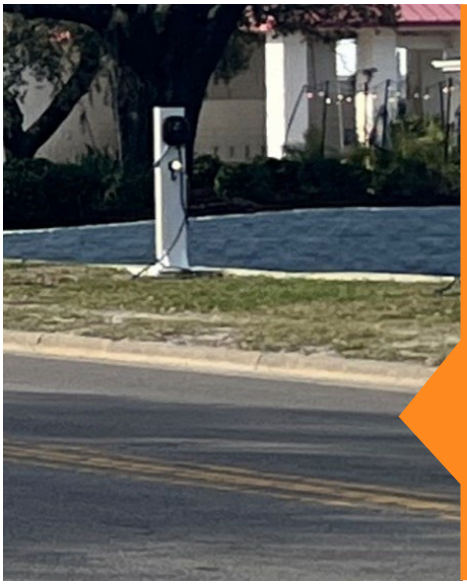
Challenges

Like many resort towns, Carolina Beach has a lot of vehicle traffic and a lot of pedestrian and bicycle traffic during beach months. This creates conflicts between users. Lake Park Blvd. presents a primary challenge to bicycle and pedestrian travel in Carolina Beach. Lake Park Blvd. has limited bicyclist and pedestrian infrastructure along the road for those traveling north/south and crossing the road for those traveling east/west. Additional connectivity challenges exist along other roadways, including Dow Rd., Spencer Farlow Dr., and Ocean Blvd.

The photo inventory below shows some examples of common challenges in Carolina Beach.

Many roads lack pedestrian bicycle or pedestrian facilities and have clear "goat paths" where pedestrians are walking in the grass or sand.

Location: S Lake Park Blvd. near Lake Dr.

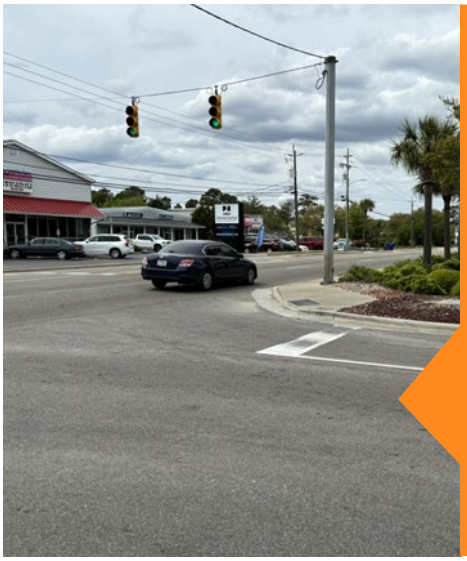


More goat paths on near commercial pedestrian activity generators.

Location: N Lake Park Blvd.

More goat paths on busy roads.

Location: Harper Ave. near S 8th St.



Wide intersections with visibility concerns. Curb ramps without marked crosswalks or pedestrian signals.

Location: S Lake Park Blvd. @ Publix

Utilities obstructing pedestrian facilities.

Location: S Lake Park Blvd. near Cape Fear Blvd.

Observed bicycle traffic mixing with vehicle traffic to cross Lake Park Blvd.

Location: S Lake Park Blvd.

More bicycle traffic mixing with vehicle traffic on Lake Park Blvd.

Location: S Lake Park Blvd.

Wide intersections lack crosswalks or sidewalks.

Location: Woody Hewett Ave. and S Lake Park Blvd.

Opportunities

Carolina Beach has an active community of residents and visitors invested in the bicycle and pedestrian network. The Town has a demonstrated history of prioritizing and implementing bicycle and pedestrian projects. Opportunity exists to prioritize connections in the existing network where there is an observed need as well as through creative land use connections. Carolina Beach adopted their first land use ordinance in 2024, which created the opportunity to use policy decisions to prioritize and implement a bicycle and pedestrian network alongside development. Many Carolina Beach streets are neighborhood streets that would not require major infrastructure projects to prioritize the safety of road users of all age and ability.

The photo inventory of common challenges on the previous pages present opportunities that inform the recommendations, including adding sidewalk where there are visible goat paths, improving intersection crossings for bicyclists and pedestrians, and ensuring bicyclists and pedestrians have clear, safe, and unobstructed networks across Town. These and other opportunities inform the recommendations in the following sections.

3

Recommended Facilities

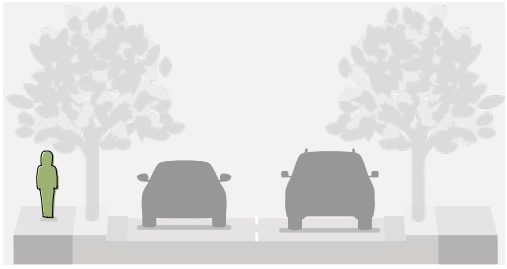
This section outlines the infrastructure recommendations intended to promote the development of a continuous and navigable network for active transportation. This section outlines the planning process, bicycle and pedestrian facility recommendations, and prioritization metrics.

3.1 Overview

The recommendations in the Plan include a diverse mix of facilities designed to make safe, logical connections for bicyclists and pedestrians throughout Carolina Beach. These recommendations account for the needs of pedestrians and bicyclists as unique users, as well as the needs of users of all age and ability. Recommendations were developed through Steering Committee input, public input from in-person events and an online survey, gaps and opportunities analysis, existing conditions review, ongoing and upcoming projects, and the iterative development of an implementation matrix.

Pedestrian and Bicycle Facility Types Summary

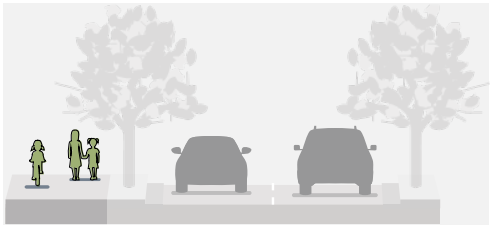
The following descriptions and diagrams detail the facility types recommended in this Plan. The maps that follow display where these various facilities are recommended in Carolina Beach.



Sidewalks

In an ideal future, every road in Carolina Beach will have either a sidewalk or a Multi-Use Path on it. Separating pedestrians from vehicles as often and with as much redundancy as possible is recognized as a long-term goal for Carolina Beach. Sidewalks, as right of way permits, should be at least 5 feet wide and include a vegetative buffer from the curb, emphasizing the separation of modes.

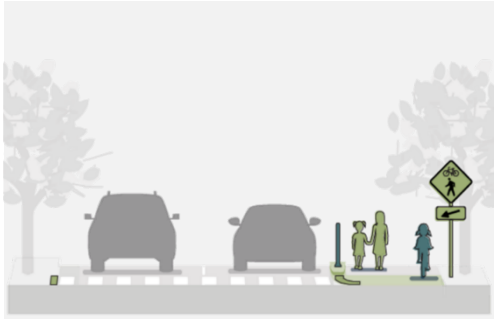
In some spots, sidewalk recommendations may differ from bicycle recommendations. Corridors identified for sidewalks should add crosswalks and all-way stops at all intersections, especially in neighborhoods. Alternatively, corridors identified for bicycle recommendations should strive to stop traffic on minor approaches, so that bicyclists traveling along the corridor are not required to stop at every intersection. This difference is explored further in the Bicycle Boulevard section.



Multi Use Path (MUP)

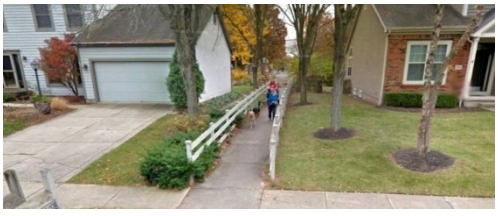
MUPs, as right of way permits, should be at least 10 feet wide and include a vegetative buffer from the curb, emphasizing the separation of modes. MUPs are shared facilities for users of all age and ability. They are particularly valuable for providing safe facilities for youth and families and on routes where mixing bicyclists of any age with vehicles creates amplified safety concerns.

Sidewalk recommendations can be upgraded to MUP recommendations in the future and should be evaluated for use and demand.



Constrained ROW Sidepath

This design innovatively addresses the constraints of right-of-way (ROW) in implementing MUPs. It is ideal for roads connecting key locations with high pedestrian and bicycle activity where traditional MUPs or sidewalks aren't feasible. The facilities enhance multimodal connectivity and offer a safe, separated space for cyclists and pedestrians of all age and ability.



Neighborhood Connector (Clintonville Greenways)

Neighborhood Connector

This facility type effectively connects bicycle and pedestrian facilities across short distances. When placed strategically, neighborhood connectors can help provide easier and more direct access to other neighborhoods and public amenities. Neighborhood connectors are typically short, paved MUPs. Neighborhood connector recommendations were largely informed by public input and formalizing existing paved or unpaved connections. These recommendations will require additional community engagement and may require collaboration with private landowners for implementation.

Bicyle Boulevard

Bicycle boulevards ensure that bicycle travel takes priority over motorists by slowing car speeds, implementing safety measures, and creating a clear route for cyclists. In practice, this may include medians with openings for bike crossings, stop signs on cross streets to favor bike movement, bicycle wayfinding signage, and mini traffic circles at intersections. These recommendations are implemented primarily on neighborhood roads where bicyclists are sharing the travel lane with vehicles instead of having a protected or separated bicycle lane or facility.

Bicycle Boulevard routes and priority sidewalk routes may not always align, as these roads are meant to facilitate safe bicycle traffic with minimal stop signs along the routes, while sidewalk recommendations will emphasize stopping all users at intersections to facilitate safe pedestrian crossing. Due to low cost and right-of-way impacts, Bicycle Boulevards can, however, be implemented as short-term solutions at locations identified in the Plan for larger infrastructure projects like MUPs and sidewalks.

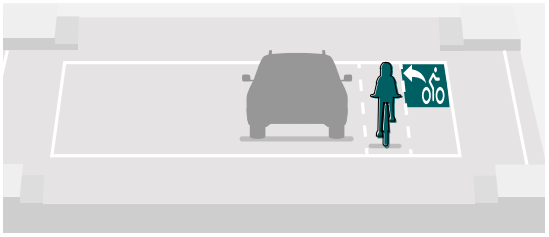
Photo and graphic examples of wayfinding signage and various enhanced shared lane markings.

Neighborhood Slow Zone

Neighborhood Slow Zones should be near areas with many vulnerable road users such as elementary schools, parks, or downtown. These zones highlight key walking and biking areas and encouraging slower driving speeds to enhance safety. These are ideal for contained "neighborhoods", where it is feasible to implement "gateways" or visual cues to all road users that they are entering a Neighborhood Slow Zone. These are also useful facilities in areas where other constraints make implementing sidewalks or MUPs difficult or infeasible. Implementation includes lowering posted speed limits to no more than 20 MPH, implementing curb extensions and daylighting at intersections, and using additional signage and pavement markings.

Crosswalk Improvement

Crosswalks are a major component of safe pedestrian networks and are best used to connect the existing network. Adding new crosswalks and making improvements to existing ones increases pedestrian connectivity and safety. Improvements may include installing accessible curb ramps, detectable warning strips, and adjusting signal elements. Recommendations in this plan include adding Rectangular Rapid Flashing Beacons (RRFBs) at crossing locations with high traffic volumes, improving marking and signage at priority crossing locations, and adding crosswalks on all intersection legs in downtown.

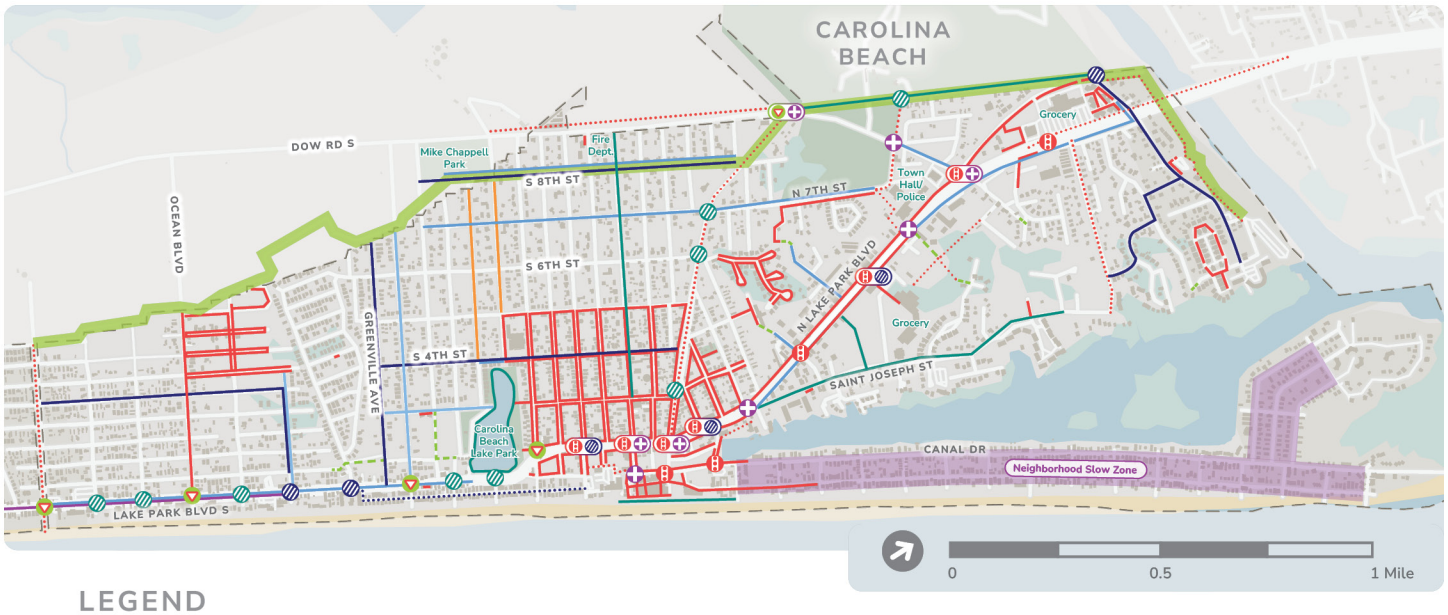


Intersection Improvement

Improvements to intersections encompass a wide range of traffic and safety elements. Intersection improvements focus on prioritizing bicycle and pedestrian user safety and visibility at key intersections, and include elements like new high visibility crosswalks, adding pedestrian signals, shortening crossing distance, adding refuge islands and curb extensions, reconfiguring intersection geometry and corner radii, and installing bike boxes at primary signalized intersections where bicyclists are mixing with vehicle traffic.

3.2 Bicycle and Pedestrian Recommendations Map

See the following pages for a close-up of the western and eastern sides of the project area.



LEGEND

Linear Recommendations

- Bike Blvd
- Constrain ROW Sidepath
- Contraflow
- MUP
- Neighborhood Connector
- Sidewalk

Existing Facilities

- Existing Full Signal
- Existing RRFB
- Existing MUP
- Existing Sidewalk
- Existing Bike Lanes
- Island Greenway

Point Recommendations

- Crosswalk Improvement
- Intersection Improvement
- New Crosswalk
- Existing Full Signal and Crosswalk Improvement
- Existing Full Signal and Intersection Improvement
- Existing RRFB and Intersection Improvement

Figure 6: Full Recommendations Map

LEGEND

Linear Recommendations

- Bike Blvd
- Constrain ROW Sidepath
- Contraflow
- MUP
- Neighborhood Connector
- Sidewalk

Existing Facilities

- Existing Full Signal
- Existing RRFB
- Existing MUP
- Existing Sidewalk
- Existing Bike Lanes
- Island Greenway

Point Recommendations

- Crosswalk Improvement
- Intersection Improvement
- New Crosswalk
- Existing Full Signal and Crosswalk Improvement
- Existing Full Signal and Intersection Improvement
- Existing RRFB and Intersection Improvement

Figure 7: Recommendations Map (South of Harper)

LEGEND

Linear Recommendations

- Bike Blvd
- Constrain ROW Sidepath
- Contraflow
- MUP
- Neighborhood Connector
- Sidewalk

Existing Facilities

- Existing Full Signal
- Existing RRFB
- Existing MUP
- Existing Sidewalk
- Existing Bike Lanes
- Island Greenway

Point Recommendations

- Crosswalk Improvement
- Intersection Improvement
- New Crosswalk
- Existing Full Signal and Crosswalk Improvement
- Existing Full Signal and Intersection Improvement
- Existing RRFB and Intersection Improvement

Figure 8: Recommendations Map (North of Harper)

3.3 Recommendation Development Process and Prioritization Matrix

Recommendations

Based on findings from the existing conditions analysis, public engagement, and review of existing Town plans and projects, the project team developed a list of project recommendations that align with the Plan's vision, goals, and objectives. Recommendations development was an iterative process to identify high need, high value network components with community support. Final projects are detailed in the following sections.

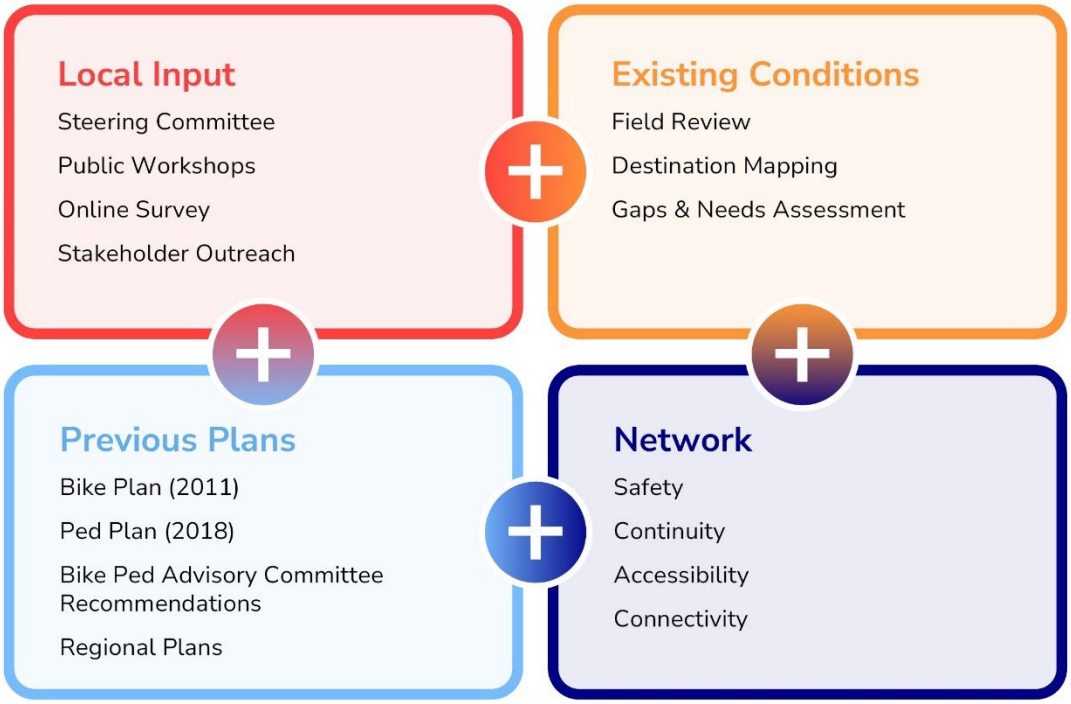


Figure 9: Recommendations Process

Prioritization

Project prioritization aims to guide staff in implementing recommended projects by analyzing and ranking projects according to a composite score. The composite score is developed by running the recommended projects through a prioritization matrix that documents a project's ease of implementation, public support, cost, and connectivity to existing infrastructure or community resources. The matrix assigns scores to the project based on the extent to which it meets the evaluation criteria, and each score is added together to create one composite score per project. Weights were assigned to the evaluation criteria through discussion with the Steering Committee. The complete list of recommended projects and their weighted scores can be found in Table 2.

Table 1: Project Weighting Criteria

Category	Weighting	Metric	Description	Max Weighted Point Total
Implementation	1	Cost	Project costs based on planning level assessment • High (>$1M): 1 • Medium ($500,000 - $1M): 3 • Low (<$500,000): 5	10
	1	Level of Complexity	Project complexity based on the type of requirements necessary (based on planning-level assessment) • Limited Engineering Complexity: 4 • Moderate Engineering Complexity: 2 • High Engineering Complexity: 0 • Town-owned: 1	
Public/Past Plans Support	2	Identified by stakeholders or Steering Committee	Y: 1 N: 0	10
	2	Identified in Bicycle or Pedestrian Plan	Y: 1 N: 0	
	2	Public Support	High: 2 Moderate: 1	
	2	Plan Alignment	Y: 1 No: 0	
Addresses Plan Goals	1	Provides a multimodal connection to key community destinations	Connection to Community Assets, measured by distance (within 1000 feet) to: • School: 3 • Park: 2 • Grocery: 2 • Downtown: 1 • Beach Access: 1	10
			Demonstrated/measured needs assessment, assessed by the presence of worn path: • Y: 1 • N: 0	
	5	Addresses a known safety issue	Safety measured by crash history, speed limit, and distance to existing crossing • Within 1000' of Bike/Ped crash: 1 • Speed Limit 35+: 1 • <100 feet to crossing: 0 • 100-500 feet to crossing: 0.5 • 500+ feet to crossing: 1	15
	1	Increases access to recreational biking and walking in Carolina Beach	Access to recreational facilities measured by connection to existing and safe facilities. • Connects to dedicated bicycle or pedestrian facility that separates bikes and peds from vehicular traffic: 2 • Connects to the Island Greenway: 2 • Connects to a neighborhood/slow street: 1	5

Project Recommendations

The project list in the following tables should be considered as a general guide. As explained further in the implementation section of the Plan, all recommendations are consistent with Plan goals and should be considered priorities to establishing a complete network. Opportunities to develop any project should be considered as they arise. As the Town develops performance metrics for the Plan, project priorities may shift, or phasing may become more important as the network is developed. As such, the project list and weights should not be considered as a fixed, phased implementation plan, and should instead be continually evaluated and tracked.

Linear facilities are identified in Table 2, and intersections are identified in Table 4. Bicycle Boulevard and Neighborhood Slow Zone recommendations are identified in Table 3. While these projects have independently weighted scores, they should be implemented systematically as a network, due to their comparatively low-cost investment.

Table 2: Recommended Linear Projects and Weights

Project Type	Road Name	From Street	To Street	Project Description	Weight
Sidewalk	Lake Park Blvd	St Joseph St	Proximity Dvpt.	Sidewalk with vegetative buffer on east side of Lake Park Boulevard connecting the newly constructed sidewalk at Proximity to the St Joseph Street intersection and MUP crossing.	32
MUP	Harper Ave	Dow Rd	S 3rd St	MUP with vegetative buffer along the southern side of Harper. Sidewalk along northern side from 7th to 3rd. MUP can be implemented in segments. Connecting the Island Greenway on Dow Road to the Bicycle Boulevard on N 8th Street should be a priority segment	30
MUP	Dow Rd	Harper Ave	Clarendon Blvd.	MUP on the west side of Dow Rd connecting the Island Greenway to parcel under consideration for development. While additional crossings of Dow Rd are not included in this Plan, this MUP recommendation should be considered to necessitate safe crossings at Cape Fear Blvd. and Clarendon Blvd. Crossings should be evaluated for PHBs or full traffic signals.	29
Sidewalk	Lake Park Blvd	Carolina Beach Lake	Alabama Ave	Sidewalk with vegetative buffer (where possible) along the western side of Lake Park Blvd from Carolina Beach Lake to Alabama Ave. Dual sidewalk (along the eastern and western sides) should be considered in the long-term.	28
MUP	Snow's Cut Bridge	Lewis Dr	New Hanover Co	MUP connection across bridge	28
Sidewalk	Lake Park Blvd	Bertram Dr	Access Rd	Sidewalk with vegetative buffer connecting existing sidewalk (at 1322 N Lake Park Blvd) to Access Rd along the eastern side of Lake Park Blvd.	27
Sidewalk	Lake Park Blvd	Dollar General	Bertram Dr	Sidewalk with vegetative buffer connecting the gap in existing sidewalk on east side of Lake Park Blvd between 1136 N Lake Park Blvd and 1322 N Lake Park Blvd.	26
Contraflow Bike Lane	Carolina Beach Ave S	Lake Park Blvd	Hamlet Ave	Buffered contraflow bike lane (against one-way travel), with shared lane markings in the direction of travel.	24.5
Sidewalk	S 3rd St	Greenville Ave	Carolina Beach Lake	Sidewalk on one or both sides of S 3rd St. All way stops and marked crosswalks at each road crossing.	24
MUP	Joseph Lewis Ryder Park	Publix Parking Lot	Lake Park Blvd Connector	Paved greenway as recommended in Park Master Plan	24
MUP	Joseph Lewis Ryder Park	Lake Park Blvd Connector	Lighthouse Dr Connector	Paved greenway as recommended in Park Master Plan	24

Project Type	Road Name	From Street	To Street	Project Description	Weight
MUP	Federal Point/Town Hall	N 7th St	Lake Park Blvd	MUP through existing Town Hall property connecting N 7th St to Lake Park Blvd. and new Lake Park Blvd crossing recommendation at Town Hall.	23
Neighborhood Connector	Lake Park Blvd Ext	Lake Park Blvd	Joseph Lewis Ryder Park	Neighborhood Connector connecting crossing recommendation at Town Hall to Joseph Lewis Ryder Park	23
Sidewalk	Winner Ave	Lake Park Blvd		Sidewalk connecting along Winner Ave from Lake Park Blvd to the Neighborhood Connector recommendation.	23
Neighborhood Connector	Winner Ave Ext	Winner Ave	Ivy Ln	Neighborhood Connector	23
Sidewalk	Spencer Farlow Dr	Driveway	Access Rd	Sidewalk with vegetative buffer connecting existing sidewalk, under 421 bridge, to Access Rd	23
Sidewalk	S 8th St	Tarboro Ave	Mike Chappell Park Entrance	Sidewalk on west side of S 8th St connecting from Tarboro to Mike Chappell Park. All way stops and marked crosswalks at each road crossing.	23
MUP	7th Street	Rec Center	N Dow Rd	MUP with vegetative buffer along the southern side of N 7th street, connecting the new Dow Rd crossing recommendation to the Town Hall property	22
Neighborhood Connector	S 2nd St	Lake Ave	Sumter Ave	Neighborhood Connector	22
Sidewalk	Access Rd	Spencer Farlow Dr	Lewis Dr	Sidewalk with vegetative buffer connecting new Lewis Dr. MUP recommendation to Spencer Farlow Dr.	22
MUP	Snows Cut Trail	Old Dow Rd	Amie Dr	Pave the existing trail.	22
MUP	Lewis Drive	St Joseph St	Access Rd	MUP connecting new St Joseph St MUP to Access Road along one side of Lewis Drive. Strategies for flood-prone areas could include a segment of boardwalk MUP. Bicycle Boulevard can be a short-term implementation.	22
Neighborhood Connector	Bowfin Ln Ext	Carolina Sands Dr	Bowfin Ln	Neighborhood Connector	21.5
Neighborhood Connector	Sumter Ave	S 2nd St	S 3rd St	Neighborhood Connector	21
Constrained ROW Sidepath	Clarendon Blvd	S 5th St	S 8th St	A modified MUP design that limits impacts on right of way, drainage, and utilities. Sidepath design is a minimum 10 foot width, at-grade path on the edge of the roadway separated by concrete barriers with gaps to permit drainage and runoff to reach the berm. A Clarendon sidepath would connect to CBES, the Carolina Beach Lake entrance, and Mike Chappell Park.	21
MUP	Joseph Lewis Ryder Park	Joseph Lewis Ryder Park	Houck Ave	Paved greenway as recommended in Park Master Plan	20
Neighborhood Connector	Joseph Lewis Ryder Park Ext	Joseph Lewis Ryder Park	Lighthouse Dr	Neighborhood Connector	20
Sidewalk	N Dow Rd	Lake Park Blvd	N 7th St	Sidewalk with vegetative buffer on north/west side of roadway, extending past Elton Ave to new crossing recommendation and MUP extension at N 7th St. Design of the connection between Elton Ave and the crossing at N 7th St should consider the usage of golf carts on this block.	18
Sidewalk	7th St	Rec Center	Spartanburg Ave	Sidewalk with vegetative buffer on at least one side of roadway. Create new connection between Spartanburg and Sumter. All way stops and marked crosswalks at each road crossing. Sidewalk can be implemented and prioritized in phases, with the connection between Cape Fear Blvd and the Rec Center the top priority.	18
Neighborhood Connector	Peninsula Dr Ext	Peninsula Dr	Island Marina Dr	Neighborhood Connector	18

Project Type	Road Name	From Street	To Street	Project Description	Weight
MUP	N 7th St Ext	Dow Rd	Old Dow Rd	MUP extension along the utility easement between the residential neighborhood and the state park land, connecting Old Dow Rd to N Dow Rd.	17.5
Sidewalk	Spartanburg Avenue	Island Greenway	Lake Park Blvd	Sidewalk with vegetative buffer on at least one side of the roadway connecting the Island Greenway to Lake Park Blvd. All way stops, crosswalks, and signage at intersections.	17
Sidewalk	S 4th St	Columbia Ave	Clarendon Blvd	Sidewalk connection between existing sidewalk at Carolina Beach Elementary School and Constrained ROW Sidepath recommendation	17
Neighborhood Connector	S 2nd St	Greenville Ave	Carolina Sands Dr	Neighborhood Connector	16.5
MUP	Lake Park Blvd	St Joseph St	Carl Winner Dr	MUP extension on eastern side of Lake Park Blvd, connecting new St Joseph MUP to Carl Winner Dr.	16
MUP	Canal Drive Ext.	Cape Fear Blvd	Hamlet Ave	MUP connection across parking area, connecting Canal Dr to Woody Hewett Ave without needing to cross Lake Park Blvd.	16
Neighborhood Connector	Risley Rd Ext	Risley Rd	Bertram Dr	Neighborhood Connector	16
Sidewalk	Tennessee Ave	Lake Park Blvd	Pinfish Ln	Sidewalk on one or both sides of Tennessee Ave. from Lake Park Blvd to the existing sidewalk on Pinfish Lane. All way stops and marked crosswalks at each road crossing.	16
Sidewalk	Bennet Ln	Lake Park Blvd	-	Sidewalk connecting along Bennet Ln from Lake Park Blvd to the Neighborhood Connector recommendation	14
Neighborhood Connector	Bennet Ln Ext	Bennet Ln	Island Palms Dr	Neighborhood Connector	14
Constrained ROW Sidepath	Columbia Ave	S 3rd St	S 8th St	A modified MUP design that limits impacts on right of way, drainage, and utilities. Sidepath design is a minimum 10 foot width, at-grade path on the edge of the roadway separated by concrete barriers with gaps to permit drainage and runoff to reach the berm. Columbia Ave sidepath would connect to new sidewalk recommendation on S 3rd St, a new entrance to Carolina Beach Lake, and Mike Chappell Park.	13.5
MUP	Alabama Ave	Lake Park Blvd	Spot Ln	MUP with vegetative buffer along one side of Alabama Ave	11

Table 3: Bicycle Boulevards and Neighborhood Slow Zone

Project Type	Road Name	From Street	To Street	Project Description	Weight
Bike Blvd	Spencer Farlow Drive	Old Dow Road	Risso Lane	Wayfinding signage, minor street stop signs, enhanced shared lane markings, lighting improvements.	35
Neighborhood Slow Zone	Carolina Beach Ave N/Canal Dr	Pelican Ln	Salt Marsh Ln	Implement Pilot Slow Zone for the north end starting at Pelican Lane. Improvements should include "gateway" signage and treatment, lowering speed limits, daylighting and curb extensions at alternating intersections, lane markings, and additional traffic calming measures. Evaluation of the Slow Zone should include access management on east/west streets and one-way controls on north/south streets.	32
Bike Blvd	Greenville Avenue	Lake Park Dr	7th St	Wayfinding signage, minor street stop signs, enhanced shared lane markings, lighting improvements.	27.5
Bike Blvd	Mackerel Ln	Tennessee Ave	Alabama Ave	Wayfinding signage, minor street stop signs, enhanced shared lane markings, lighting improvements.	27
Bike Blvd	8th Street	Sumter Ave	Harper Ave	Wayfinding signage, minor street stop signs, enhanced shared lane markings, lighting improvements.	25.5
Bike Blvd	S 4th St	Harper Ave	Clarendon Blvd	Wayfinding signage, minor street stop signs, enhanced shared lane markings, lighting improvements.	24

Project Type	Road Name	From Street	To Street	Project Description	Weight
Bike Blvd	Tennessee Ave	Bowfin Ln	Mackerel Ln	Wayfinding signage, minor street stop signs, enhanced shared lane markings, lighting improvements.	23.5
Bike Blvd	Otter Rd	St Joseph St	Teakwood Dr	Wayfinding signage, minor street stop signs, enhanced shared lane markings, lighting improvements.	21
Bike Blvd	Whelk Lane	Lewis Dr	Spencer Farlow	Wayfinding signage, minor street stop signs, enhanced shared lane markings, lighting improvements.	20
Bike Blvd	S 4th St	Clarendon Blvd	Harper Ave	Wayfinding signage, minor street stop signs, enhanced shared lane markings, lighting improvements.	19.5
Bike Blvd	Teakwood Dr	Otter Rd	Peninsula Dr	Wayfinding signage, minor street stop signs, enhanced shared lane markings, lighting improvements.	19
Bike Blvd	Peninsula Drive	Teakwood Dr	Access Rd	Wayfinding signage, minor street stop signs, enhanced shared lane markings, lighting improvements.	16

Table 4: Recommended Intersection Projects and Weights

Project Type	Road Name	Project Description	Weight
Intersection Improvement	N 7th St and Dow Rd	High Visibility Crosswalk and PHB. Crossing design and signage should consider the usage of golf carts connecting from N. 7th St to Elton Ave.	32
Intersection Improvement	Lake Park Blvd and St Joseph St	Realign intersection to perpendicular geometry, add high visibility crosswalks and pedestrian signals	30
New Crosswalk	Lake Park Blvd and Lake Dr	High Visibility Crosswalk and RRFB	29
New Crosswalk	Lake Park Blvd and Driftwood Ln	High Visibility Crosswalk and RRFB	29
Crosswalk Improvement	Spencer Farlow Dr and Old Dow Rd	High Visibility Crossing connecting to the Island Greenway	28
New Crosswalk	Lake Park Blvd and North Carolina Ave	High Visibility Crosswalk and RRFB	26
Intersection Improvement	Lake Park Blvd and N Dow Rd	Realign intersection geometry to slow vehicle turning speeds and shorten crosswalks. Add concrete refuge islands. Add high visibility crosswalks and pedestrian signals on east, west, and north legs.	26
Intersection Improvement	Lake Park Blvd at Town Hall	Add a traffic signal with pedestrian signals, high visibility crossing, and trail crossing.	24
New Crosswalk	Harper Ave and N 3rd St	High Visibility Crosswalk and Signage (Consider All Way Stop)	23.5
Crosswalk Improvement	Lake Park Blvd at Publix	High Visibility Crosswalk on all approaches, add pedestrian countdown signals. Add traffic signal for vehicles leaving commercial driveway on western approach.	22
New Crosswalk	Harper Ave and N 7th St	High Visibility Crosswalk and Signage (Consider All Way Stop)	22
New Crosswalk	N 7th Ext MUP/Old Dow Rd	High Visibility Crossing connecting to the Island Greenway	22
Crosswalk Improvement	Lake Park Blvd and Carl Winner Dr	High Visibility Crosswalk all approaches	22
Intersection Improvement	Harper Ave and Dow Rd	Realign intersection geometry to remove right turn slip lane, convert RRFB to full traffic signal, add pedestrian countdown signal on southern approach connecting to Island Greenway	21
Crosswalk Improvement	Lake Park Blvd and Tennessee Ave	Add RRFB to crossing	21
Intersection Improvement	Lake Park Blvd and Harper Ave	Add shared lane markings and bike boxes at intersection east and west approaches	21

Project Type	Road Name	Project Description	Weight
Crosswalk Improvement	Harper Ave and Canal Dr	Raised intersection. Option to close Canal to southbound traffic using bollards and convert signal to stop-control.	19
New Crosswalk	Lake Park Blvd and Texas Ave	High Visibility Crosswalk and RRFB	19
Intersection Improvement	Lake Park Blvd and Cape Fear Blvd	Add shared lane markings and bike boxes at intersection east and west approaches	19
Crosswalk Improvement	Lake Park Boulevard near Carolina Sands Dr	Add RRFB to crossing	17
Crosswalk Improvement	Lake Park Blvd and Hamlet Ave	High Visibility Crosswalk on the northern leg.	17
New Crosswalk	Harper Ave, Goldsboro St, and N 6th St	High Visibility Crosswalk and Signage (Consider All Way Stop)	15
New Crosswalk	Lake Park Blvd and South Carolina Ave	High Visibility Crosswalk and RRFB	15

3.4 Project Cutsheets

From the project prioritization matrix, the Steering Committee and project team identified eight priority projects for cutsheets. These were identified through rank voting by the Steering Committee and an identified need to establish a clearer vision for some priority projects through the development of cutsheets. Table 5 provides an overview of these priority projects.

Table 5 Priority Cutsheet Projects and Planning Level Cost Estimates

Cut-Sheet	Project Name	Pedestrian Projects	Bicycle Projects	Description	Estimated Cost
1-A & 1-B	Lake Park Blvd at Dow Rd Intersection	✓		Add high visibility crosswalks and pedestrian signals on the north, east, and west legs of the intersection. Option to to remove right turn "slip lane" on Dow Rd and replace with a curb extension.	$751,000
2	N 7th St at Dow Rd Intersection	✓	✓	Add Pedestrian Hybrid Beacon (PHB) at N 7th St and sidewalk connection to Elton Rd. Supports recommendations to add MUPs on N 7th St.	$84,000
3	Harper Ave at Dow Rd Intersection	✓	✓	Convert intersection to a full traffic signal. Remove right turn "slip lane" with curb extensions on both eastern corners. Supports recommendation to extend Island Greenway on Harper Ave.	$410,000
4	Harper Ave at Canal Dr Intersection	✓	✓	Install a raised intersection. Option to use bollards to close Canal Dr to southbound traffic on southern leg of intersection.	$429,000
5	Winner Ave Neighborhood Connector	✓	✓	Paved neighborhood connector along existing cut-through.	$550,000
6	Harper Ave MUP	✓	✓	Install a MUP along Harper Ave, from Dow to 3rd St. Option to implement in phases, with Dow Rd to S 8th St. as priority connection.	$4,853,000
7	Lake Park Blvd Sidewalks	✓		Install sidewalks on Lake Park Blvd from Alabama Ave to Carolina Beach Lake.	$3,187,000
8	Bicycle Blvd Network		✓	Improve and formalize connectivity by creating routes that prioritize bicyclists. Install wayfinding signs, pavement markings, and other tools in strategic locations around Carolina Beach	$89,000
				TOTAL COST	**$10,353,000**

PROJECT
1.A

Figure 10: Lake Park Blvd./Dow Rd. Intersection Cutsheet

Lake Park Blvd. and Dow Rd. Intersection Pedestrian Improvements

The intersection carries a high volume of traffic at high speeds in an area with businesses and restaurants. There are no crosswalks across the north, south, or east legs of the intersection, limiting pedestrian connectivity to key destinations. There are no sidewalks on the eastern and northwestern sides of the intersection. Due to the high volume of vehicle traffic, reducing capacity on Lake Park Blvd. is likely to cause congestion issues. Many residents noted that they would prefer to walk or bicycle between businesses in the area, but doing so is prohibitively difficult.

The recommendations focus on improving crossing safety and connectivity to other plan recommendations. The intersection crossing recommendations build on sidewalk connectivity recommendations along the eastern side of Lake Park Blvd. (from Access Rd. to Dollar General) and the northern side of Dow Rd. (to N 7th St.). The recommended crossing at Town Hall supplements a crosswalk on the southern leg of this intersection, which might require more significant vehicle capacity reduction.

Existing Conditions

PROS

- \+ Creates new, safe crossing opportunities and uses concrete medians for refuge islands
- \+ Vegetation strips provide an additional buffer between pedestrians and high-speed traffic
- \+ Increases sidewalk connectivity on the eastern frontage of Lake Park Blvd. and along Dow Rd.
- \+ Significant public support

CONS

- — Does not provide crossing access along the south leg of the intersection across Lake Park Blvd.
- — Does not realign intersection geometry to reduce vehicle turning speeds
- — Project costs
- — Reliant on connectivity to other Plan recommendations

Route	AADT (2020)	Speed Limit	Roadway Width (ft)	ROW (ft)	Local
Lake Park Blvd.	26000	35	118	100	No
Dow Rd.	12000	45	56	100	No

Project conceptual rendering from aerial perspective.

Proposed Facility

- High visibility crosswalks and pedestrian signals on the east, west, and north legs of the intersection
- High visibility crosswalk on Bridge Barrier Rd.
- New sidewalk connectivity with vegetative buffer

Total Planning Level Cost: $751,000

- **Design:** $89,000
- **ROW:** $23,000
- **Utilities:** $0
- **Construction:** $639,000

Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2023 USD ($)

PROJECT
1.B

Figure 10: Lake Park Blvd./Dow Rd. Intersection Cutsheet

Lake Park Blvd. and Dow Rd. Intersection Pedestrian Improvements

The intersection carries a high volume of traffic at high speeds in an area with businesses and restaurants. There are no crosswalks across the north, south, or east legs of the intersection, limiting pedestrian connectivity to key destinations. There are no sidewalks on the eastern and northwestern sides of the intersection. Due to the high volume of vehicle traffic, reducing capacity on Lake Park Blvd. is likely to cause congestion issues. Many residents noted that they would prefer to walk or bicycle between businesses in the area, but doing so is prohibitively difficult.

This recommendation differs from the previous by removing the right turn "slip lane" from Dow Rd. and reducing the corner radius at the this turn lane, therefore reducing the number of crossings and crossing distance on Dow Rd.

Existing Conditions

PROS

- \+ Creates new, safe crossing opportunities and uses concrete medians for refuge islands
- \+ Vegetation strips provide an additional buffer between pedestrians and high-speed traffic
- \+ Realignment of intersection geometry slows vehicle turning speed and decreases crossing distance
- \+ Increases sidewalk connectivity on the eastern frontage of Lake Park Blvd. and along Dow Rd.
- \+ Significant public support

CONS

- — Does not provide crossing access along the south leg of the intersection across Lake Park Blvd.
- — Corner radius adjustment may impact turning movements for large vehicles
- — Likely higher project cost

Route	AADT (2020)	Speed Limit	Roadway Width (ft)	ROW (ft)	Local
Lake Park Blvd.	26000	35	118	100	No
Dow Rd.	12000	45	56	100	No

Project conceptual rendering from aerial perspective.

Proposed Facility

- High visibility crosswalks and pedestrian signals on the east, west, and north legs of the intersection
- High visibility crosswalk on Bridge Barrier Rd.
- New sidewalk connectivity with vegetative suffer
- Removal of the slip lane on Dow Rd. replacing with a curb extension

Total Planning Level Cost should be re-evaluated based on feasibility of curb extension and corner radius reduction

PROJECT
2

Figure 11: N 7th St. and Dow Rd. Intersection Cutsheet

7th St. and Dow Rd. Intersection Multimodal Improvements

The intersection carries a high volume of traffic at high speeds in an area that is surrounded by residential and recreational land uses. The Elton Ave. residential community is effectively disconnected from safe pedestrian and bicycle access to other areas of Carolina Beach, including 7th St. and Lake Park Blvd. Currently there are no crosswalks or sidewalks on any leg of this intersection. 7th St. provides access to neighborhoods, downtown, parks, and beach access without having to use Dow Rd. or Lake Park Blvd. This is already a high-volume crossing location for pedestrians, bicyclists, golf carts and other non-vehicular road users.

This recommendation focuses on making this intersection safer for the many residents and visitors already crossing here. The primary intersection improvements include a Pedestrian Hybrid Beacon (PHB) on Dow Rd. This recommendation has significant public support and supports the MUP and sidewalk connectivity Plan recommendations at this site. The signalized crossing should not be dependent on the connectivity of MUPs, and the design should consider the use of golf carts at this crossing.

Existing Conditions

PROS

- Facilitates safe multimodal access and connectivity across Dow Rd.
- Separates users in space along N 7th St.
- Halts the flow of traffic to ensure users may cross without concern for traffic movement
- Increases marking visibility
- Connects to two MUP recommendations
- Significant public support

CONS

- Impacts to vehicular movement
- Design of the crossing will need to consider golf carts using the facility
- Design of the connection to Elton Ave will need to be wide enough for shared use of pedestrians, bicyclists, and golf carts

Route	AADT (2020)	Speed Limit	Roadway Width (ft)	ROW (ft)	Local
7th St.	-	20	18.5	50	Yes
Dow Rd.	12000	45	56	100	No

Project conceptual rendering from person-level perspective.

Durham, NC

Proposed Facility

- Crosswalk
- Pedestrian Hybrid Beach (PHB)
- MUP and sidewalk connections on N 7th St., Dow Rd., and "alley"

Total Planning Level Cost: $84,000

- **Design:** $10,000
- **ROW:** $3,000
- **Utilities:** $0
- **Construction:** $71,000

Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2023 USD ($)

PROJECT
3

Figure 12: Harper Ave. and Dow Rd. Intersection Cutsheet

Harper Ave. and Dow Rd. Intersection Multimodal Improvements

The intersection carries traffic at high speeds on Dow Rd. with a stop control on Harper Ave. and an RRFB at the Island Greenway crossing. The current configuration of the intersection makes crossing dangerous, with users having to cross the full width of Dow Rd. including a right turn "slip lane". There are no sidewalks on the southeast side of Dow Rd. nor on Harper Ave. Harper Ave. serves as a direct connection into downtown Carolina Beach and to continue along the Island Greenway.

The recommended improvements focus on making the intersection safer for pedestrians and bicyclists, ensuring those using the Island Greenway have a consistently comfortable experience. The primary recommendation is to convert the Stop Control + RRFB into a full traffic signal. The recommendation also reconfigures the intersection geometry, adding curb extensions on both eastern corners and shortening the crossing distance for Island Greenway users. The inset map shows the recommendation for extending the MUP along the western side of Dow Rd.

Existing Conditions

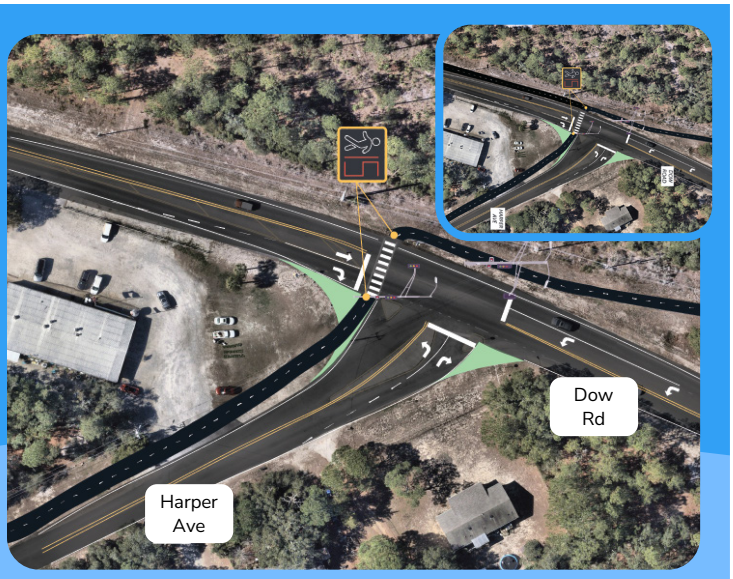
PROS

- Addition of full traffic signal ensures safer crossings at a high-volume, high-speed intersection
- Connection to recommendation for Harper Ave. MUP, improving safety of Island Greenway users from Dow Rd. to 8th Street.
- Curb extensions shorten crossing distance and slow vehicle turning speeds
- Creates opportunity for future crossing additions on eastern and northern approaches, should the Town add bicycle or pedestrian facilities along the eastern side of Dow Rd.

CONS

- Traffic signal impact on vehicular movement and delay.

Route	AADT (2020)	Speed Limit	Roadway Width (ft)	ROW (ft)	Local
Harper Ave.	-	25	35	100	Yes
Dow Rd.	12000	45	56	100	No



Project conceptual rendering from aerial perspective.

Proposed Facility

- Conversion of RRFB to full traffic signal
- 2 pedestrian countdown signals on either side of Dow Rd.
- High visibility crosswalk on Dow Rd.
- Island Greenway MUP extension along Harper Ave.
- Curb extensions on the eastern corners of the intersection
- Tying in recommendation to extend MUP south on Dow Rd. for future development **(see inset)**

Total Planning Level Cost: $410,000

- **Design:** $57,000
- **ROW:** $15,000
- **Utilities:** $0
- **Construction:** $338,000

Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2023 USD ($)

PROJECT
4

Figure 13: Harper Ave. and Canal Dr. Intersection Cutsheet

Harper Ave. and Canal Dr. Intersection Multimodal Improvements

The intersection is located at a highly popular pedestrian and bicycle destination in Downtown Carolina Beach and is a gateway for downtown for bicyclists and pedestrians. During peak season, this intersection has very high pedestrian volumes. The businesses along the southeastern corner create visibility concerns for pedestrians crossing this leg of the intersection.

The recommended improvements focus on making the intersection safer and better connected for pedestrians, prioritizing slow vehicle speeds and emphasizing the role of multimodal use. The primary recommendation is to raise and stamp this intersection. There is also the potential to alter traffic flow on the south side of the intersection, closing the road to southbound traffic, only allowing bicycles to travel on south segment of the road.

PROS

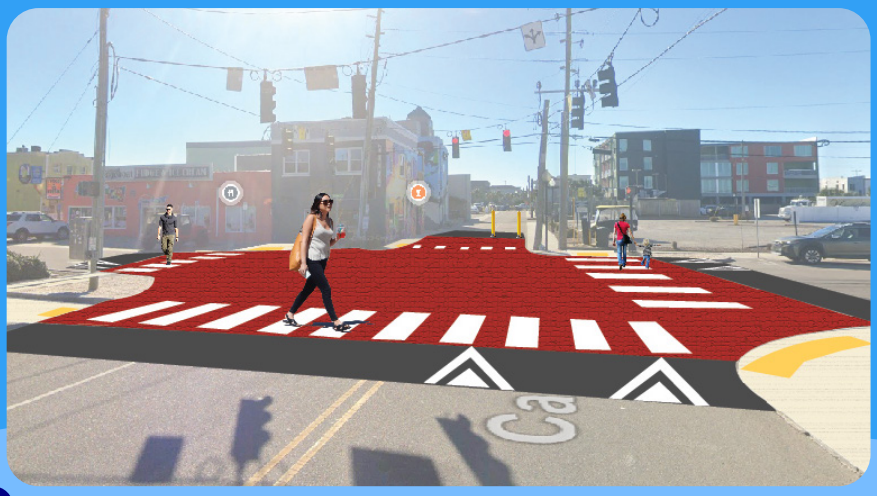
- \+ Establishes a gateway to downtown for bicyclists and pedestrians
- \+ Improves safety for all modes accessing downtown
- \+ Significant public support

CONS

- — Impacts to vehicular traffic
- — Costs

Existing Conditions

Route	AADT (2020)	Speed Limit	Roadway Width (ft)	ROW (ft)	Local
Harper Ave.	-	25	42	50	Yes
Canal Dr.	3800	25	40	50	Yes



Project conceptual rendering from person-level perspective.

Proposed Facility

- Raised Intersection
- Stamped asphalt
- Potential to consider closing southern leg to vehicles or closing to through traffic (using bollards)

Total Planning Level Cost: $429,000

- **Design:** $51,000
- **ROW:** $13,000
- **Utilities:** $0
- **Construction:** $365,000

Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2023 USD ($)

PROJECT
5

Figure 14: Winner Ave. Neighborhood Connector Cutsheet

Winner Ave. Neighborhood Connector

This area is currently used as a pedestrian and bicyclist east/west connection from Ivy Ln. to Winner Ave. and Lake Park Blvd. Without a connection, pedestrians and bicyclists would travel out to Goldsboro Ave. to Lake Park Blvd.

Neighborhood Connector recommendations focus on identifying opportunities to create new or formalize existing connections between residential neighborhoods and pedestrian and bicyclist destinations. These create more connection opportunities without building new roads or impacting traffic patterns. These recommendations are primarily built on public input from workshops and support the Plan's goals for accessibility and connectivity.

The recommended improvements focus on making a clear and direct pathway from Ivy Ln. to Winner Ave. This connection removes pedestrians and bicyclists from the main roads and offers an alternative route, safe for users of all age and ability. The recommendation includes sidewalk connection along Winner Ave. to Lake Park Blvd. Signage should indicate that bicyclists ride with traffic on Winner.

Existing Conditions

PROS

- \+ Allows pedestrians and bicyclists to avoid main roads
- \+ Increases east/west connections across Carolina Beach

CONS

- — Potential Stormwater impacts
- — Project cost
- — Will require additional community engagement
- — Will require working with private property owners for easement or acquisition
- — Sidewalk crosses multiple driveways and commercial parking

Route	AADT (2020)	Speed Limit	Roadway Width (ft)	ROW (ft)	Local
Ivy Ln.	-	20	20	50	Yes
Winner Ave.	-	20	35	50	Yes

Project conceptual rendering from aerial perspective.

Proposed Facility

- Neighborhood connector between Ivy Ln. and Winner Ave.
- Sidewalks along Winner Ave.

Total Planning Level Cost: $550,000

- **Design:** $189,000
- **Utilities:** $116,000
- **ROW:** $79,000
- **Construction:** $116,000

Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2023 USD ($)

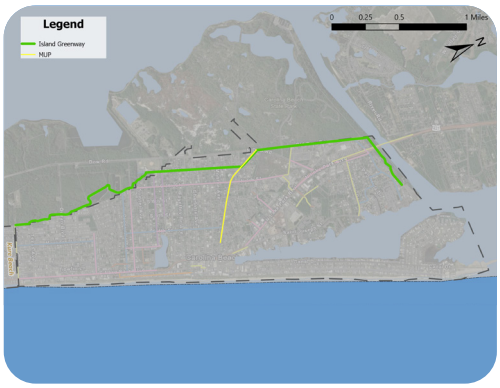
PROJECT
6

Figure 15: Harper Ave. MUP Cutsheet

Harper Ave. Multi-Use Path

Harper Ave. is a main connecting roadway leading into downtown Carolina Beach and public beach access. Along its north and south sides, Harper connects to many residential neighborhoods, parks, and other destinations. It is important to note that the northern segment of Harper Ave. from Dow Rd. to 8th St. is included in the Island Greenway. However, the only bicycle facilities provided are shared lane markings, which are fading and are more appropriate for low speed roads. Many members of the public noted high vehicle speeds on Harper Ave., especially the stretch west of the median. These factors make it a strong candidate for bicycle and pedestrian improvements.

The recommended improvements focus on providing a protected MUP along Harper Ave. This recommendation provides a primary east-west connection across Carolina Beach and removes pedestrians and bicyclists from a road with observed high vehicle speeds. This MUP can be prioritized by segment, with the block from Dow Rd. to S 8th St. being a priority connection of the Island Greenway. Parking stall design should mirror the angle design on Cape Fear Blvd.



Existing Conditions

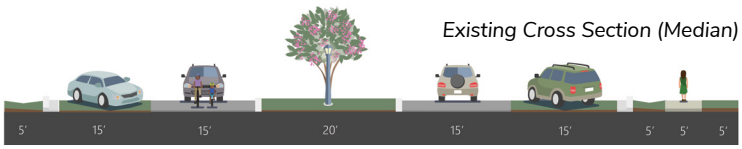
PROS

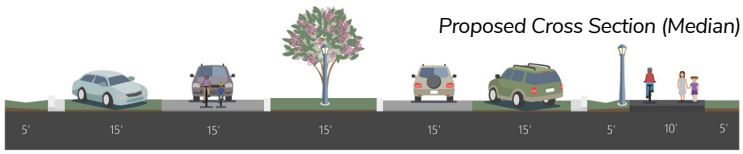
- Separates pedestrians and bicyclists in space allowing for safer travel for all
- Connects the Island Greenway with a safe facility that ties into a Bicycle Blvd. recommendation on S 8th St.
- Connects to other proposed projects
- Significant public support

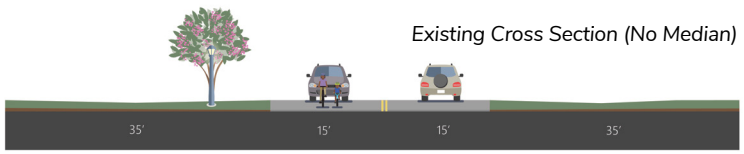
CONS

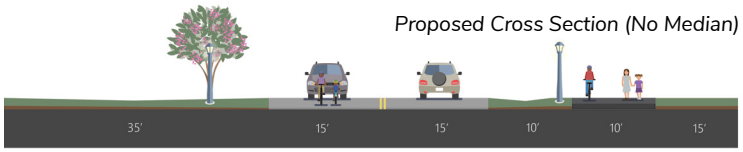
- May need to be constructed in phases
- Project cost

Route	AADT (2020)	Speed Limit	Roadway Width (ft)	ROW (ft)	Local
Harper Ave.	-	25	42	100	Yes









Proposed Facility

- Multi-use path along Harper Ave, from Dow Rd. to 3rd St.

Total Planning Level Cost: $4,853,000

- **Design:** $746,000
- **Construction:** $2,768,000
- **ROW:** $444,000
- **Utilities:** $895,000

Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2023 USD ($)

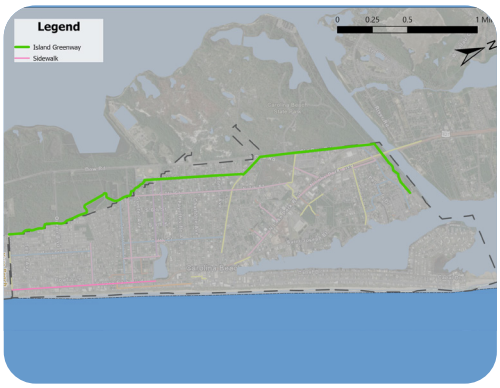
PROJECT
7

Figure 16: S Lake Park Blvd. Sidewalk Cutsheet

S Lake Park Blvd. Sidewalks

S Lake Park Blvd. is a very popular route for all modes. It is a common route as it leads into downtown Carolina Beach and beach access and continues south towards Kure Beach. There are businesses and the Carolina Beach Lake Park located along S Lake Park Blvd. However, the current roadway is very narrow and cannot adequately accommodate the needs of all road users. During peak season, pedestrians and bicyclists are regularly walking in the roadway, traveling in large groups to access the beach, boardwalk, businesses, and other amenities. Crosswalks and RRFBs have been added at some intersections, but there are no sidewalks. Residents consider pedestrian improvements to S Lake Park Blvd. as one of the most necessary projects in Carolina Beach.

The recommended improvements focus on providing a pedestrian facility along S Lake Park Blvd. This recommendation completes the connection between downtown and the southern end of Carolina Beach. The connection removes pedestrians from the road and offers a separated space allowing for more comfortable and safe travel. The recommendation builds on crossing improvements at all beach access points, emphasizing the safety of pedestrians along this busy, shared roadway.



Existing Conditions

PROS

- \+ Separates pedestrians in space allowing for safer walking in and out of downtown and the beach.
- \+ Connects to other proposed projects
- \+ Significant public support

CONS

- — Limited roadway width
- — Project Cost

Route	AADT (2020)	Speed Limit	Roadway Width (ft)	ROW (ft)	Local
S Lake Park Blvd.	7200	25	30	50	No

Project conceptual rendering from person-level perspective.

Proposed Facility

- Sidewalks along S Lake Park Blvd. from Alabama Ave to Carolina Beach Lake Park

Total Planning Level Cost: $3,187,000

- **Design:** $289,000
- **ROW:** $289,000
- **Utilities:** $289,000
- **Construction:** $1,033,000

Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2023 USD ($)

PROJECT
8

Figure 17: Bicycle Boulevard Network Cutsheet

Bicycle Boulevard Network

Throughout the Town of Carolina Beach, there are many opportunities to prioritize bicycle travel. With a variety of low volume, low speed neighborhood roads, and destinations spread throughout the Town, Carolina Beach is a strong candidate for the systemic implementation of Bicycle Boulevards. These Bicycle Boulevards build on public input and the Town's Bike and Walk Map.

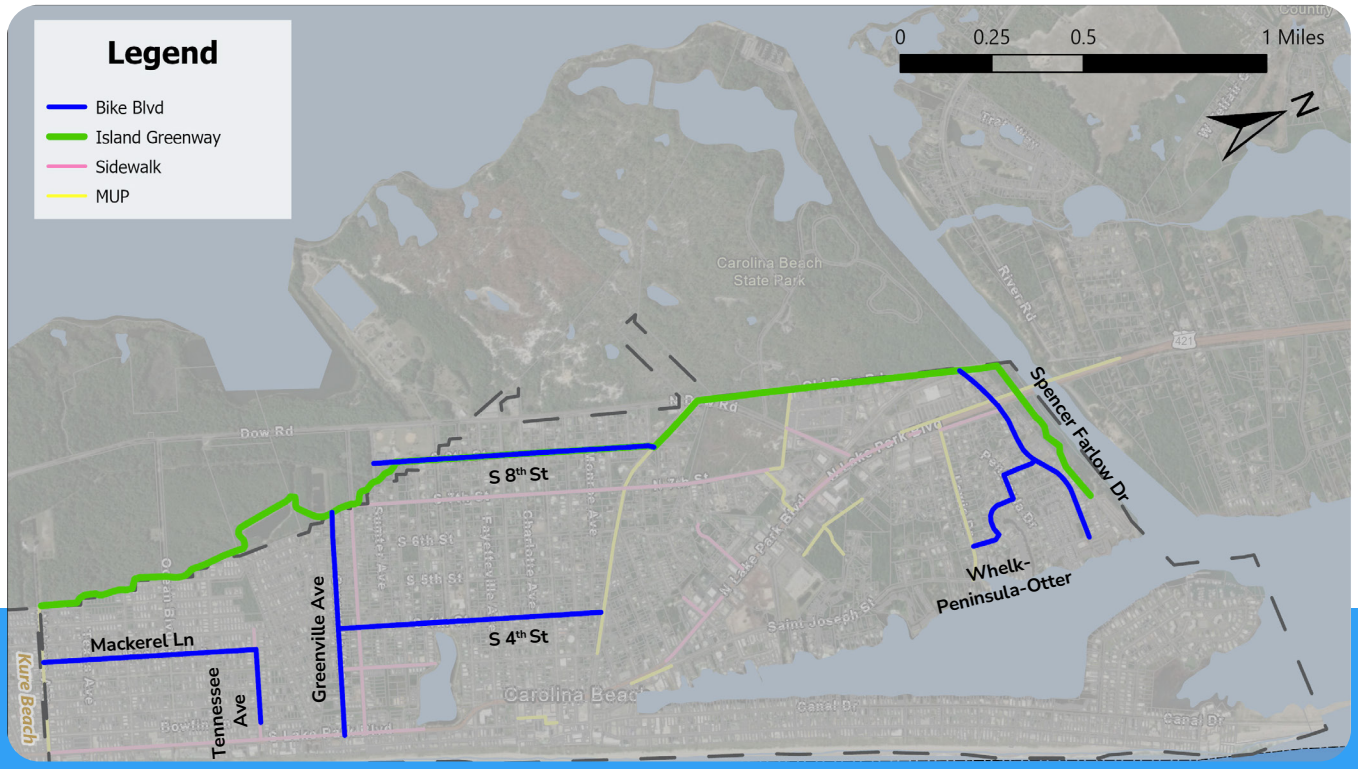
The recommended improvements focus on providing various bicycle corridors through Carolina Beach, and prioritize bicyclists with signage, minor approach stop signs, pavement markings, speed management, and enhanced wayfinding.

PROS

- \+ Prioritizes bicycle mode throughout the town
- \+ Slowing of motor vehicles to improve safety of bicycle travel on priority routes
- \+ Connects to other proposed and existing projects to create a full network
- \+ Resolves a frequently identified public need
- \+ Project cost and implementation

CONS

- — Large project scope



Project conceptual rendering from aerial perspective.

Proposed Facility

- Mackerel Ln. from Alabama Ave. to Tennessee Ave.
- Tennessee Ave. from Mackerel Ln. to Bowfin Ln.
- Greenville Ave. from 7th St./Island Greenway to Lake Park Blvd S.
- S 4th St. from Greenville Ave. to Harper Ave.
- S 8th St. from Sumter Ave. to Harper Ave.
- Spencer Farlow Dr. from Old Dow Rd. to Island Marina Dr.
- Whelk Ln. to Peninsula Dr. to Teakwood Dr. to Otter Rd.

Total Planning Level Cost: $89,000

Costs developed with NCDOT's Bicycle and Pedestrian Cost Estimation Tool and adjusted to 2023 USD ($)

4

Recommended Programs and Policies

In addition to infrastructure (Section 3), strong programs and policies can help encourage and support pedestrians and bicyclists within the Town.

4.1 Existing Programs

Carolina Beach Bicycle and Pedestrian Committee

The Town's Bicycle and Pedestrian Committee is an active committee working to enhance the experience of bicyclists and pedestrians in Carolina Beach. The committee meets regularly to discuss bicyclist and pedestrian needs, evaluate and track progress on plan implementation, develop educational materials, and advocate for bicyclist and pedestrian safety and connectivity.

Carolina Beach Bicycle and Pedestrian Facilities Map

The Bicycle and Pedestrian Committee created a biking and walking map for residents and visitors in Carolina Beach. The map shows the locations of all bicycle and pedestrian facilities in Carolina Beach and highlights key destinations around the Town. This map is highly useful for educating bicyclists and pedestrians about how to safely travel around Carolina Beach. As new bicycle and pedestrian infrastructure gets built in Carolina Beach, the Bicycle and Pedestrian Committee should work with the Town to prepare an updated facilities map. The Town should consider adding bicycle parking facilities to the map and designating routes by facility type (MUP, Sidewalk, Bicycle Boulevard, etc.) to help user experience, expectation, navigation, level of comfort, and safety. This map is available on the Town's website (carolinabeach.org/visitors/island-greenway), and print copies are available at Town Hall.

Wayfinding Signs

Carolina Beach has already installed several wayfinding signs around the Town that direct travelers to the Island Greenway. As the bicyclist and pedestrian network expands, the Town could expand wayfinding signage to help users navigate bicycle and pedestrian infrastructure and alert drivers to be aware of bicyclists and pedestrians. The Town should consider adding information like distance and travel time to destinations on the wayfinding signage, and making them more visible to all road users, indicating to drivers that they are on a shared roadway. Some existing wayfinding signage (as pictured) also includes information on the East Coast Greenway (ECGW). As the Town expands wayfinding signage, it may be necessary to separate ECGW and Town signage.

Carolina Beach Elementary School (CBES) Bike, Walk, and Roll to School

Carolina Beach Elementary School hosts an annual Bike, Walk and Roll to School event in October. Many students and parents at CBES participate. The Town could consider sponsoring the event or expanding the event to encourage all residents of Carolina Beach to bike, walk, or roll to their places or work or other daily activities that day.

4.2 Program Recommendations and Resources

Encouragement Programs

The Town can use encouragement programs to strengthen the walking and bicycling culture within the community. Local businesses and Town departments can all play a role in encouraging pedestrian and bicycle activities through a variety of local opportunities and incentives. Increasing the amount and coverage of encouragement programs were highly recommended from the Plan's community outreach.

Non-Infrastructure Transportation Alternatives Program

NCDOT Non-Infrastructure Transportation Alternatives Program funds grants for Safe Routes to School (SRTS). Agencies may request up to three years of funding for projects that encourage children to walk and bike to school, make walking more appealing, and facilitate the development of projects and activities to improve transportation safety near schools. The SRTS Program uses federal funds to fund projects ranging from one to three years. Funding amounts may range from $50,000 to $500,000 per project. Funding may be requested to support activities for community-wide, regional, or statewide programs. The Town may choose to coordinate with school, the school district, or the county to pursue funding and recommend projects. Numerous projects in the Plan align with the goals of the SRTS Program.

Walking/Bicycling Tours and Clubs

Walking and bicycling tours encourage active transportation and present an opportunity for residents to socialize. By developing and advertising one or more formal tour routes in association with the Town's walking and bicycling map, the Town could identify routes to connect pedestrians and bicyclists to recreational, shopping, dining, and scenic destinations. Tour routes could begin with existing facilities and expand as the network develops. A running or bicycling club could be another way for residents to come together in small groups and experience the Town while enjoying active recreation and socialization.

Story Walks

Story walks, strolls, or trails are an interactive way to get people of all ages out walking while reading children's picture books. These walks are simple and low cost to set up, requiring only a physical copy of a children's book. The Town has one StoryWalk at Carolina Beach Lake Park and should consider expanding this program to other existing and proposed MUP facilities to promote that these facilities are friendly for all ages.

Awareness Days and Events

The Town can devote specific days of the year to raise awareness related to pedestrian and bicycle promotion and encourage socializing, especially downtown and on multi-use facilities like MUPs. Examples of national events include National Walk to Work Day (April), Earth Day (April 22), National Trails Day (First Saturday in June), PARK(ing) Day (September), National Open Streets Day (September), and National Walk and Roll to School Day (October).

Temporary Installations and Open Streets

The Town can use temporary installations to get the public invested and excited about Carolina Beach's multimodal future. There are several types of temporary projects the Town can conduct:

- **Open Streets:** an event where a section of a street or multiple connecting streets are closed to cars and activities occur in the public right-of-way, often including bicycle rides, outdoor seating, and other potential uses for the public space. These events often occur on a weekend and engage the community in imagining community-centered public spaces. This type of activity could be sponsored by the Town, arts groups, or the county. Open Streets can be particularly effective in downtown business districts and as opportunities to test our various streets and projects identified in the Plan.
- **Demonstration Projects:** short-term installations of bicycle or pedestrian infrastructure using low-cost and temporary materials. These projects can evaluate the effectiveness of different facilities or recommendations without investing in the full development of them. Potential examples include application of continental crosswalk marking patterns and curb extensions with flex posts and pavement markings, flex-post-protected sidepaths, and traffic calming.

Temporary installation of a street mural and separated bike lanes (Asheville, NC)

- **Pop-up bicycle parks/traffic gardens:** short term bike installations can be a quick solution to implement a safe space for recreational biking. A pop-up bicycle park or traffic garden installation can be created to help participants learn and develop safe bicycling skills and gain experience with traffic signage, guidelines, and infrastructure.

National Programs in Support of Walk or Bike Friendly Community Designations

Several national recognition programs encourage towns and cities to promote pedestrian and bicyclist activity. The Town can pursue or strive for progress towards one of the programs that recognize communities that are working to improve access, safety, mobility, and transportation options. Recognition programs include being designated as a Walk Friendly Community[1] or Bike Friendly Community[2]. New Hanover County joined the AARP Age Friendly Community designation in 2024[3].

Law Enforcement as Encouragement

Law enforcement can be used as an encouragement program by incentivizing or reinforcing appropriate behavior. Local law enforcement can conduct a pedestrian enforcement campaign that commends pedestrians for using crosswalks, or a motorist enforcement campaign that rewards motorists for yielding to pedestrians, for instance. The Town can work with local business owners to provide gift certificates, coupons, or other small tokens as rewards, and should conduct these in visible locations and promote them beforehand on social media.

Education Programs

Educational programs should promote safe behaviors, rules, and responsibilities for all roadway users.

Project-Related Efforts

The Town should coordinate closely with NCDOT and other local stakeholders when elements of the Plan and other pedestrian or bicycle roadway improvements are planned or implemented. Public involvement and education are essential throughout the project process. Communication with the public during the planning phase ensures the community is aware of upcoming events or potential impacts to the roadway, construction schedules, improvements, and proposed completion dates. This also provides an opportunity for community feedback, which can help inform future educational efforts on the project. Once a project is completed, education efforts should provide information on how to use the facility.

Internal Education

Education is not limited to the community, but should also include all key staff involved in Plan implementation. This includes Town staff, Council members, and Steering Committee members as well as NCDOT Division staff and regional or county staff, when relevant. Opportunities for education include, but are not limited to, the following:

- Staff presentations on sessions or conference events.
- Meetings or retreats on the Plan to discuss the status of the Plan, potential funding opportunities, roadblocks to implementation, or other similar pertinent information.

[1] https://www.walkfriendly.org/apply/

[2] https://bicyclefriendly.secure-platform.com/a/page/community

[3] https://livablemap.aarp.org/member/new-hanover-county-nc

- Coordination between agencies and departments, such as information or resource sharing between transportation, planning, health, facilities, parks and recreation, and other such departments.
- Training opportunities—webinars, brown bag lunch presentations—to educate staff on guidelines and designs and best practices from across the state and nation.

Youth focused bicycling event (Mecklenburg County, NC)

Let's Go NC – Pedestrian and Bicycle Curriculum

NCDOT sponsors this free educational program and provides instructional lesson plans, videos, and other downloadable programming to teach children how to walk and bicycle safely. Instructors do not need training. Schools, community organizations, and businesses can be good partners for this type of training or event.

Electric Mobility

As electric mobility is becoming more common across the country, Carolina Beach is experiencing a rapid increase in the use of electric bicycles, electric scooters, and other electric-powered mobility options. The Town should develop educational materials around safety, user behavior, and yield requirements.

The Town could consider speeds and comfort in the design of future MUPs or expansion(s) of the Island Greenway. The Swamp Rabbit Trail in the City of Greenville (SC), along with other facilities across the country, have implemented "Fast Lanes" and "Slow Lanes" in the design of their off-road multi-use facilities. These designs separate users through user's own assessment of their speed preference, and they create space for pedestrians or slower moving users with fewer conflicts with electric mobility or fast recreational users, for instance. To accommodate this type of design, the Town would need to consider updated facility width and route options.

The Town should produce information detailing that users should always yield to slower moving traffic. This can include brochures, web-based educational material, digital videos, and trail user signage. The City of Portland (OR) has developed signage that indicate yield guidelines. This type of trail etiquette signage is an effective public engagement tool and reinforces the role of safety culture in user behavior. The Town could consider policies that formalize a yielding hierarchy (electric motorized yield to non-motorized yield to pedestrians, for instance), although with the rapid development of the electric mobility field, this may set the Town up to have to continually revise and update their policies with the introduction of new technologies.

Greenville, SC (Greenville Parks and Rec)

Portland, OR (BikePortland)

Eat Smart, Move More NC

Eat Smart, Move More NC is a North Carolina program that promotes physical activity and healthy eating. They provide free, downloadable resources to encourage communities, schools, grocery stores, and similar businesses to make the healthy choice the easier choice. Community-based tools support creating active outdoor play spaces, information on coalitions to support the movement, and handouts for distribution, among others.

Enforcement Programs

Enforcement programs serve to educate all roadway users about traffic laws and encourage safer behaviors.

Watch for Me NC

This statewide pedestrian and bicycle safety campaign is designed to reduce pedestrian and bicycle injuries and deaths through education and enforcement. Watch for Me NC targets all roadway users and provides useful resources and tools for municipalities and residents. The program provides free training to law enforcement on state traffic laws supporting pedestrian safety, in exchange for commitments to conduct an operation campaign locally. The program also provides free safety materials for distribution during local operations or special community events.

Speed Feedback Signs

The Town can use temporary traffic calming devices at key locations. These devices are mobile and can placed roadways where motorists may be traveling at higher speeds like Lake Park Boulevard or Dow Road.

Motorist Enforcement

Law enforcement should work together with Town planning staff to coordinate one-time or ongoing motorist enforcement campaigns along primary corridors in this Plan. Enforcement may include monitoring vehicle speeds, traffic signal compliance, and yield compliance. The Town should conduct

these enforcement efforts at highly visible locations and publicize them in the community and via social media.

Evaluation Efforts

The Town can use evaluation efforts to understand how well the strategies in the Plan are performing. Evaluation activities include setting goals, collecting baseline data (where possible), setting timetables, and collecting follow up data for all projects. Not all evaluation activities are data-driven; qualitative feedback and partnerships can assist with achieving the goal of evaluating program/strategy effectiveness and identifying improvements.

Annual Bicycle and Pedestrian Count Program

The Town and the Bicycle and Pedestrian Advisory Committee can work together to conduct annual bicycle and pedestrian counts to identify high-traffic locations. Volunteers from schools or community organizations can conduct manual observational counts at different times of the day and days of the week. Counts for specific locations should be done prior to implementation of a project to establish a baseline and then continue annually or on a two-year cycle. Observational qualitative data can also be used to identify locations for specific safety, enforcement, and educational efforts.

Road Safety Audits

Town staff and representatives can conduct Road Safety Audits on priority corridors to identify more specific engineering-related improvements. This is a formal and detailed process that involves a multidisciplinary team to identify roadway elements that present the most safety concerns and formulate solutions to eliminate or mitigate the safety issues. The Town may request support from NCDOT Division 3, the NCDOT Traffic Safety Unit, and even request technical assistance from the Federal Highway Administration (alternatively, the Town can consider hiring an outside consultant to organize and conduct RSAs).

Corridors that may be suitable candidates based on their traffic volumes, speeds, numbers of lanes, pedestrian crashes, pedestrian-focused land uses, and recommended facilities include:

- Lake Park Boulevard
- Dow Road
- Harper Avenue
- Carolina Beach Avenue/Canal Drive

Vision Zero /Local or Regional Transportation Safety Plan

Going beyond a Road Safety Audit for one specific corridor, a Transportation Safety Plan or a Vision Zero Plan undertake a comprehensive review of transportation safety issues to improve safety for all users. Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safety, healthy and equitable mobility for all through a safe system approach. Several local and regional agencies across North Carolina have undertaken transportation safety plans in recent years, including the WMPO. The Town should be involved in the WMPO safety plan and prioritize project identification that support safety in alignment with the goals of the Plan.

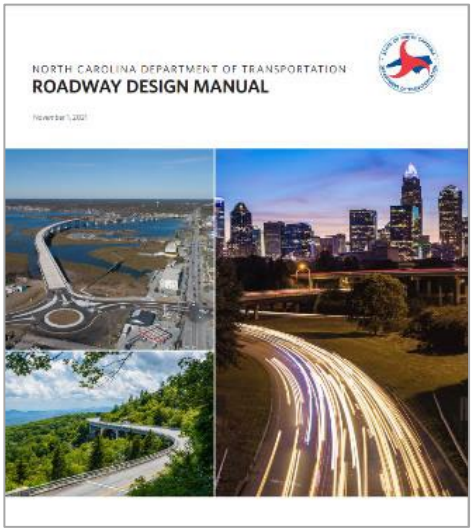
Community Surveys

The Town can use surveys and other similar feedback mechanisms as tools to gauge community-wide acceptance and understanding of new projects; needs and interests for other future projects; and other community concerns that may be addressed through Encouragement and Education programming. The Town should work with stakeholder groups like the Bicycle and Pedestrian Committee to help disseminate surveys tools and collect feedback. Even though the projects in this Plan are informed by robust community engagement, continued engagement and communication is vital to sustaining momentum, community adoption, and support of new and proposed projects.

Facility Inspection and Maintenance

A key piece of evaluation is measuring and identifying maintenance needs after project implementation. Town staff should conduct routine maintenance checks of bicycle and pedestrian infrastructure to identify general wear and tear and other issues that may impede use, such as potholes and broken asphalt.

4.3 Policy Recommendations



Complete Streets Policy and Guidelines

The USDOT defines Complete Streets as "streets designed and operated to enable safe use and support mobility for all users…[including] people of all ages and abilities, regardless of whether they are travelling as drivers, pedestrians, bicyclists, or public transportation riders."[4] The Town of Carolina Beach does not have a Complete Streets policy or design guidelines as of 2025.

NCDOT adopted its first Complete Streets Policy in 2009, revised it in 2019, and updated implementation guidance in 2022.[5] The updated policy and guidance documents reinforced that NCDOT is committed to partnering with local agencies to deliver Complete Streets. NCDOT highway projects (as defined by the STIP with a primary purpose of improving mobility for motor vehicles) that do not yet have an environmental document (as of August 30, 2019) are subject to the new policy. Revisions or clarification to the policy and guidance will be considered by a NCDOT Complete Streets Technical Team on an ongoing basis.

The 2019 policy and updated guidelines require NCDOT staff to incorporate multimodal facilities into the design of all transportation projects led by NCDOT, with few exceptions.

[4] USDOT https://www.transportation.gov/mission/health/complete-streets

[5] https://connect.ncdot.gov/projects/Project-Management/Documents/CS%20Policy%20Update%20Memo%20Secretary%208.28.19.pdf

The NCDOT Roadway Design Manual is the authoritative reference for Complete Streets design for NCDOT projects.

The Town of Carolina Beach should adopt a local Complete Streets Policy. The Town may reference the 2019 NCDOT policy or develop language customized to meet the objectives of this Plan and local stakeholders.

Unified Development Ordinance

In 2024, the Town of Carolina Beach adopted its first Unified Development Ordinance (UDO). Developing land use and transportation policies and development regulations that support multimodal goals for the Town is one of the most cost effective methods of implementation. The project team reviewed the draft UDO and presented a curated list of best practice multimodal policies for incorporation in the UDO. Many of these recommendations were incorporated in the adopted ordinance. The Town should monitor the adherence to these development regulations and ensure that the multimodal policies incorporated are effectively supporting the delivery of the projects and goals outlined in this Plan. Future updates to the UDO should consider any revisions to the multimodal policies in order to most effectively deliver the goals of this Plan.

Bicycle Parking

Bicycle parking is one of the primary recommendations for UDO evaluation. Standardizing bicycle parking throughout Town, such that bicyclists know that they will have convenient, easy-to-use, and secure parking available at their destination, helps legitimize bicycling as a form of transportation. Adding development requirements for short- and long-term bicycle parking can further reinforce bicycling as a legitimate transportation option and may encourage mode-shift from vehicle trips. Guidance on bike parking, including site planning for short and long-term parking, rack selection, and placement can be found in the Association of Pedestrian and Bicycle Professionals (APBP) Essentials of Bike Parking[6].

Additional Policy Recommendations

The Town should consider a suite of additional policies that support bicycle and pedestrian safety, connectivity, and accessibility. These policies should be further reviewed for feasibility, but if implemented effectively can complement the infrastructure improvements outlined in this Plan.

- **Right Turn On Red Restrictions:** The Town should consider right turn on red restrictions at primary intersections with high volume pedestrian and bicycle activity, including intersections along Lake Park Boulevard.
- **Reverse Angle Parking:** The Town should consider updating its parking policy in the central business district to convert angle parking to reverse angle parking. This change will have negligible impact on parking capacity and creates a safer environment for bicyclists sharing the travel lane with vehicles along roads with on-street parking. This policy would primarily impact parking on Cape Fear Boulevard and Lake Park Boulevard. The two blocks of Cape Fear Boulevard from S 3rd Street to Canal Drive have bicyclists sharing the travel lane with vehicles, and are primary network connections for bicyclists from the Cape Fear MUP to the Boardwalk.

[6] https://www.apbp.org/assets/docs/EssentialsofBikeParking_FINA.pdf

- **Speed Management:** The Town should evaluate primary corridors in this Plan, especially those throughout the central business district, for speed management policies, including setting context-sensitive speed limits.
- **Traffic Calming Policy:** The Town should consider adopting traffic calming policies. These policies typically create an avenue for residents to request traffic calming review on specific roads. The Town should consider establishing an evaluation procedure for traffic calming requests. This procedure can include pedestrian and bicycle activity, and whether the road is identified in this Plan. Additional considerations are geometric features of the road, development or commercial activity, and parking. This policy can identify various traffic calming measures, which can include enforcement, low-cost, and high-cost measures, and should identify general guidelines and uses for each measure to assist resident understanding of how to request measures that are appropriate and address their specific safety concerns.
- **Intersection Control:** When considering alternative intersection designs, including traffic circles and roundabouts, the Town should ensure design prioritizes bicycle and pedestrian safety and connectivity, and that new intersection designs account for the recommendations in this Plan. The Town should consult resources like the Federal Highway Administration's Improving Intersections for Pedestrians and Bicyclists.[7] The Town should consider policies like Rest-In-Red during night-time, off-peak hours, and off-peak season for intersections with high pedestrian and bicycle volumes.

[7] https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/fhwasa22017.pdf

5

Implementation

Implementing the Plan requires robust collaboration among local agencies, clear administrative and infrastructure action steps, and regular community engagement to understand evolving needs and secure public support. Developing a robust performance measurement program is essential to monitor and evaluate progress, with relevant metrics to gauge the effectiveness of implemented projects. Regularly reviewing and updating the Plan with current data and feedback ensures it remains responsive to the community's needs and aligns with broader transportation goals.

5.1 Overview

This section outlines the organizational structure and steps necessary to successfully achieve the goals set forth by this Plan. The recommendations within this section include:

- Organization structure for administering programs.
- Action items for building a culture of active living.
- Methods for monitoring progress and continuing encouragement.

5.2 Organizational Framework for Implementation

This section describes the ongoing and future roles of key partners in developing active transportation facilities in Carolina Beach. Successful implementation of the Plan will require partnerships between several agencies and organizations such as NCDOT, the Town, and the WMPO. Community organizations and residents are also key partners. These coalitions will likely be formed as the Town coordinates Plan implementation and project development.

Role of NCDOT

As the administrator of the Integrated Mobility Division Grant and the primary agency for transportation planning, engineering, and construction on North Carolina system roads, NCDOT will be a key partner in the implementation of this Plan. After adoption, NCDOT should continue providing technical assistance for pedestrian and bicycle transportation planning in Carolina Beach. NCDOT Division 3, responsible for construction of pedestrian facilities on system roads in the Town, should support the design and construction of projects outlined in Section 3 of this Plan.

The NCDOT Division of Integrated Mobility offers guidance on bicycle and pedestrian policies, laws, and safety education and administers various statewide initiatives promoting safety and participation in active transportation. The Town should use the Division of Integrated Mobility's online resources to guide specific treatments as it progresses with the Plan.

Role of the Wilmington Urban Area Metropolitan Planning Organization (WMPO)

WMPO, the metropolitan planning organization for Brunswick, New Hanover, and Pender Counties, can collaborate with the Town of Carolina Beach to integrate the Town's multimodal transportation needs into WMPO's future Metropolitan Transportation Plan. Many projects from this report can align with WMPO maintenance programs and state roadway improvements like SPOT.

Role of New Hanover County

There are several important ways for the County to support this Plan:

- Support active transportation through regional trails and networks.
- Promote active transportation and public health through county-wide programming.
- Prioritize pedestrian and bicyclist safety when updating plans.
- Include the Plan's facility recommendations as an amendment to existing long-range plans.

Role of Regional Partners

The Town should continue to coordinate with and pursue new partnerships with regional partners to implement this Plan. Some partners may include:

- Friends of Carolina Beach Parks and Greenways
- Carolina Beach Elementary School
- New Hanover County Schools
- New Hanover County Parks and Gardens
- Neighboring cities and counties
- Private developers

Role of the Town of Carolina Beach

Carolina Beach is responsible for implementing this Plan. Through its adoption, the Town will be empowered to act as a champion for bicycle and pedestrian needs. The Town should continue to engage with the Bicycle and Pedestrian Committee to help guide bicycle and pedestrian planning in Carolina Beach. As champions of active transportation, Committee members should continue advocating for the project and programmatic recommendations in this Plan, as well as developing events and programs as they work in the community.

5.3 Implementation Action Steps

This section outlines general steps to fully implement this Plan. Implementation Action Steps are outlined in Table 6 includes specific details of each step and the expected timeline.

Table 6: Implementation Plan

Step	Details	Category	Timeline/Phase
Adopt this Plan	The first step of this updated Plan is adoption by Town Council. Adoption will improve the Town's eligibility to receive priority funding for projects.	Policy	Short-term (2025)
Continue to Engage with the Bicycle and Pedestrian Committee	The Town's Bicycle and Pedestrian Committee has an intimate knowledge of active transportation in Carolina Beach and should continue to provide guidance on bicycle and pedestrian projects.	Program	Ongoing (2025-)
Prioritize Projects	The highest-scoring projects in Section 3 should be considered for implementation in the near to mid-term. The Town should begin project development for top priority projects upon adoption of the Plan, which should include preliminary engineering, right of way assessment, and permitting. However, should opportunities arise to implement this Plan's projects concurrent with related capital, NCDOT, or private developments, the Town should pursue those options to support completion of its network. Every project identified in this Plan is a priority to complete the bicycle and pedestrian network, and projects should not be overlooked nor opportunities passed up on based on established rank priority. As the Town progresses on project implementation, it should re-prioritize the list of projects on a regular basis (e.g. two- or three-year cycle) with updated costs, facility specifications (as needed), and public support.	Infrastructure	Short-term/Ongoing (2025-)
Identify Funding Sources	Federal, state, and local funding sources are necessary to implement this Plan. Section 6 offers more information on funding sources.	Funding	Short-term/Ongoing (2025-)

Step	Details	Category	Timeline/Phase
Continue to Enforce State and Local Regulations	Ensuring that all roadway users obey speed limits, pedestrian signals, and other traffic regulations can improve the perception and desirability of active transportation in Carolina Beach.	Enforcement	Ongoing (2025-)
Establish a Monitoring and Benchmarking Program	The Bicycle and Pedestrian Committee should devise ways of monitoring pedestrian and bicycling activity, as well as preferred routes and destinations. The needs and preferences of the community will evolve over time. To ensure that Town officials and planners can respond effectively, there should be an established methodology for tracking these changes, evaluating current programs, and generating new priorities. The benchmarking program should be designed to support the Plan's goals and associated performance measures noted in Section 5.4.	Evaluation	Ongoing (2025-)
Create Educational and Encouragement Outreach Programs	The Town should begin developing and implementing education and encouragement programs upon adoption. Programs may include walk and bike to work and school events and open streets events. Implementing significant wayfinding measures should be viewed as a priority program, ensuring that users of the Town's bicycle and pedestrian network can safely navigate the network as outlined in this Plan.	Program	Ongoing (2026-)
Develop a Long-Term Funding Strategy	The Town should consider setting aside capital funds annually to fund the construction of projects in this Plan. Many outside funding sources will require a match, often 20% of costs, so a measured approach would be to use 20% of the cost estimates for priority projects. Additional strategies for long term funding include coordinating with NCDOT Division 3's road resurfacing program and STIP to implement Complete Streets improvements in this Plan.	Funding	Ongoing (2025-)
Establish a Bicycle and Pedestrian Facility Maintenance Plan	The Town should define a maintenance plan, budget, and schedule for existing and future bicycle and pedestrian facilities, pavement markings, and sidewalks, collaborating with NCDOT as needed.	Infrastructure	Ongoing (2025-)

Step	Details	Category	Timeline/Phase
Perform Road Safety Audits	An RSA is a formal examination of mobility safety performance to identify potential road safety issues and identifies opportunities for improvements in safety for all road users. RSAs help identify elements of the road that may present a safety concern and recommend a standard approach to elimination or mitigation. The Town should coordinate with NCDOT to determine corridors identified in this Plan whose design and implementation would benefit from an RSA.	Infrastructure	Ongoing (2026-)
Review the Applicability of Future Projects	Many projects in this Plan, and other transportation projects in Carolina Beach, will require detailed site-specific evaluation as priorities evolve. Town staff and the Bicycle and Pedestrian Committee should collaborate to regularly reassess these projects, focusing on priority projects and working with the County and WMPO for funding and implementation through local and regional plans.	Infrastructure	Mid- to long-term (2026-)
Become Registered as a Walk Friendly and Bicycle Friendly Community	The Town can apply for the designations as a Walk Friendly Community through the University of North Carolina's Highway Safety Research Center (HSRC) and as a Bicycle Friendly Community through the League of American Bicyclists. By undergoing this process, the Town may be more equipped to apply for future grant funding.	Program	Mid- to long-term (2026-)
Update this Plan	This Plan should be updated at least every five years. It may be necessary to establish new or updated priorities based on how many recommendations have been completed. If the recommendations have not been implemented, it may be necessary to review and revise the implementation strategy. The prioritization metrics established in this Plan can be reviewed continually, with weights revised, to ensure that priority projects continue to meet Town goals.	Policy	Long-term (2030)

5.4 Performance Measures

The Town should consider adopting formal performance measures to continually evaluate the bicycle and pedestrian experience in Carolina Beach. Determining which programs are effective and which ones are less effective within the Carolina Beach context will be critical in making future decisions regarding the full implementation of this Plan. Potential performance measures should connect directly to the Plan's goals as identified in Section 1.2. These could include:

- **Improve and emphasize the safety** of bicyclists and pedestrians in Carolina Beach.
  - Rate of bicycle and pedestrian crashes (i.e. rolling five-year average)
  - Number of safety improvement projects completed per year
  - Percentage of users reporting feeling safe on bike and pedestrian facilities (via surveys/interviews/popups)
- **Enhance accessibility** through the connectivity of bicycle and pedestrian facilities to various town destinations, like neighborhoods, local businesses, parks, and beaches.
  - Number of community assets connected by bicycle or pedestrian facilities
  - Bicycle and pedestrian counts along designated corridors or route
  - Percentage of population within 0.X miles of bicycle or pedestrian facilities
  - Percentage of facilities that comply with ADA standards
  - Change in retail sales in areas with new bicycle and pedestrian infrastructure
- **Promote a culture of active living** and establish the Town as a welcoming bicycle and pedestrian destination.
  - Bicycle and pedestrian counts along designated corridors or route
  - Number of bike and pedestrian safety education and encouragement events or campaigns conducted annually, and number of people engaged
  - Changes in walk scores and bike scores over time
  - Changes in biking and walking mode shares over time
- **Prioritize** future bicycle and pedestrian projects based upon current conditions.
  - Amount of funding secured and allocated to high-priority projects annually

6

Project Funding Resources

Not all bicycle and pedestrian projects can be accomplished with a single funding source. Therefore, it is necessary to identify several sources of funding that together will support full project implementation. Funding sources can be used in different ways, from sponsoring programs to supporting planning, design, implementation, and maintenance. Funding availability and amounts may change over time. The Town should continue to evaluate these and additional new funding sources.

6.1 Federal Funding Sources

- Congestion Mitigation and Air Quality funding (CMAQ)
- HUD State Community Development Block Grant Program: Provides assistance for community projects for smaller communities that benefit low to middle income households
- Active Transportation Infrastructure Investment Program: Funding for local, regional, and state active transportation projects that build upon an existing network. The projects and planning efforts must account for safety and facilitate greater walking and biking.
- Safe Streets and Roads for All: Funding for Vision Zero plans, infrastructure, and programs
- STBGP-DA and TASA-DA Funds: The Surface Transportation Block Grant Program Direct Attributable (STBGP-DA) and Transportation Alternative Set Aside Direct Attributable (TASA-DA) are federal funding sources distributed by the WMPO.
- Safe Routes to School (SRTS) Program

6.2 State and State-Administered Funding Sources

- **NCDOT Strategic Transportation Investments (STI):** Funding for bicycle and pedestrian projects that have a minimum total cost of $100,000, and may be used for right-of-way acquisition, preliminary engineering, and construction.
- **Spot Safety Program:** Funding for low-cost safety improvements on state system roads. The maximum allowable contribution of Spot Safety funds per project is $250,000. Traffic signals and intersection improvements are often good candidates for Spot Safety. Some of the funding evaluation criteria include 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.
- **Surface Transportation Program-Direct Allocation funding (STP-DA)**
- **State Street-Aid (Powell Bill) Program**

- **NCDOT HSIP Hazard Elimination Program:** Safety grant program utilizing federal and state funding to address safety and potential safety issues. Projects are selected based on a cost-benefit ratio with safety benefits being classified in terms of crashes reduced.
- **Governor's Highway Safety Program Grant:** Safety grant program specifically related to preventing crashes on North Carolina roads.
- **Eat Smart, Move More NC:** Provides a variety of links and resources, including potential funding sources for public health initiatives.
- **Non-Infrastructure Transportation Alternatives Program**

6.3 Local Funding Sources

Local governments typically fund bicycle and pedestrian infrastructure or improvements through Capital Improvement Projects (CIP) or, at times, their annual Operating Budgets. CIPs should encompass all types of capital improvements (such as water, sewer, buildings, streets, etc.) rather than focusing on single-purpose programs. This approach enables decision-makers to balance all capital needs. Common capital funding mechanisms include capital reserve funds, taxes, fees, and bonds. However, many of these mechanisms require specific local actions to establish a program if one is not already in place.

6.4 Third Party Funding Sources

- **AARP Community Challenge:** A 'quick-action' grant to fund projects that improve transportation and public spaces through either a permanent physical improvement or a temporary demonstration that leads to long-term change.
- **National Association of Realtors Placemaking Grant:** The Placemaking Grant funds the creation of new, outdoor public spaces and destinations in a community, and it is accessible through state and local REALTOR® Associations. Potential funded projects include demonstration projects like parklets, pop-up parks, pedestrian plazas, bike lanes, and amenities like street furniture, paint, signage, materials, landscaping, and murals.
- **Better Block Foundation:** The Better Block Foundation is a 501(c)3 nonprofit that educates, equips, and empowers communities and their leaders to reshape and reactivate built environments to promote the growth of healthy and vibrant neighborhoods. Its services support the reimagination of public spaces to include active transportation like walking and bicycling.
- **Duke Energy Foundation:** Funded by Duke Energy shareholders, this foundation makes charitable grants to nonprofit organizations and government agencies. Grant applicants must serve communities that are also served by Duke Energy. The grant program has several investment priorities that may potentially fund bicycle and pedestrian projects.
- **Corporate Donations**
- **Private Individual Donations**
- **Fundraising/Campaign Drives**

A

Appendix

This section is reserved for additional information regarding the existing conditions work and public engagement activities conducted for the development of the Carolina Beach Bicycle and Pedestrian Plan.

A.1 Existing Conditions Report

The existing conditions report contains five sections including, prior plan review, demographic analysis, attractors and generators, transportation infrastructure, and safety analysis.

Demographic Analysis

Carolina Beach grew 13.2 percent from 2007 to 2021. As reflected in Figure A-1, growth over this period is concentrated in the north end, Carolina Sands, and Wilmington Beach, which was annexed into the Town in the early 2000s.[ii]

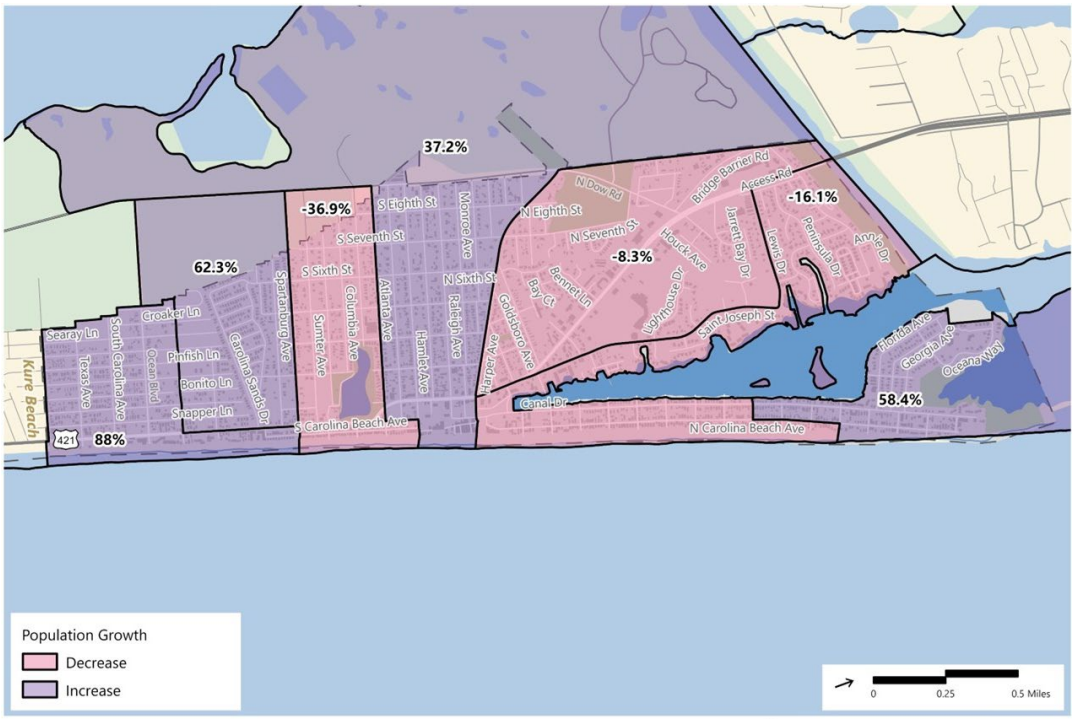


Figure A-1: Population Change per Census Block Group, 2007-2021

Carolina Beach's median age is 51.3, notably higher than the North Carolina median age of 39.2. As shown in Table A-1, average household income, percentage of population in poverty, and zero vehicle households are all lower than county averages. Notably, the percentage of people who walk to work is higher than county average but significantly lower than neighboring Kure Beach to the south.

Table A-1: Demographic Comparison

Geography	Population	Average Household Income	Average Age	%BIPOC Population	% Population Experiencing Poverty	% Limited English Proficiency	% Zero Vehicle Households	% Walk to Work
Carolina Beach	6,583	$87,159	51.3	4.40%	8.70%	0.40%	2.50%	1.50%
Kure Beach	2,313	$97,269	55.1	2.60%	3.50%	0.20%	0.50%	11.30%
Wilmington	116,933	$58,908	37.6	25.60%	17.80%	3.00%	9.30%	2.30%
New Hanover County	228,134	$67,515	40.2	20.90%	12.70%	2.60%	6.30%	1.40%
North Carolina	10,439,388	$67,481	39.2	30.10%	12.80%	4.60%	5.40%	1.60%

Figures A-2 and A-3 display concentrations of elderly and low income populations.

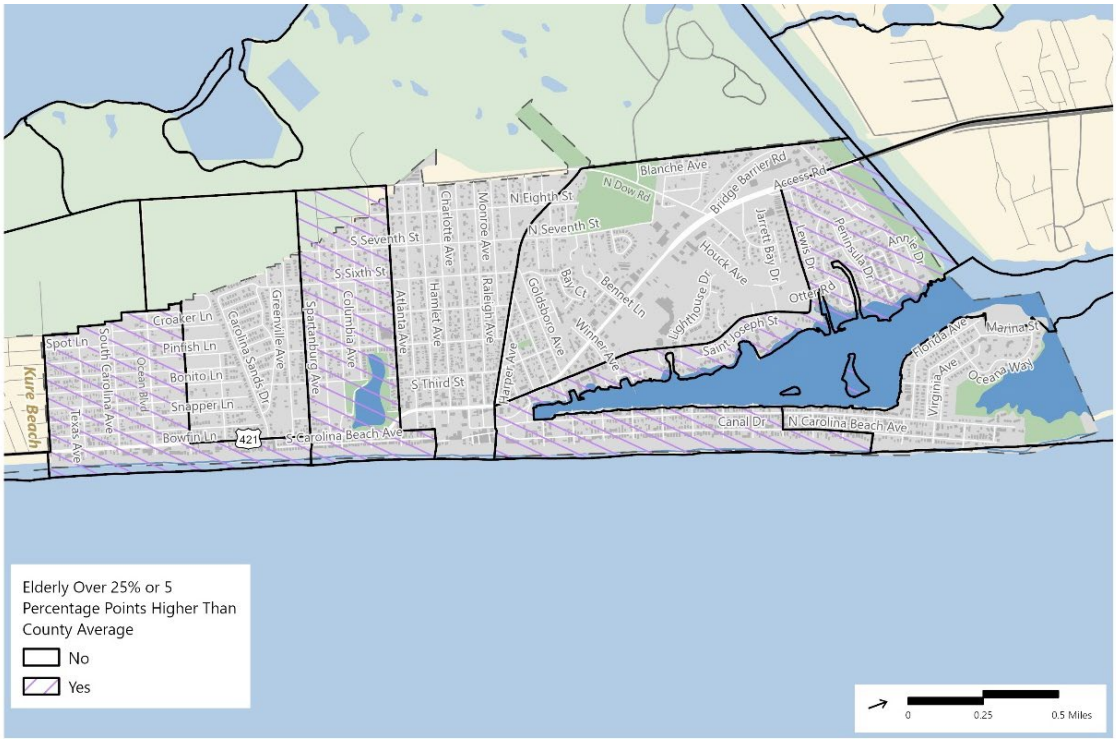


Figure A-2: Elderly Population Distribution by Census Block Group, 2021

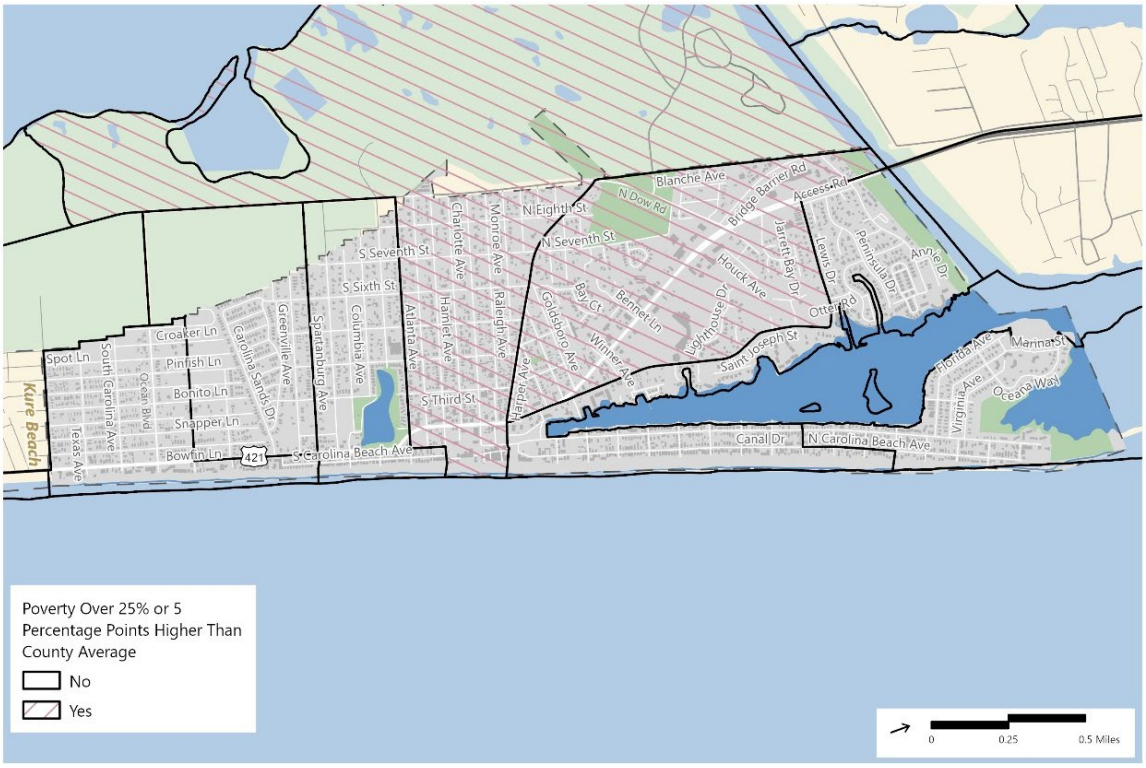


Figure A-3: Poverty Distribution by Census Block Group, 2021

Figure A-4 and Table A-2 displays the percentage of the Town's bicycle and pedestrian facilities that fall in each census block group in Carolina Beach. More than half of all existing pedestrian and bicyclist infrastructure in Carolina Beach is concentrated Census Tract 2202, Block Group 1, or block group D in Figure A-4. This Block Group contains Carolina Beach State Park and much of the downtown core.

Table A-2: Distribution of Existing Pedestrian and Bicyclist Network by Census Block Group

Figure 9 Label	Tract	BG	% of Total Sidewalk Miles	% of Total Bike Miles	% of Total SUP Miles	% of Total BP Miles
A	2201	Block Group 1	1.40%	10.67%	0.00%	4.68%
B	2201	Block Group 2	9.92%	14.41%	10.94%	11.75%
C	2201	Block Group 3	25.24%	4.27%	2.03%	14.08%
D	2202	Block Group 1	42.50%	62.59%	50.03%	51.11%
E	2202	Block Group 2	10.16%	0.00%	10.58%	6.40%
F	2202	Block Group 3	5.82%	5.92%	11.36%	6.64%
G	2202	Block Group 4	4.97%	2.15%	15.05%	5.33%

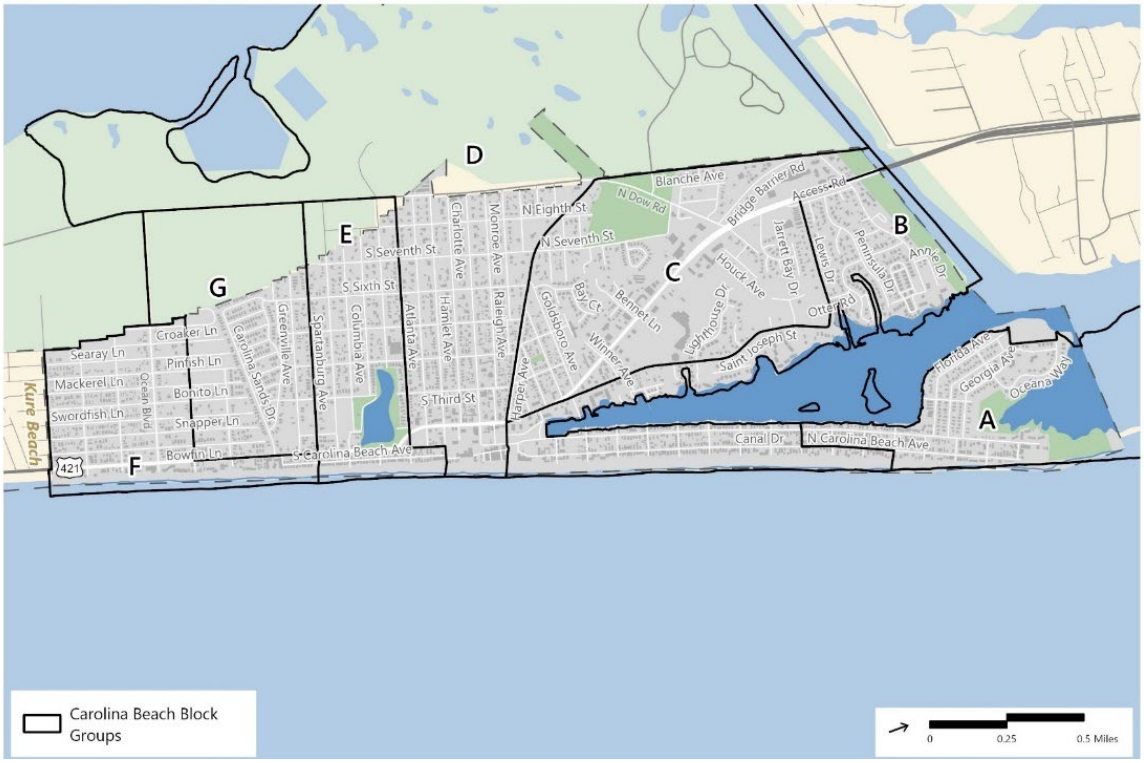


Figure A-4: Census Block Groups in Carolina Beach

Zoning

Table A-3 and Figure A-5 further explore access and concentration of the Town's pedestrian and bicyclist infrastructure by displaying the distribution of facilities by zoning districts. This analysis compressed the Town's zoning codes into four categories: Business, Hotel/Motel, Conservation/Other, and Residential. Most of the existing sidewalk is in residential zones, primarily concentrated between Lake Park Blvd., Fifth St., Harper Ave., and Atlanta Ave. Most of the bicycle facilities and shared use paths fell into the 'Conservation/Other' zones, which encompass Carolina Beach State Park and much of the facilities on Dow Rd.

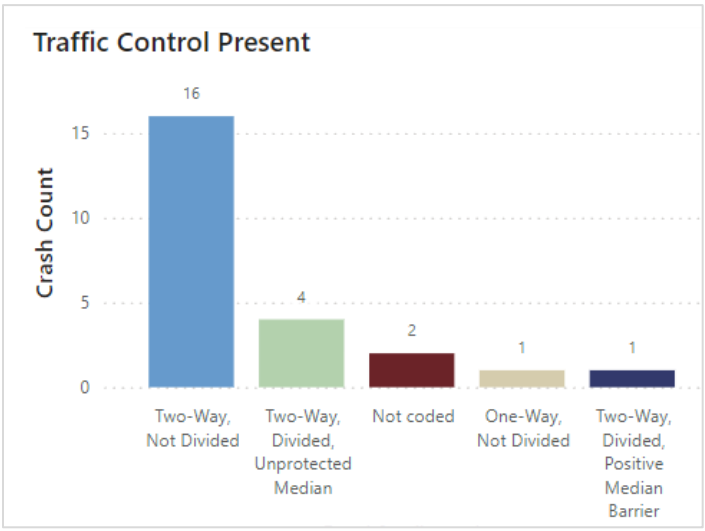
Table A-3: Distribution of Pedestrian and Bicyclist Infrastructure Network by Zoning District

Zone	% of Total Sidewalk Miles	% of Total Bike Miles	% of Total SUP Miles	% of Total PBIN Miles
Business	39.92%	7.24%	16.28%	24.31%
Hotel/Motel	3.52%	2.19%	0.00%	2.52%
Conservation/Other	9.11%	64.22%	42.43%	34.52%
Residential	47.45%	26.34%	41.29%	38.65%

Figure A-5: Zoning

Safety

According to crash data reported to NCDOT, 24 bicycle and pedestrian crashes occurred between 2013 and 2022. Bicycle and pedestrian crash frequency increased significantly after COVID-19 and has continued to rise since 2020 (Figure A-7).



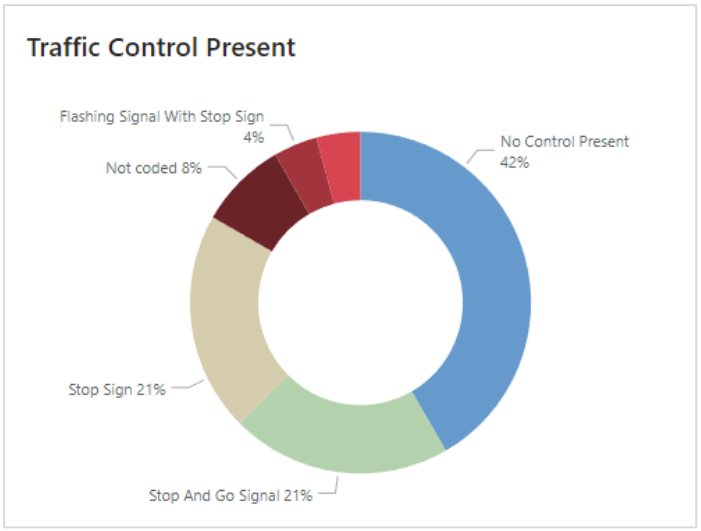


Figure A-6: Lane Configuration and Traffic Control Present at Crash Sites

Fourteen (14) crashes occurred from July to September over the 10-year period, indicating that mid-to-late summer was the most frequent time of year for crash occurrences. The most common days for crashes were Wednesday, Thursday, and Friday, with more than half of all crashes from 2013 and 2022 occurring on these days. 63% of crashes occurred in daylight conditions between the hours of 7:00 and 18:00, creating a fairly even distribution of daytime and nighttime crashes. Nearly half of all bicycle and pedestrian crashes occurred where traffic controls were not present.

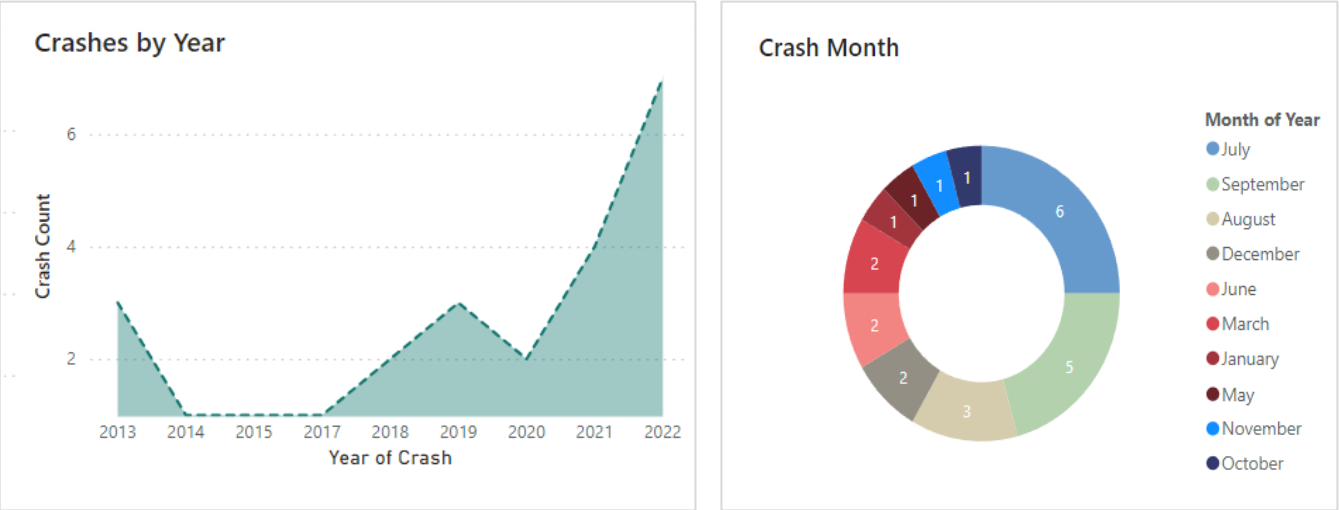


Figure A-7: Crash Occurrence by Year and Month

Of the 24 crashes, three resulted in fatalities and six in serious injuries. Fatal and serious injury crashes were disproportionately concentrated on US-421 between Ocean Boulevard and Dow Road: only one – a serious injury on Ocean Boulevard – occurred outside that corridor (Figures A-8 and A-9).

Figure A-8: Bicycle Crashes in Carolina Beach from 2013 to 2022

Figure A-9: Pedestrian Crashes in Carolina Beach from 2013 to 2022

Transportation

Speed Limits and Traffic Volume

Lake Park Blvd. (US-421) and Dow Rd. are the main north/south roadways on the island, serving local and through traffic. US-421 north of Carolina Beach has a posted speed limit of 55 MPH. As drivers cross Snow's Cut Bridge, the speed limit reduces to 35 MPH. At Winner Ave., the speed limit reduces to 25 MPH through Town limits. The speed limit on Dow Rd. is 45 MPH north of Ocean Blvd. and 55 MPH south of Ocean Blvd. Ocean Blvd., which connects US-421 to Dow Road, has a 35 MPH speed limit. The remaining roads in the study area have a 25 MPH posted speed limit.

Annual Average Daily Traffic (AADT) decreases from 35,000 at Snow's Cut Bridge to 11,500 at Alabama Ave. Traffic volume data is not available for local roads, but the roads shown in Table A-4 are understood to carry the majority of traffic in Carolina Beach. Traffic conversations in Carolina Beach must be considered with the context that volumes increase significantly during busier summer months and decreases significantly during quieter winter months.

Table A-4: Annual Average Daily Traffic (AADT) on Carolina Beach Roadways

Roadway	From	To	AADT	Type
US-421	River Rd	Spencer Farlow Rd	35,000	US Route
US-421	Lewis Dr	Lumberton Dr	24,000	US Route
US-421	Lumberton Dr	Alabama Ave	11,500	US Route
Dow Rd	US-421	Spartanburg Ave	11,500	Secondary Route
Dow Rd	Spartanburg Ave	Ocean Blvd	6,200	Secondary Route
State Park Rd	US-421	Nature Trail Ln	800	Secondary Route
Lewis Dr	Saint Joseph St	US-421	1,300	Non-System
Saint Joseph St	US-421	Lewis Dr	1,300	Non-System

Roadway Design and Sections

Most roads in Carolina Beach are two-lane undivided sections with no monolithic curbs. Carolina Beach roads have a mix of closed curb and gutter and open ditch drainage systems.

US-421 is a four-lane section with a monolithic island median from Snow's Cut Bridge to just south of Dow Rd. and dedicated turn lanes at Lewis Dr. and Dow Rd. South of Dow Rd., US-421 is a four-lane undivided roadway, which tapers to two-lanes at Fayetteville Ave. Lane widths along US-421 span 10-12 ft.

Additional roadway conditions include:

- On-street parking along both sides of US-421 from Harper Ave. to Fayetteville Ave.
- Crosswalks at roads intersecting US-421 include transverse and high visibility markings.

- Three of the six intersections along US-421 from Harper Ave. to Fayetteville Ave. are signalized with pedestrian phasing.
- Right-of-way (ROW) is limited in the downtown core and on adjacent, local roads.
- Many roads outside of downtown do not have pavement markings or stop bars at the intersection of local roads.
- Canal Dr. and Carolina Beach Ave., colloquially referred to as the north end, are two-lane, undivided roadways, with a combination of bike lanes and marked edgelines.
- Grassy shoulders on local roads vary in width.
- Dow Rd. has 4 to 6-foot paved shoulders south of the intersection of Harper Avenue

Plans and Policies

This section reviews relevant local and regional plans and policies applicable to the bicycle and pedestrian infrastructure recommendations for Carolina Beach and identifies key themes from these plans that inform the Carolina Beach bicycle and pedestrian landscape.

Local

Carolina Beach Coastal Area Management Act Land Use Plan (2020)[iii]

The Carolina Beach Coastal Area Management Act (CAMA) Land Use Plan sets a long-term growth management vision and is the most recent embodiment of Town priorities. It directs planners to balance local character and natural resources with economic and connectivity advancements.

The Bicycle and Pedestrian Master Plan should be guided by the following goals embedded in the Land Use Plan:

- Community Goal 1: Enhance functionality and appearance of major thoroughfares and gateways.
- Community Goal 3: Promote and beautify the town center as a focal point, including increasing connections to the surrounding community.
- Community Goal 8: Sustain a vibrant locally-oriented economy that respects tourism.
- Community Goal 9: Enhance and promote family-oriented businesses.
- Community Goal 10: Enhance mobility for pedestrians, bicyclists, and non-traditional vehicles.
- Community Goal 13: Maintain and increase the accessibility of public trust waters and public recreational facilities and assets, especially the beach, waterfront, parks, and downtown.

The plan produced a land use map that concentrates high-intensity mixed-use downtown and along US-421. Development patterns are planned to be increasingly less dense the farther a parcel is from these activity centers.

Carolina Beach Pedestrian Plan (2018) [iv]

The Carolina Beach Pedestrian Plan is the most recent local active transportation master plan. The plan prioritizes active living, access to business and recreation, and pedestrian safety. Guiding design principles were:

- Building an everyday network for residents, not just seasonal visitors.
- Building an aesthetically appealing network that enhances the sense of community in Carolina Beach.
- Creating safe crossings, particularly along Lake Park Boulevard and Dow Road, to encourage people to move more freely through the Town.
- Taking approaches that target driver behavior as well as pedestrian behavior and making drivers more aware of their responsibility to share the road.

Figure A-10 displays the recommended improvements made by the Pedestrian Plan. New facilities targeted towards corridors that reflect the most direct routes between pedestrian origins and destinations. Recommendations primarily focus on crosswalk upgrades and new sidewalk and multi-use paths.[v]

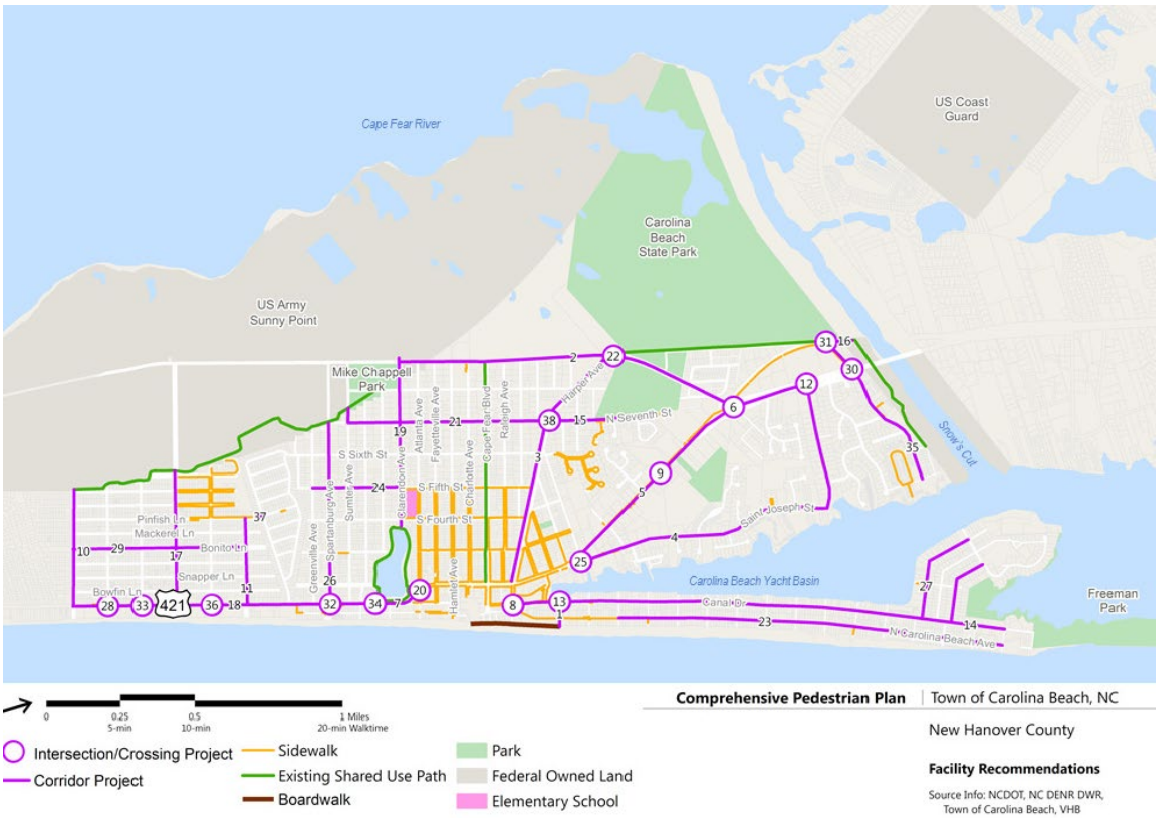


Figure A-10: Facility Recommendations from the 2018 Carolina Beach Pedestrian Plan

Carolina Beach Bicycle and Pedestrian Plan

Carolina Beach 2017-2022 Parks, Recreation and Open Space Master Plan (2016)[vi]

The Carolina Beach 2017-2022 Parks, Recreation and Open Space Master Plan assesses the state of the town's community parks and provides recommended improvements. Proposals include strategically placed bicycle racks, markings and signage on the Snow's Cut bike path, and implementing plans for the Island Greenway.

Carolina Beach Bicycle Multi-Use Transportation Plan (2011)[vii]

The Carolina Beach Bicycle Multi-Use Transportation Plan is the most recent local bicycle plan. It identifies and ranks the following high-priority corridors for either multi-use paths or bike lanes:

1. Island Greenway from Greenville Avenue to North Carolina Avenue
2. Dow Road from Harper Avenue to Sumter Avenue
3. Snow's Cut Bridge
4. Snow's Cut Bike Path
5. Island Greenway, remaining portion

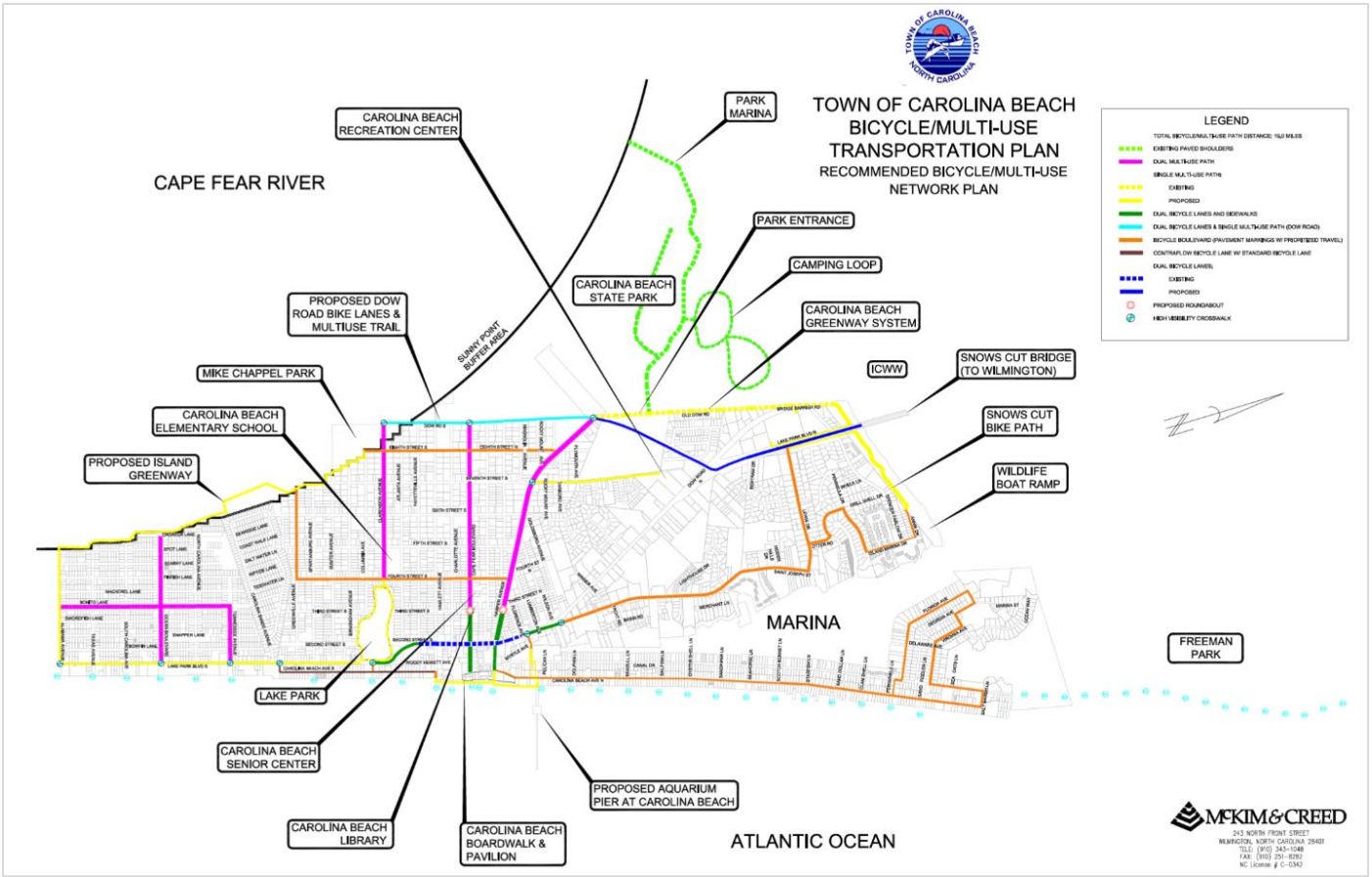


Figure A-11: Facility Recommendations from the 2018 Carolina Beach Pedestrian Plan

Regional

Wave Transit Locally Coordinated Public Transportation Plan (2021)[viii]

This plan identifies pedestrian and bus stop improvements as the biggest community priority, according to survey comments, focus groups, stakeholder interviews, and public meetings. While the plan offers no specific proposals, it recommends establishing a mobility management program to advocate for pedestrian infrastructure and assessing bus stops for ADA accessibility and lighting.

While Wave Transit does not have a fixed-route services in Carolina Beach, the town is included in its Microtransit Zone.[ix]

Cape Fear Change in Motion 2020 Short-Range TDM Plan 2021-2025 (2020)[x]

The Change in Motion Plan outlines a strategy for, among other transportation goals, fostering a bicycle and pedestrian friendly culture throughout the Wilmington Urban Area MPO (WMPO), specifically by implementing existing education programs such as "Be a Looker," "Vision Zero," and "Watch for Me NC." The plan named Carolina Beach as a target municipality, citing characteristics such as its existing infrastructure, tourist attractions, and large retired population.

Cape Fear Moving Forward 2045 Metropolitan Transportation Plan (2020)[xi]

For Carolina Beach, the Metropolitan Transportation Plan (MTP) fiscally constrained eleven bicycle/pedestrian projects (captured in Figure A-12[xii]), two public transportation projects, a ferry project, and a roadway project. All are listed in Table A-1.

Figure A-12: Fiscally-Constrained Bicycle and Pedestrian Projects in Southern New Hanover County, WMPO MTP

Table A-5: Fiscally-Constrained Projects in Carolina Beach, WMPO MTP [xiii]

Mode	Final Rank (within Mode)	Project ID	Project Name	Planning Year	Planning Year Cost
Bicycle/Pedestrian	1	EB-6039	St. Joseph Street/Lewis Drive Bike Lanes	2025	$575,222
Bicycle/Pedestrian	2	U-6233	US421/S Lake Park Blvd & Hamlet Avenue Improvements	2025	$270,000
Bicycle/Pedestrian	14	BP-604	Lewis Drive & N Lake Park Blvd Crosswalk Improvements	2025	$63,200
Bicycle/Pedestrian	15	BP-846	St. Joseph Street & N Lake Park Blvd Crosswalk Improvements	2025	$29,200
Bicycle/Pedestrian	45	BP-849	S Lake Park Blvd & Carolina Beach Lake Park Access Crosswalk Improvements	2025	$29,200
Bicycle/Pedestrian	55	BP-626	River Road & Carolina Beach Road Crosswalk Improvements	2030	$73,900
Bicycle/Pedestrian	59	BP-851	North Carolina Avenue & S Lake Park Blvd Crosswalk Improvements	2030	$33,900
Bicycle/Pedestrian	61	BP-854	Harper Avenue & 7th Street Crosswalk Improvements	2030	$33,900
Bicycle/Pedestrian	71	BP-845	Harper Drive & Canal Drive Crosswalk Improvements	2040	$59,200
Bicycle/Pedestrian	75	BP-852	South Carolina Avenue & S Lake Park Blvd Crosswalk Improvements	2040	$45,500
Bicycle/Pedestrian	77	BP-853	exas Avenue & S Lake Park Blvd Crosswalk Improvements	2040	$45,500
Ferry	8	F-1	Carolina Beach Ferry/Taxi Stop	2045	$3,331,934
Public Transportation	60	PT-157	Pleasure Island Trolley, with Bus Stop at Ferry, and Amenities	2040	$1,705,332
Public Transportation	70	PT-98	Carolina Beach Road at Snow's Cut Bridge	2040	$9,581
Roadway	60	RW-221	US421/Snow's Cut Bridge Replacement	2040	$149,090,000

Wilmington/New Hanover County Greenway Plan (2013)[xiv]

The Greenway Plan provides a framework to establish a comprehensive network of greenways in New Hanover County. For Carolina Beach, the plan proposes the following trails:

- Island Greenway
  - Connects beach access with Carolina Beach Elementary, the library, and Chappell Park
  - Treats a corridor with high bike/ped accident frequency

- Lies mostly within existing easements or public property

› Dow Road Trail
  - Connects beach access with higher-density residential areas and several parks
  - Lies mostly within existing easements or public property

› Harper Avenue Trail
  - Connects beach access with Carolina Beach State Park

› Carolina Beach Waterfront Trail
  - Connects beach access with high-density residential and commercial areas

State

North Carolina Department of Transportation 2024-2033 State Transportation Improvement Program (2024)[xv]

The State Transportation Improvement Program (STIP) commits funding to the following Carolina Beach improvement projects:

› EB-6039 – Construct bike lanes along St. Joseph Avenue and Lewis Drive from Lake Park Boulevard to Access Drive in Carolina Beach.

› U-6233 – Construct new traffic signal and improve pedestrian accommodations at the intersection of US-421 (Lake Park Boulevard) and Hamlet Avenue in Carolina Beach.

Field Review

The project team conducted two days of field review, on April 9 and 10, 2024. Field review is intended to identify gaps in the bicycle and pedestrian network, key destinations, safety concerns, proposed projects, nighttime conditions, and identifying potential new connections. The field review consisted of daytime and nighttime observations on the following roadways and areas:

› US-421
› Spencer Farlow Dr.
› Lewis Dr.
› Carolina Beach Lake
› Lake Dr. to Harper Ave.
› Carolina Beach Ave/Canal Drive/Pier
› North of Pelican
› Connections to Kure Beach
› Alabama Ave.
› Island Greenway
› Harper Ave.
› Cape Fear Blvd.
› Atlanta Ave.
› Mike Chappell Park
› Clarendon Blvd.
› 7th St.
› St Joseph St.

A.2 Additional Public Engagement Summaries

The project team engaged with the Carolina Beach community through a variety of methods, including meetings, workshops, public tabling, and surveys. Community members were very involved in the formation of this plan's recommendations, and their feedback was essential to the identification and prioritization of projects. The following sections summarize each engagement opportunity that took place during the duration of the plan.

Stakeholder Questionnaire

The project team distributed a questionnaire to 7 stakeholders, representing a variety of organizations in Carolina Beach. The stakeholders that received the survey are listed in Table A-6.

Table A-6: Carolina Bicycle and Pedestrian Plan Stakeholder Questionnaire Recipients

Stakeholder Group	Organization	Contact
Local Businesses	Pleasure Island Chamber	Jim DeGilio
Disability Community	Ocean Cure	Kevin Murphy
Youth	CBES PTA	Emily Harding and Emily Wood
Elderly	Katie B Hines Senior Center	n/a
WAVE Transit	WAVE Transit	Brad Cannon
Kure Beach	Kure Beach BP Committee	Nikki Keely, Director of Recreation & Events
Carolina Beach State Park	Carolina Beach State Park	Crystal Lloyd, Park Superintendent

The stakeholder questionnaire yielded 5 total responses: WAVE Transit, Carolina Beach Elementary School PTA, Carolina Beach Business Owners, and the Kure Beach Bicycle and Pedestrian Committee. Questionnaire responses highlighted improvement areas for bicycle and pedestrian facilities. The respondents emphasized the need for connectivity of facilities throughout the Island, improved sidewalks and crosswalks, connections to parks, the Island Greenway, and Carolina Beach Elementary School, safety improvements on Lake Park Boulevard and Dow Road, and the importance of neighborhood streets and greenways in providing safe spaces for bicyclists and pedestrians.

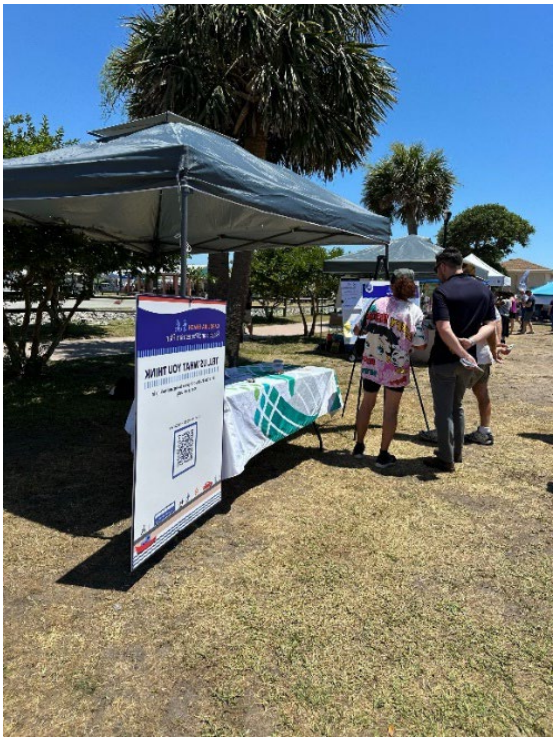
Public Engagement Events

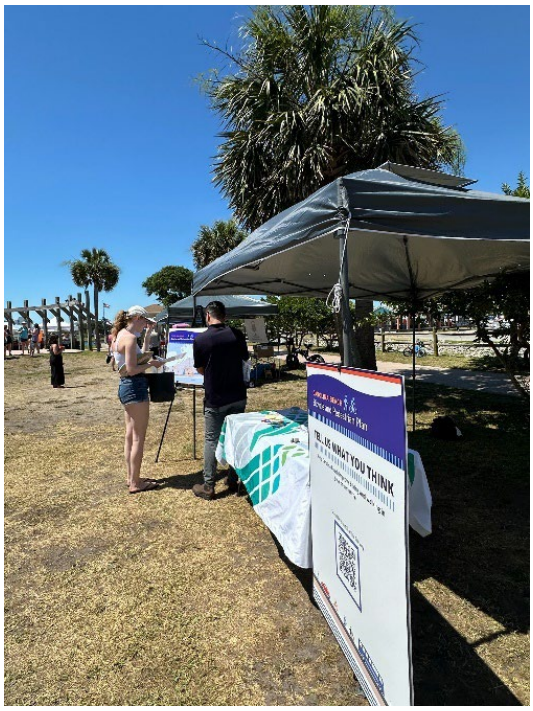
June 8th, 2024 Pop Up Event

The June public engagement took place at the Carolina Beach Market. The project consultant team set up a booth with fliers, a scannable QR code directing people to the

public survey, and a map poster for participants to mark specific concerns and areas of transportation concerns in Carolina Beach. An estimated 200 members of the public visited the pop-up, and an additional 100 people took informational flyers but did not engage in conversation. Photographs from the event are included below.

Participants at the market helped identify areas of concern in the existing roadway network. The high-level takeaway from this event was a need to create additional bicycle and pedestrian facilities to better facilitate safer multimodal travel around Carolina Beach. Lake Park Boulevard was highlighted by community members as an area in most need of improvements. Much of the public described S. Lake Park Boulevard as a popular area for walking in and out of downtown, but without sidewalks they felt that it was often difficult and dangerous. Requests for sidewalk infill along the length of S. Lake Park Boulevard into downtown were the most popular improvement mentioned. Adding bicycle facilities on a route from Whelk Lane to St Joseph Street also came up frequently in discussion, as did additional bicycle and pedestrian facilities on Carolina Beach Ave N and Canal Street. The community also described a need for neighborhood connectors to allow for pedestrian and bicycle travel away from the main roads.



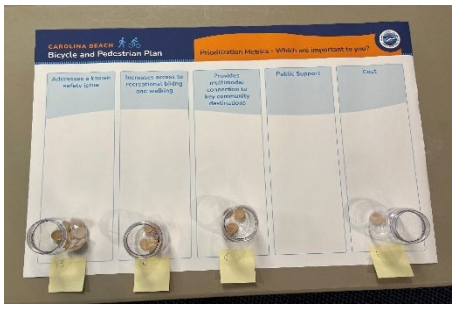


September 26th, 2024 Workshop Event

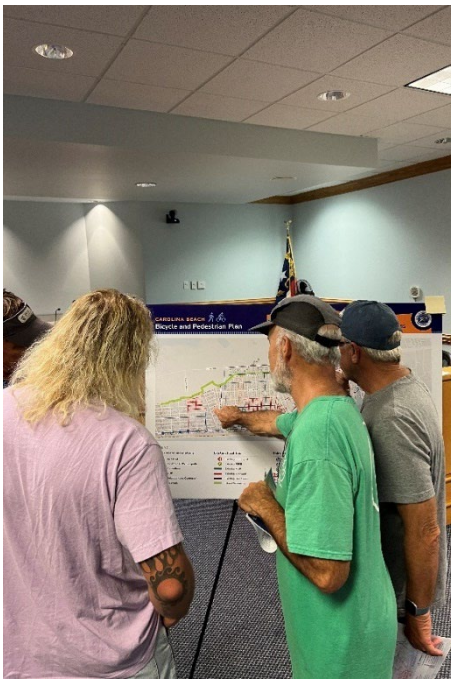
The September public engagement event took the form of a public workshop hosted in Carolina Beach town hall. The public reviewed draft project recommendations and facility types and had the opportunity to comment on proposed project prioritization methods. The workshop was held in two parts to accommodate varying working hours and schedules. The first session was held from noon to 2PM, and the second session was held from 5PM to 7PM. In total, an estimated 25 people came to the workshops. Generally, there was support for the proposed project recommendations, and a repeated emphasis on improvements needed along key corridors like Lake Park Boulevard, Harper Avenue, and Dow Road. There was also a concern about regulating e-bikes along greenways. When voting on the prioritization metrics that mattered the most to them, attendees were most in support of prioritizing projects that provide multimodal connections to key destinations throughout the Town.


CAROLINA BEACH
Bicycle and Pedestrian Plan


CAROLINA BEACH
Bicycle and Pedestrian Plan
Bicycle and Pedestrian Network Recommendations
Project Types
Multi-Use Path (MUP)
Sidewalk
Constrain Right-of-Way (ROW) Sidepath
Bicycle Boulevard
Neighborhood Connector
Neighborhood Slow Zone
Intersection Improvement
Crosswalks
CAROLINA BEACH
LAKE PARK BLVD
S 5TH ST
N 7TH ST
SAINT JOSEPH ST
CANAL DR
Neighborhood Slow Zone
0
0.5
1 Mile
LEGEND
Linear Recommendations
Bike Blvd
Constrain ROW Sidepath
Contraflow
MUP
Neighborhood Connector
Sidewalk
Existing Facilities
Existing Full Signal
Existing RRFB
Existing MUP
Existing Sidewalk
Existing Bike Lanes
Island Greenway
Point Recommendations
Crosswalk Improvement
Intersection Improvement
New Crosswalk
Existing Full Signal and Crosswalk Improvement
Existing Full Signal and Intersection Improvement
Existing RRFB and Intersection Improvement

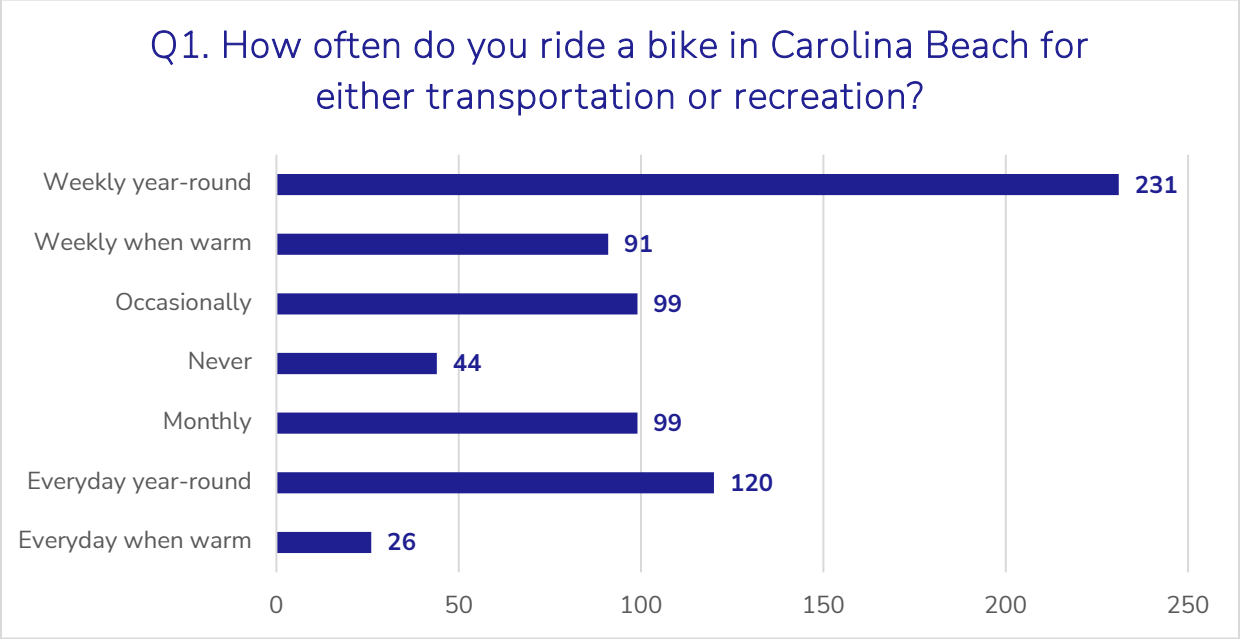

CAROLINA BEACH
Bicycle and Pedestrian Plan
Prioritization Metrics - Which are important to you?
Addresses a known safety issue
Increases access to recreational biking and walking
Provides multimodal connection to key community destinations
Public Support
Cost

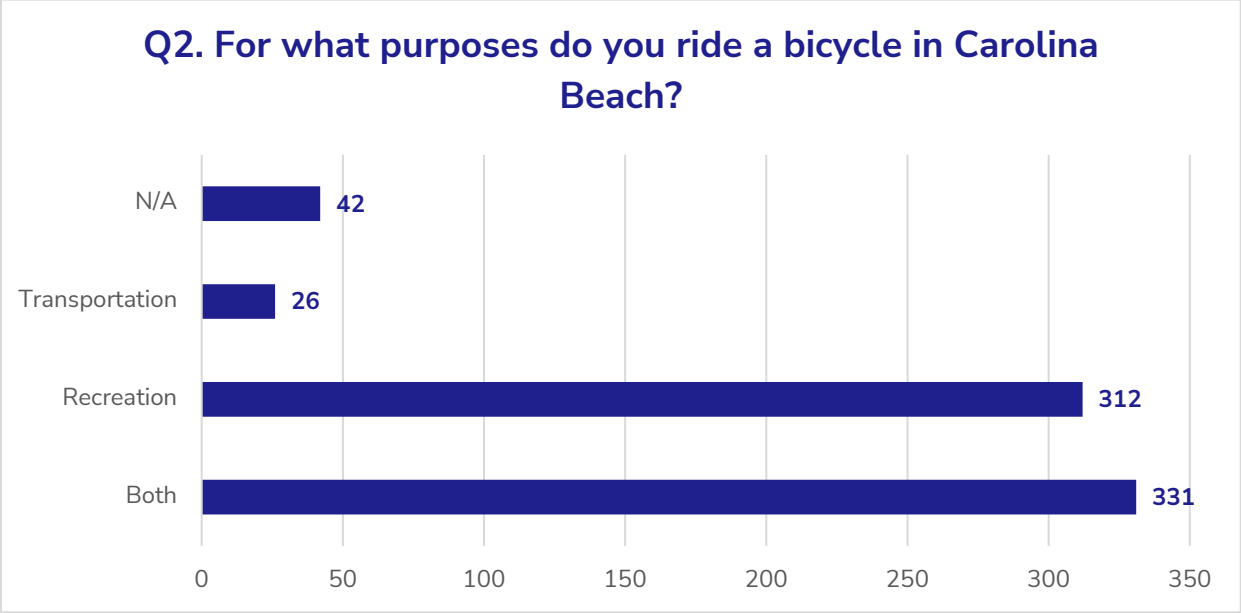

CAROLINA BEACH
Bicycle and Pedestrian Plan
Types of Projects in the Draft Plan
Sidewalks
Best use is on roads that connect destinations or on roads with significant automobile traffic.
Constrain ROW Sidepath
Best use is on roads that connect destinations, have pedestrians and bicyclists in the road, and right of way limits an MUP.
Neighborhood Slow Zones
Best use is near areas with higher numbers of vulnerable pedestrians, with or without sidewalks -- schools, parks, residential neighborhoods, and downtowns. Best for roads with speeds of 15-20 mph.
Multi-Use Path (MUP)
Best use is is to connect destinations, including parks and recreation facilities priority community amenities, along roads with high traffic speeds or volumes and expected multimodal use.
Crosswalk Improvement
Best use is to connect the existing pedestrian network. Type of improvement depends on the speed and size of roadways and may consider signalization, curb ramp standards, refuge islands, and more.
Neighborhood Connectors
Best use is to connect bicycle and pedestrian facilities across short distances with a multiuse path to provide residential areas with direct, safe access to public amenities and other neighborhoods.
Intersection Improvement
Best use is to connect existing or proposed multimodal networks and prioritize pedestrian and bicycle safety at intersections. The type of improvement depends size of roadway and connected network.
WAIT HERE
Bicycle Boulevard
Best use is on roads with low-motorized traffic volumes and low speeds. Utilizes traffic calming devices, enhanced shared lane markings, and wayfinding to prioritize bicycle movement and limit conflicts between cyclists and motorists.


CAROLINA BEACH
Bicycle and Pedestrian Plan

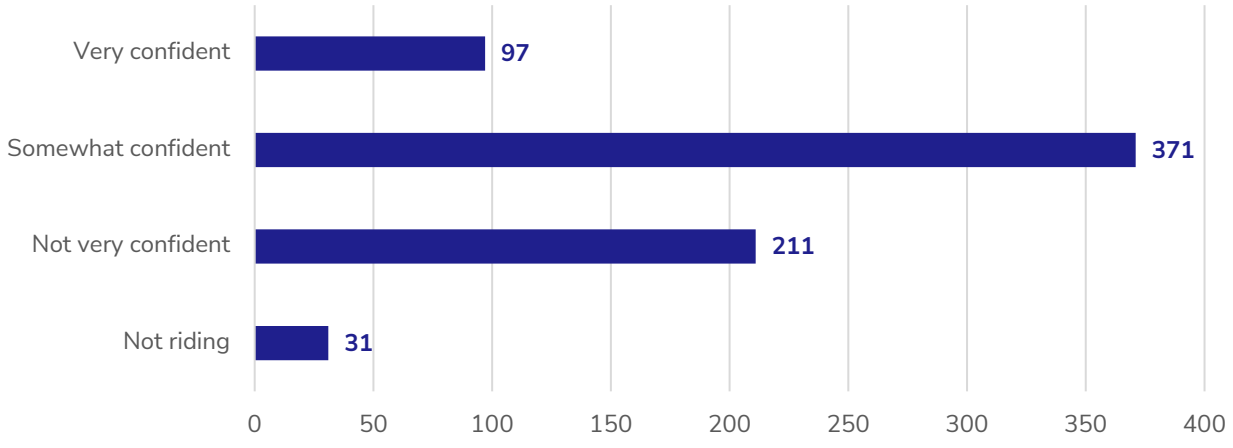
Public Survey

The public survey was published May 17th, 2024, and was publicly available until July 1st, 2024. It was deployed online using ArcGIS Survey123. Town staff sent the survey link and QR code to community members via email in order to reach as many potential respondents as possible. The survey QR code was also publicly displayed on a large poster during the June community engagement event and community members were reminded to take the survey. In total, the survey received 719 responses. The summaries of the responses to each survey question can be found in below.

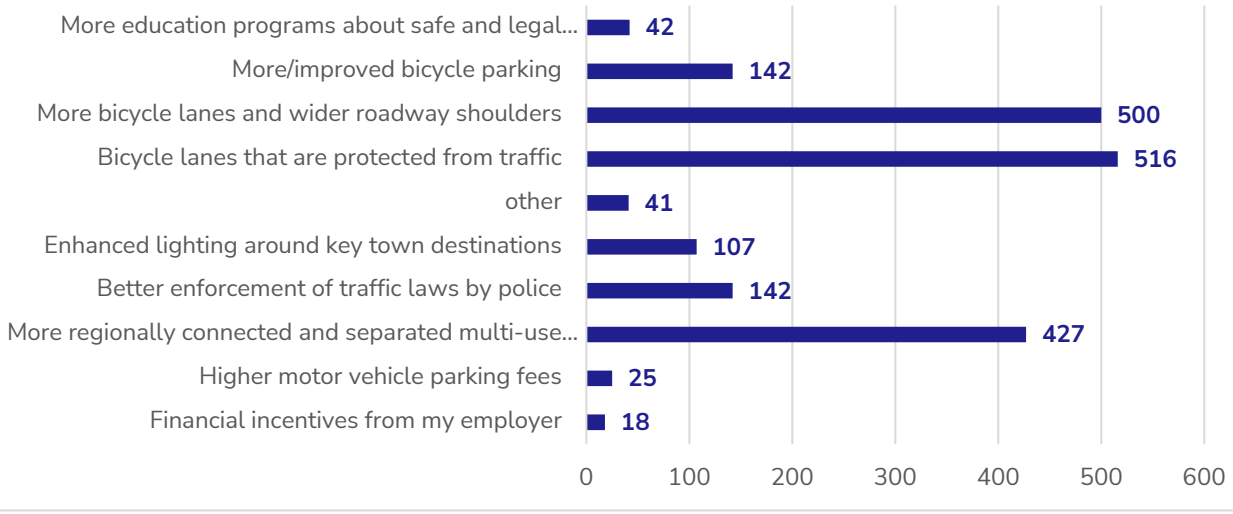




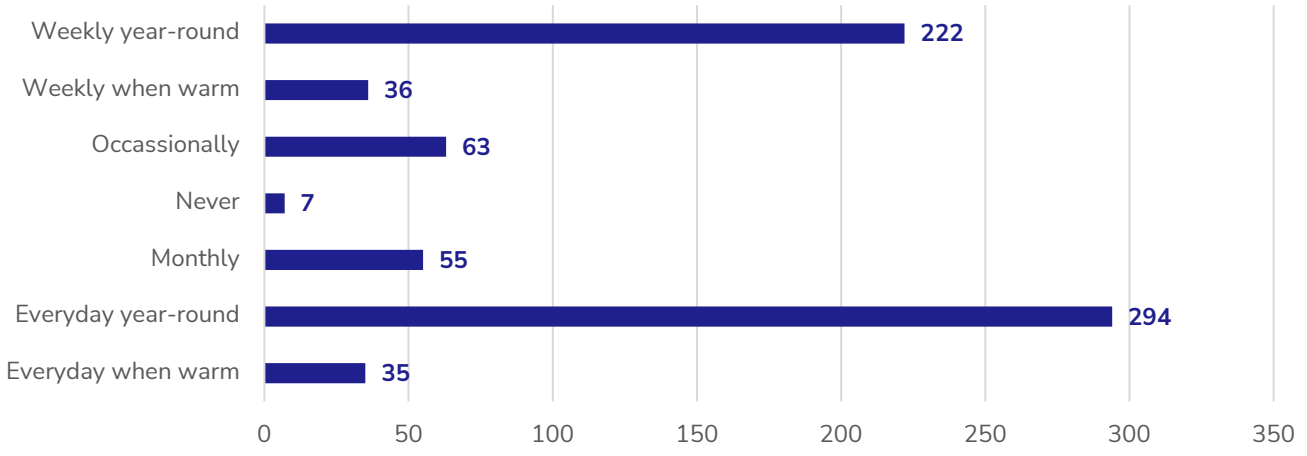
Q3. How confident do you feel while riding a bicycle in Carolina Beach?



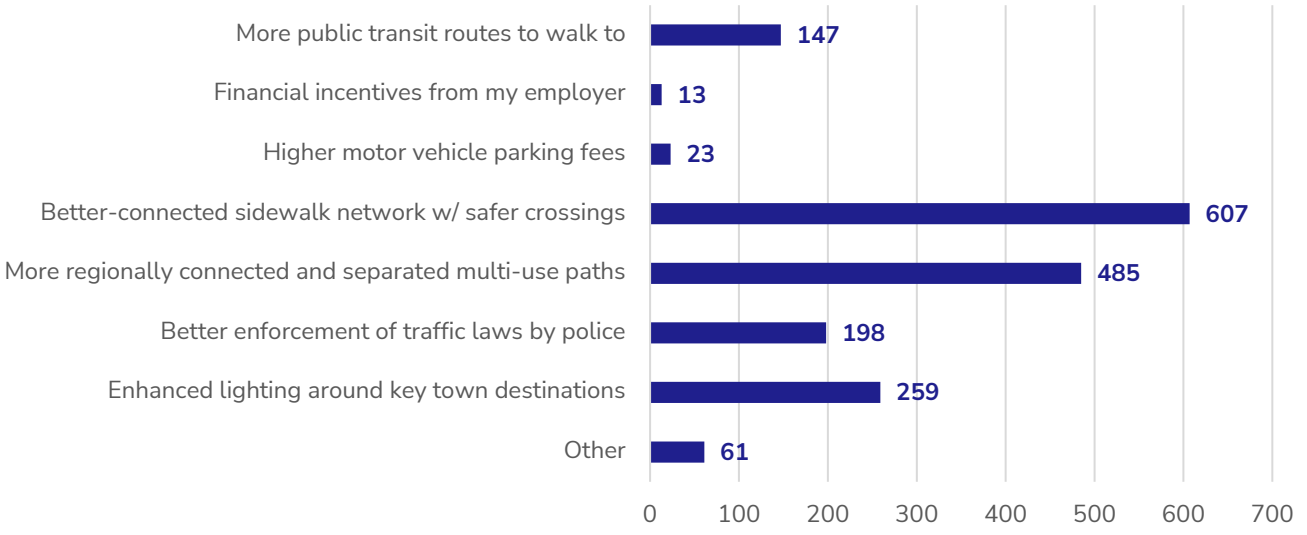
Q4. Which of the following initiatives would encourage you to bike more frequently for transportation purposes?



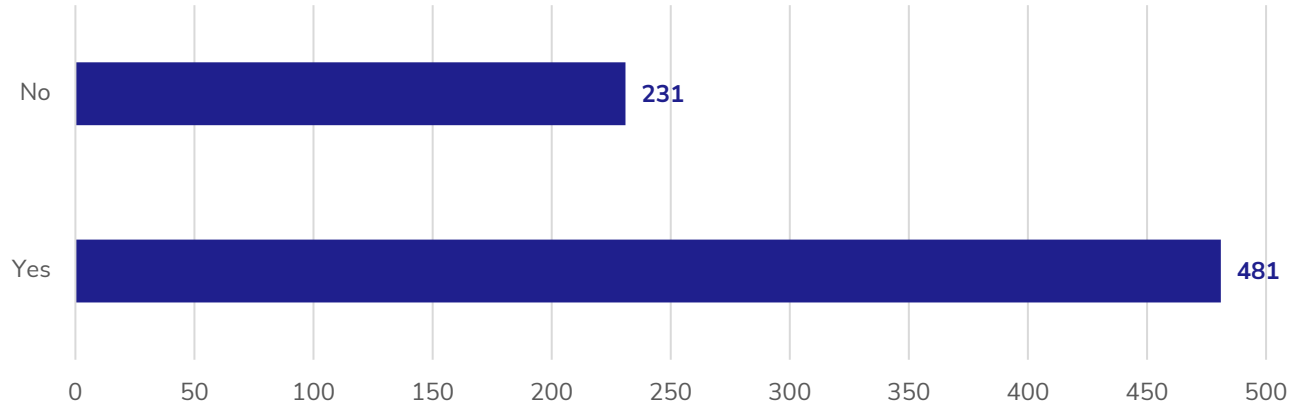
Q5. How often do you walk in Carolina Beach for transportation or recreation?



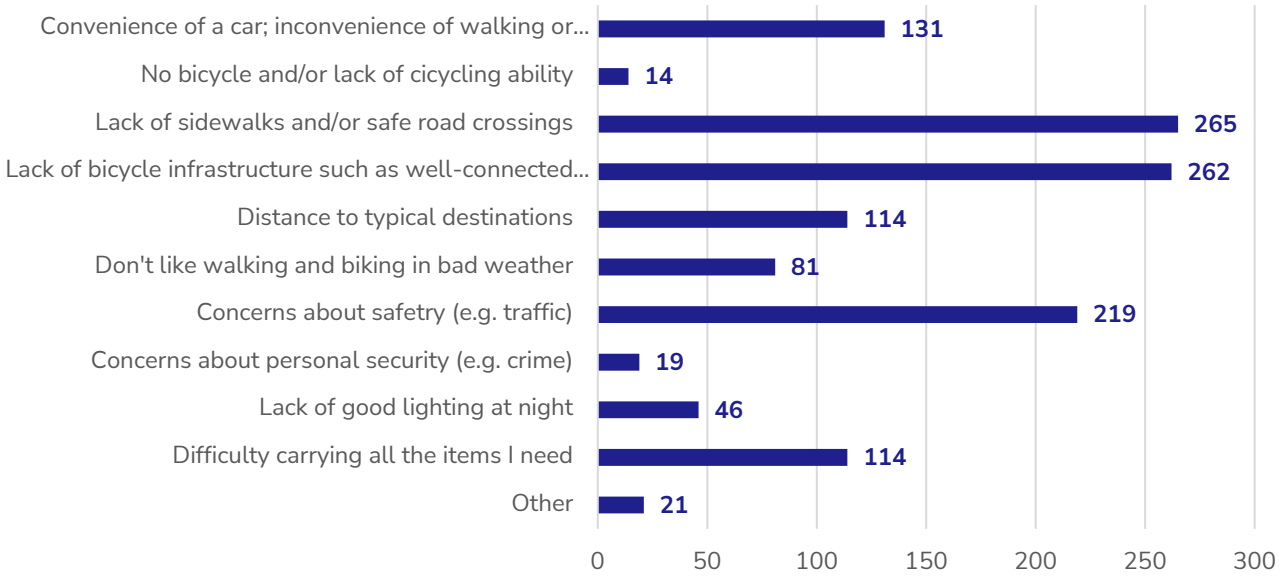
Q6. Which of the following initiatives would encourage you to walk more frequently for transportation purposes?



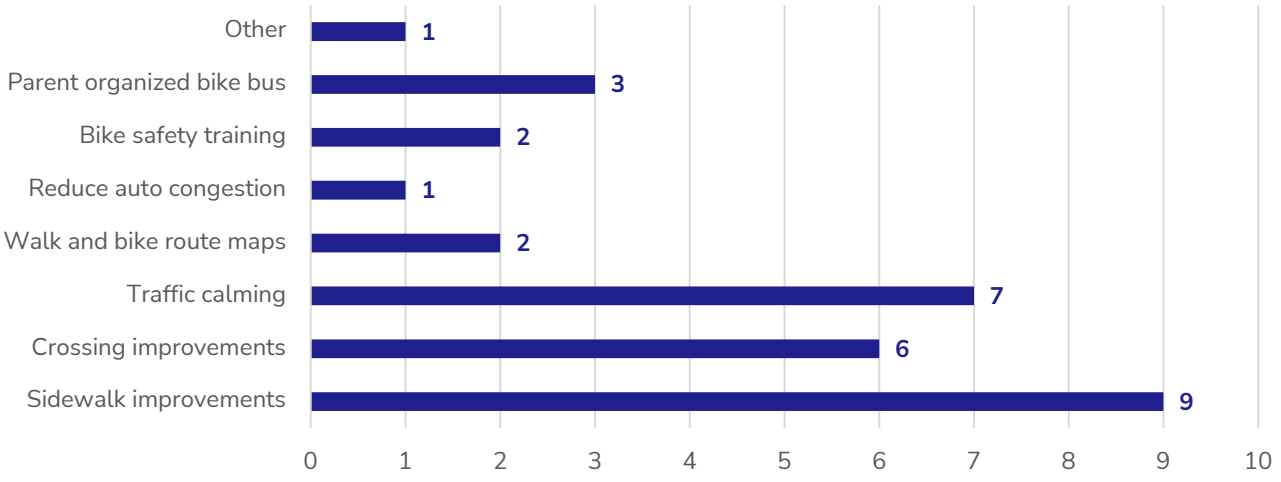
Q7. Do you drive regularly for most or all of your trips in Carolina Beach?



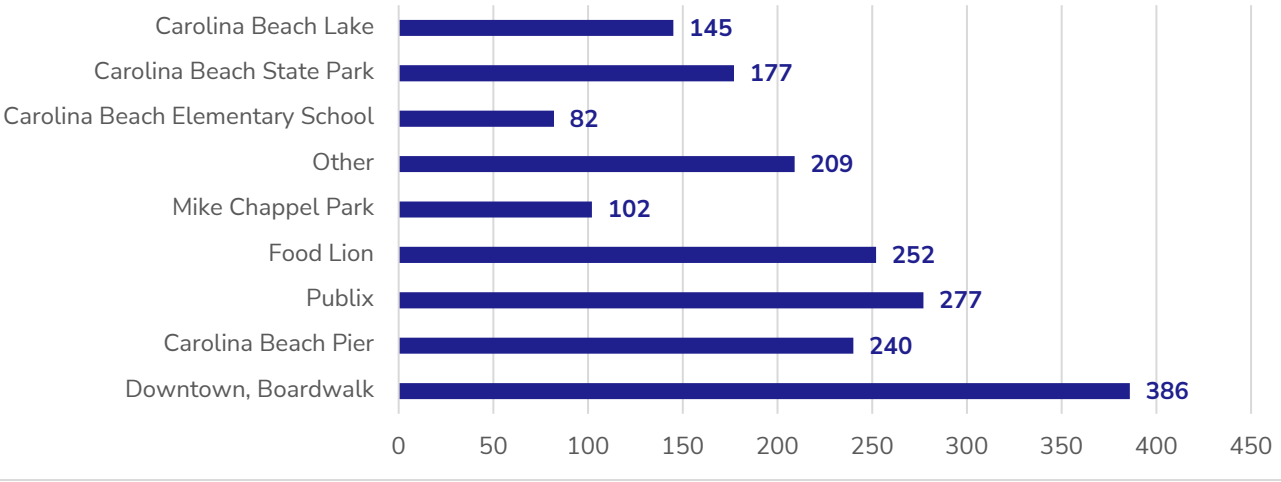
Q7a. If you drive regularly for most or all of your trips, what barriers prevent you from walking or bicycling more frequently?



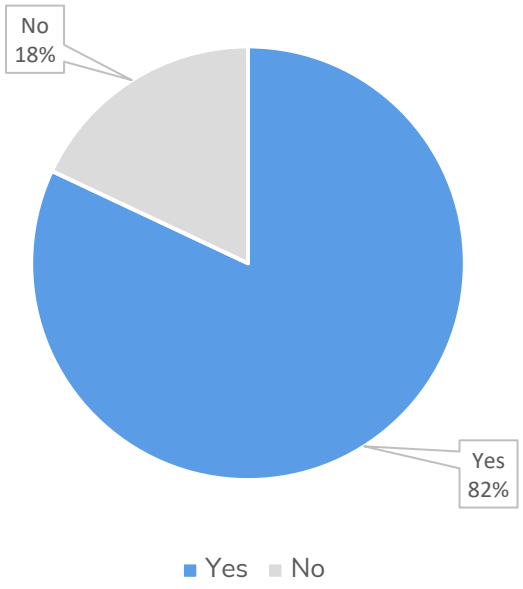
Q8. What do you think would MOST improve the walking and bicycling experience for school-age children?



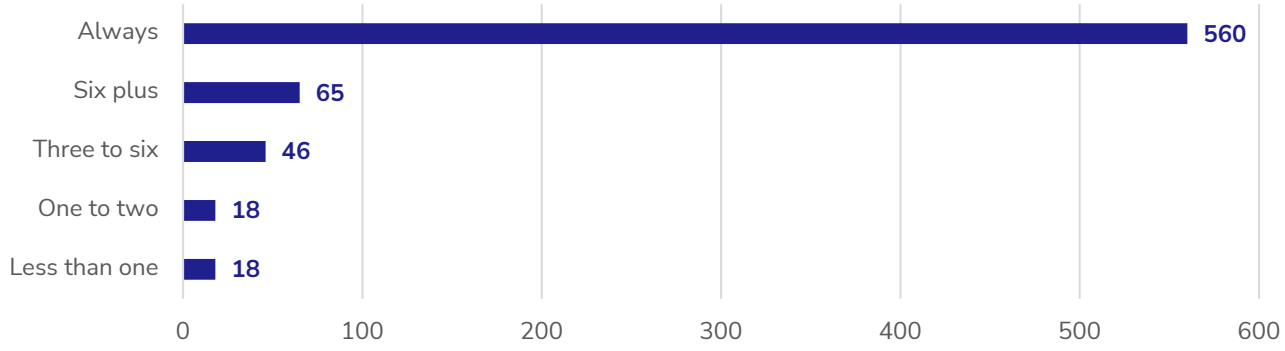
Q11. Which of these destinations need better pedestrian and bicycle infrastructure nearby?

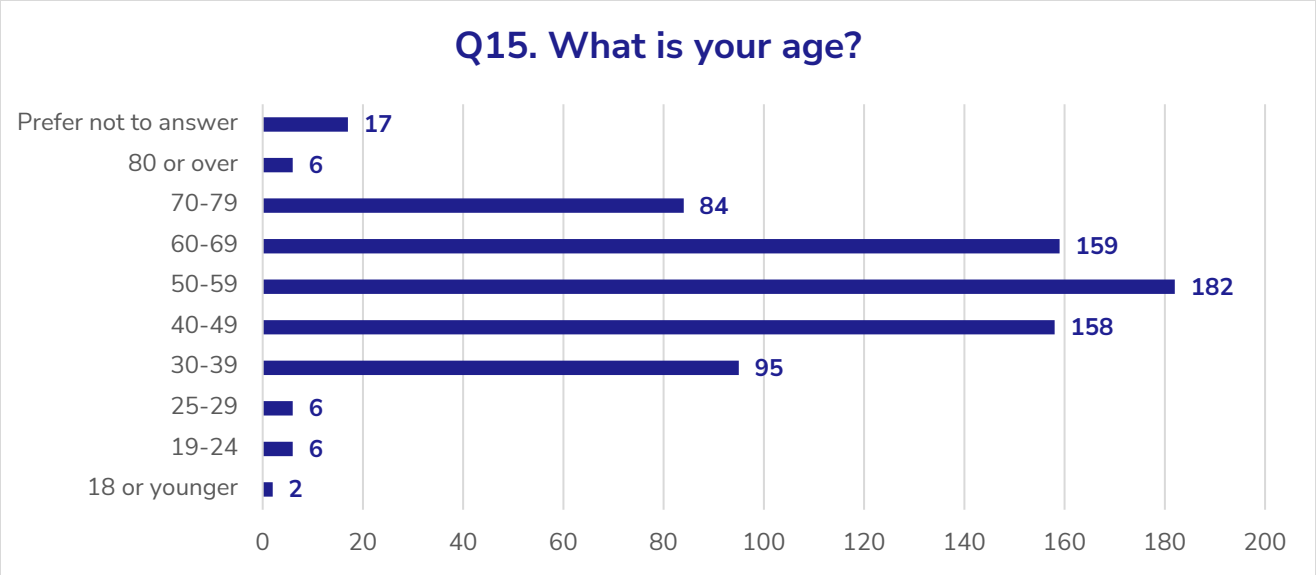


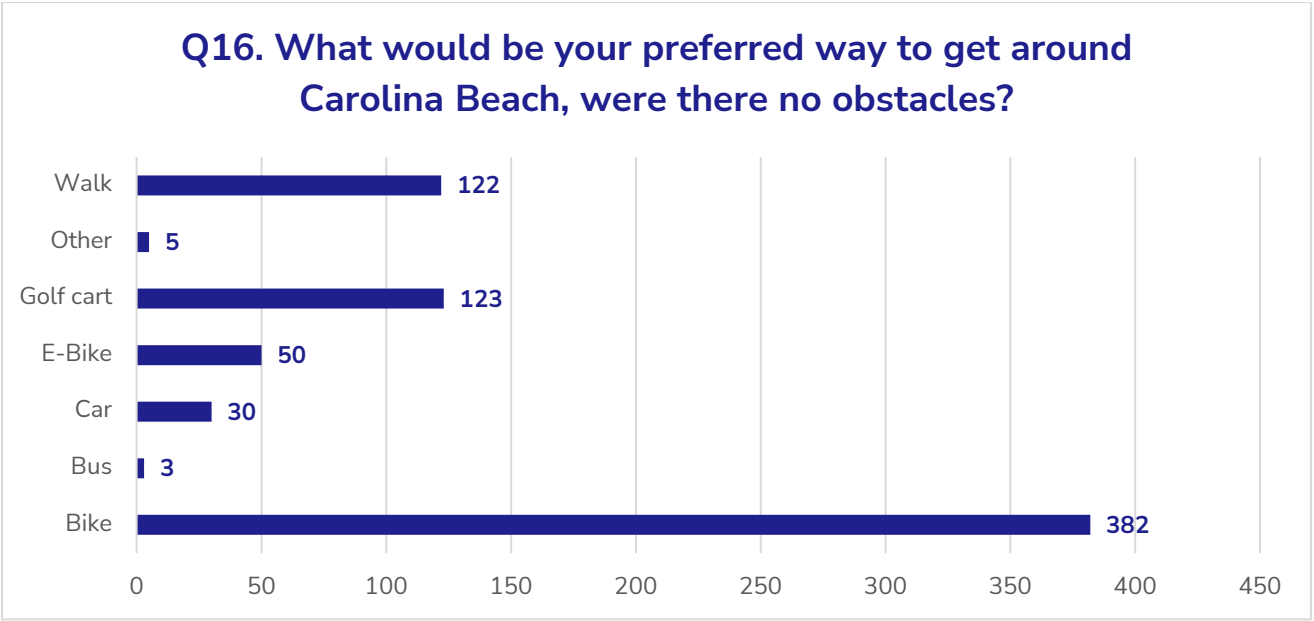
Q13. Are you a Carolina Beach resident?



Q14. How many months a year do you spend at Carolina Beach?







Summaries of the Open-ended Responses

Several questions on the survey had the option for respondents to choose “other, please specify”. The responses received under those questions are summarized below.

Question 4: Which of the following initiatives would encourage you to bike more frequently for transportation purposes?

Respondents shared that they would like to see traffic and transportation infrastructure improvements such as more one-way streets for better flow of traffic, improved lane markings, improved trash and debris removal off greenways, and repairing potholes. They also had some safety suggestions, including regulating e-bikes, improved enforcement of traffic laws, and lower speed limits.

In regard to future development, some respondents expressed dissatisfaction with the current development pace, believing it overextends road capacity. There was also the desire to design new roads to incorporate bike safety and to require new developments to improve adjacent roadway infrastructure to include bicycle and pedestrian facilities.

Question 6: Which of the following initiatives would encourage you to walk more frequently for transportation purposes?

Respondents mentioned that they would like to see safety and connectivity improvements to bicycle and pedestrian facilities, especially to and around key destinations in Carolina Beach. There was an expressed desire to have these improvements be infrastructural by adding more sidewalks, crosswalks, wider shoulders, multi-use paths, and public seating. Community members also expressed concerns about speed limits. They emphasized the need to control vehicle speeds to ensure safety and suggested lowering speed limits for vehicles in Carolina Beach

Respondents shared that they would appreciate beautification efforts and the completion of ongoing projects along bicycle and walking routes to enhance the experience. Community members also identified a need for public transit that provides routes to and from the beach.

Question 7a: If you drive regularly for most or all of your trips, what barriers prevent you from walking or bicycling more frequently?

Respondents described four major barriers to walking or bicycling in Carolina Beach. One major concern was the extreme heat which makes it difficult to engage in active forms of transportation. Pedestrian traffic and parking are other issues community members raised, saying that existing infrastructure poorly regulates the flow of pedestrian traffic. Community members also suggested the addition of kayak docks on both sides of the sound to better facilitate crossing and connectivity since walking across the sound is not possible and walking around the sound is lengthy.
A few respondents cited personal medical issues that prevent them from walking or bicycling in Carolina Beach.

Question 11: Which of these destinations need better pedestrian and bicycle infrastructure nearby?

Key Corridors Mentioned:

- Lake Park Blvd
- St. Joseph Street
- Dow Road
- Ocean Blvd

[ii] United States Census Bureau (2022).
[iii] Town of Carolina Beach, "CAMA Land Use Plan," (Carolina Beach, NC, 2020).
[iv] Town of Carolina Beach, "Carolina Beach Pedestrian Plan," (Carolina Beach, NC, 2018).
[v] Town of Carolina Beach (2018).
[vi] Town of Carolina Beach, "Carolina Beach 2017-2022 Parks, Recreation and Open Space Master Plan," (Carolina Beach, NC, 2016).
[vii] Town of Carolina Beach, "Bicycle Multi-Use Transportation Plan," (Carolina Beach, NC, 2011).
[viii] Cape Fear Public Transportation Authority, "Wave Transit Locally Coordinated Public Transportation Plan," (Wilmington, NC, 2021)
[ix] Cape Fear Public Transportation Authority, "Full route map," (Wilmington, NC, 2022).
[x] Go Coast, "Cape Fear Change in Motion 2020 Short-Range TDM Plan 2021-2025," (Wilmington, NC, 2020).
[xi] Wilmington Urban Area Metropolitan Planning Organization, "Cape Fear Moving Forward 2045," (Wilmington, NC, 2020)
[xii] Wilmington Urban Area Metropolitan Planning Organization (2020).
[xiii] Ibid
[xiv] Wilmington Metropolitan Planning Organization, "Comprehensive Greenway Plan," (Wilmington, NC, 2013).
[xv] North Carolina Department of Transportation, "State Transportation Improvement Program," (Raleigh, NC, 2023).


TOWN OF CAROLINA BEACH
NORTH CAROLINA