



# City of Wilmington BIKE PLAN

August 2019 Report



**MOVING US FORWARD**



# A PLAN FOR BIKING IN THE CITY OF WILMINGTON

## CONTENTS

EXECUTIVE SUMMARY .....	2	GOAL 1: DESIGN AND IMPLEMENT A COORDINATED AND SAFE CITYWIDE BIKE ROUTE NETWORK .....	31
<b>1</b> INTRODUCTION.....	<b>5</b>	Recommendations 1.1 through 1.6.....	31
VISION .....	6	GOAL 2: EDUCATE AND ADVOCATE TO PROVIDE SAFER BIKING CONDITIONS FOR ALL .....	34
GOALS .....	6	Recommendations 2.1 through 2.5.....	35
THE CASE FOR WILMINGTON.....	7	GOAL 3: FACILITATE ACCESS TO BIKING .....	36
THE BENEFITS OF BIKING IN CITIES .....	8	Recommendations 3.1 through 3.6.....	37
<b>2</b> PLAN DEVELOPMENT.....	<b>11</b>	<b>5</b> IMPLEMENTATION .....	<b>43</b>
BIKE WILMINGTON .....	12	PROGRESS MEASURES.....	44
DEVELOPING A MAP OF POTENTIAL ROUTES .....	12	Goal 1 Recommendations.....	44
GIS ANALYSIS OF POTENTIAL ROUTES MAP .....	12	Goal 2 Recommendations.....	46
PUBLIC PRESENTATIONS.....	14	Goal 3 Recommendations.....	47
PUBLIC SURVEY.....	14	COORDINATION .....	49
DEVELOPMENT OF FINAL COORDINATED BIKE ROUTE NETWORK MAP .....	16	PUBLIC OUTREACH.....	50
CORRIDOR CONCEPTS .....	16	PROJECT PRIORITIZATION .....	50
<b>3</b> EXISTING CONDITIONS.....	<b>21</b>	State-Maintained Streets .....	51
RECENT ACCOMPLISHMENTS.....	22	City-Maintained Streets .....	51
EXISTING BIKE INFRASTRUCTURE.....	22	FUNDING .....	54
CRASHES INVOLVING CYCLISTS (2013-2018).....	25	APPENDICES.....	55
DESIGNATED STATEWIDE BICYCLE ROUTES IN AND AROUND WILMINGTON .....	25	A: BIKING TIME TO DOWNTOWN WILMINGTON (MAP) .....	56
<b>4</b> GOALS AND RECOMMENDATIONS .....	<b>27</b>	B: STREETS RECOMMENDED FOR ROAD DIETS .....	57
THE COORDINATED BIKE ROUTE NETWORK MAP.....	28	C: PUBLIC PRESENTATION LOCATIONS AND TABLING EVENTS .....	58
		D: PUBLIC SURVEY QUESTIONS .....	59
		E: APPROXIMATE GEOGRAPHIC DISTRIBUTION OF SURVEY RESPONSES (MAP) .....	60
		F: CHART OF GEOGRAPHIC DISTRIBUTION OF SURVEY RESPONSES.....	61
		G: SURVEY RESPONSE SUMMARY CHARTS .....	62
		H: UNIT COUNTS AND COST ESTIMATES FOR BIKE FACILITY MATERIALS .....	65

# LIST OF FIGURES

FIGURE 1: COORDINATED BIKE ROUTE NETWORK MAP.....3

FIGURE 2: LEVEL OF TRAFFIC STRESS (MAP)..... 13

FIGURE 3: LOCATIONS FREQUENTLY MENTIONED IN PUBLIC SURVEY (MAP)... 15

FIGURE 4: 5 CORRIDORS SELECTED FOR CORRIDOR CONCEPTS (MAP)..... 17

FIGURE 5: PORTION OF BAYNARD BOULEVARD/WASHINGTON STREET  
CORRIDOR CONCEPT (RENDERING) ..... 18

FIGURE 6: PORTION OF 4TH STREET CORRIDOR CONCEPT (RENDERING)..... 19

FIGURE 7: PORTION OF 12TH STREET CORRIDOR CONCEPT (RENDERING)..... 20

FIGURE 8: BIKE RACK STYLE TO AVOID ..... 22

FIGURE 9: EXISTING CONDITIONS (MAP)..... 23

FIGURE 10: CRASHES INVOLVING CYCLISTS (2013-2018) (MAP) ..... 24

FIGURE 11: BICYCLE ROUTE MAP OF  
NEW CASTLE COUNTY, WILMINGTON INSET (MAP)..... 26

FIGURE 12: COORDINATED BIKE ROUTE NETWORK MAP (SAME AS FIGURE 1) 29

FIGURE 13: SIGNS TO BE USED ON BIKE-FRIENDLY STREETS ..... 30

FIGURE 14: GREEN SHARROWS ..... 30

FIGURE 15: STATE-MAINTAINED STREETS (MAP) ..... 32

FIGURE 16: PREFERRED BIKE RACK STYLE AND LOCATION ..... 39

FIGURE 17: BIKE HOOKS ON NJ TRANSIT TRAIN ..... 40

FIGURE 18: SAN FRANCISCO WAYFINDING SIGN DESIGNED FOR CYCLISTS .... 41

FIGURE 19: BIKE REPAIR STAND NEXT TO URBAN BIKE PROJECT ..... 41

FIGURE 20: SCREENSHOT OF AUSTIN'S MOBILE-FRIENDLY BIKE MAP ..... 42

FIGURE 21: MILES OF BIKEWAYS BY TYPE AND  
MAINTENANCE AUTHORITY (TABLE)..... 51

FIGURE 22: PROJECTS TO BE SUBMITTED FOR DELDOT FUNDING (TABLE) ..... 52

FIGURE 23: PROPOSED PHASED IMPLEMENTATION PLAN FOR  
CITY-MAINTAINED STREETS (TABLE)..... 53

# COVER IMAGE CREDITS

FRONT COVER IMAGE: UNION STREET BIKE RIDE  
Image credit: West Side Grows Together.

CHAPTER 1 COVER IMAGE: KIDS' RIDE DURING WILMINGTON GRAND PRIX .....5  
Image credit: Urban Bike Project.

CHAPTER 2 COVER IMAGE: BIKER ON MARKET STREET ..... 11  
Image credit: Jamie Magee.

CHAPTER 3 COVER IMAGE: BAYNARD BOULEVARD..... 21  
Image credit: Matthew Harris.

CHAPTER 4 COVER IMAGE: BIKER ON MARKET STREET ..... 27  
Image credit: Matthew Harris.

CHAPTER 5 COVER IMAGE: HARRISON STREET BIKE LANE ..... 43  
Image credit: Matthew Harris.

APPENDICES COVER IMAGE: JACK A. MARKELL TRAIL BRIDGE  
WITH CITY OF WILMINGTON IN BACKGROUND ..... 55  
Image credit: Whitman Requardt and Associates, LLP.

BACK COVER IMAGE: BIKER ON 9TH STREET  
Image credit: Jamie Magee.

# ACKNOWLEDGMENTS



The project team would like to thank the following groups and individuals for helping to guide this plan:

Michael S. Purzycki, Wilmington Mayor

Wilmington City Council

- Dr. Hanifa Shabazz, City Council President
- Linda M. Gray, 1st District
- Ernest “Trippi” Congo II, 2nd District
- Zanthia Oliver, 3rd District
- Michelle Harlee, 4th District
- Va’Shun “Vash” Turner, 5th District
- Yolanda McCoy, 6th District
- Robert A. Williams, former 7th District
- Charles M. “Bud” Freel, 8th District
- Ciro Adams, At-Large
- Rysheema Dixon, At-Large
- Samuel L. Guy, Esq., At-Large
- Loretta Walsh, At-Large

Department of Planning and Development

- Herb Inden, Director
- Matthew Harris, Sr. Planner II
- Gemma Tierney, Planner II
- Jessica Molina, Planner I

Department of Public Works

- Kelly Williams, Commissioner
- Brian Mitchell, Transportation Director
- Steve Weber, Transportation Engineer

Wilmington City Planning Commission

Bike Wilmington Committee

- Aundrea Almond
- Marco Boyce
- Bobbi Britton
- Jim Clevenger
- Adam Crosby
- Heather Dunigan
- Maria Dziembowska
- Jeff Greene
- Dave Gula
- Matthew Harris
- Paul Horan
- Richie Jones
- Leah Kacanda
- Sarah Lester

- Jamie Magee
- Paul Moser
- Bill Pearson
- Jeff Riegner
- Job Taminiau
- Gemma Tierney
- Andrea Trabelsi
- Amy Wilburn
- Laura Wilburn
- James Wilson

Wilmington Area Planning Council

Delaware Department of Transportation

Whitman Requardt and Associates, LLP

Delaware Greenways

The Nature Conservancy, Delaware Chapter

And all the community members and civic leaders who took the time to provide their input.



## EXECUTIVE SUMMARY

"Moving Us Forward: A Plan for Biking in the City of Wilmington" sets out to create a livable city where people of all ages and abilities can connect with each other and neighborhoods across the City by biking and walking. The City is well-positioned to become bike-friendly for several reasons. These reasons include: its compact size that makes traveling across the City by bike relatively easy, a traditional street grid, an ample City parks system, many calm residential streets, and strong trail connections to the surrounding New Castle County. The Wilmington Bike Plan was developed concurrently with the City of Wilmington's latest Comprehensive Development Plan, "Wilmington 2028: A Comprehensive Plan for our City and Communities" and will serve as the bicycle plan element of Wilmington 2028.

This plan was developed with extensive community input. Over the summer of 2018, Planners from the City met with 22 civic associations and tabled at 3 community events. At these meetings, communities were presented with draft network ideas, guiding principles of the plan, and the value of biking in cities. In addition, Planning staff conducted a public survey at the public presentations and online to solicit ideas for the bike plan. One of the themes that emerged from the survey responses was that respondents said that they were more likely to bike if the City had high-quality bike facilities such as protected bike lanes.

Although this plan includes recommendations for off-street pathways, its primary focus is on the development of on-street bike facilities, rather than recreational trails. The primary reason for this focus is that the plan seeks to maximize opportunities for people to use bikes to access employment, services, schools and other day-to-day needs. Given Wilmington's high rate of poverty and the high cost of car ownership, a safe and comfortable Citywide network of bike infrastructure can translate into more affordable,

" A safe and comfortable Citywide network of bike infrastructure can translate into more affordable, healthy and convenient transportation options and, in turn, more economic opportunities for Wilmingtonians."

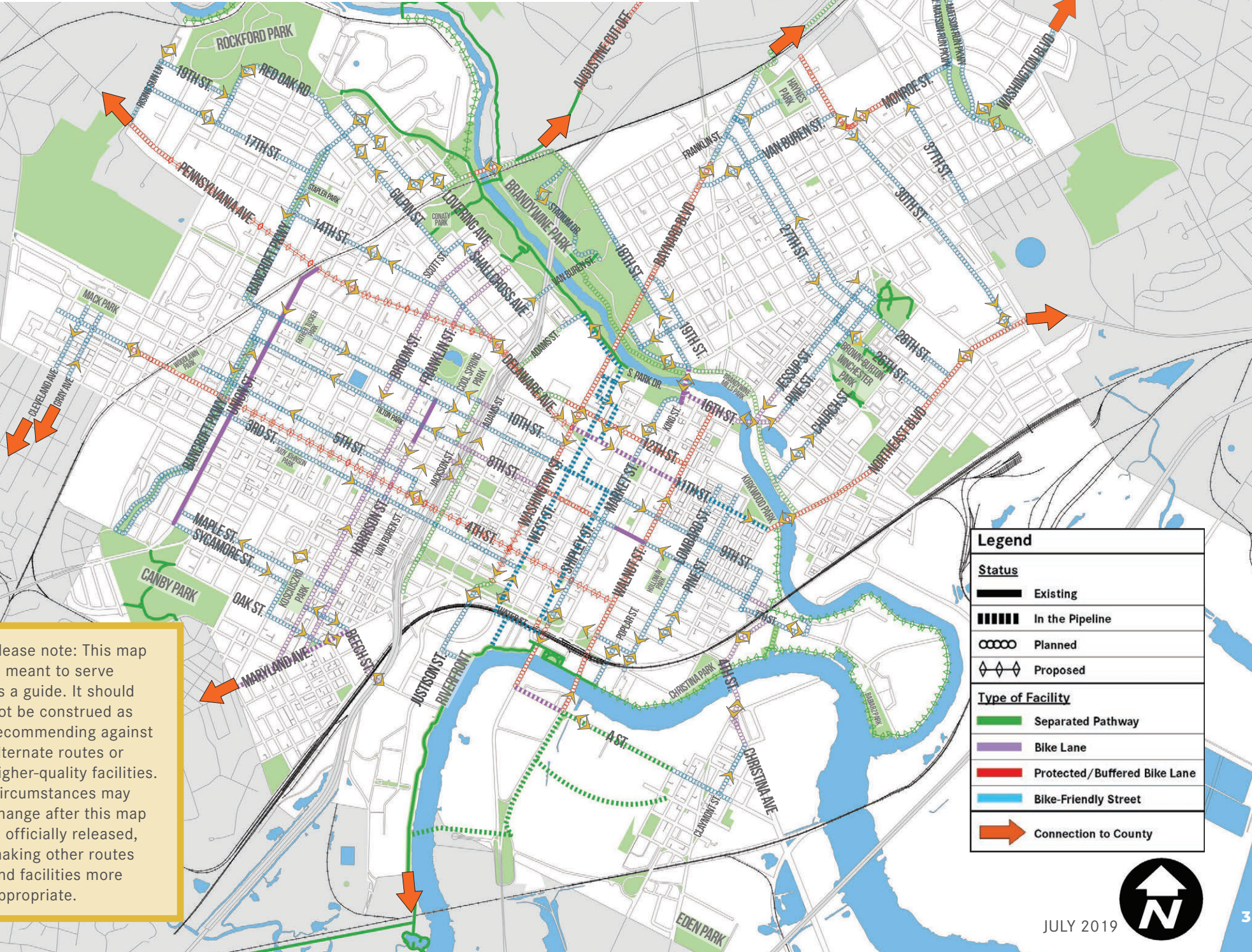
healthy and convenient transportation options and, in turn, more economic opportunities for Wilmingtonians.

Moving Us Forward builds upon the 2008 Wilmington Bicycle Plan. Since 2008, there have been many biking-related changes and accomplishments in Wilmington. One of the most important accomplishments was the creation of the Bike Wilmington Committee in 2010. Bike Wilmington is made up of a variety of stakeholders including agencies and citizens. The committee has played an integral role in all stages of the development of the 2019 bike plan.

The plan's recommendations are structured around three goals related to the plan's vision. The goals are:

- Develop a coordinated and safe Citywide bike route network.
- Educate and advocate to provide safer biking conditions for all.
- Facilitate access to biking.

# FIGURE 1: COORDINATED BIKE ROUTE NETWORK MAP



Please note: This map is meant to serve as a guide. It should not be construed as recommending against alternate routes or higher-quality facilities. Circumstances may change after this map is officially released, making other routes and facilities more appropriate.

Legend	
<b>Status</b>	
	Existing
	In the Pipeline
	Planned
	Proposed
<b>Type of Facility</b>	
	Separated Pathway
	Bike Lane
	Protected/Buffered Bike Lane
	Bike-Friendly Street
	Connection to County



In pursuit of Goal 1, the plan recommends specific types of bike facilities for numerous City streets. Planning staff evaluated each corridor using guidance from a variety of sources, including the Manual of Uniform Traffic Control Devices (MUTCD) and the National Association of City Transportation Officials (NACTO) and developed recommendations that balance the needs of both vehicles and cyclist on the roadway.

Creating a bike-friendly Wilmington will require more than painting lines on the streets. For this reason, the plan also lays out recommendations related to Goals 2 and 3. Promoting the numerous benefits of cycling will be integral to growing the City's biking mode share. Several organizations, many of whom have been critical to the development of this plan, are vested in the mission of making biking an accessible transportation option and helping people enjoy and feel comfortable biking. Through a combination of investments in infrastructure, education and access, Wilmington can accomplish this plan's vision to make Wilmington more livable by making biking and walking more viable transportation options for all.

The plan concludes by laying out implementation strategies to accomplish this broad vision and its associated goals and recommendation. The City of Wilmington, the Wilmington Area Planning Council (WILMAPCO) and the Delaware Department of Transportation (DelDOT) will all be essential actors in carrying out the recommended physical improvements. Additionally, the City should continue to support our community partners to expand access to bikes and programs.

This plan outlines a path towards a City with safer and healthier transportation options for all.

## BIKER IN DOWNTOWN WILMINGTON

Image credit: Matthew Harris.







# 1. INTRODUCTION



## VISION

**THIS PLAN IS GUIDED BY A VISION OF A MORE LIVABLE WILMINGTON WHERE PEOPLE OF ALL AGES AND ABILITIES CAN CONNECT WITH EACH OTHER AND NEIGHBORHOODS ACROSS THE CITY BY BIKING AND WALKING.**



## GOALS

**THE GOALS OF THIS PLAN ARE TO:**

- 1. Design and implement a coordinated and safe bike route network;**
- 2. Educate and advocate to provide safer biking conditions for all; and**
- 3. Facilitate access to biking.**

### **GROUP BIKE RIDE IN WILMINGTON**

Image credit: Urban Bike Project.



## THE CASE FOR WILMINGTON

Like most American cities, Wilmington is an auto-oriented city served by bus transit options. While a strong network of off-street trails exists in and adjacent to Wilmington, there are few on-street bicycle facilities in the City. Not surprisingly, most of Wilmington's workers commute to work by driving alone. According to U.S. Census data for the period 2013-2017, about 68% of Wilmington's 30,079 workers age 16 and older who commute to work get there by driving alone. That is about 20,400 people. Approximately 20% (about 5,900 people) commute by carpooling or taking public transit and 6.7% (about 2,000 people) walk. In comparison, 0.8% of people (or 240 people) bike to work. This is slightly above the national average for the same period, which was 0.6%.

The reason for this higher rate of bike commuting may be due to some of Wilmington's existing attributes, which also support the creation of a Citywide bike network:

- A compact size that translates into excellent potential to make biking a practical, enjoyable and more efficient (compared to driving) way to travel across the City (see Appendix A for a map illustrating bike travel times to downtown Wilmington, from "Wilmington 2028: A Comprehensive Plan for Our City and Communities").
- A traditional street grid network that offers numerous route options.
- A well-designed and ample City Parks system.
- A strong, centrally-located employment center in a growing downtown commercial core.
- Calm residential streets.
- Some streets with excess space that can be used for bike lanes.
- Connections to New Castle County via an off-street trail network.

Unfortunately, Wilmington is also characterized by economic disparities. According to U.S. Census data for 2013-2017, 27% of City residents live below the poverty level, about 22% of households do not own a vehicle, and about 11% of workers age 16 and older do not own a vehicle. These characteristics underline the importance of creating a safe and comfortable Citywide bike network. Such a network will provide a safe, affordable transportation option for residents living on limited incomes for whom car ownership is not practical or possible.

The recent residential, recreational and commercial development that has occurred in the downtown and along the riverfront makes a strong Citywide bike network both more useful and more feasible. A safe and coordinated bicycle network across the City will allow residents across the City to access both the downtown, the Riverfront, and the rest of the City's many amenities without the use of a car. Additionally, the Jack A. Markell (JAM) Trail, which connects the Wilmington Riverfront to New Castle, opens the City to additional bicyclists from elsewhere in the County and region. Proving better bike connectivity in the City will create better connectivity with regional trail networks.

# THE BENEFITS OF BIKING IN CITIES

This plan hopes to help Wilmington realize both the individual benefits of cycling, and the collective benefits of investing in bicycle infrastructure in urban settings to bring more bicyclists onto the streets. These benefits are summarized here to reinforce the importance of the investments being recommended in the remaining chapters of this plan.

## INDIVIDUAL BENEFITS OF CYCLING



### Health Benefits

- Whether you bike for exercise, transportation or recreation, cycling is a simple aerobic exercise that can lead to better health, especially respiratory and heart health.
- Although biking alongside heavy car traffic exposes a biker to carbon dioxide and other emissions from motor vehicles, several studies have shown that the health benefits of cycling next to cars outweigh the impacts of breathing in these emissions.
- Commuting in cars can increase stress levels and reduce health outcomes, while commuting by bike provides an opportunity for regular physical activity. Physical activity has been shown to reduce stress and boost energy levels. Furthermore, biking to school has been shown to help students focus and perform better when they arrive at school.



### Mobility and Economic Opportunity

- Bicycles offer a transportation option for those who do not have access to a car or who do not or cannot have a driver's license.
- Compared to cars, bicycles are affordable to purchase, maintain, and use: some comparisons estimate that a frequently-used basic bike costs around \$100-300 annually to own and maintain, while a car costs about \$5,000 or more annually to own and maintain.
- Bicycles offer greater flexibility than public transit because they are not limited by transit schedules or routes. This is especially important for people who are commuting to and from jobs when transit is not running at all.
- Bicycles can also facilitate transit trips by connecting starting points to transit stops, and transit stops to destinations.

## BIKER ON MARKET STREET

Image credit: Gemma Tierney.

# COLLECTIVE BENEFITS OF INVESTING IN BIKING IN WILMINGTON



### Safety

- Narrowing or eliminating traffic lanes to provide space for bike lanes also has a traffic calming effect, meaning that the narrower lanes encourage drivers to drive more slowly, which reduces the number and severity of crashes.
- The addition of designated areas for on-street bike travel, such as bike lanes and advanced stop lines (aka bike boxes), promote safer interactions between cars and bikes.
- Adding signs and pavement markings that remind drivers to share the road helps drivers to be more attuned to the presence of bicyclists, making the experience of biking safer and more comfortable.
- Safety in numbers: more bicyclists on the road can also translate into greater safety by increasing the visibility of cyclists.
- Cyclists and pedestrians can also add to the safety of a community by being its eyes and ears.
- The above factors can lead to more people choosing bikes over cars, thereby reducing the number of cars on the road, which can reduce the possibility of car crashes and decrease traffic congestion.





### Economic Development

- An increasing proportion of young professionals are expressing a preference for downtown living and walkable or bikeable commutes to work. Employers are responding to this preference by choosing to locate in cities where bike infrastructure can facilitate bikeable commutes. The provision of bike infrastructure should be a key strategy in Wilmington’s efforts to attract new employers.
- Many downtown small businesses have struggled to compete with car-oriented shopping centers and malls because they do not have free and abundant car parking. However, cyclists do not require parking spaces and can therefore more easily stop and spend time and money at local businesses in downtown areas. In this way, bringing more cyclists onto city streets can support small businesses. Additionally, if cyclists are replacing drivers, the reduced traffic congestion and noise pollution and the improved air quality can also make downtowns more attractive for all users, particularly pedestrians.



### Environment

- Reducing the number of cars on the road by increasing the bike mode share can reduce greenhouse gas emissions and improve air quality.
- In turn, better air quality can improve public health, such as by reducing rates of asthma and other respiratory conditions.



### Fiscal Savings

- Per mile, bikeway projects cost a small fraction of the amount needed for motor vehicle infrastructure projects like expanding roadways.
- While initial investments in bike infrastructure add cost to transportation budgets, an increase in the cycling mode share and corresponding reduction in driving can reduce wear-and-tear on streets and therefore make investments last longer.
- Because bikes take up less space than cars, increasing the bike mode share relative to driving can reduce the amount of land needed for car parking. This may reduce the demand for parking lots and structures, which can then be developed into more productive uses that can increase property tax revenues.

## REALIZING THE BENEFITS

This plan seeks to address all these benefits; however, improving mobility and opportunity have especially driven this plan. This planning effort is important because a coordinated bike network will allow residents who do not drive or do not have access to a car to more safely and comfortably use biking for transportation, thereby making it easier to reach destinations, including employment opportunities.

This plan considers both on- and off-street bikeways. However, on-street infrastructure is emphasized because it provides greater utility in terms of providing routes for everyday transportation (and thereby mobility and opportunity), rather than just recreation, and because Wilmington’s on-street infrastructure is currently very limited.



## 2. PLAN DEVELOPMENT

## BIKE WILMINGTON

The 2018 Wilmington Bike Plan was developed by Department of Planning Staff in conjunction with the Bike Wilmington Committee. Bike Wilmington is an inter-agency group focused on advocacy and planning. Bike Wilmington includes representation from the following groups:

- City of Wilmington
- DeIDOT
- Delaware Greenways
- The Nature Conservancy
- New Castle County
- Private sector transportation planning professionals
- Residents
- WILMAPCO
- Urban Bike Project

## DEVELOPING A MAP OF POTENTIAL ROUTES

Summer 2017: A working group made up of members of Bike Wilmington developed a potential route map that showed planned/pending routes, and identified additional routes for standard bike lanes, protected bike lanes, and sharrows. Routes were chosen based on, among other factors, topography, perceived traffic volume and speed, the potential for road diets and lane diets, and connections to existing trail networks, parks, schools, and other major destinations, as well as connections to New Castle County.

## GIS ANALYSIS OF POTENTIAL ROUTES MAP

Winter 2017-18: Planning staff conducted a GIS analysis of the feasibility and utility of the initially identified potential bike routes. The analysis looked at the street and lane widths, level of traffic stress (LTS) and the speed limit for each street segment. DeIDOT and the City of Wilmington provided this data. An LTS map of Wilmington is provided in Figure 2, on the next page, and the concept of LTS is summarized in the box below.

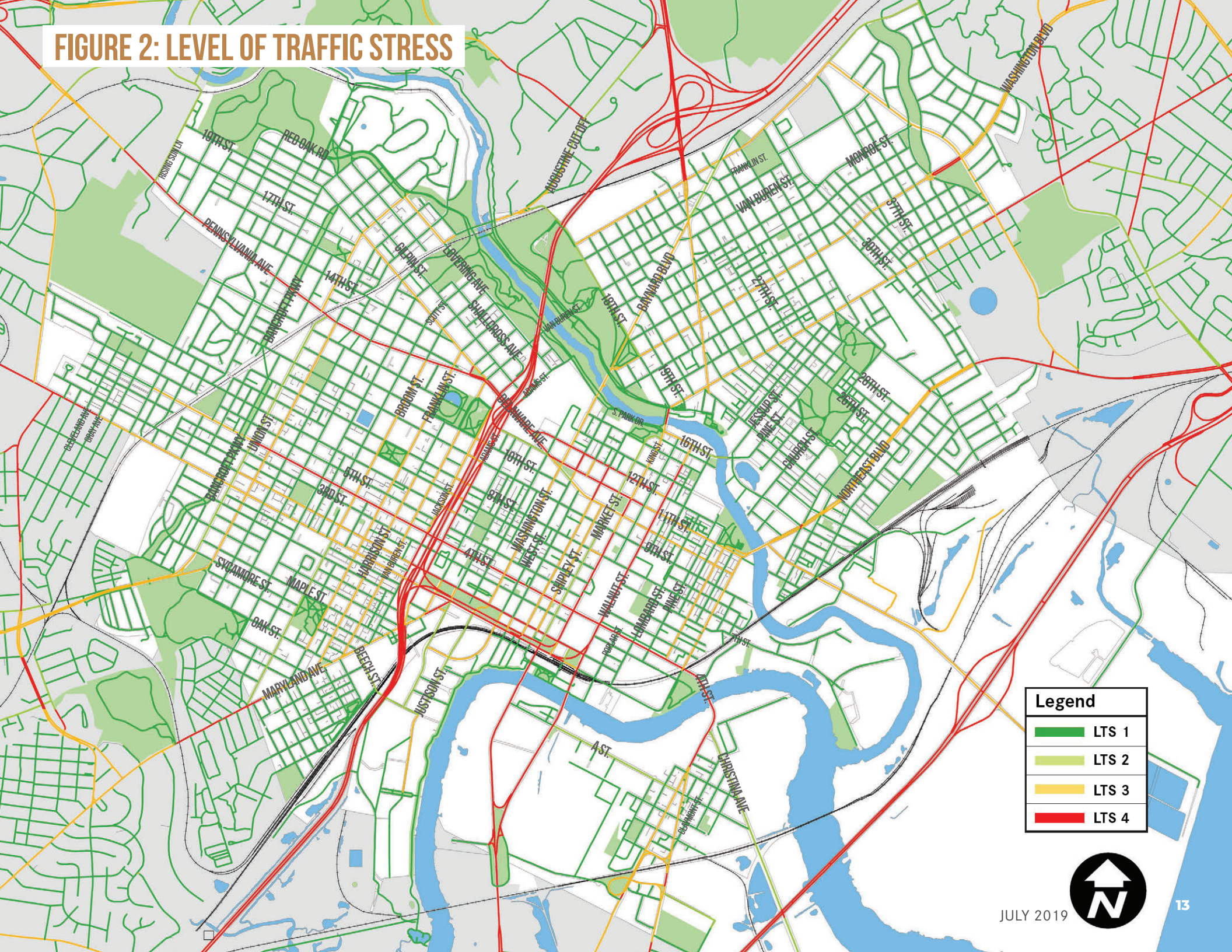
### LEVEL OF TRAFFIC STRESS

Level of Traffic Stress (LTS) is a rating system for roadways based on the amount of traffic stress a cyclist experiences while riding on the street. Many factors are used to determine LTS, including vehicular speeds, number and width of travel lanes, intersection designs, and improvements made for cyclists. A roadway's LTS is categorized as one of four levels, with LTS 1 being comfortable for most riders and LTS 4 being uncomfortable for most riders.

Most of Wilmington's streets are classified as LTS 1. These are the streets that make up the City's residential neighborhoods. However, traveling between neighborhoods often means traveling on or across arterial streets with LTS 3 or 4. See the LTS map of the City on the next page for specific classifications. Several of Wilmington's high-LTS streets are identified for bike improvements to reduce their LTS and thereby reduce the barriers for biking between neighborhoods.



**FIGURE 2: LEVEL OF TRAFFIC STRESS**



**Legend**

- LTS 1
- LTS 2
- LTS 3
- LTS 4



Planning staff analyzed the potential routes for the appropriateness of adding either bike lanes or sharrows.

1. Sharrows: Routes that did not have enough excess space to create a bike lane were then considered for sharrows. Among these streets, routes with speed limits of 25 mph or less and LTS of 1 or 2 were identified as appropriate for sharrows.
2. Lane-diet bike lanes: the first round of analysis identified streets where a lane diet could yield at least five feet of extra width, which could be used for a bike lane.
3. Road-diet bike lanes: several corridors were identified where a road diet could be implemented to provide space for a standard or protected bike lane. Road diets were more likely than lane diets to yield enough width to create a buffered or protected bike lane or a two-way bike lane (all of which require more than the minimum five feet of width required for a standard bike lane). Appendix B includes a list of those streets where road diets are proposed to create space for a bike lane.

## ROAD DIETS AND LANE DIETS

Both road diets and lane diets are improvements that can be made to “rightsized” existing roadways that are wider than is warranted for their traffic volume, to reduce vehicle speeds and thereby increase safety, and to reallocate space to other uses such as bike or pedestrian improvements, transit, angled parking, streetscaping/landscaping, etc.

The difference between these two design interventions is that a road diet removes one or more vehicle lanes, while a lane diet reduces the width of one or more vehicle lanes.

## PUBLIC PRESENTATIONS

Spring-Summer 2018: As part of the public outreach process, Planning staff presented on the bike plan at 22 civic group meetings across the City and conducted additional outreach by tabling at several public events. The civic association meetings and public events are listed in Appendix C.

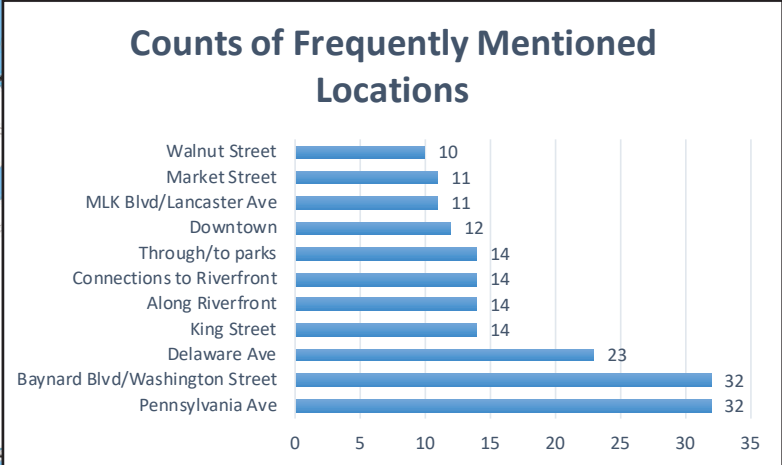
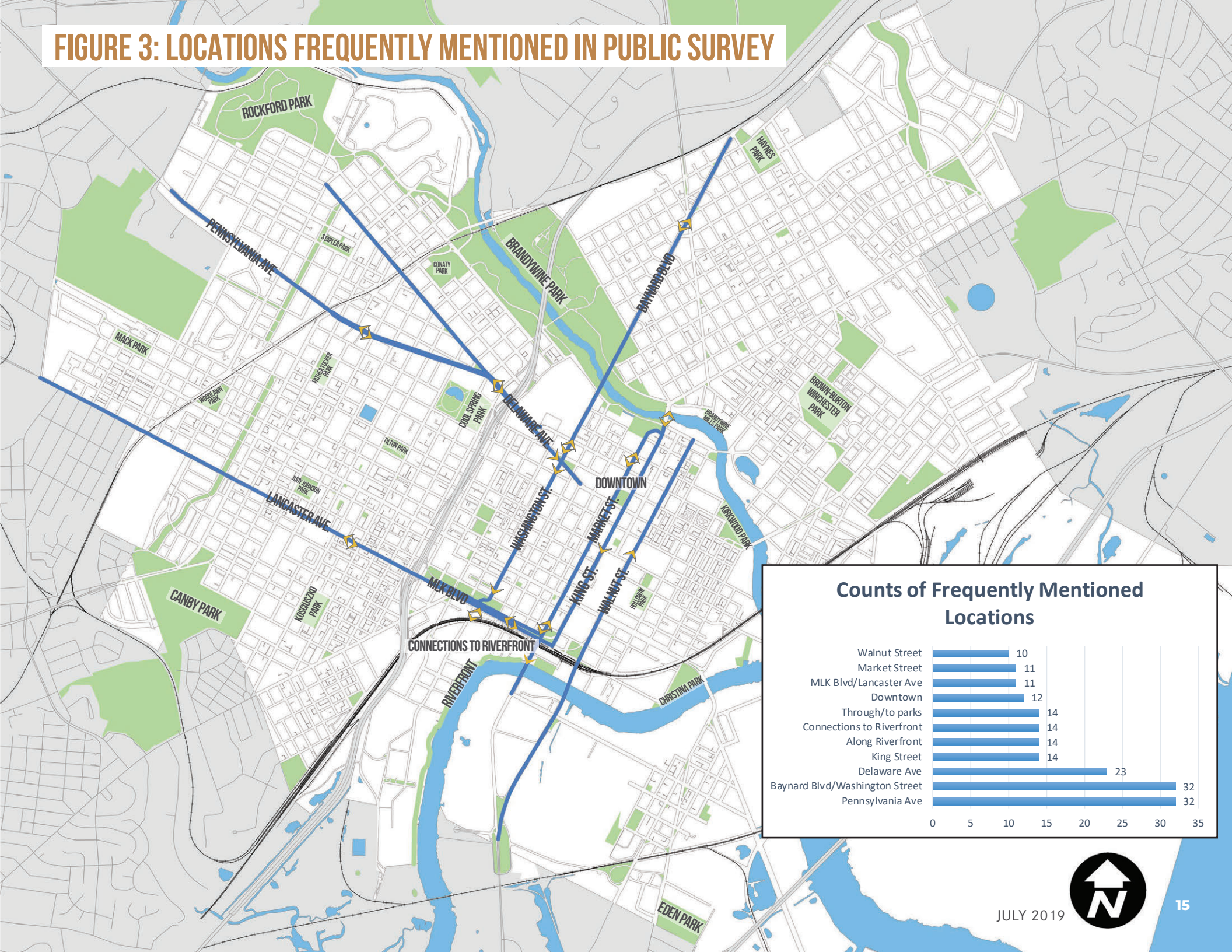
## PUBLIC SURVEY

Spring-Summer 2018: In addition to the public presentations, Bike Wilmington developed a public survey to gather information about respondents’ transportation choices. The survey is included in Appendix D. The survey was administered at the civic group meetings and public events where Planning staff presented, and offered online through the Bike Wilmington page on the City website. A total of 415 surveys were completed. A map of the approximate geographic distribution of survey responses is provided in Appendix E. Appendix F provides a chart of this geographic distribution (that lists neighborhoods).

Charts summarizing the responses to the multiple-choice survey questions are provided in Appendix G. The survey also included open-ended questions allowing respondents to specify factors that would encourage them to bike (at all or more often) and streets where they thought bike infrastructure would be most beneficial. All the anonymous survey response data is available for download on Bike Wilmington’s web page, [www.wilmingtonde.gov/bikewilmington](http://www.wilmingtonde.gov/bikewilmington).

There were several places mentioned most frequently as locations where respondents thought bike infrastructure would be beneficial. All the locations mentioned 10 or more times are displayed in Figure 3, on the next page, in both map and chart form.

**FIGURE 3: LOCATIONS FREQUENTLY MENTIONED IN PUBLIC SURVEY**



In addition to these frequently mentioned streets, several recurring themes emerged from the other short answer responses. These themes included the following:

- Protected bike lanes as preferred type of lane
- Concerns about bike theft
- Desire for conveniently-located bike parking (near businesses)
- Desire for better connections to recreational paths and trails

Both the recurring themes and frequently mentioned streets guided the creation of the plan's priorities.

## DEVELOPING A FINAL COORDINATED BIKE ROUTE NETWORK MAP

Winter 2018-2019: Drawing on public feedback, the GIS analysis, and ongoing feedback from Bike Wilmington members, Planning staff developed the final Coordinated Bike Route Network Map. This map was first presented in the Executive Summary and is presented in greater detail in Chapter 4. The map is intended to be used as a guide for future infrastructure investments by the City and DelDOT to create a convenient Citywide network. It is important to note that the map is intended to serve as a guide and should not be construed as preempting other future potential projects or along alternate routes or upgrades to completed projects.

## CORRIDOR CONCEPTS

Winter 2018-19: The Department of Planning and Development developed sketch-level bike facility concepts for five major City corridors. Staff selected these routes because they were frequently mentioned during the

public outreach process and they would create very important connections. However, they also offer many design challenges that make it difficult to determine what kind of facilities could be feasibly provided along those routes.

Detailed traffic analysis or engineering were not undertaken at this master plan level. Therefore, the concepts that were developed are intended to provide direction for creating more detailed, assessed and implementable plans for the corridors in the future.

The five corridors are:

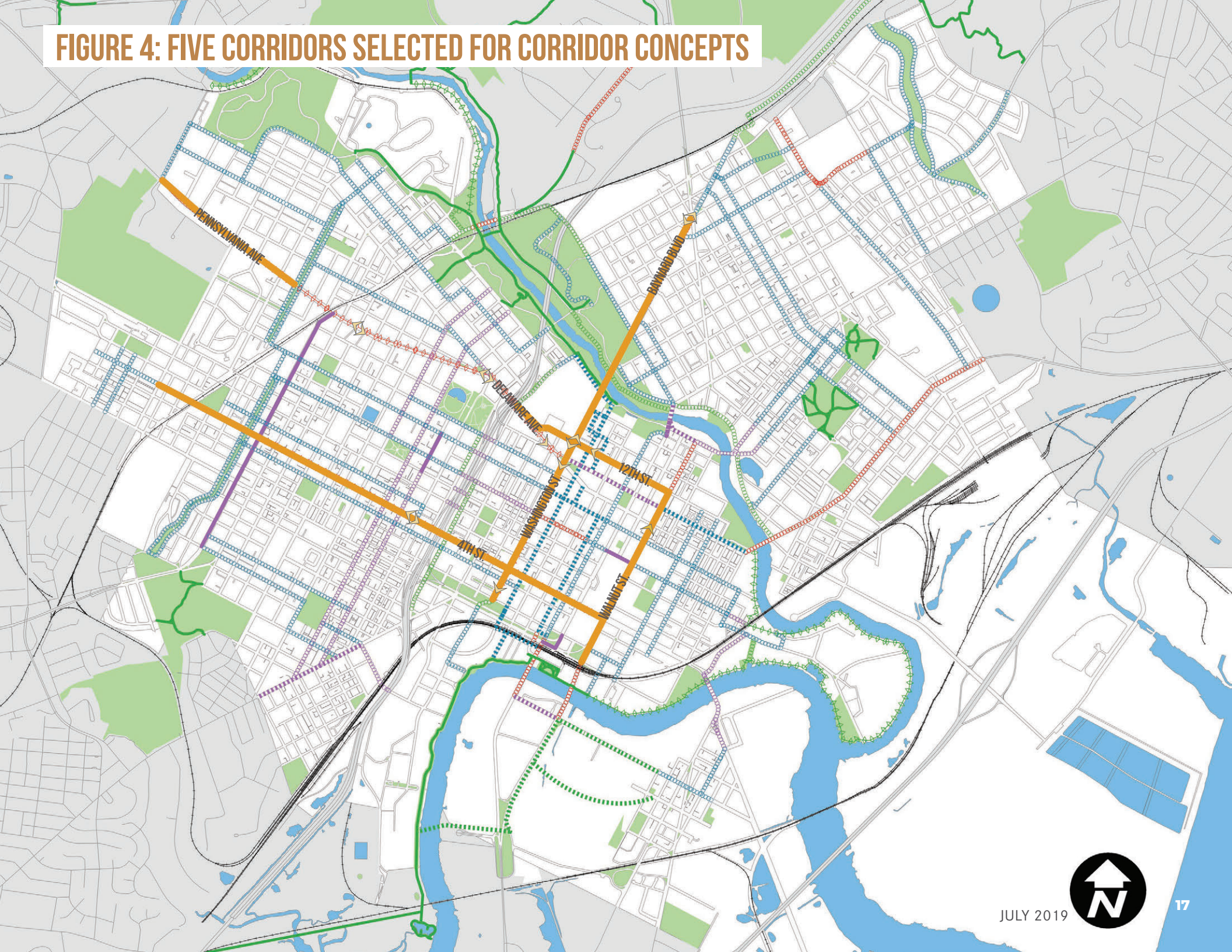
- Baynard Boulevard/Washington Street from Concord Avenue to Martin Luther King, Jr. Boulevard
- Pennsylvania Avenue from the western City line to Delaware Avenue, Delaware Avenue from Pennsylvania Avenue to Jefferson Street
- 12th Street from Delaware Avenue to Walnut Street
- Walnut Street from Front Street to 12th Street
- 4th Street from Walnut Street to Greenhill Avenue

The five corridors are shown in Figure 4, on the next page. They are overlaid on the Coordinated Bike Route Network Map to indicate how they link to the Citywide network.

Sketch-level concepts were developed for the entire length of four of the five corridors. However, along Pennsylvania Avenue/Delaware Avenue, the near-term feasibility of reconfiguring the portion of the corridor east of Bancroft Parkway is low given the width of the right of way and traffic demands. In lieu of developing concepts for this section of the corridor, alternate ways to connect the northwest portion of the corridor (west of Bancroft Parkway) eastward were proposed.

Renderings of sections of three of the corridor concepts are shown on pages 18-20 (Figures 5-7). The entirety of the corridor concept study materials is available as a report, which, along with this plan, can be downloaded from Bike Wilmington's web page, [www.wilmingtonde.gov/bikewilmington](http://www.wilmingtonde.gov/bikewilmington).

**FIGURE 4: FIVE CORRIDORS SELECTED FOR CORRIDOR CONCEPTS**



# CORRIDOR CONCEPT RENDERINGS



**FIGURE 5: PORTION OF BAYNARD BOULEVARD/WASHINGTON STREET CORRIDOR CONCEPT**  
BUFFERED BIKE LANES ON BAYNARD BOULEVARD



**FIGURE 6: PORTION OF 4TH STREET CORRIDOR CONCEPT**  
BIKE LANES AND SEPARATED PATHWAY ALONG 4TH STREET



**FIGURE 7: PORTION OF 12TH STREET CORRIDOR CONCEPT**  
MULTI-USE SEPARATED PATHWAY ALONG DELAWARE AVENUE





# 3. EXISTING CONDITIONS

This chapter summarizes the current state of bicycle infrastructure and related planning efforts in Wilmington. It documents recent accomplishments, existing infrastructure, crashes involving bikes, and the State's recommended bike route map.

## RECENT ACCOMPLISHMENTS

Wilmington's first bike plan was created in 2008 by WILMAPCO. Since 2008, there have been numerous bike-related accomplishments across the City, which are listed in the time-line below:

- March 2010: Wilmington Bicycle Advisory Committee (WBAC), aka Bike Wilmington, created by Mayor Baker via executive order.
- May 2010: Additional bicycle route signs installed downtown.
- November 2010: Delaware's first sharrows installed on Market Street.
- May 2011: Wilmington hosted its first Bike-to-Work Day event. This event has been held in May every year since.
- June 2013: 10 new bike racks installed.
- Spring 2016: Bikeshare feasibility study completed.
- November 2017: 15-block bike lane installed on Union Street as part of a road diet project.
- May 2018: "Augustine Cut Off Area Trail Feasibility Study" completed (for a potential City-County connection that would be important for both recreational and commuter cyclists).

Despite these accomplishments, Wilmington still has a long way to go to become a bike-friendly city. In fact, Wilmington scores less than 50% on the League of American Bicyclists' Bicycle Friendly Communities Quick Assessment. Nevertheless, these accomplishments are important and provide a foundation on which the 2019 Wilmington Bike Plan can build.

## EXISTING BIKE INFRASTRUCTURE

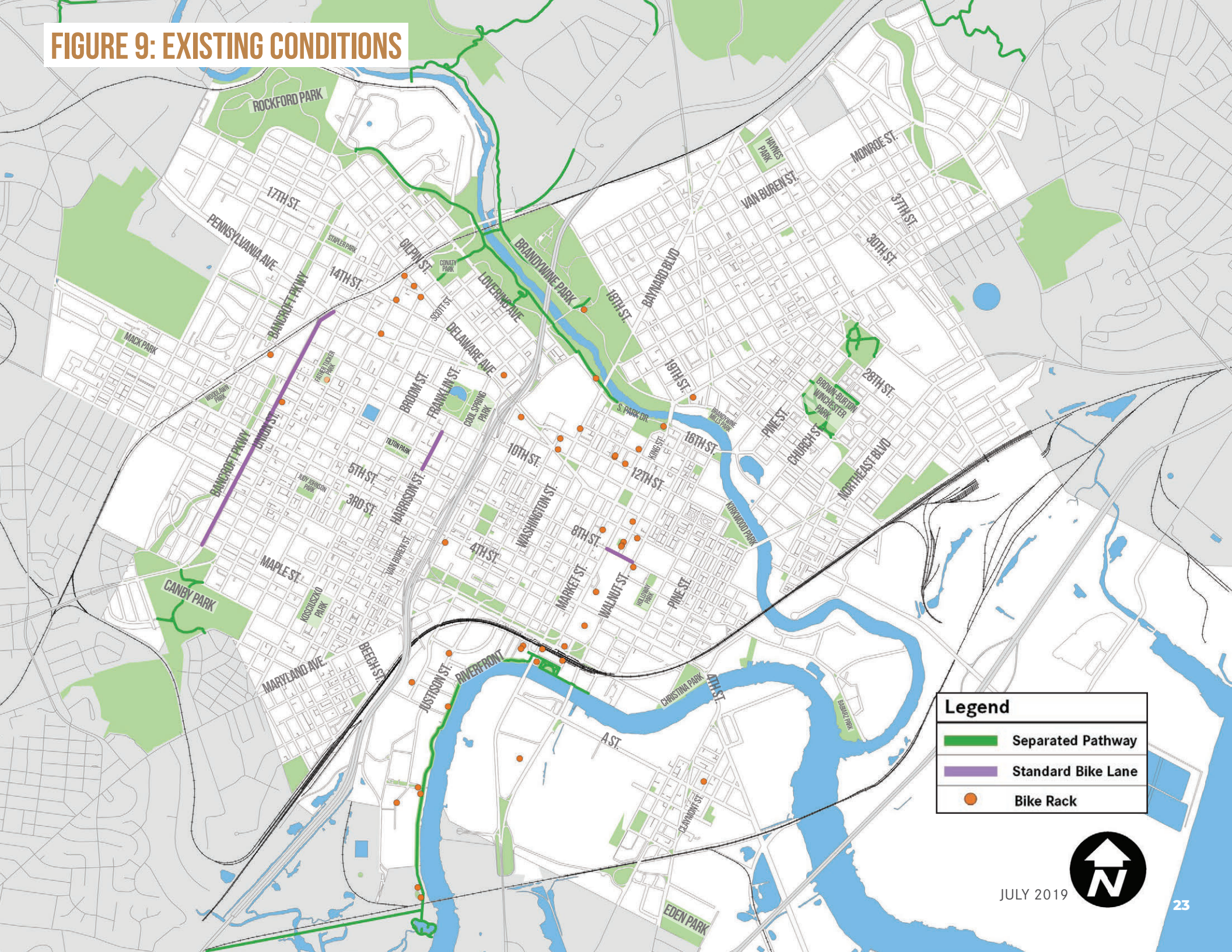
Figure 9, on the next page, shows the City's existing bike-specific infrastructure. Wilmington has a great system of public parks, some of which offer off-street pathways that connect to the regional trail network. However, the City has very limited on-street bike infrastructure.

Additionally, the number and location of the City's existing bike racks is insufficient. There are approximately 80 bike racks of various styles (designed to hold about 240 bikes) across the City. However, several of these racks are poorly designed and/or positioned and cannot accommodate as many bikes as their design intended. One of the more common inconvenient bike rack styles is the grid (also called the "comb" or "toaster") style, shown in Figure 8 below. Moreover, there are few to no bike racks along the City's major commercial corridors or at gathering places like community centers. In fact, there are only two bike racks on Market Street and one on Union Street, even though they are major commercial corridors.






**FIGURE 8: BIKE RACK STYLE TO AVOID**  
GRID BIKE RACK LOCATED TOO CLOSE TO A WALL

**FIGURE 9: EXISTING CONDITIONS**

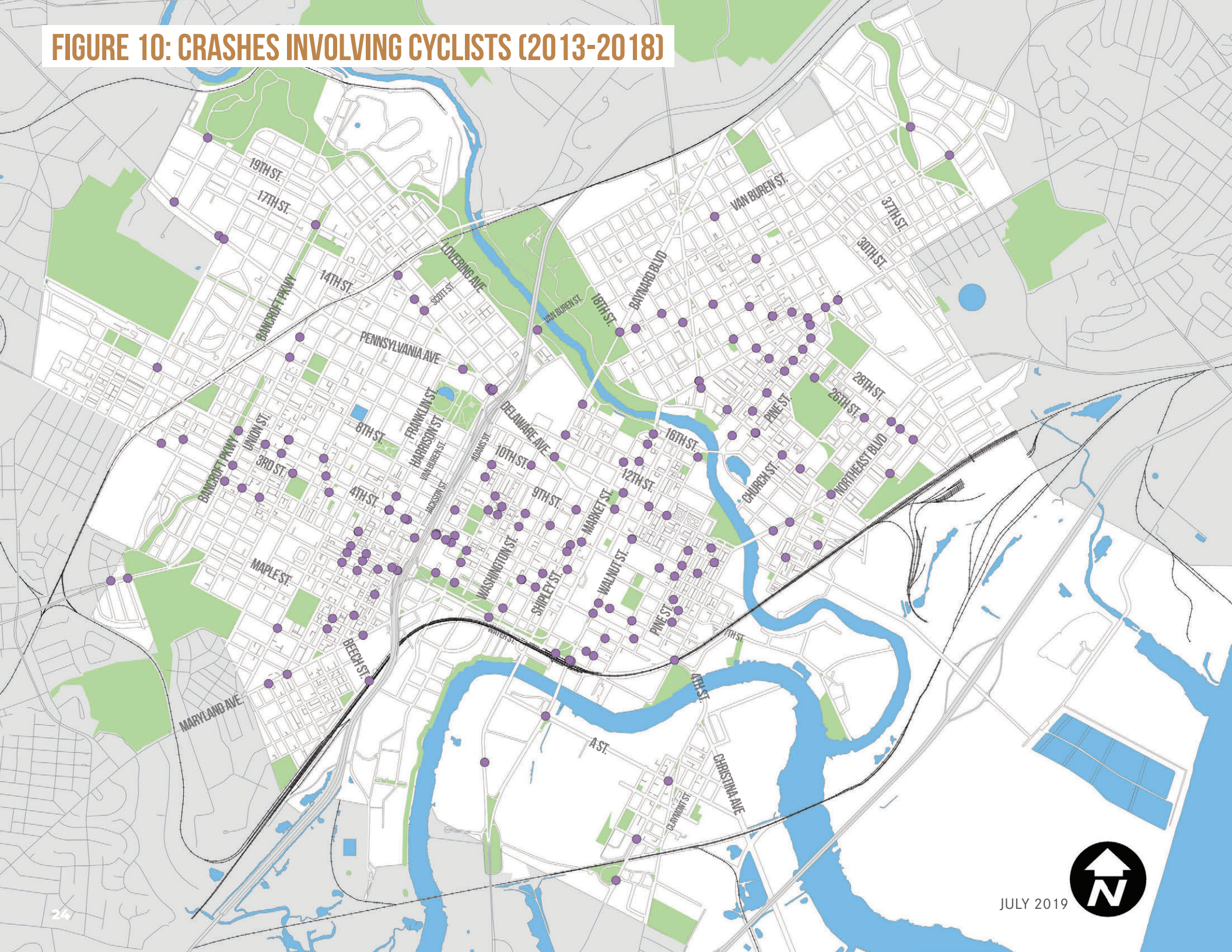


**Legend**

-  Separated Pathway
-  Standard Bike Lane
-  Bike Rack



**FIGURE 10: CRASHES INVOLVING CYCLISTS (2013-2018)**



## FIXING A FLAT

Image Credit: Urban Bike Project.

# CRASHES INVOLVING CYCLISTS (2013-18)

Figure 10, on the previous page, shows reported crashes in the City involving cyclists and/or pedestrians for the period 2013-2018. 165 of these crashes involved bicycles. Most of the bike crashes (120) occurred at intersections. Additionally, crashes were more likely to occur on State-maintained streets than on City-maintained streets. This is likely because State-maintained streets are generally busier streets.

Another significant pattern is that most of the bike crashes occurred in Wilmington's East Side, Hilltop, West Center City and Northeast neighborhoods. None of these neighborhoods have any bike infrastructure. According to the U.S. Census Bureau's 2017 American Community Survey (ACS) 5 Year Estimates, the average per capita income for these neighborhoods is around \$14,000, which is about half of the City average for the same period. Therefore, the cost of owning and maintaining a car can represent a significant cost burden for many residents of these neighborhoods. Owning a car costs at least \$5,000 per year. This estimate of car-related costs represents 36% of the 2017 ACS 5-year estimate of average per capita income for these Wilmington neighborhoods. A car that is not paid off may cost twice as much annually due to car payments.

As discussed in Chapter 1, this situation underpins one of the major motivations for implementing a coordinated bike network across Wilmington, which is to provide a safe and comfortable way for all residents, especially those with limited transportation choices, to use an affordable transportation option.



# DESIGNATED STATE BICYCLE ROUTES IN AND AROUND WILMINGTON

Figure 11, on the following page, is the Wilmington portion of the Delaware Bicycle Council's 2011 Bicycle Map of New Castle County. The map is a navigation tool, rather than planning tool, because it does not propose changes to the routes. In fact, most of the routes shown in Figure 11 are on-street routes with no bike infrastructure, and many are on high-stress streets. However, the Coordinated Bike Route Network Map presented in Chapter 4 proposes bike infrastructure on many of these routes. These recommendations would allow these designated routes to become more hospitable to a wider array of cyclists.

# FIGURE 11: BICYCLE MAP OF NEW CASTLE COUNTY, WILMINGTON INSET





# 4. GOALS AND RECOMMENDATIONS

This chapter lays out the Plan's three goals. The first goal focuses on creating a Citywide bike route network, the second goal focuses on creating safer conditions for all cyclists, and the third is about making biking more accessible by making it more affordable and convenient.

Each goal has a set of recommendations that support the achievement of the goal with which they are associated. Progress measures are also provided to aid in tracking the City's progress in implementing the recommendations and achieving the goals.

Most of the recommendations are intended to be carried out in large part by the City of Wilmington, which spearheaded the making of this plan, and DelDOT, which maintains many of the City's major corridors. However, many of the recommendations require support from and coordination with other stakeholders.

Please note: the recommendations are meant to be flexible, given the plan's limited technical analysis, and the long time frame and opportunities for changing conditions generally associated with transportation projects.

## THE COORDINATED BIKE ROUTE NETWORK MAP

This section presents the Coordinated Bike Route Network Map. The recommendations associated with Goal 1, to follow, are based around this map.

As stated in Chapter 1, the City of Wilmington has several attributes that could help it to become a very bicycle-friendly city. These attributes include Wilmington's small geographic size, existing and potential on- and off-street connections to the surrounding region, and calm residential streets. These characteristics helped shape the final route network. For instance, routes were chosen to connect to major destinations (schools, employers, parks, etc.) in Wilmington's compact area, to connect to the regional trail system, and to provide traffic calming on neighborhood streets where excess space encourages fast vehicle speeds.

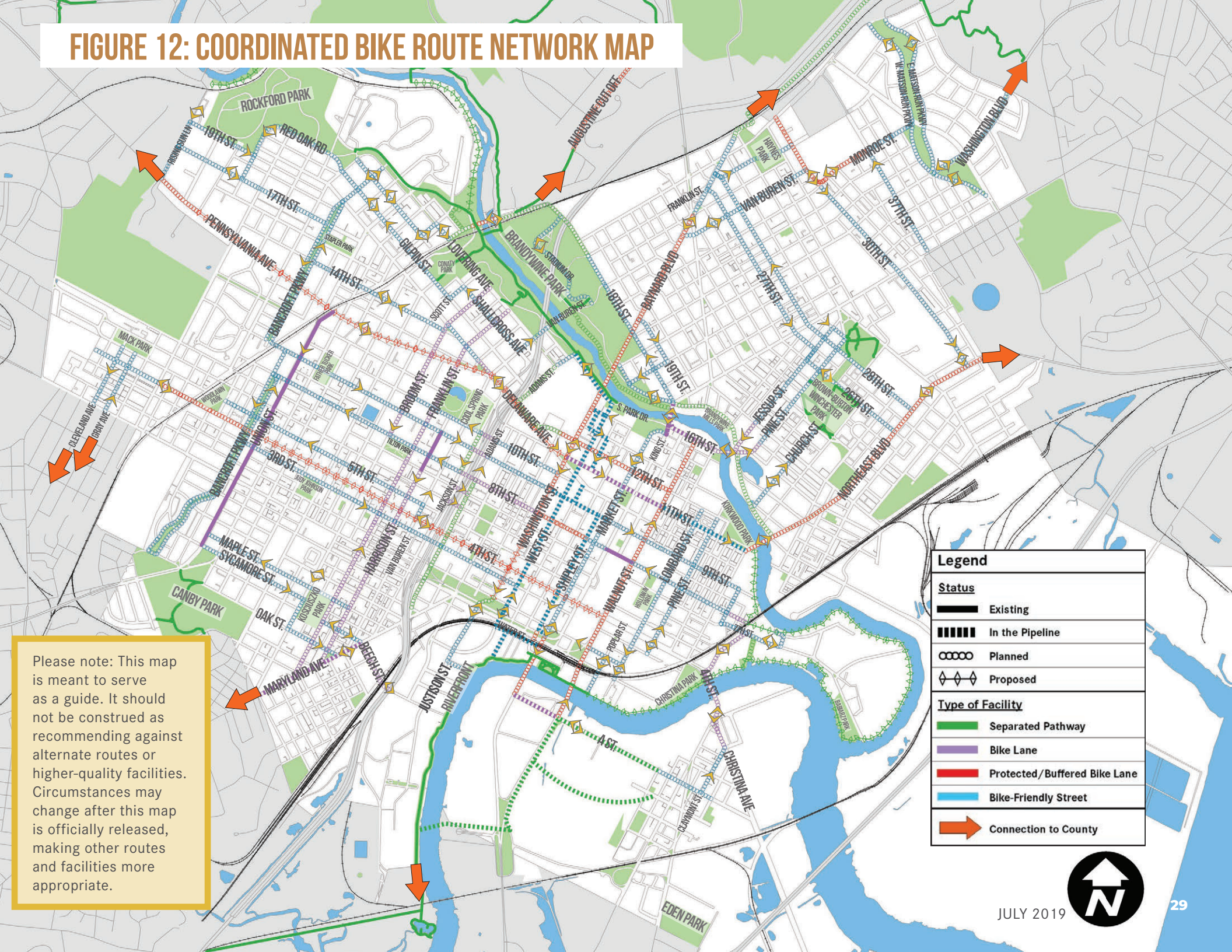
The Coordinated Bike Route Network Map, on the opposite page, shows the proposed routes, along with existing and planned facilities. The map proposes several types of bike facilities. Most of these categories have commonly accepted definitions, or at least parameters that can be accessed from many other informational resources, and therefore do not need to be redefined in this plan. However, the category of "bike-friendly street" merits further explanation:

- Bike-friendly streets do not provide a dedicated area for bikes
- Instead, they incorporate design features that allow bicycles to share the street with cars more comfortably
- The most common design features are:
  - » Low motor vehicle speeds (maximum of 25 mph)
  - » Signs indicating that cyclists may use the full vehicle lane and that the street is a designated bike route, such as those signs shown in Figure 13, on page 30.
  - » Sharrows, preferably with green surrounds, such as those shown in Figure 14, on page 30.
  - » Bike boxes at signalized intersections
  - » May also include traffic-calming features such as traffic diversions to reduce cut-through traffic, curb extensions (bumpouts), medians, and traffic circles
- Streets in Wilmington that were identified for this type of facility already have low speeds and low traffic volumes.

Finally, it is important to keep in mind when looking at this map that bike infrastructure evolves and frequently improves over time, as a City's demand for high-quality infrastructure gains momentum. Therefore, opportunities to install more basic but also more affordable infrastructure in the near-term should be taken where appropriate. This basic infrastructure is more likely to be replaced by higher-quality, lower-stress infrastructure in the future, in comparison to a scenario in which no bike infrastructure is built.



# FIGURE 12: COORDINATED BIKE ROUTE NETWORK MAP



Please note: This map is meant to serve as a guide. It should not be construed as recommending against alternate routes or higher-quality facilities. Circumstances may change after this map is officially released, making other routes and facilities more appropriate.

Legend	
<b>Status</b>	
	Existing
	In the Pipeline
	Planned
	Proposed
<b>Type of Facility</b>	
	Separated Pathway
	Bike Lane
	Protected/Buffered Bike Lane
	Bike-Friendly Street
	Connection to County





**FIGURE 13**  
EXAMPLES OF SIGNS TO BE USED ALONG BIKE-FRIENDLY STREETS

Image credit:

TOP photo: pacres, "Bike Route" (July 12, 2009), via Flickr.

Bottom photo: Eric Fischer, "Bicyclists may use full lane," (February 3, 2018), via Flickr.



**FIGURE 14**  
GREEN SHARROW

Image credit: SanFranciscoize.com - Mark Dreger, "GreenSharrow" (May 16, 2012), via Flickr.



# GOAL 1: DEVELOP A COORDINATED AND SAFE CITYWIDE BIKE ROUTE NETWORK

The Plan's first goal is to design and construct a coordinated network of bike routes across the City. The six individual recommendations on the following pages are the key steps for designing and encouraging the construction of this network. Chapter 5, Implementation, discusses the actual funding of construction projects.



## RECOMMENDATION 1.1

**Build a coordinated and safe Citywide bike route network using the Coordinated Bike Route Network Map as a guide.**

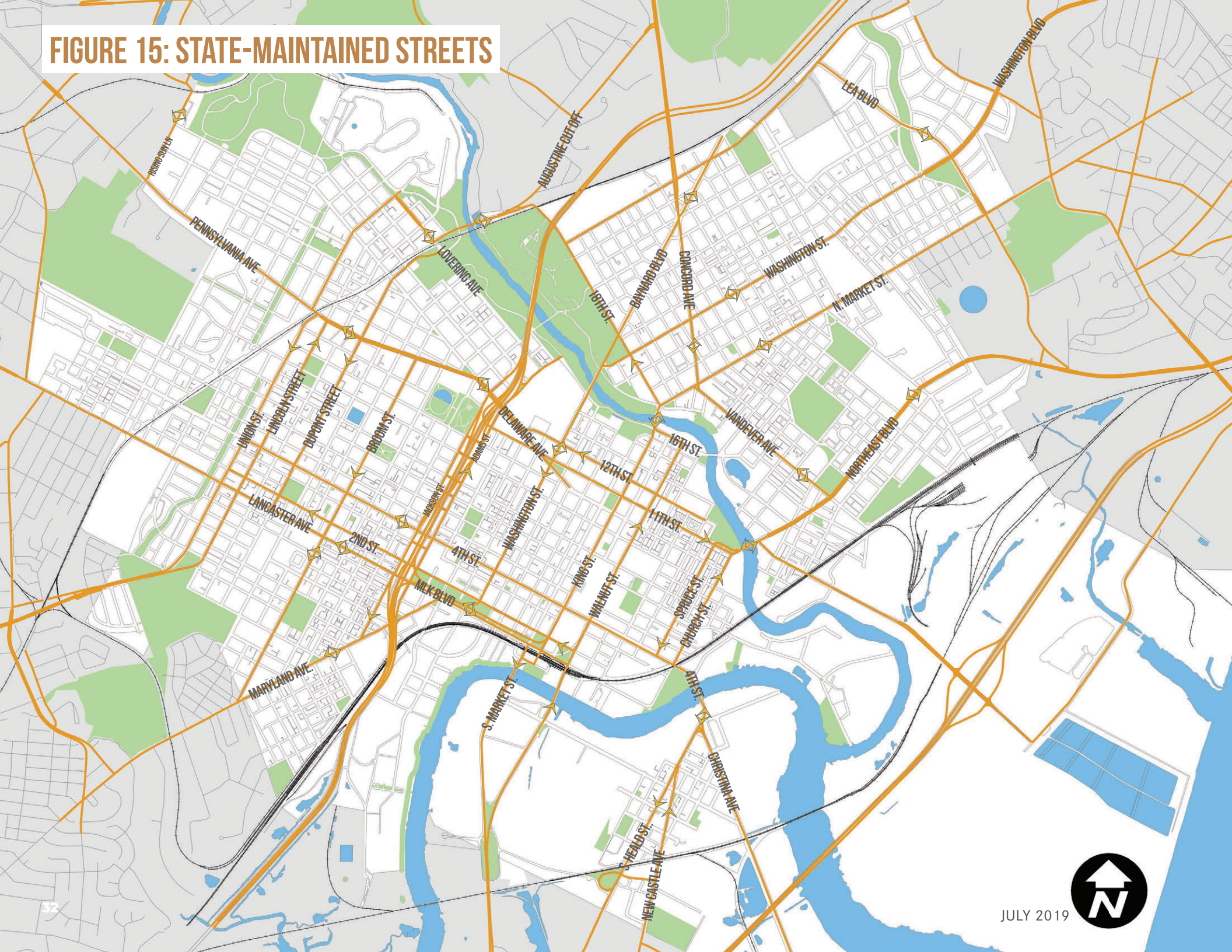
The building of the bike network will require the installation of bike facilities Citywide to create the connections shown in the map on the previous page or alternative connections with similar value. The network will require improvements on both City and State-maintained streets. The next chapter lays out the expected implementation processes for these two types of streets.

Although the Coordinated Bike Route Network Map above does not identify additional bikeway design features such as signs, traffic signals, bike boxes and two-stage left turn queue boxes, this plan recommends that these features be installed along bikeways wherever appropriate to increase cyclists' safety and comfort.

### UNION STREET BETTER BLOCK EVENT 2016

Image credit: Sarah Lester, West Side Grows Together.

**FIGURE 15: STATE-MAINTAINED STREETS**



It is recommended that the City and DeIDOT pilot major projects before investing larger sums of money in permanent changes. Although not every project merits a piloting stage, it can yield very valuable results in many cases by providing more data and time to adjust a design based on that data. Therefore, it is a cost-effective and efficient method for testing out new ideas and designs that can contribute to a low-stress bike network.

One option to pilot bike infrastructure projects and get the local community involved is through a Better Block event. Better Block events make temporary changes to a built environment to demonstrate how that environment could be improved, particularly in the areas of creating a more active sidewalk life and safer streets through streetscape improvements, programming, and Complete Streets improvements.

The community development group West Side Grows Together implemented a Better Block event on Union Street for several years that demonstrated the traffic calming effect of a bike lane. A similar event, or smaller scale versions of Better Block, could be designed to pilot other bike infrastructure projects.

## RECOMMENDATION 1.2

### **Maintain the network map as a dynamic GIS document.**

While the Coordinated Bike Route Network Map is being published in this bike plan as a static document, it is recommended that the map be treated as a living document subject to change. For this reason, Planning staff should regularly update the map in GIS as conditions change and make the updated version of the map available to the public via the City website.

## RECOMMENDATION 1.3

### **Encourage DeIDOT to formally adopt their Complete Streets policy.**

While the State's Complete Streets policy was created in 2010 and has been considered in many DeIDOT projects since then, it has not been officially adopted by DeIDOT. For the policy to be vested with its full potential authority,

it needs to be officially adopted. It is recommended that the City and Bike Wilmington advocate for DeIDOT to formally adopt this policy.

## RECOMMENDATION 1.4

### **Endorse DeIDOT's Complete Streets policy.**

Wilmington does not have a Complete Streets policy. However, the State-maintained streets in the City are subject to the State's Complete Streets policy, which was created in 2010. This policy requires that the Department attempt to accommodate all modes of travel when carrying out transportation construction projects. Most of Wilmington's small residential streets are calm enough to provide a comfortable environment for non-drivers. The larger arterial streets that have greater need and more room for Complete Streets design features are generally State-maintained streets. Figure 15, on the previous page, shows the City's State-maintained streets.

Because many potential Complete Streets projects in Wilmington are subject to DeIDOT's Complete Streets policy, it becomes less pressing for the City to create its own policy. Therefore, it is recommended in the near term that the City endorse DeIDOT's Complete Streets policy. Additionally, it is recommended that the City endorse NACTO's "Complete Streets Complete Networks: A Manual for the Design of Active Transportation" in order to ensure that the City will implement appropriate Complete Streets elements on City-maintained streets in the near-term.

## RECOMMENDATION 1.5

### **Develop a Wilmington-specific Complete Streets policy.**

Over the longer term, the City should develop its own Complete Streets policy. This will allow the City to better ensure that changes to City-maintained streets will accommodate buses, pedestrians, cyclists, wheelchair users and others.

## RECOMMENDATION 1.6

### Promote the economic development benefits of bike infrastructure.

As discussed in Chapter 1, urban bicycle infrastructure can have a variety of economic development benefits. These benefits have been documented in many research efforts. It is important to promote to both private- and public-sector decision makers the economic development and employee wellbeing benefits of biking to encourage those decision makers to help make biking more convenient.

With this in mind, it is recommended that Bike Wilmington develop and promote a white paper on the relationship between bike infrastructure and economic development, potentially in partnership with WILMAPCO and university-based researchers.

This white paper should be shared with public decision makers as well as private companies. It should include sections that encourage employers to provide amenities within their own walls to encourage their employees to bike to work. These amenities can include secure bike parking and changing/showering facilities, as well as incentives such as small cash bonuses or raffles to encourage regular bike commuting.

Private real estate developers can also install public bike facilities such as bike racks and even bike lanes or off-street pathways if they are rehabilitating the public space around their site. For instance, when the pharmaceutical company Incyte located just outside of Wilmington in 2017, they built a grade-separated, multi-use path along the front of their campus.

Therefore, it is also recommended that the City create incentives or requirements for major development projects that include street construction to include bike facilities where appropriate.



## GOAL 2: EDUCATE AND ADVOCATE TO PROVIDE SAFER BIKING CONDITIONS FOR ALL

The Wilmington Bike Plan vision cannot be achieved simply by building a bike route network, especially because the feasibility of creating a completely protected, low-stress network in the near term is low. It also requires efforts to help people feel safer biking on City streets and know the rules of the road for both cars and bikes, and to make biking an affordable and convenient transportation option. Therefore, Goal 2 addresses safety, while Goal 3 addresses access, affordability and convenience.

The safety of all road users was consistently emphasized during the public outreach process of this plan. There are a variety of both simple and complex steps that the City can take to improve safety conditions for bikers and other road users.

## RECOMMENDATION 2.1

### Develop and implement a maintenance plan for public bike infrastructure.

For bicycle facilities to be safe and comfortable to use, they need to be maintained. This means that it is very important for the City to create and carry out the maintenance plan. It is recommended that the Wilmington Department of Public Works, in conjunction with DeIDOT, develop a plan to maintain and improve the quality, operation, and integrity of the City's bike infrastructure.

The most important maintenance task is ensuring that pavement markings, like lanes and sharrows, remain clear by repainting or reapplying them. Additionally, because slippery leaves and pieces of debris can be unsafe for a bike's narrow wheels, bikeways should be kept clear of this debris. Additionally, bike racks in the public right of way and bike signs will require periodic repair and replacement.

## RECOMMENDATION 2.2

### Create publications and programs to educate about bike safety.

Education on how to properly share the street is important for the safety of bikers, pedestrians and drivers and can help potential bikers feel more comfortable making the leap to biking on City streets.

It is recommended that Bike Wilmington create or adopt existing education and outreach materials for bikers, drivers and pedestrians to raise awareness about bike transportation and promote safe sharing of the road. Many government agencies and bike advocacy groups have already created such educational materials. If the City finds suitable existing materials that they can reproduce and share, this saves time and effort. Whether borrowed or created anew, these educational materials should do the following:

- Be written in easily-understandable terms
- Use graphics in favor of text to convey messages
- Be available in English and Spanish
- Be available in print and online

It is also recommended that Bike Wilmington, along with partner agencies such as Urban Bike Project and Delaware Greenways, develop and conduct trainings for both the public and City police officers regarding safe bicycle practices, bike-related traffic laws, and issues faced by on-street cyclists. These trainings should be conducted through community events, civic association meetings, and online.

## RECOMMENDATION 2.3

### Adopt a Vision Zero policy at the City level.

One of the recommendations discussed under the previous goal is to endorse DeIDOT's Complete Streets policy and begin to develop a Wilmington-specific Complete Streets policy based on the DeIDOT policy. In addition to this policy, it is recommended that the City develop a Vision Zero policy. Vision Zero policies lay out goals and guidelines to reduce fatalities and severe injuries among all road users. The development of this policy should follow the City's endorsement of DeIDOT's Complete Streets policy, because the latter policy can serve as a foundation for the Vision Zero policy.

## RECOMMENDATION 2.4

### Assist Wilmington schools in participating in DeIDOT's Safe Routes to School program.

DeIDOT administers a Safe Routes to School (SRTS) funding program to support eligible projects that help make biking and walking a safer option for K-8 children to get to school. Following the 2018-2019 school year, the two Wilmington public schools that participated in the program closed. It

is recommended that Bike Wilmington and the City of Wilmington provide support to Wilmington schools and relevant stakeholders to create their SRTS plans, apply for SRTS funds, and implement their programs and projects.

## RECOMMENDATION 2.5

**Support nonprofit organizations and programs that provide education and advocacy for safe biking in the City.**

The Wilmington Police Department administers several free bike-related programs for children through the Wilmington Police Athletic League (PAL). These include a monthly Learn to Ride a Bike program for children ages 3 and older, a weekly safe riding program for children ages 12-14, and a twice-weekly mountain bike ride for children ages 12-14. The Learn to Ride program uses bikes that are recovered by the police and not reclaimed, and helmets donated by the Safe Kids Delaware Coalition of Nemours/A. I. DuPont Hospital for Children. It is recommended that the City increase the budget and resources available to the PAL to provide their youth bike education programs. Urban Bike Project (discussed further in the next section) also provides education programs for youth.



## GOAL 3: FACILITATE ACCESS TO BICYCLING

As stated above, a network of bike routes may not be enough to increase the number of people who choose to bike in the City. Providing people affordable access to a bike and ensuring that it is convenient to incorporate biking into their transportation routines are also key to encouraging more people to take up biking.

Additionally, there are several organizations in the Wilmington area that provide bike education and group and guided bike rides. These include Urban Bike Project, local bike shops, White Clay Bike Club, Biking Blue Hens, Trail Spinners, and local League of American Bicyclists instructors. It is recommended that Bike Wilmington partner with these and other organizations (DeIDOT, WILMAPCO, Bike Delaware, Delaware Greenways, and the East Coast Greenway Alliance) to organize rides aimed at introducing people to biking safely.



**WILMINGTON PAL LEARN TO RIDE PROGRAM PARTICIPANTS**

Image credit: Police Athletic League of Wilmington, palw.org.





## RECOMMENDATION 3.1

### Coordinate with and support Urban Bike Project.

Biking is a very affordable transportation option in comparison to driving. Due to its greater flexibility, it can even provide a more affordable and time-saving option than transit. However, the initial purchase of a bike can be too expensive for some.

Urban Bike Project (UBP), Wilmington's community bike shop, offers affordable bikes and repairs to make biking affordable to all income levels. UBP is a non-profit that provides affordable volunteer-assisted DIY repair hours, used bikes and bike parts; free bikes and repair hours for qualifying individuals; and youth programs.

By providing bikes and affordable bike maintenance to those who might not otherwise be able to afford them, UBP fills a very important role in allowing a larger portion of Wilmington's population to ride bikes for transportation, which can help those with limited means to access more or better employment opportunities. Additionally, UBP's youth programs provide safety education and help instill a bike culture in Wilmington for years to come by helping young people enjoy biking.

In 2017, the City granted a thirty-year lease to UBP for their current shop on the East Side. This lease ensures that UBP will be able to remain in this location, which makes it easier for them to apply for other funding.

UBP provides a unique service in the City of Wilmington. Because the organization can help bike recipients find and keep jobs, its work contributes to some of the City's economic development goals. Therefore, it is recommended that the City and Bike Wilmington continue to provide recognition and support to UBP as they work to expand and promote their programs. This could take the form of financial support in the future.

### YOUTH SHOP PARTICIPANT FIXING BIKE AT UBP

Image credit: Urban Bike Project.

## RECOMMENDATION 3.2

### Implement an affordable, Citywide bike share program or programs.

Bike share programs can make biking more accessible by providing bikes in a wide range of convenient locations at all hours and by eliminating the need for potential riders to invest in buying and maintaining a major initial purchase (a personally-owned bike).

In the spring of 2016, Toole Design Group and Century Engineering completed the “Wilmington Bike Share Feasibility Study,” which outlines many of the other potential benefits of a bike share program. The study found that a bike share program in Wilmington is feasible and recommended that it be implemented in a way to best meet several objectives relating to livability, equity, environmental goals. The study also recommends that Wilmington expand its on-street bike facilities to create a Citywide network in order to maximize the usefulness of the bike share program and provide more safe places for new bikers to ride.

At the time of writing, the City is exploring the possibility of an e-bike share program. E-bikes and other “shared micromobility” services, such as electric scooters, should also be implemented prudently, affordably and equitably. Additionally, the study’s recommendation that the City expand its on-street bike infrastructure is also relevant to increasing both the usefulness and the safety of these and other forms of shared micromobility, which should ideally use bike lanes rather than sidewalks or traffic lanes.

This bike plan concurs with the recommendations of the bike share feasibility study. Therefore, it is recommended that Bike Wilmington and the City look to the “Wilmington Bike Share Feasibility Study” recommendations in order to design any shared micromobility so that it supports affordable and convenient commuting for the whole city.

## RECOMMENDATION 3.3

### Increase the amount of quality bike parking throughout the City and help people find it.

Providing conveniently located and secure bike parking across the City is critical to making biking a convenient transportation option. To this end, the following measures are recommended:

- Develop or adopt existing standards for bicycle parking, including bike rack types, locations, shelters, lighting, and security measures.
  - » Preferred type of bike rack: Many bike rack designs do not maximize the number of bikes that can be locked up in a given space, nor do they support the bike at two points to keep it from toppling over as easily. The invert U rack style, shown in Figure 16, below, is the preferred basic type of bike rack because they address both issues. Decorative or sculptural racks should be able to support bike frames at two points and hold the same number of bikes as an inverted U rack within a similar amount of space.
  - » Preferred installation method: When feasible, it is preferable to install bike racks into the pavement, such as in a concrete footing, rather than bolting them to the surface of the pavement.
- Focus initial bike rack installation efforts along the City’s major commercial corridors (Market Street, Union Street), as well as schools and community centers (Chapter 5 provides a recommended installation schedule).
- Develop an agreement with Delaware Transportation Corporation (DTC) for installing bike parking adjacent to major bus stops.
- Modify the parking requirements section of the City Zoning Code to include requirements for minimum number of bike parking spots in new construction or major rehabilitations, including parking lots and structures.
- Amend the City Code’s parking lot screening and landscaping requirements to permit parking lot redesigns to provide bicycle parking in lieu of some landscaping.

- Develop easy-to-use application for private property owners to be permitted to install racks on the public right-of-way.
- Application should include regulations for locating the rack in relation to other street features, to help limit the number of applications for unfeasible locations.
- Depending on volume of requests from private property owners, consider placing authority to review and approve bike rack applications in the Department of Planning, to reduce the burden on the Department of Public Works.
- The Department of Public Works should develop a maintenance program for public bike racks.
- Develop a “Racks with Plaques” program that allows people to donate a bike rack for a public location with a plaque honoring an individual or organization (like memorial bench programs).
- Compile and post information on Bike Wilmington webpage about locations of and access to bike parking throughout the City (access information would include hours of availability for interior bike parking).



**FIGURE 16: PREFERRED BIKE RACK STYLE**  
WELL-LOCATED INVERTED U RACK IN WILMINGTON

## RECOMMENDATION 3.4

### Advocate for better accommodations for, and promotion of, using bikes in conjunction with transit.

Biking can make taking transit more convenient because it can make it easier and faster to get to a transit stop, such as a bus stop or train station, or get from a transit stop to your destination. However, to enable this convenience, transit services need to make it convenient for people to bring bikes on transit, and provide secure and sufficient bike parking at or near transit stops

DART, Delaware’s bus transit service, provides front racks on its buses that can hold two bikes and can be used at no additional cost to the rider.

The SEPTA commuter rail line, which serves Wilmington, also permits bicycles on trains at no additional cost to the rider. Although a multi-car train can technically accommodate more bikes than a DART bus can, SEPTA has additional restrictions that make it more difficult to take a bike on a train. Bikes cannot be brought on all peak-hour trains. Because bikes are placed in the space that is for passengers using wheelchairs or other mobility devices, cyclists may not board or will have to disembark if that space is needed by passengers using wheelchairs. Additionally, due to the design of some trains cars and station platforms, it can even be difficult to maneuver the bike on and off the train.

These limitations indicate that there are several potential improvements that could be made to facilitate cyclists bringing their bikes on trains. For instance, dedicated, easy-to-use bike storage facilities, such as bike racks or hooks or seats that can be folded up, would provide an easier, more consistent and more clearly understandable experience for cyclists bringing their bikes on board. An example of a bike hook combined with folding seats is shown in Figure 17. Ideally, SEPTA train cars could be equipped with both hooks and an alternate storage method that does not require lifting one's bike.

It is recommended that Bike Wilmington partner with Philadelphia-area bike and transit advocacy groups to advocate for more convenient bike accommodations on SEPTA trains.



In order to address the provision of secure bike parking at transit stops, it is recommended that the City create an agreement with DART to ensure that bike racks are installed at many transit stops throughout the City, particularly at major stops and the planned DART bus transit center on Front and Walnut Streets. Secure bike lockers (rentable and/or first come, first serve) are also recommended at the Wilmington Train Station and the bus transit center.

Finally, it is recommended that the City encourage local transit agencies to provide educational and promotional resources about bringing a bike on transit to Wilmingtonians. In particular, it is helpful to provide instructions and opportunities to learn how to use the bike racks on the front of buses.

## RECOMMENDATION 3.5

### Install wayfinding signs designed for easy visibility by bikers and pedestrians.

Wayfinding signs can be helpful to all users of a street for finding major destinations. However, they can also be designed to provide additional, bike-specific information, such as directions to nearby bike routes, and the distance and typical length of time to reach a destination via bike. Figure 18, to the right, is an example of a sign with bike-specific wayfinding information in San Francisco. It is recommended that Wilmington designed and install similar bike-specific wayfinding signs. The signs should be positioned to be easily readable for bikers rather than for drivers.

Additionally, DeDOT recently released an MUTCD-compliant "Low Stress Bikeway" sign. Several of these signs were installed in the City of New Castle in May 2019. The signs can include wayfinding information or simply advertise the existence of a "Low Stress Bikeway." This designation should

### FIGURE 17 BIKE HOOKS ON NJ TRANSITS TRAIN

Image credit: Andrew J. Sebold, "No bikes on NJ TRANSIT trains Christmas Day. Eve?" December 24, 2014, Vision Zero NJ.

encourage people who wouldn't normally want to bike to try biking along those routes. It is recommended that the City and DeIDOT install these signs along with the wayfinding signs on the low-stress bike facilities they build.



**FIGURE 18**  
SAN FRANCISCO WAYFINDING SIGN DESIGNED FOR CYCLISTS

Image credit: Chris Cassidy, "Sign, Sign, Everywhere a (New) Sign" (October 9, 2016), San Francisco Bicycle Coalition.

**FIGURE 19**  
BIKE REPAIR STATION NEXT TO URBAN BIKE PROJECTS

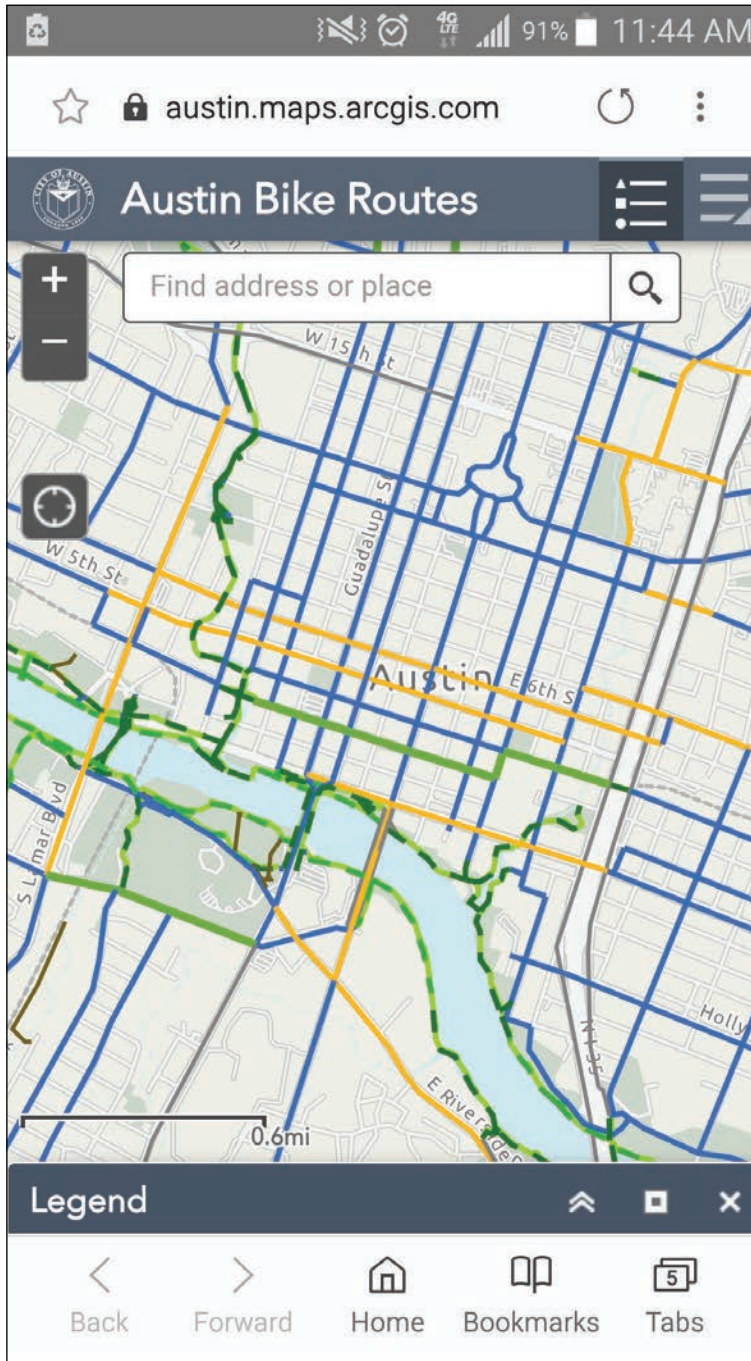
Image credit: Urban Bike Project.

## RECOMMENDATION 3.6

### Install public bike repair stations at key locations throughout the City.

Bike repair stations provide commonly used bike repair tools as well as a pump and a bike stand, all of which are attached to a fixed metal post. They provide people with 24/7 access to free tools to make bike repairs, thereby making biking and bike ownership both more affordable and convenient. While they are often provided along recreational trails, these repair stations can be very useful to bike commuters as well. Therefore, it is recommended that the City install bike repair stations at key locations throughout the City, such as near the train station, major bus stops, community centers, and schools and universities. These stands would be especially useful because the only bike shop currently in Wilmington is Urban Bike Project. It is also recommended that the selection of locations for stations at the periphery of the City is coordinated with New Castle County.





**FIGURE 20**  
 SCREENSHOT OF AUSTIN'S MOBILE-FRIENDLY BIKE MAP

## RECOMMENDATION 3.7

### Create a printable and mobile-friendly bike network map.

The Coordinated Bike Network map presented in the beginning this chapter is intended to be a guidance tool for planning and implementation of bike infrastructure. It is recommended that Bike Wilmington also develop a map that would serve as a navigation tool for biking through the City in the present. Much like the 2011 Bicycle Map of New Castle County developed by the Delaware Bicycle Council, the map should show preferred routes, major destinations and transit facilities, designated greenways, and bike shops, and include sidebars that provide safety information, rules of the road, and approximate bike travel times between major destinations. Wilmington's map should also show the locations of the City's bike racks and bike repair stands.

Such a map could be a very useful intermediate step in helping riders choose relatively comfortable routes around the City while there is still very little bike infrastructure. The map should be regularly updated to reflect newly added bike facilities. It should be developed as both a foldable print map to be carried by cyclists, and a mobile-compatible web map.

As an example, Austin, Texas, has a map available in both formats. Figure 20, to the left, shows a mobile phone screenshot of their interactive, mobile-friendly online bike map. This map is available at [www.arcg.is/0z5CSK](http://www.arcg.is/0z5CSK). A printable version of the map (published in 2017) is currently accessible at [www.austintexas.gov/page/austin-cycling-101](http://www.austintexas.gov/page/austin-cycling-101). The printable map provides some additional content that the online map does not, such as bike safety information and bike rack locations.



# 5. IMPLEMENTATION

This chapter addresses the following aspects of plan implementation:

- Progress Measures
- Coordination
- Public Outreach
- Project Prioritization for Projects on State-Maintained and City-Maintained Streets
- Funding

# PROGRESS MEASURES

## GOAL 1 RECOMMENDATIONS

### 1.1: Build a coordinated and safe Citywide bike route network using the Coordinated Bike Route Network Map as a guide.

Progress Measure	Objective
Installation of bike lanes	1 mile per year
Installation of bike-friendly streets	3 miles per year, starting in FY 2021  (In FY 2020, the City plans to focus on installing bike lanes. Therefore, the yearly goal for bike friendly streets will begin the following year in FY 2021)
Submittal of project proposals to DeIDOT's Statewide Bike and Pedestrian Program	2 projects per year
Installation of bike facilities in a 0.25-mile radius of schools, community centers, parks and the Central Business District	2 miles per year
Pilot/trial installations of new bike facilities	For all road diet projects on City-maintained streets



### 1.2 Maintain the network map as a dynamic GIS document.

Progress Measure	Objective
Maintenance of bike route network map	Update quarterly

### 1.3: Encourage DeIDOT to formally adopt their Complete Streets policy.

Progress Measure	Objective
DeIDOT's formal adoption of State Complete Streets policy	Within 2 years

### 1.4: Endorse DeIDOT's Complete Streets policy.

Progress Measure	Objective
Formal endorsement by City government	Within 1 year

### 1.5: Develop a Wilmington-specific Complete Streets policy.

Progress Measure	Objective
Development and adoption of City Complete Streets Policy	Within 3 years following endorsement of DeIDOT policy

### 1.6: Promote the economic development benefits of bike infrastructure.

Progress Measure	Objective
Development of a white paper on economic development benefits	Within 2 years
Creation of incentives and/or requirements for major development projects to include bike facilities (such as bike parking minimums)	Within 5 years

## GOAL 2 RECOMMENDATIONS

### 2.1: Develop and implement a maintenance plan for public bike infrastructure.

Progress Measure	Objective
Department of Public Works and DeIDOT to coordinate on creation of maintenance plan	Within 3 years (with ongoing maintenance of infrastructure during this time)
Implementation of maintenance plan	Ongoing implementation, update maintenance plan as needed for new facilities or division of duties

### 2.2: Create publications and programs to educate about bike safety.

Progress Measure	Objective
Create or adopt and distribute bike safety education materials	Within 1 year, and continue to offer materials at least on an annual basis thereafter
Organization of bike safety education programs	Within 2 years, and continue to offer programs at least on an annual basis thereafter

### 2.3: Adopt a Vision Zero policy at the City level.

Progress Measure	Objective
Development and adoption of policy	Within 5 years
Proportion of bike-related crashes (as reported by the Wilmington Police Department) relative to the number of bike commuters in Wilmington (as reported in the U.S. Census Bureau American Community Survey)	Decrease by 10% over 10 years

#### 2.4: Assist Wilmington schools in participating in DeIDOT's Safe Routes to School program.

Progress Measure	Objective
Increase in the number of participating Wilmington K-12 schools	1 per year

#### 2.5: Support nonprofit organizations and programs that provide education and advocacy for safe biking in the City.

Progress Measure	Objective
Provide advocacy, and promotional/technical/financial assistance as is feasible by Bike Wilmington and City Departments	Maintain regular communication with organizations to identify opportunities for support

## GOAL 3 RECOMMENDATIONS

#### 3.1: Coordinate with and support Urban Bike Project.

Progress Measure	Objective
Provide advocacy, promotional support, technical assistance as is feasible by Bike Wilmington and City Departments	Maintain regular communication with Urban Bike Project to identify opportunities for support, promotion and other assistance

#### 3.2: Implement an affordable, Citywide bike share program or programs.

Progress Measure	Objective
Phased implementation of affordable bike share program or programs throughout the City	At least 50 bikes per year over 4 years

**3.3: Increase the amount of quality bike parking throughout the City and help people find it.**

Progress Measure	Objective
Installation of quality bike parking spots	At least 20 spots per year over 15 years, with maintenance and additions as needed  (Many bike racks can accommodate more than one bike. Therefore, this measure is based on the number of bikes that can be accommodated, rather than the number of racks)
Updating City Code to require bike parking minimums in new development and permit bike parking in lieu of some provisions for parking lot landscaping.	Within 2 years
Development of a user-friendly application for private property owners to install racks and a "racks with Plaques" program to allow private donations of racks	Within 2 years
Posting of information on Bike Wilmington webpage about locations of and access to bike parking throughout the City.	Within 6 months

**3.4: Advocate for better accommodations for, and promotion of, using bikes in conjunction with transit.**

Progress Measure	Objective
Creation of policy with DART for the installation of bike racks at major transit stops	Within 2 years
Working with Philadelphia-area bike advocacy organizations to advocate for changes on SEPTA	Make contact and plan advocacy efforts with organizations
Encouraging transit agencies (DART and SEPTA) to provide educational and promotional materials in Wilmington about bringing bikes on transit	Send letters of support and examples to transit agencies within 1 year
Increase in the proportion of transit riders who combine their transit trip with biking	5% within 5 years

### 3.5: Install wayfinding signs designed for easy visibility by bikers and pedestrians.

Progress Measure	Objective
Planning and design of wayfinding signs	Within 3 years
Installation of wayfinding signs	15 per year over 3 years, followed by additional installations/updates as needed

### 3.6: Install public bike repair stations at key locations throughout the City.

Progress Measure	Objective
Installation of bike repair stations	3 per year over 3 years

### 3.7: Create a printable and mobile-friendly bike network map.

Progress Measure	Objective
Creation of printable and interactive web map	Within 1 year
Format interactive map for mobile viewing	Within 2 years

## COORDINATION

Currently, many transportation improvements taking place in the City are reviewed and shaped by a group called Wilmington Initiatives. Wilmington Initiatives is a multi-agency group with representation from City Departments, WILMAPCO, DeIDOT, Delaware Transit Corporation and various consultant agencies. Additionally, Bike Wilmington provides an important forum for communication on bike-related matters among a variety of stakeholders.

However, more detailed coordination between the stakeholders represented by both of these groups will be extremely valuable for refining, phasing and funding the proposed coordinated bike network.

Within the City government, the Departments of Public Works, Planning and Development, and Parks and Recreation, the Office of Economic Development, and the Wilmington Police Department can all play a large role in implementing this plan's recommendations and should therefore closely coordinate.

To maximize the benefits of coordinating, the City, State and WILMAPCO should work together to formalize the amount and type, and timing of coordination they should engage in when planning bicycle facilities. This will help to guard against the tendency for coordination to begin later than is ideal in a planning process, or to occur only at a symbolic level.

One specific coordination mechanism is for Wilmington Initiatives and Bike Wilmington to review DeIDOT's planned Pavement and Rehabilitation (P&R) projects for the City each year. This review would allow the parties to determine where planned P&R projects overlap with proposed bike facilities. The P&R project could then include the design and installation of the proposed bike facility along the project area.

A similar review and coordination process should also be implemented for the Department of Public Works' street rehabilitation projects. Department of Public Works staff should be aware of and regularly consult the Bike Network Map when doing street and sidewalk work, and Bike Wilmington should be aware of this work ahead of time in order to offer input to help implement the plan.

## PUBLIC OUTREACH

Like the coordination process for bike facility planning, public outreach processes are also prone to being delayed or irregular. For this reason, the City should develop a formal public outreach process for implementing the bike plan. The outreach process should include regular communication with constituents to collect feedback and build awareness of and support for bike-related planning, development, and implementation.

Outreach should also include publicizing recent accomplishments and upcoming projects to build support for implementing the bike plan. Sharing information about recent and upcoming projects could also be packaged within a more general promotional campaign about the benefits of biking for transportation.

## PROJECT PRIORITIZATION

As previously noted, Wilmington has both City-maintained streets and State-maintained streets. Because City- and State-maintained streets require different implementation processes, they are discussed separately in the next two sections.

Figure 21, on the next page, breaks down the planned bike network in terms of type of facility, miles of each facility type, and whether the facility is on a State- or City-maintained street. All separated pathways are included under the State-maintained category because they would be submitted to the Statewide Pedestrian and Bicycle Program for funding due to their high cost.

Additionally, the estimated amount of materials needed to construct are provided in Appendix H, as are per-unit cost estimates based on 2019 prices. Please note that these cost estimates do not include the cost of engineering or labor.

# STATE-MAINTAINED STREETS

The City of Wilmington can submit projects to DeIDOT for many of the bike projects proposed in the City of Wilmington, particularly those on State-maintained streets. DeIDOT will in turn prioritize these projects for funding through the State Capital Transportation Program.

In 2018, the State of Delaware completed the "Blueprint for a Bicycle-Friendly Delaware - A Statewide Policy Plan." This plan outlines a prioritization process for having projects funded through the Statewide Bicycle and Pedestrian Program. See DeIDOT's "Blueprint for a Bicycle-Friendly Delaware - A Statewide Policy Plan", available at [www.deldot.gov/Programs/bike/biking\\_in\\_delaware](http://www.deldot.gov/Programs/bike/biking_in_delaware), for more information on this prioritization process. This prioritization process is specifically for bicycle and pedestrian improvements. However, bike projects in Wilmington can also be prioritized for other types of DeIDOT funding

Figure 22, on page 52, summarizes the bike facility projects planned for State-maintained streets that the City will need to submit for prioritization by DeIDOT for funding. This list of projects is not exhaustive.

**FIGURE 21: MILES OF BIKEWAYS BY TYPE AND MAINTENANCE AUTHORITY**

Facility type	Miles on City-maintained streets	Miles on State-maintained streets	Total miles
Standard bike lane	5.4	1.1	6.5
Protected/buffered bike lane	1.2	8.9	10.1
Bike-friendly street	30.9	1.5	32.4
Separated pathway	0	9.3	9.3
<b>Total miles</b>	<b>37.5</b>	<b>20.7</b>	<b>58.2</b>

# CITY-MAINTAINED STREETS

The Wilmington Department of Public Works (DPW) will be integral in implementing Goal 1 of this plan. DPW has the technical abilities to install the bike facilities planned for City-maintained streets. These capabilities include:

- Recently-purchased machines for applying thermoplastic and epoxy coatings to asphalt
- Staff trained in applying green epoxy specifically used for bike facilities
- A sign shop where all bicycle signs can be made
- Ability to contract out for installation of bike racks

However, even though DPW has the technical abilities to complete these tasks, such tasks have so far not been included in the Department’s annual capital budget. Therefore, DPW has not been able to pay for the materials and staff time required to carry out these projects.

Moving forward, it is important that DPW’s capital budget include funds for the installation of bike facilities on City-maintained streets and bike racks in the public right of way.

Figure 23, on page 53, provides a phased implementation plan for building the Citywide bike network, based on yearly phases.

This chapter set out the progress measure of installing approximately three miles of bikeways on City-maintained streets each year, in addition to bike racks.

In order to build the network up so that it becomes useful as soon as possible, it is recommended to phase bikeway improvements to focus on specific swathes of the city, rather than building facilities in a scattered, piecemeal fashion. After FY 2019-2020 (for which projects have already been identified), the neighborhoods that have a higher number of crashes are prioritized for installation of on-street bike infrastructure.

Conversely, the installation of bike racks is prioritized in terms of land use, so that commercial corridors, schools, community centers and employment centers are prioritized.

**FIGURE 22: PROJECTS TO BE SUBMITTED FOR DELDOT FUNDING**

Project location (inclusive of intersections)	Facility type	Submission priority level
1. Walnut Street (A Street to 16th Street)	Protected/buffered bike lane	Near-term
2a. 12th Street (Delaware Ave to Walnut Street)	Protected/buffered bike lane	Near-term
2b. Delaware Ave (Adams Street to 12th Street)	Separated pathway	Near-term
3. Intersection of MLK Boulevard and Shipley Street	Protected/buffered bike lane	Near-term
4. Baynard/Washington Street (9th Street to Concord Ave )	Protected/buffered bike lane	Near-term
5. Market Street (A Street to MLK Blvd)	Protected/buffered bike lane	Near-term
6a. Adams and Jackson (Maryland Ave to 10th Street)	Separated pathway	Mid-term
6b. I-95 Overpasses (6th-10th Streets between Jackson and Adams Streets)	Standard bike lane	Mid-term
7. Northeast Boulevard (City line to 11th Street)	Protected/buffered bike lane	Mid-term
8a. Augustine Cut-Off (Lovering Ave to 18th Street)	Separated pathways, protected/buffered bike lane	Mid-term
8b. 18th Street (Augustine Cutoff to N. Market Street)	Separated pathway, bike-friendly street	Mid-term
9. E. 4th Street and Christina Ave (Church Street to Claymont Street)	Standard bike lane, protected/buffered bike lane	Long-term
10. Washington Street (2nd Street to Justison Street)	Separated pathway	Long-term
11. Washington Street (9th Street to 2nd Street)	Protected/buffered bike lane	Long-term
12. Pennsylvania Avenue (City line to Bancroft Parkway)	Protected/buffered bike lane	Long-term



**FIGURE 23: PROPOSED PHASED IMPLEMENTATION PLAN**

Project area	Infrastructure Type	Time frame	Priority level
West Side N-S bike lanes: Harrison Street and Franklin or Van Buren Street	Bike lanes	FY2020	1
Market Street and Union Street	Bike parking	FY2020	1
Other West Side below Pennsylvania Ave	Bike lanes, bike-friendly streets	FY2021	2
K-12 schools	Bike parking	FY2021	2
WCC, Downtown, East Side, South Wilmington	Bike lanes, bike-friendly streets, protected/ buffered bike lanes	FY2022	3
Healthcare and community facilities	Bike parking	FY2022	3
Parks	Bike parking	FY2022	3
North of Brandywine Creek	Bike lanes, bike-friendly streets, protected/ buffered bike lanes	FY2023	4
Neighborhood commercial corridors	Bike parking	FY2023	4
Other Downtown	Bike parking	FY2023	4
West Side above Pennsylvania Ave	Bike lanes, bike-friendly streets	FY2024	5

## FUNDING

Many of the recommendations related to Goals 2 and 3 are not eligible for funding from DeIDOT's Statewide Bicycle and Pedestrian Program. Therefore, the City, in conjunction with Bike Wilmington stakeholders and neighborhood groups, must identify and secure appropriate funding for bike and pedestrian projects.

In working with communities in the implementation of our bicycle friendly street network, if additional improvements beyond street markings and signs are requested, depending on project scope it could be entered into the Transportation Alternatives Program or the City's Capital Improvements Program.

## GRANT FUNDING

There are several resources online that summarize Federal funding opportunities for bike-related projects. These include:

- The Federal Transit Administration webpage "FTA Program & Bicycle Related Funding Opportunities" ([www.transit.dot.gov/regulations-and-guidance/environmental-programs/livable-sustainable-communities/fta-program-bicycle](http://www.transit.dot.gov/regulations-and-guidance/environmental-programs/livable-sustainable-communities/fta-program-bicycle))
- The Federal Highway Administration webpage "Pedestrian and Bicycle Funding Opportunities" ([www.fhwa.dot.gov/environment/bicycle\\_pedestrian/funding/funding\\_opportunities.cfm](http://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.cfm))
- The Rails to Trails Conservancy webpage "Obtaining Funding for Active Transportation" ([www.railstotrails.org/policy/building-active-transportation-systems/obtaining-funding/](http://www.railstotrails.org/policy/building-active-transportation-systems/obtaining-funding/)).

Additionally, the League of American Bicyclists, in conjunction with the Alliance for Biking and Walking, produced a guide in 2014 called "How Communities are Paying for Innovative On-Street Bicycle Infrastructure." The guide outlines a variety of funding sources, and is available for free online.

## PRIVATE FUNDING

As indicated in the discussions in previous chapters of the potential economic development benefits of a bike-friendly City, corporations may have an interest in investing in bike infrastructure, events, educational materials, or other resources for biking in the City. The City should reach out to major employers in Wilmington to gauge their interest in investing in these efforts, promote the benefits of doing so, and identify opportunities for this investment and coordination.

Major institutions like Christiana Care and the University of Delaware may also be interested in funding bike-related projects because of the health and economic benefits such projects can provide to the populations they serve.

In particular, corporations and institutions have sponsored bike share programs in many other cities. The City of Wilmington is interested in bringing a bike share to the City if feasible under current budgetary constraints, and private sponsorship would go a long way to making this possible.

## FINAL THOUGHT

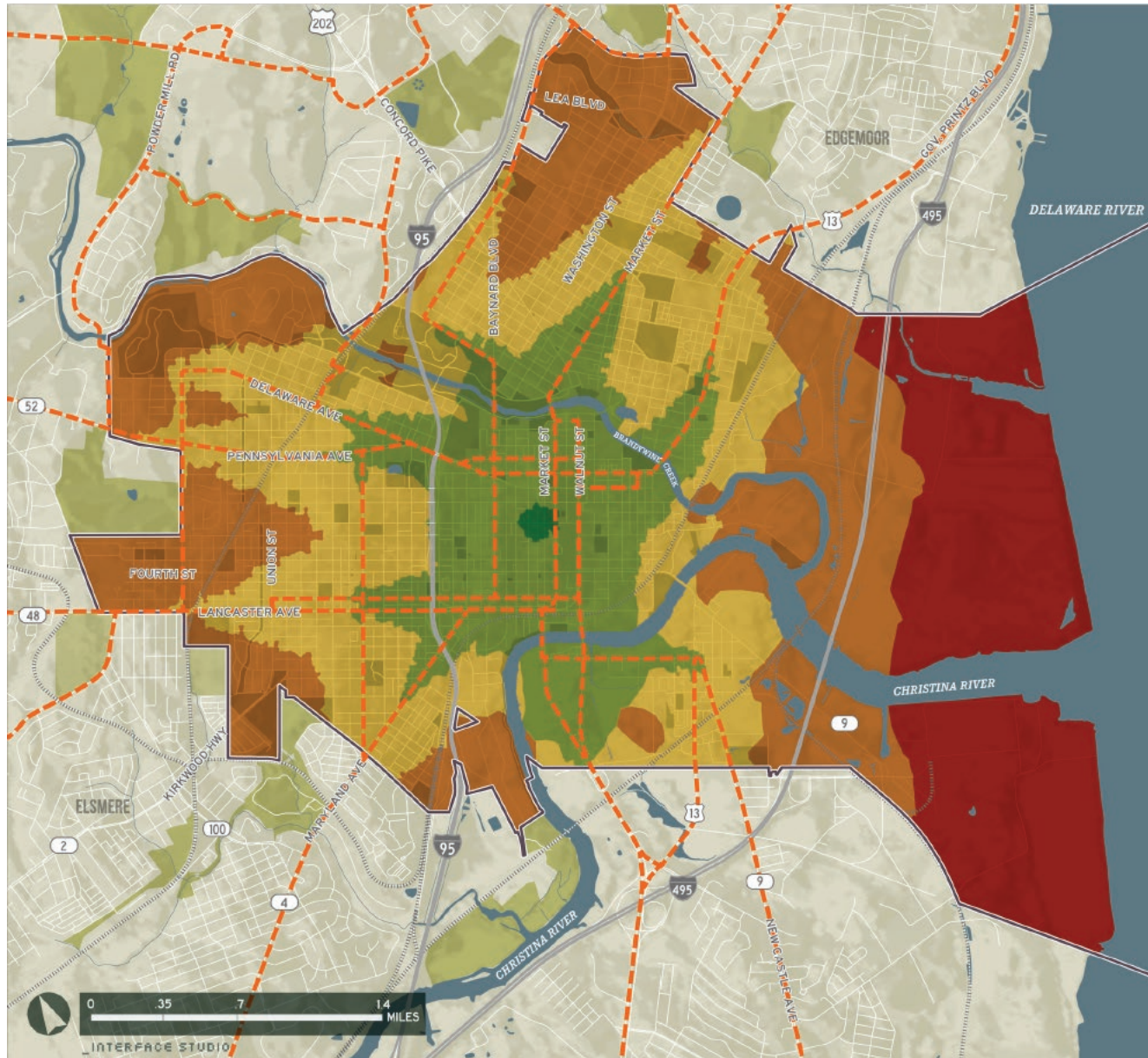
Studies have shown that the majority of the population (around 60%) is "interested but concerned" in biking for transportation. This means that they are interested in riding a bike for transportation, but are concerned about their safety in terms of sharing space with motor vehicles. It is hoped that this bike plan will help "interested but concerned" Wilmington residents access the convenience and benefits (health, affordability, environment...) of biking for transportation, while also providing safer and more comfortable bike facilities for those who are already riding.



# APPENDICES

# APPENDIX A

## BIKING TIME TO DOWNTOWN WILMINGTON



Travel Time in Minutes to 8th and Market Streets with Preference Given to Designated State Bicycle Routes

- Greater than 30
- Up to 30
- Up to 15
- Up to 10
- 1 minute
- Designated State Bicycle Route

Image Credit: Interface Studio  
(data from Interface Studio and  
City of Wilmington)

# APPENDIX B

## STREETS RECOMMENDED FOR ROAD DIETS

- Washington Street/Baynard Boulevard (Concord Avenue to MLK, Jr. Boulevard)

- » Baynard Avenue and Washington Street constitute a critical north-south route that could provide a low-stress connection for bikers to travel to the Christina Riverfront, downtown, the Creative District, several North side neighborhoods, and to a potential off-street trail connecting to the Northern Delaware Greenway. In addition, Washington Street intersects with 11th and 12th Streets, which are planned to provide an east-west route through the downtown.

- Pennsylvania Avenue (Rising Sun Lane to Greenhill Avenue)

- » While the bike network map proposes the entirety of Pennsylvania Ave in the City for a bike lane, this westernmost portion is the most feasible portion for a road diet, and is therefore recommended to be built in the nearer term, in comparison to the remainder of the corridor.

- Walnut Street (Front Street to 12th Street)

- » This one-way street is a busy, multi-lane barrier between the East Side neighborhood and downtown. Adding a protected bike lane via a road diet would allow Walnut Street to serve as an important downtown north-south connector. The road diet would also provide a traffic calming effect, making it less stressful for pedestrians to cross the street as well as walk along it.

Like Washington Street, Walnut Street intersects with 11th and 12th Streets, which are planned for east and west bike routes. Walnut Street would also provide a very important connection at its southern end to the Wilmington Train Station and the planned DART Transit Center. Having a low-stress bike facility connected to these transit hubs would provide greater transportation flexibility by allowing people to combine transportation modes more easily.

- 12th Street/Delaware Avenue (Washington Street to Adams Street)

- » This wide, multi-lane street receives very little traffic outside of rush hour. It is therefore proposed for a road diet to create a protected westbound route to complement the standard bike lane to be built on 11th Street.

- 8th Street (Market Street to Adams Street)

- » This portion of 8th Street has two traffic lanes but the lanes are not striped and most motorists treat the street as a single wide lane. This indicates that some of the street width represents excess capacity. A road diet would provide room for a protected/buffered bike lane while also calming vehicle traffic.

- Harrison Street (9th Street to Maryland Avenue)

- » This neighborhood street has low traffic volumes, and its two traffic lanes encourage vehicles to speed. As a traffic calming measure, one of the traffic lanes on the 700 and 800 blocks has been dieted and turned into a standard bike lane. The bike plan proposes to continue this lane southward to Maryland Avenue.

- Broom Street (Lovering Avenue to 9th Street)

- » Harrison Street is cut off between Pennsylvania Avenue and 10th Street and is laid with bricks between 9th and 10th Streets. Therefore, Broom Street, which also has two lanes, is recommended to provide a southbound connection above 9th Street. The planned bike-friendly street on 9th Street would connect the Broom Street lane to the Harrison Street lane.

- Franklin Street (Maryland Avenue to Lovering Avenue)

- » Alternative Street: Van Buren Street

- » Like neighboring Broom and Harrison Streets, Franklin Street has two traffic lanes that provide excess capacity for its neighborhood traffic volumes. Therefore, a road diet would provide both traffic calming and allow the street to serve as the northbound counterpart to Harrison and Broom Streets, creating a north-south connection on the west side.

Van Buren Street, which is also two lanes and runs the same direction as Franklin, is an alternative to Franklin. Both streets have advantages and disadvantages. Van Buren is less centrally located on the West Side than Franklin, but is also less steep.

- Northeast Boulevard

- » Northeast Boulevard currently comprises 2 traffic lanes in each direction, a shared center turn lane, and shoulders of varying widths on either side. Its highest AADT (between 12th Street and 14th Street) is 18,000, while the rest is below 15,000 AADT, making it a good candidate for a road diet. A protected bike lane on Northeast Boulevard would provide an excellent connection through Wilmington's North Side, and connect to a potential bike facility on Governor Printz Boulevard all the way to Claymont. Given the presence of the shoulder, a protected two-way bike lane could be accommodated by removing just one traffic lane. Traffic analysis would have to be conducted to determine which lane would be more logical to remove. However, because there are two nearby southbound one-way streets (Claymont and Locust) that parallel much of the Boulevard, so it may be more feasible to remove one of the southbound lanes. Of course, if it is found that removing a lane in each direction is feasible, that would be preferable because of the greater potential for traffic calming.

## APPENDIX C

### PUBLIC PRESENTATION LOCATIONS AND TABLING EVENTS

#### Public Presentation Locations

1. 2nd District Neighborhood Planning Council
2. 4th District Neighborhood Planning Council
3. 6th District Neighborhood Planning Council
4. 8th District Neighborhood Planning Council
5. Browntown Community Association
6. Canby Park Civic Association
7. Cool Spring/Tilton Park Neighborhood Association
8. Eastlawn Civic Association
9. East Side Civic Association
10. Harlan Park Civic Association
11. Midtown-Brandywine Neighbors' Association
12. Northeast Civic Association
13. Northwest Civic Association
14. Southbridge Civic Association

15. Southwest Civic Association
16. Triangle Neighborhood Association
17. Trinity Vicinity Neighborhood Association
18. Union Park Gardens Neighborhood Association
19. Washington Heights Neighborhood Association
20. West Side Neighborhood Coalition
21. West Side Community Action Committee
22. South Wilmington Planning Network

#### Tabling Events

23. Bike to Work Day 2018
24. Earth Day 2018
25. Elbert Palmer STEM Event
26. Trail Fest

# APPENDIX D

## PUBLIC SURVEY QUESTIONS



City of Wilmington  
Bike Plan

### City of Wilmington Bike Plan Survey

1. If you have a daily commute, what form of transportation do you primarily use? (check one)

- Take a bus
- Take a train
- Bike
- Carpool
- Drive
- Walk
- Combine walking and taking bus/train
- Combine biking and taking bus/train
- Other \_\_\_\_\_

2. How long is your daily commute? (check one)

- Less than 10 minutes
- 10-19 Minutes
- 20-29 Minutes
- 30+ Minutes
- Other \_\_\_\_\_

3. Outside of your daily commute, how do you primarily get around the City? (check one)

- Take a bus
- Bike
- Drive
- Walk
- Other \_\_\_\_\_

4. How often do you ride a bicycle (approximately)? (check one)

- Do not ride a bicycle
- Less than once per month
- 1-4 times per month
- 5+ times per month
- Other \_\_\_\_\_

5. If you do ride a bicycle, when do you use it? (check all that apply)

- To get to my job
- To get to school
- To get to parks
- To go shopping
- To visit friends/family
- On recreational trails
- Not applicable
- Other \_\_\_\_\_

6. If you do not ride a bicycle, why? (check all that apply)

- Uncomfortable riding my bicycle on roads with cars
- Distance to and from destinations
- Do not own a bicycle
- Family/job obligations require daily use of my car
- Not confident in my bicycle-riding ability
- Do not want to ride a bicycle
- Not applicable
- Other \_\_\_\_\_

7. What factors would help or encourage you to ride your bicycle more often?

8. Are there specific streets where you would be more likely to ride a bike if bike infrastructure was provided?

9. Please tell us a little about yourself.

- a) In which neighborhood do you live? \_\_\_\_\_
- b) In which zip code do you live? \_\_\_\_\_
- c) Your race and/or ethnicity: \_\_\_\_\_
- d) Your gender: \_\_\_\_\_
- e) Your age: \_\_\_\_\_

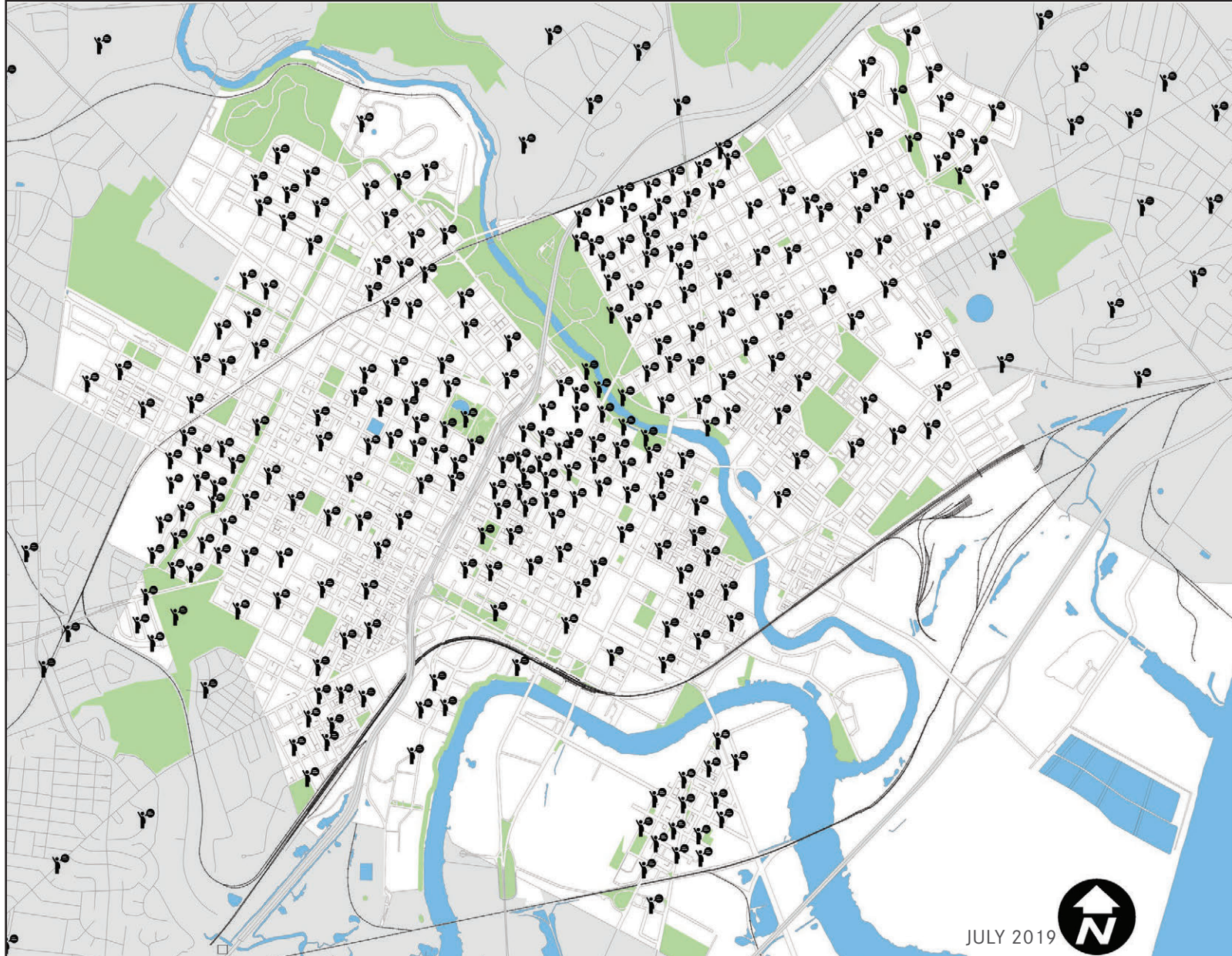
10. Please share any other comments or questions.

11. If you would like to be added to our Bike Wilmington email list, enter your email address.

**Thank You!**

# APPENDIX E

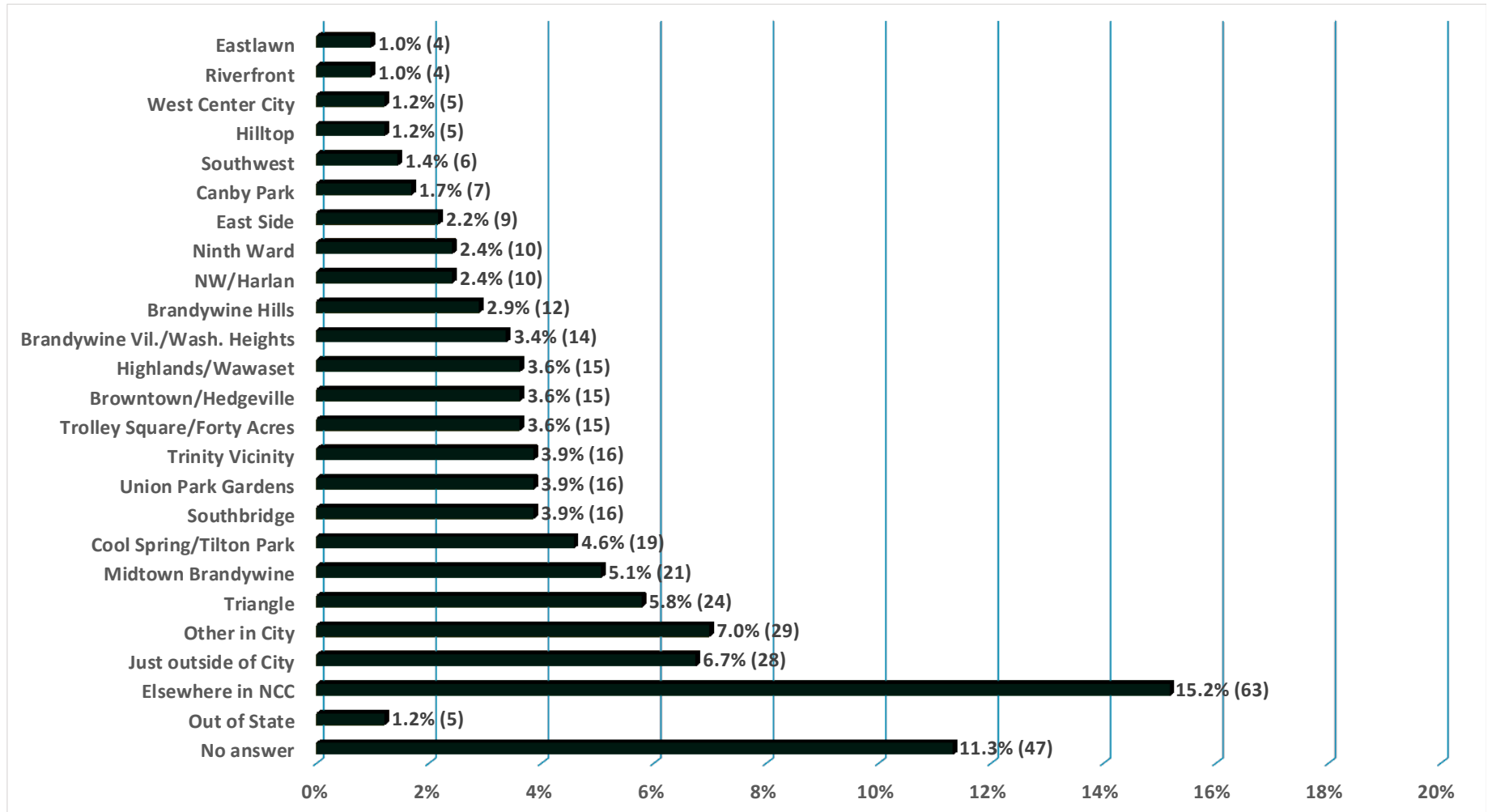
## APPROXIMATE GEOGRAPHIC DISTRIBUTION OF SURVEY RESPONSES





# APPENDIX F

## CHART OF GEOGRAPHIC DISTRIBUTION OF SURVEY RESPONSES (415 RESPONDENTS)

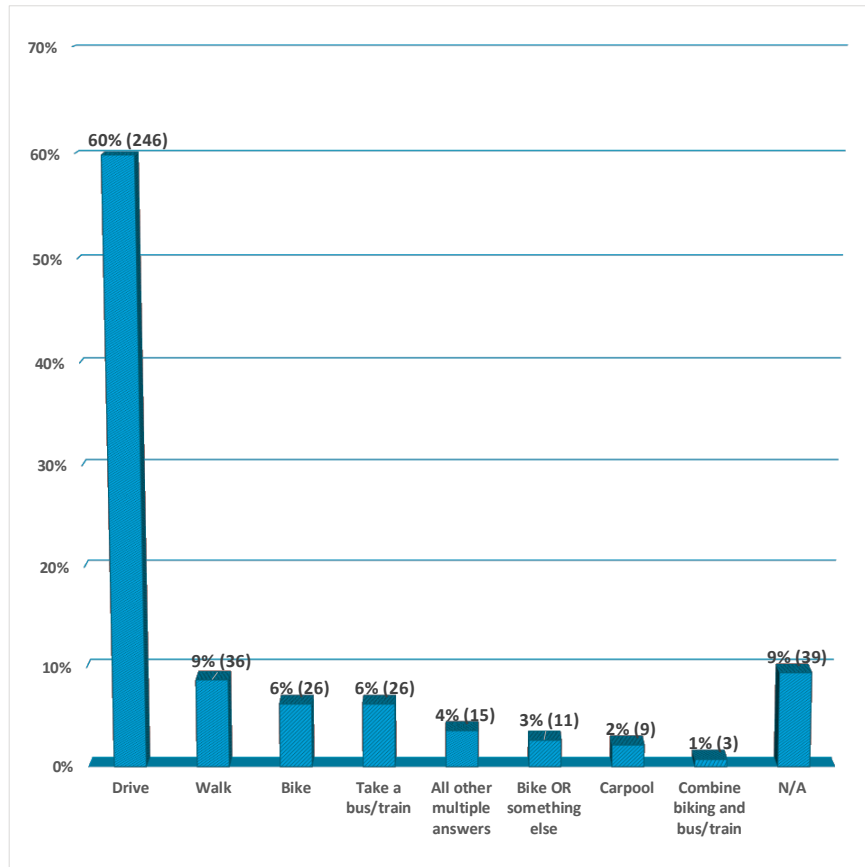


# APPENDIX G

## SURVEY RESULTS SUMMARY CHARTS

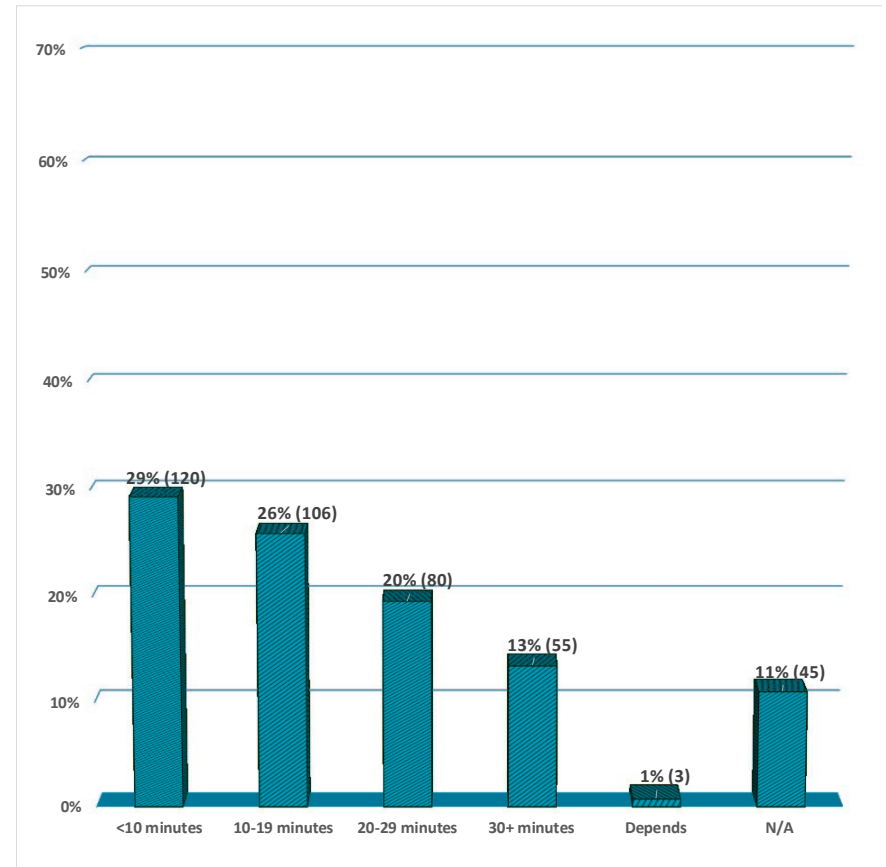
**Q1. If you have a daily commute, what form of transportation do you primarily use?**

**(411 respondents)**



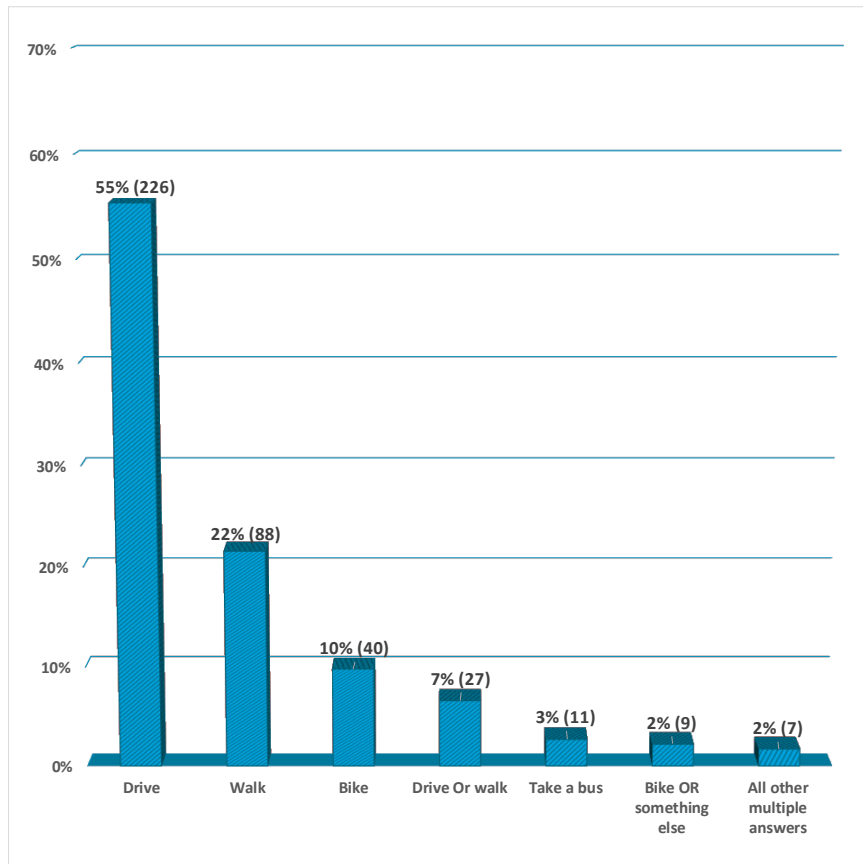
**Q2. If you have a daily commute, how long is your commute?**

**(409 respondents)**



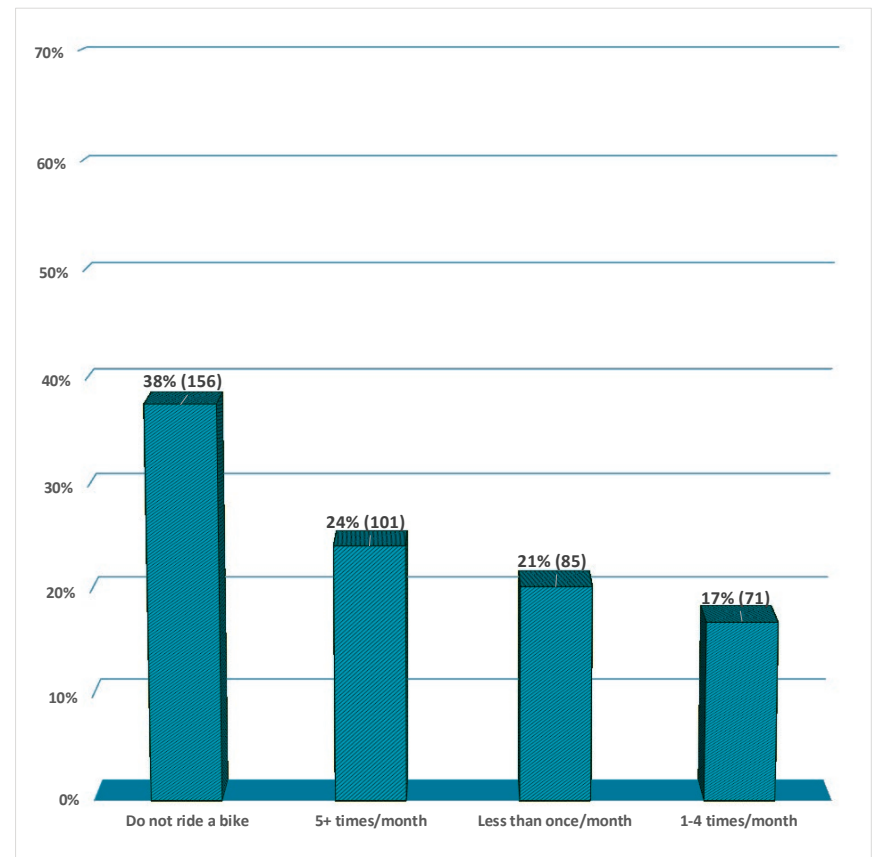
**Q3. Outside of your daily commute, how do you primarily get around the City?**

**(408 respondents)**



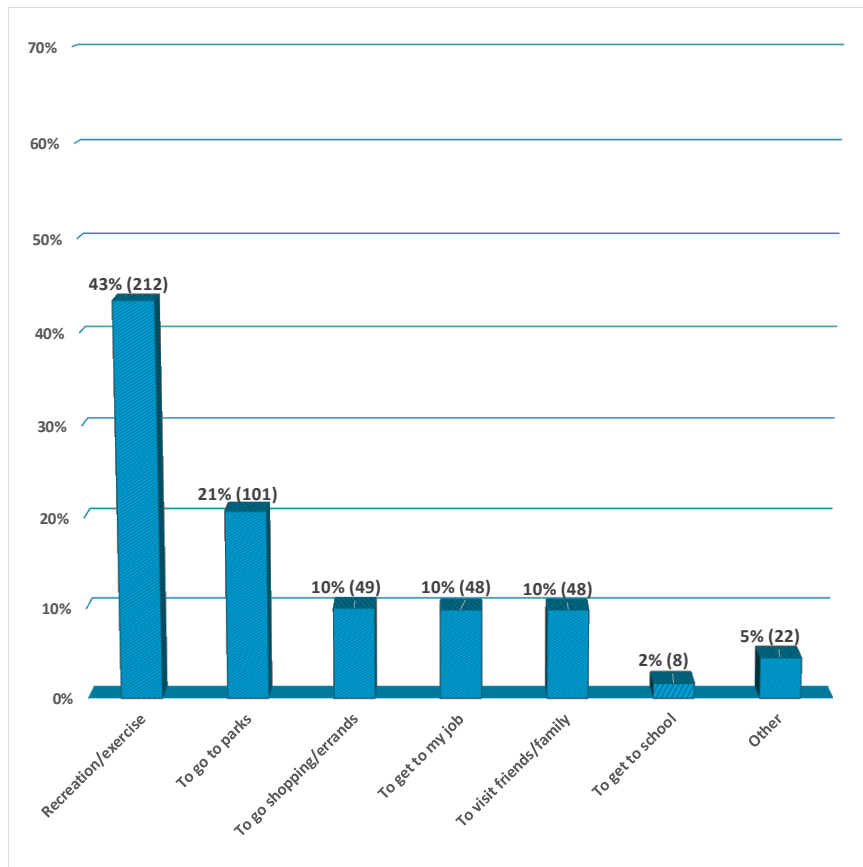
**Q4. How often do you ride a bike (approximately)?**

**(413 respondents)**



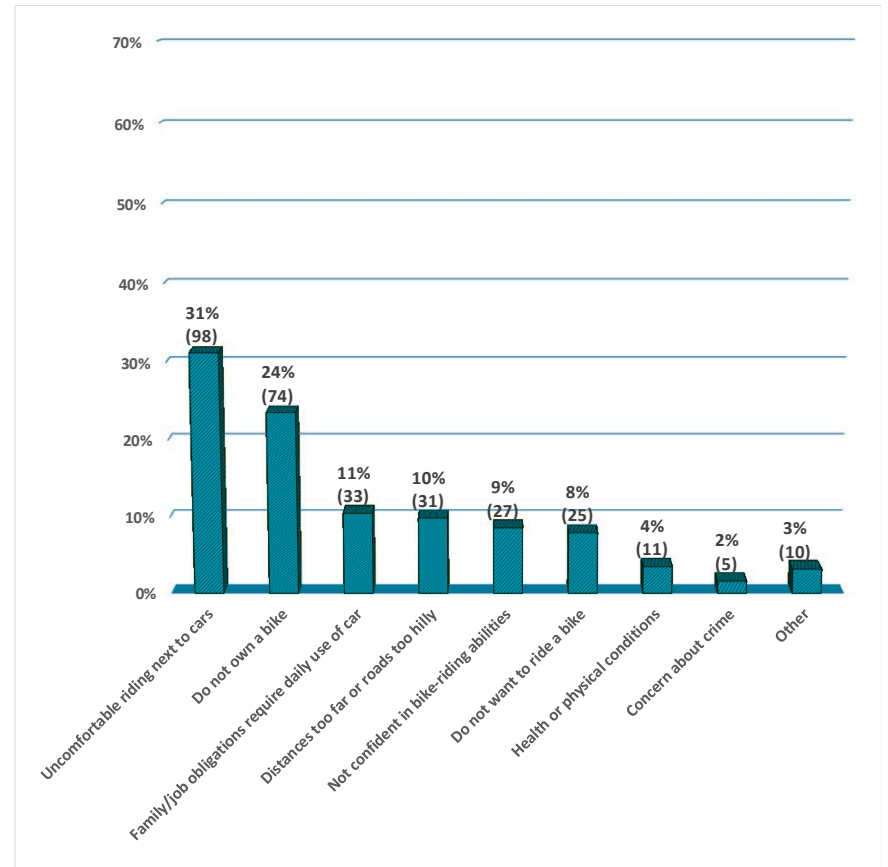
**Q5. If you do ride a bike, when do you use it?**

(Multi-select, 488 selections by 257 respondents, percentage is out of 488)



**Q6. If you do not ride a bike, why?**

(Multi-select, 314 selections by 228 respondents, percentage is out of 314)



# APPENDIX H

## UNIT COUNTS AND COST ESTIMATES FOR BIKE FACILITY MATERIALS

### APPROXIMATE 2019 COSTS FOR MATERIALS (EXCLUDES ENGINEERING AND LABOR COSTS)

Material	Potential cost per unit (based on 2019 prices)
Can of white line paint (contains about 450 linear ft)	\$30
Sharrow marking surrounded by green box	\$1,000
White bike marking for bike lane	\$75-375
Can of green paint for transition/mode mixing zones (contains about 100 sq. ft.)	\$150
Bike sign (made in-house by City)	\$30
Plastic delineator post	\$40
Pre-cast concrete curb (1 ft)	\$20
Inverted U Rack	\$150

### BIKE-FRIENDLY STREETS (32.4 MILES)

Component	Units/mile	Total units for 32.4 miles
Sharrow marking in green box (every 150 ft)	35.2	1140.5
Bike sign (every 300 ft)	17.6	570.2
100 sq. ft. green transition zone (every half mile)	2	64.8

### STANDARD BIKE LANES (6.5 MILES)

Component	Units/mile	Total units for 6.5 miles
Line paint for 2 stripes (each can of paint contains 450 linear ft)	23.4	152.1
Bike marking (every 150 ft)	35.2	228.8
Bike sign (every 500 ft)	10.6	68.6
100 sq. ft. green transition zone (every quarter mile)	4	26

### PROTECTED/BUFFERED BIKE LANES (10.1 MILES):

#### OPTION 1: BUFFERED OR PARKING PROTECTED BIKE LANES

Component	Units/mile	Total units for 10.1 miles
Line paint for 3 stripes and diagonal hatch (each can of paint contains 450 linear ft)	46.9	474
Bike marking (every 150 ft)	35.2	355.5
Bike sign (every 500 ft)	10.6	101.1
100 sq. ft. green transition zone (every quarter mile)	4	40.4

## OPTION 2: PROTECTED BY PLASTIC DELINEATOR POSTS

Component	Units/mile	Total units for 10.1 miles
Plastic delineator posts (every 15 ft)	352	3,555.2
Line paint for 3 stripes (each can of paint contains 450 linear ft)	46.9	474
Bike marking (every 150 ft)	35.2	355.5
Bike sign (every 500 ft)	10.6	101.1
100 sq. ft. green transition zone (every quarter mile)	4	40.4

## OPTION 3: PROTECTED BY PRE-CAST CURB

Component	Units/mile	Total units for 10.1 miles
Pre-cast curb	N/A	N/A
Line paint for 2 stripes (each can of paint contains 450 linear ft)	46.9	474
Bike marking (every 150 ft)	35.2	355.2
Bike sign (every 500 ft)	10.6	101.1
100 sq. ft. green transition zone (every quarter mile)	4	40.4



**MOVING US FORWARD: A PLAN FOR BIKING IN THE CITY OF WILMINGTON**  
**AUGUST 2019**