



Promoting Safe and Convenient Bicycle Transportation





2008

The City of Wilmington Bicycle Plan

**Promoting Safe and Convenient Bicycle
Transportation**

**Prepared by the staff of the
Wilmington Area Planning Council**

For

The City of Wilmington

Endorsed by the WILMAPCO Council on November 13, 2008

The preparation of this document was financed in part with funds provided by the Federal Government, including the Federal Transit Administration and the Federal Highway Administration of the United States Department of Transportation.

TABLE OF CONTENTS

Introduction

The Vision.....6

Why Wilmington.....6

Goals

1. Design a Coordinated Network.....8

2. Provide Access to the Network.....14

3. Provide Bicycle Parking.....23

4. Promote Safety and Education.....31

5. Create Bicycle Policies.....40

6. Develop a Phased Implementation Plan.....42

7. Involve the Community.....45

Path Forward.....47

List of Figures

Figure 1: New Castle County, Delaware.....6

Figure 2: The City of Wilmington, Delaware.....7

Figure 3: Greenway Networks in Wilmington.....10

Figure 4: Live Map of Submitted Bike Routes.....11

Figure 5: Proposed Coordinated Bicycle Network12

Figure 6: Bicycle Network Coverage in Wilmington.....15

Figure 7: Examples of Bicycle Rack Designs from Other Cities.....25

Figure 8: Key Destinations with Proposed Bicycle Routes.....26

Figure 9: Existing and Recommended Bicycle Parking Locations.....29

Figure 10: Injuries Related to Bicycle Crashes in Wilmington.....31

Figure 11: Total Bicycle Crashes in Wilmington, 2000-2006.....32

Figure 12: Wilmington Bicycle Crashes at Intersections.....33

Figure 13: Total Intersection Crashes by Bicycle Route Category.....33

Figure 14: Example of Intersection Configuration with a Bicycle Box.....34

Figure 15: Example of Intersection Configuration with Curb Extensions.....38

Appendix: Currently Used Bicycle Routes.....49

The Vision: The Wilmington Bicycle Plan will promote safe and convenient bicycle transportation for commuters and recreational riders within Wilmington, Delaware.

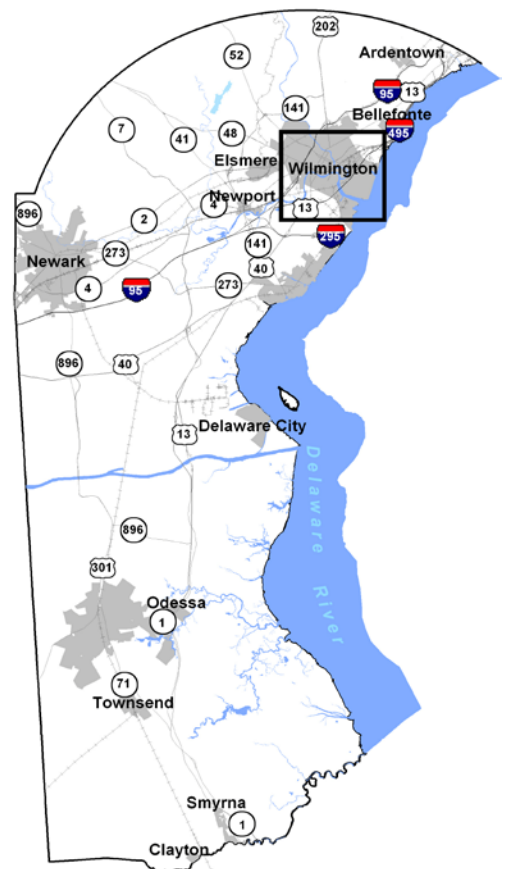
Why Wilmington

The City of Wilmington, Delaware, has a goal of attracting more residents with new Downtown and Riverfront condominiums and apartments designed for both young professionals and older empty-nesters. A citywide plan to improve bicycle access and safety appeals to active suburban residents who are accustomed to cycling for recreation and using their bicycles for work trips and errands. New bicycle amenities also benefit long-time city residents and support the Healthy Wilmington 2010 initiative. This program, launched in 2003 by Mayor James Baker, serves as a community health guide and agenda to improve the wellness of residents. An active bicycling community would aid this initiative.

In 2007 the population estimate for Wilmington was 72,868; employment was estimated to be 62,570.¹ As an employment center, Wilmington is the destination for many commuters, which causes congestion to the surrounding road network in the morning and evening peak driving periods. In the 2000 Census, there were 29,797 city residents who commuted to work. In total, 2,245 (7.5%) residents reported they walked to work. Yet only 58 listed their primary means of travel via bicycle. This represents less than 0.2 percent of commuters. While that number mirrors the percentage for New Castle County, the county consists of mainly suburban land uses surrounding Wilmington and is much more rural to the south of the Chesapeake & Delaware Canal. This generally results in longer commutes, many of which are not conducive to a bicycle for county residents. In contrast, the City of Newark, the second largest city in New Castle County, has about two-thirds as many total commuters (19,437) as Wilmington and had 1.15 percent of commuters list cycling as their primary mode for travel to work. These commuters benefit from Newark's bicycle-friendly roads and trails, developed as part of the Newark Bicycle Plan (WILMAPCO, 1996).

Furthermore, conditions exist to support a healthy cycling culture in Wilmington. For example, the Delaware Transit Corporation (DTC), which supplies transit service for the state

Figure 1: New Castle County, Delaware



¹ U.S. Census Bureau, 2006 Wilmington Population Estimates. American Community Survey, Employment Status, Wilmington, DE, 2005 and 2006.

of Delaware, has equipped all buses in the DART public transit system with bike racks. This allows cyclists to utilize transit for longer portions of their commute and use their bikes to complete their trips after they arrive in the Downtown. The aim of the Wilmington Bike Plan is to make cycling a popular and practical mode of transportation for City residents by providing an economic and environmentally-friendly alternative to the automobile, augment mobility and accessibility, and promote public health. The plan will help to prioritize needs to create a network of bicycle boulevards and lanes and guide the development of policies needed to support and maintain them. To achieve the vision, seven goals have been established, each accompanied by a series of objectives. Combined, the goals and objectives provide direction toward implementation and will help gauge the plan's progress. This document is organized first by each goal, then by the objectives, and finally by the approach used to address each objective. However, several objectives do not include an approach because the endorsement of this plan and the incorporation of new bicycle policies are a prerequisite before further actions can be taken.

Figure 2: The City of Wilmington, Delaware



GOAL ONE: DESIGN A COORDINATED NETWORK

Objectives	
1	Develop a coordinated, connected network of bicycle facilities with a combination of off-street and on-street bikeways.
2	Create and distribute a Wilmington Bicycle Network Map, including tips on safe bicycling practices.

- ❖ **Objective 1**—Develop a coordinated, connected network of bicycle facilities with a combination of off-street and on-street bikeways. On-road facilities should be designed as complete streets² appropriate to both the street classifications and traffic volume. The network should be well-signed for ease of use and to provide a viable alternative to the automobile for residents and commuters to bike to work, school or play.

To benefit cyclists, the bicycle network must provide adequate linkages. The underlying idea is to create a fluid network that connects existing bike lanes to new segments and designates bike boulevards that are needed to close gaps in the system. Bicycle boulevards are a traffic calming method in which roads are configured to encourage cycling and to slow the speeds of motor vehicles. More importantly, bike boulevard designations are actions that can be accomplished in the short-term.



To increase the ease of use, the network must have bicycle traffic controls, such as signage, street and pavements markings, and signals, making routes easier to navigate by users. These controls will be discussed in more detail under Goal Four.

Bicycle Boulevards are shared roadways which have been optimized for bicycle traffic, and use a variety of traffic calming elements to achieve a safe cycling environment.

² “Complete Streets” are designed to provide safe access for all users of any age and physical ability, encompassing motorists, pedestrians, bicyclists, and transit riders.

A minor arterial is the preferred street classification to accommodate bicycle lanes because the wider lane can handle separated bicycle traffic. Thus, having adequate access along arterials is essential to achieving linkages throughout the network. There is no standard traffic volume threshold for potential bike lane striping or bike boulevard designation. However, it is very challenging, if not impossible, to stripe bike lanes on existing roads that are too narrow or congested with vehicular traffic. Where feasible, travel lane widths should be slightly reduced for safety and to accommodate bicycle lanes. According to the American Association of State Highway and Transportation Officials (AASHTO), the minimum width for a bicycle lane is five feet. Striping bicycle lanes should be considered long-term actions since more evaluation is needed to determine which roadways are most suitable. For roadway segments that are not feasible for bike lane striping, bicycle boulevard designations should be explored.



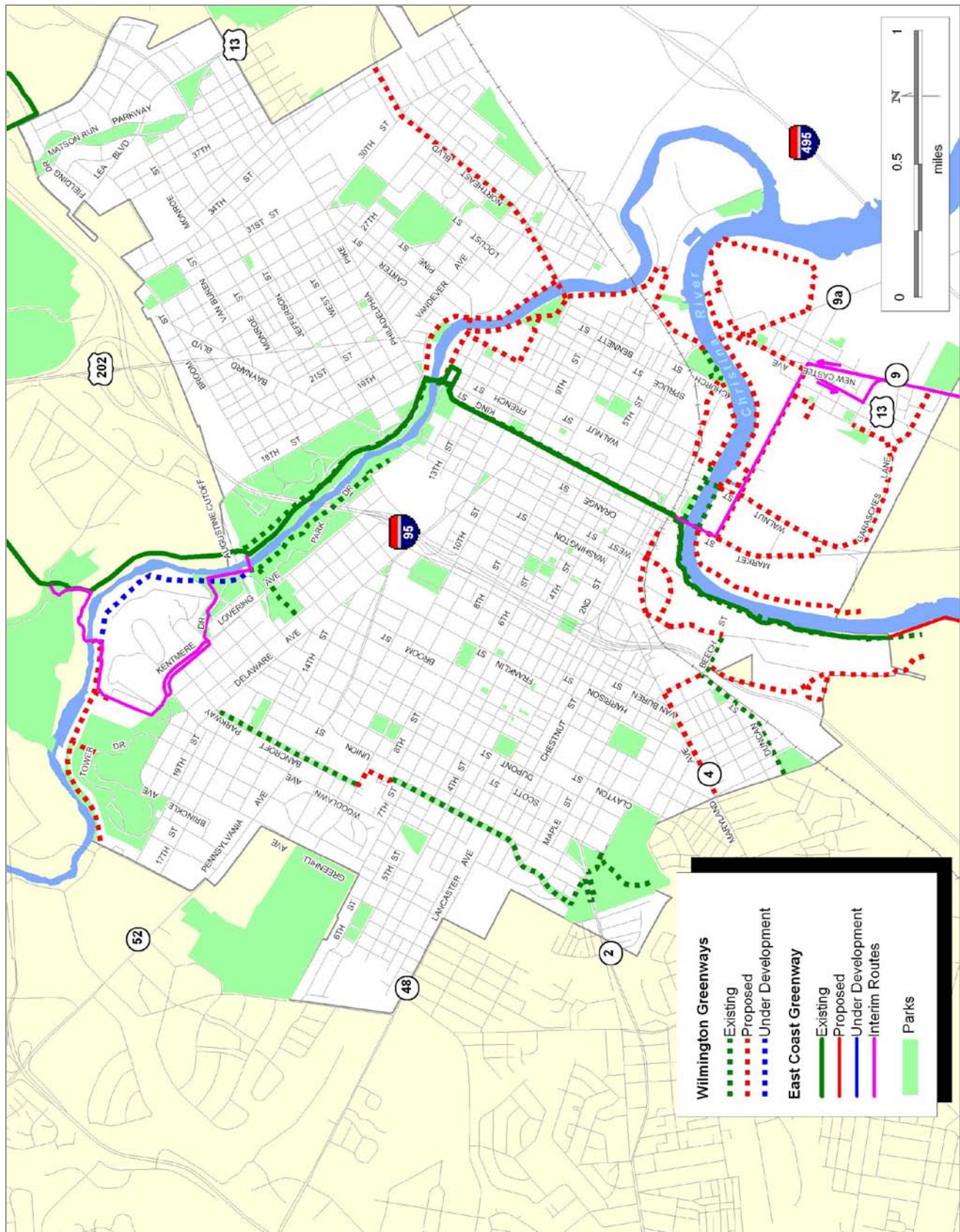
The two key corridors identified to create a complete bicycle travel network are Northeast Boulevard, in east Wilmington, and Market Street, in the downtown area. Submissions from cyclists for routes reflect a lack of bicycle activity along Northeast Boulevard, yet the travel speeds and lane widths are capable of accommodating bicycle lanes. Travel lanes along this roadway are actually striped for bicycle lanes, but they are not signed or marked as such. This minor arterial also connects cyclists to Fox Point State Park alongside the Delaware River. Market Street from Martin Luther King, Jr. Boulevard to 7th Street was recently re-opened to two-way vehicular traffic with on-street parking. Street trees, pedestrian lighting, bulb-outs, and crosswalks were implemented as well. These elements, combined with low travel speeds, make a bicycle boulevard designation on Market Street feasible. Both corridors tie into the Delaware Greenways, which are pathway corridors intended for recreational purposes.

Bicycle Lanes
separate travel lanes on the road for cyclist, identified by a solid white line that is dashed at intersections to indicate where motor vehicles may cross the lane for turning movements.

Our Approach

The first step toward developing a coordinated network was to identify bicycle facilities, review published reports, and seek public input concerning bicycle travel. Figure 3 illustrates existing and planned pathways in Wilmington, which lay the groundwork of the proposed network. As planned pathway improvements are made, these new facilities will be added to the city-wide network.

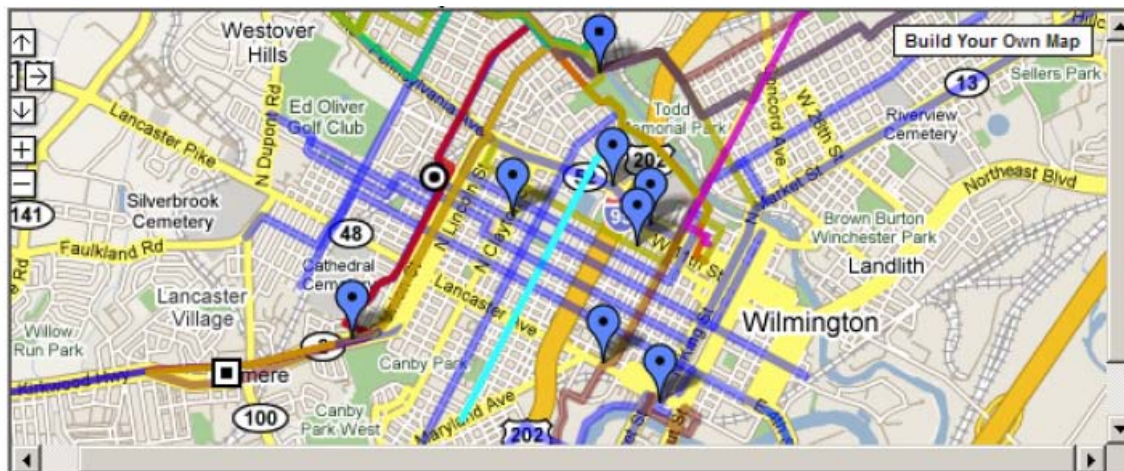
Figure 3: Greenway Networks in Wilmington, Delaware



Next, the Delaware Department of Transportation (DeIDOT) *Delaware Bicycle Facility Master Plan* (May 2005) was reviewed. This document seeks to implement a statewide system of designated, on-road bicycle routes along DeIDOT maintained roadways. The system consists of statewide, regional and connector bike routes. Planned improvements along these routes will be implemented through DeIDOT's existing roadway maintenance and construction schedule.

In conjunction with DeIDOT's designated facilities, the input of cyclists was sought to better understand how they travel throughout the City. We asked cyclists to map the routes they navigate on a regular basis and document any obstacles encountered (see Appendix). The submissions are intended to help create a method for prioritizing corridors for improvements. Developed by Bicycle Philadelphia, a Google Maps application via WILMAPCO's website enabled cyclists to submit their routes and attach attribute data containing comments about the route. In total, forty routes were received from the online submissions, producing a live map of routes which can be viewed through the WILMAPCO website at <http://www.wilmapco.org/BikeWilmington>. These routes are illustrated in the figure below. In the future, the live map should remain active to serve as a resource for cyclists to view, download, and print route maps.

Figure 4: Live Map of Submitted Bike Routes



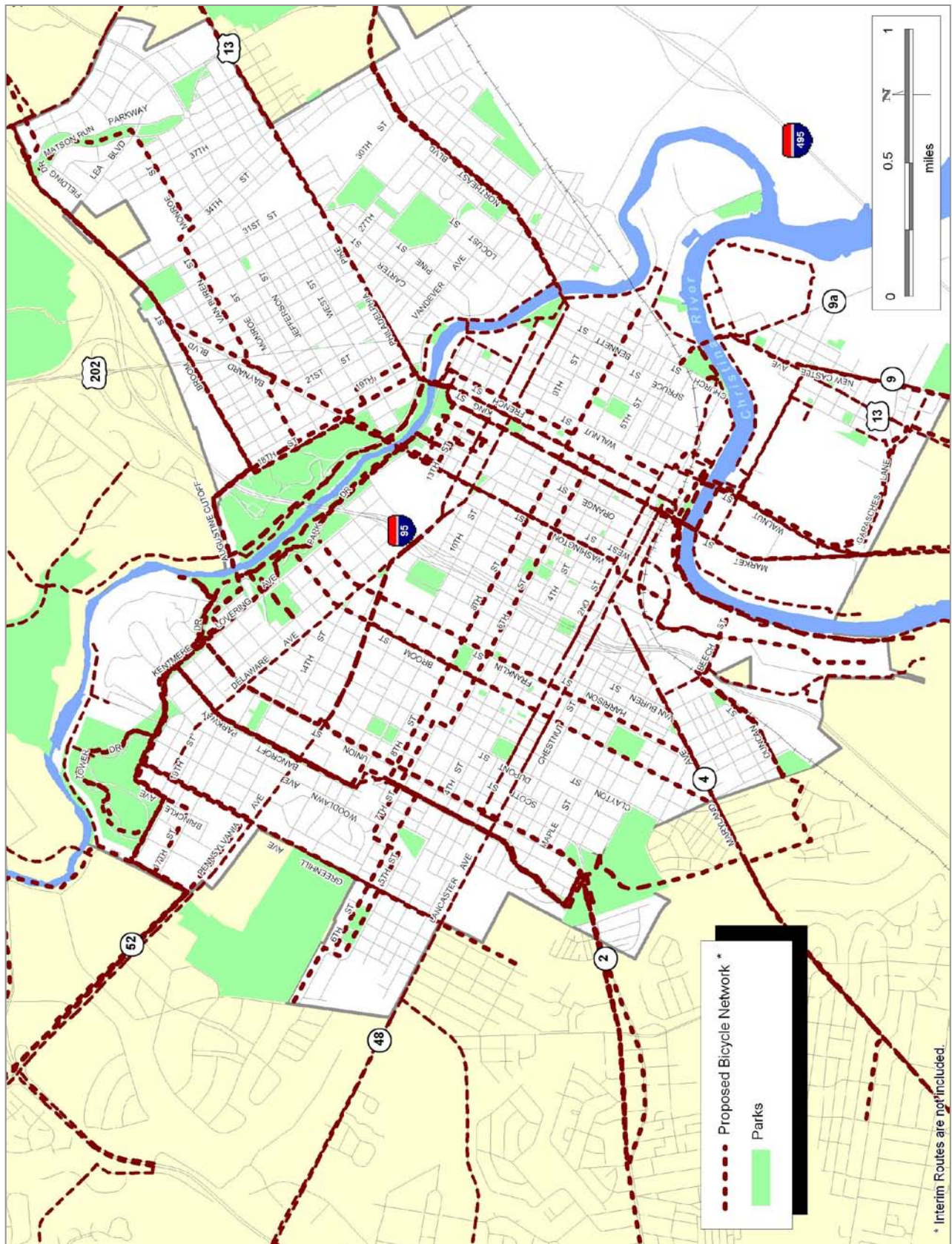
Google Maps is a free web mapping service application and technology that performs map-based services and allows embedded maps on third-party websites.

Using Google Maps, cyclists can trace a route, and enter place marks to denote relevant features such as "dangerous intersection" or "pedestrian bridge." Once complete, the routes can be saved online. Pictured above, the array of colors represents bicycle routes that were submitted online, and the blue balloons are comments that describe bicycle conditions for the route.

All of the above information was merged together to generate the proposed coordinated bicycle network for Wilmington, which consists of:

- Existing and planned Greenways
- DeIDOT's designated bicycle facilities (statewide, regional, and connector routes)
- Favorable bicycle route submissions from cyclists

Figure 5: Proposed Coordinated Bicycle Network



- ❖ **Objective 2**—Create and distribute a Wilmington Bicycle Network Map, including tips on safe bicycling practices.

One of the end products of this plan will be a printed and distributable Bicycle Network Map which will clearly identify bicycle routes, road conditions for cyclists, parking locations, connections to transit, parks and greenways, and other desirable locations. The map will include key points on how to bicycle safely, particularly with motor vehicle traffic. Eventually, the routes should be merged into DeIDOT's New Castle County Bicycle Map to create one seamless, streamlined map for cyclists to use. The map should be available in a downloadable digital format and should coordinate with on-street bicycle signage.

GOAL TWO: PROVIDE ACCESS TO NETWORK

Objectives	
1	Network should provide access within one-quarter of a mile of all Wilmington residents.
2	Design improvements to the street network for bicyclists by eliminating barriers, creating access along arterials where warranted by land use, creating bicycle and pedestrian "short cuts" and accommodating bicycles on bridges and underpasses.
3	Identify access to the East Coast Greenway and Northern Delaware Greenway networks.
4	Improve bicycle access to transit by identifying safe and convenient bicycle routes to and from transit hubs and bus stops.
5	Create a Wilmington Cycling Center for public information and education. The facility should also provide bicycle rentals as an alternate transportation mode and to promote tourism.

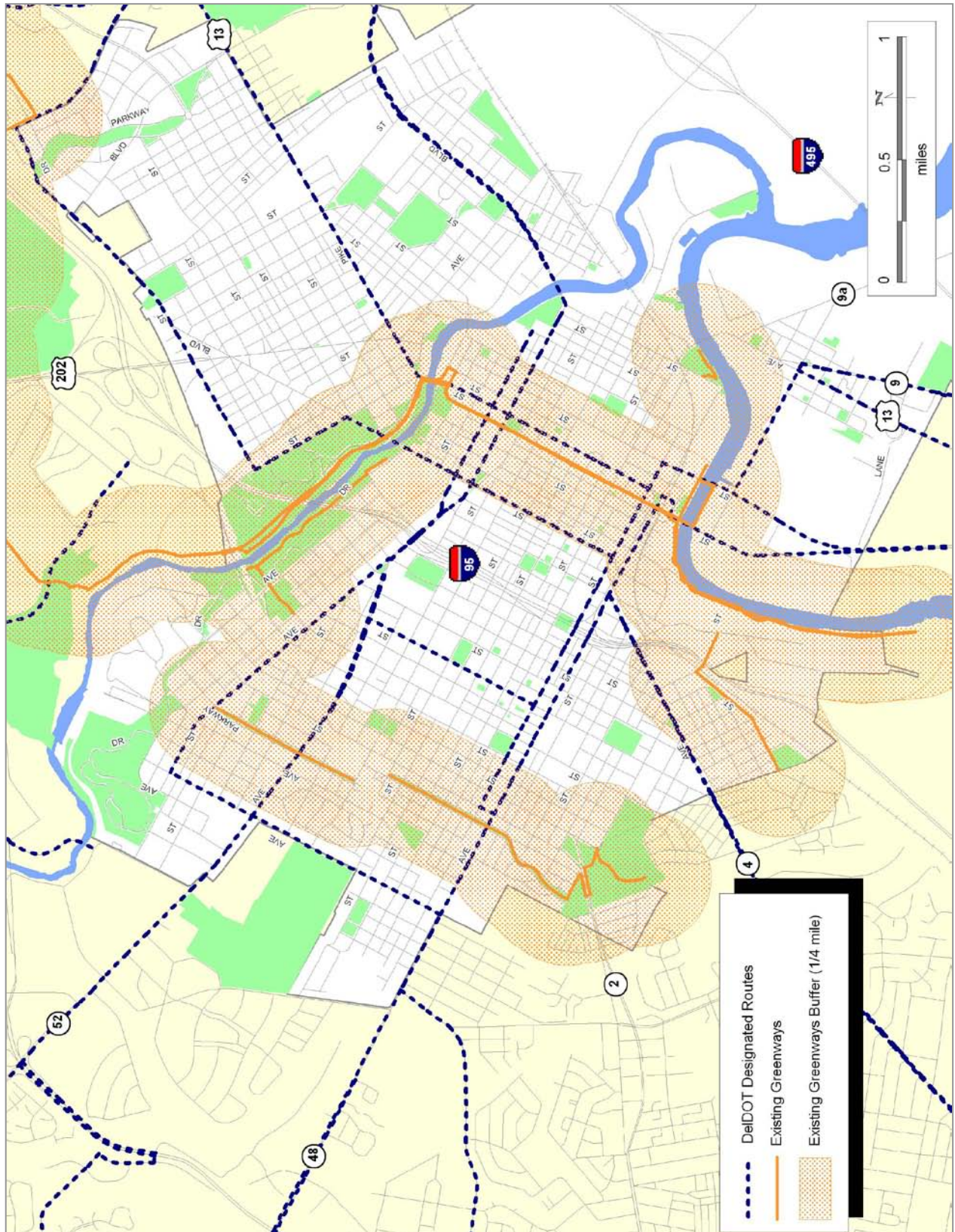
- ❖ **Objective 1**—Network should provide access within one-quarter mile of all Wilmington residents.

The network must be within a reasonable distance for all City residents; the rule of thumb is that access be within one-quarter of a mile. Adequate access to the network will facilitate more bicycle trips. Cycling becomes more practical when it connects riders to open spaces and parks, office and industrial parks, schools, businesses, shopping centers, downtown retail, and points at the Wilmington Riverfront. In addition to linking major trip origins and destinations, attention should focus on how the bicycle network will get riders to these places safely.

Our Approach

To evaluate network accessibility, a Geographic Information System (GIS) overlay map was created between existing greenway networks and a one-quarter mile buffer. Beyond their formal designations, existing greenway networks have undergone physical improvements to enhance access and safety. Along with the greenway buffer, DeIDOT's designated bicycle routes have been mapped. These routes, however, have not undergone any physical improvements, and in most cases do not have signage to indicate the designations. Despite DeIDOT's designated bicycle routes traversing much of the City, approximately one-half of the City falls outside the one-quarter mile buffer creating a disparity between bicycle routes with improvements for safe non-motorized travel and mere designated routes. Further outreach efforts will be conducted to identify specific needs and bicycle conditions for parts of the City outside the buffer and feasible alternatives to pursue.

Figure 6: Bicycle Network Coverage in Wilmington, Delaware



- ❖ **Objective 2**—Design improvements to the street network for bicyclists by eliminating barriers, creating access along arterials where warranted by land use, creating bicycle and pedestrian "short cuts" and accommodating bicycles on bridges and underpasses.

Poorly designed bikeways can present barriers to cycling. Barriers can include narrow car lanes, absent bike lanes, potholes, uneven surfaces, concrete islands at intersections, parallel grates on storm drains, lack of signage and lighting, and overgrown vegetation on pathways, underpasses, and bridges. Bike lanes and boulevards must not end abruptly or lead recreational or inexperienced cyclists into busy roadways not conducive for bike travel. If necessary, interim routes can be identified and signed properly until permanent routes are completed.



Overgrown vegetation on 8th Street at the viaduct prevents non-motorized access to the East 7th Street Peninsula.



Ideally, pedestrian and bicycle access should be provided for under- and overpasses.

Our Approach

Following the accessibility analysis, fieldwork was conducted to examine barriers to bicycle travel. Three examples from different parts of the City show the challenges we are faced with in providing a seamless network. Field observations and recommendations for each target area are summarized below.

Canby Park

Canby Park, located southwest of the City, is an attractive recreation facility with several connecting trailways, one of which leads further south into Canby Park West. The troublesome intersection is at Union (Route 2) and Barry Streets. The second part of the inspection looked at east and west connections from Canby Park to nearby Kosciuszko Park, which is wedged between Broom and Franklin Streets.



Problems:

- Travel lanes along 4th Street are too narrow and motorists drive too fast, which hinders bike lane striping or route designation.
- The sidewalk on the William Winchester Bridge from Christina Park, at 4th and Church Streets connecting to South Wilmington is too narrow for pedestrians and bicyclists.

Opportunities:

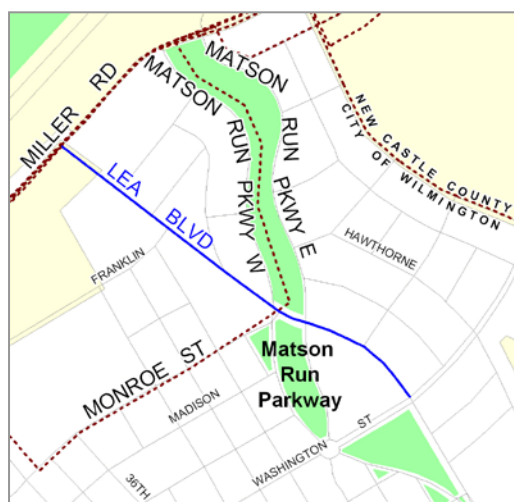
- Several local roads north of 4th Street are practical for bicycle boulevards if more signage and an additional stop control at 6th and Spruce are provided.
- A service road that is parallel to 4th Street and runs between Spruce and Walnut Streets could be utilized by cyclists who use 4th Street.
- Although the sidewalk on the William Winchester Bridge is narrow, the space can be shared with pedestrians and bicyclists who chose not to ride in the roadway. Signage to direct cyclists to yield and dismount for pedestrians would be warranted. Shown to the right, the regulatory sign for bicycle facilities may be used where a bicyclist is required to cross or share a facility used by pedestrians and is required to yield to pedestrians.



Lea Boulevard

In northeast Wilmington, Lea Boulevard is a missing link for connectivity of Miller Road to the northwest and Washington Street and Northeast Boulevard to the southeast. Examining this road was important based on the proposed routes through the park along Matson Run Parkway East and West, identified in the New Castle County Greenway Plan.

Problems:



- Lea Boulevard provides a connection to Northeast Boulevard but was not identified as a currently used bicycle route from cyclists' submissions.
- Lea Boulevard from Miller Road to Monroe Street is not ideal for bicyclists due to traffic speeds along the four-lane road. There is no opportunity for separation from traffic, and the road configuration does not invite a bicycle boulevard designation.

Opportunities:

- The proposed Greenway route through Matson Run Parkway, if constructed, would provide an integral link connecting cyclists from northeast Wilmington eastward to the Brandywine Creek and to destinations beyond.

Overall, based on the information gathered about these areas, a number of concerns were addressed while new challenges were uncovered. A second phase of site visits to new locations will commence as the plan advances.

❖ **Objective 3**—Identify access to the East Coast Greenway and Northern Delaware Greenway networks.

The bicycle network will join with the existing and proposed East Coast Greenway networks and Northern Delaware Greenway networks. Currently, New Castle County has several trails designated as part of the East Coast Greenway, one of which is located in the City of Wilmington. The Christina Riverwalk is located along the north side and western bend of the Christina River, beginning at the Amtrak Station and ending at the proposed Peterson Urban Wildlife Refuge, totaling over one mile in distance. Additional linkages should be explored to connect the Northern Delaware Greenway, via existing Wilmington trails in Brandywine Park, Rockford Park, and Alapocas Woods.

Possible connections to other Wilmington Walkways, such as Swedes Landing Trail and the Brandywine Riverwalk, should be evaluated. Implementation of the bike plan should coordinate with proposed networks in the New Castle County Greenway Plan and the Brandywine East Greenway Plan, which extends from Market Street to Northeast Boulevard. To ensure efforts are not duplicated, but rather overlapped, the Bike Plan Advisory Committee has met with WILMAPCO's Non-Motorized Subcommittee at the beginning and ending development stages of the plan.

Pathways are bicycle and pedestrian routes separated from motorized vehicular traffic by an open space, barrier or curb.

The East Coast Greenway is underway as the nation's first long-distance urban multi-use trail network from Maine to Florida. www.greenway.org

- ❖ **Objective 4**—Improve bicycle access to transit by identifying safe and convenient bicycle routes to and from transit hubs and bus stops.

Cyclists are a good market for mass transit services since combining biking with buses and light rail can yield additional transit ridership. It's an accepted concept that people will ride their bike three to four times farther than they would walk, which translates into cyclists willing and able to commute farther to a bus stop or train station.



Accordingly, this plan aims to promote DART's concept of "pedal and park," which connects cyclists to transit options. Currently, all buses in the state of Delaware are equipped with a front bike rack that can accommodate two bikes at a time. There is no additional cost for loading a bike on the bus rack. Together, DeIDOT's Bicycle and Pedestrian Program and DART have installed high-security bicycle parking lockers at six Park & Ride locations in New Castle County. While there is one location just northwest of Wilmington at Routes 100 and 52, there are none within the City. An accommodation, such as bike parking at transit locations, combined with this access would create a larger draw for transit usage.

Currently, SEPTA's R2 regional rail service only allows bicycles to board during weekday off-peak hours or in the reverse commute direction during peak hours; on weekends, bicycles are permitted at all times. If space permits, a maximum of two bicycles can board. Cyclists are instructed to place their bikes in the rear vestibule of the car, which is actually designated for disabled seating. If wheelchair passengers are occupying the designated areas, cyclists are not permitted to board. If a passenger in a wheelchair boards after a cyclist and the space is needed to accommodate a wheelchair, the cyclist must vacate the space and leave the train unless another designated wheelchair area is available. These weekday restrictions and lack of bicycle-designated space can discourage cyclist from combining their commute trips with rail service.

Based on a study of best practices, new ideas appropriate to Wilmington can be incorporated to expand current transit accommodations for cyclists. Several transit service providers across the nation allow bikes onto the rail system during all hours of operation, rather than off-peak hours only.³ In order to keep a smooth flow of passenger movement, specific rail cars (front, rear, or both) can be designated for bicycle boarding. More common on newer rail cars are interior bike racks or special hooks to hang bikes inside the trains for convenient storage. Another method for convenient bicycle storage is train seats that flip up and enable additional room for bikes. A successful



³ Retrieved from Sacramento Regional Transit and The Regional Transportation District in Denver.

integration of new bicycle accommodations on rail will require cooperation and coordination from DART and SEPTA.

Although not final at this point, a new transit hub in Wilmington is being sought out through the Downtown Wilmington Traffic Circulation Study, which is currently underway. If or when a new location is secured, more work will be warranted to ensure that access and proper accommodations are provided at this key transfer point.

- ❖ **Objective 5**—Create a Wilmington Cycling Center for public information and education. The facility should also provide bicycle rentals as an alternate transportation mode and to promote tourism.

The City of Wilmington should have a Cycling Center that serves the needs of cyclists of all ages and skill levels. The Center should be at a location that is easily accessible to most city residents and tourists and in close proximity to mass transit.

The Cycling Center could provide services including, but not limited to, the following:

- **Advocate a bike-friendly community and motivate residents to bike more**—the center should emphasize the health, economic, and environmental benefits of biking and help make it more appealing and easy.
- **Teach proper bicycle handling skills to ensure a good cycling experience**—this entails steering mechanics for new riders, using multiple gears correctly, proper techniques for riding up- and down-hill, making lawful traffic maneuvers, and maintenance instructions.
- **Educate cyclists and motorists on share-the-road practices**—to create a safe environment by highlighting traffic laws which govern both motorists and cyclists in regard to one another.
- **Make bicycle equipment available**—the center should assist cyclists with proper sizing and the purchase of helmets, bicycle locks, apparel that increases visibility, and protective gear. The center should also provide guidance on the purchase of a new bicycle (i.e. mountain bike, road bike, or hybrid), based on the rider's intended purpose and frequency of use. Alternate bicycle types should be considered for different needs and age groups, for instance, seniors who may wish to use tricycles or bikes with baskets to carry items.
- **Provide bike route maps**—as one end product of this plan, the maps will indicate bike lanes, bike boulevards, off-road biking facilities, connections to transit, key destinations, and bike parking locations.
- **Assist with bike trip planning**—to help cyclists navigate to destinations within and outside of the city with ease.

- **Bicycle fix and repair**—perform duties such as tire inflating, wheel alignments, rim replacements, inner tube replacements, chain repairs, etc.
- **Recycle and redistribute old bikes and parts**—to reinforce that bicycling is sustainable.
- **Attract city tourists**—the center should provide bike rentals and bike tours to allow visitors an opportunity to view Delaware’s greenways, scenic areas, and historic sites.
- **Host a Bike Share Program**—the rental program, which is meant to encourage sustainable transportation, would consist of a fleet of distinct bicycles intended for shared public use. The Cycling Center can function as the sole location for rentals or manage a controlled network of bike stations at various locations throughout the City.
- **Facilitate “Bike Buddies”**—a bicycle mentor program would pair an advanced rider familiar with the bike routes with a novice rider who is interested in learning how to commute by bike and navigate the city safely.
- **Provide additional biking resources**—the center should provide further information such as bike commuting tips, biking races and events (i.e. May Bike Month, Bike to Work Week, Wilmington Grand Prix, etc.), bicycle forums, and contacts to local bike shops.

A practical way for the City of Wilmington to formalize a Cycling Center is to provide support and funding or coordinate bicycle-related tasks with the Urban Bike Project of Wilmington, Inc. (UBP), an existing non-profit organization. Tying smoothly into the vision for this plan, the mission of UBP is to “serve the community’s needs by educating and promoting cycling as a safe, practical, cost-efficient mode of transportation.” Although currently staffed by a core group of committed volunteers, UBP is already carrying out or planning to carry out several of the tasks and services listed above. In fact, the organization repairs bicycles, offers a commuting course, and provides guidance for bike selection, proper attire, and route planning. However, insufficient resources have restricted their ability to provide additional services at the present time. Support from the City could help establish a full-time staff to give this bicycle organization extra momentum needed to catapult it into a superb Cycling Center attracting both residents and city visitors.

More importantly, the City’s support of an official Cycling Center is the best means to get a Bike Share Program started, which would facilitate a collection of bicycles for public use. While Bike Sharing Programs have been around for sometime, the operating systems for tracking and maintaining the bicycles are more sophisticated. The program has grown more attractive in recent times since it is a practical and sustainable transportation alternative that increases access and mobility and is cost-effective and energy-saving. Many European cities have already established successful Bike Share Programs, and several U.S. cities are following their lead. The Bike Share Program in Wilmington could be promoted with transit, and the rental system could be integrated with DART and SEPTA cards used for bus and rail service, respectively.

GOAL THREE: PROVIDE BICYCLE PARKING

Objectives	
1	Develop standards for bicycle parking, including bike rack types, public locations, garage locations, lighting, and security measures.
2	Identify locations where public bicycle parking should be provided. Encourage adequate and secure bicycle parking at all major destinations.
3	Recommend locations where adequate and secure bicycle parking should be provided within the transit system, including the Amtrak station, Rodney Square, and other bus stops.

- ❖ **Objective 1**—Develop standards for bicycle parking, including bike rack types, public locations, garage locations, lighting, and security measures.

Adequate parking is essential along points on the bicycle network. The network is ineffective if cyclists have no bike storage at their trip destination. Lack of parking is frustrating to existing cyclists and discouraging to potential new users. And even more frustrating is poorly designed parking which can result in bicycle damage or theft. A proven assumption is that parked bikes bring more bikes; therefore, conveniently located bike parking will help boost cycling. Parking locations that make sense are recommended for short-term implementation. For instance, all or most major destinations should welcome bicycles. To create a necessary link between transit and bicycling, all transit stations and Park & Rides should have ample bike parking. There should be an appropriate number of parking spaces that correspond to various buildings and land uses.

Short-term storage should be in place for shorter stops (i.e. recreational users), whereas long-term storage is needed for bikes that will be left for hours at a time (i.e. bike commuters). Short-term parking should be in close proximity to building entrances and does not necessarily need covered storage. In contrast, long-term parking is practical at a further distance but should not expose bicycles to the weather elements. For instance, long-term parking can be located close to the entrances of vehicle parking garages, where attendants can provide a sense of security.

Developing standards for bike rack installation involves examining four components.⁴ A well-designed rack element should keep the bike from tipping over, allow the frame and one or two wheels to be secured by a lock, and accommodate front-in or back-in parking. The rack should be sturdy enough to

The Rack Element is the part of the bike rack that supports one upright bicycle.

The Rack is a series of rack elements joined together by the same base or simply in close proximity to one another.

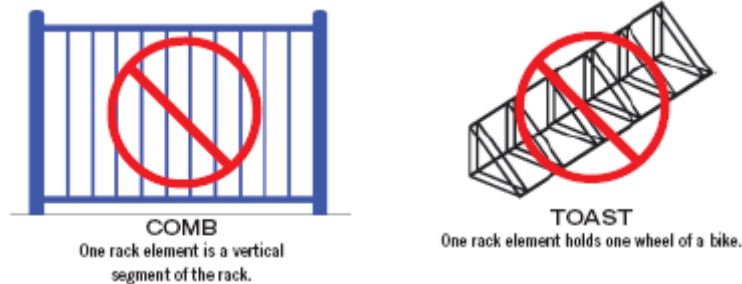
The Rack Area is a designated space for parking where the racks are separated by aisles.

The Rack Area Site is the relationship of the rack to a building entrance and approach.

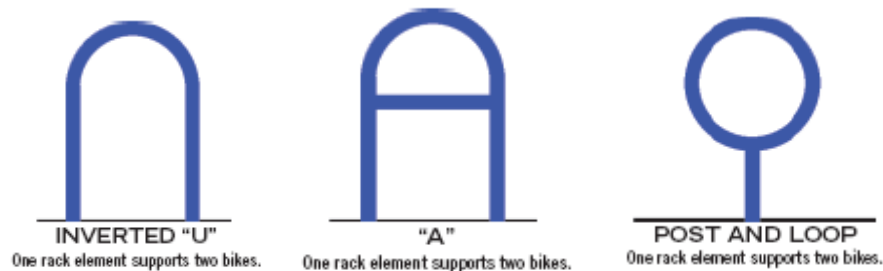
⁴ The Association of Pedestrian and Bicycle Professional (apbp). Bicycle Parking Guidelines and Recommendations, 2002.

prevent theft and spaced correctly to allow easy, independent access. Racks that are becoming commonly unacceptable are referred to as the comb and toast, shown below.

These racks do not yield enough bicycle support and are known to bend the wheel frame.



Racks that are most acceptable and generally recommended are below:



To ensure the network is seamless in meeting the needs of riders, safe parking locations with ample lighting is a priority. Short-term parking can use pedestrian lighting, whereas long-term parking may need additional light placement. Another key component, which Wilmington notably lacks, is adequate parking signage to alert and clearly direct users to designated locations. Bicycle parking signage should adhere to Traffic Controls for Bicycle Facilities identified in the Manual for Uniform Traffic Control Devices (MUTCD). Indoor bicycle parking policies must be explored to better serve bike commuters.

This city-wide plan presents an opportunity to integrate innovative bicycle parking practices, such as bicycle corrals. Bike corrals are designated spaces that can provide on-street parking and accommodate a large number of bikes at once. Within the corral, riders can secure their bikes with individual locks for added security. Most corrals use one and one-half converted vehicle parking spaces, but can be built to any specification; the size and design of any bike corral should be site sensitive. In addition, non-standard designed bike racks can visually enhance public spaces where racks are installed. Artistic bicycle racks give positive attention toward bicycling and would help project the image that Wilmington is bike-friendly and accepts bicycles as an important component of the transportation system.



On-street bike corral in Portland, Oregon

Figure 7: Examples of Bicycle Rack Designs from Other Cities



In Jacksonville, Florida the top design indicates this is a bike rack



Converted parking meter in Arlington, Virginia



Artist-designed bike rack in Downtown Saline, Michigan

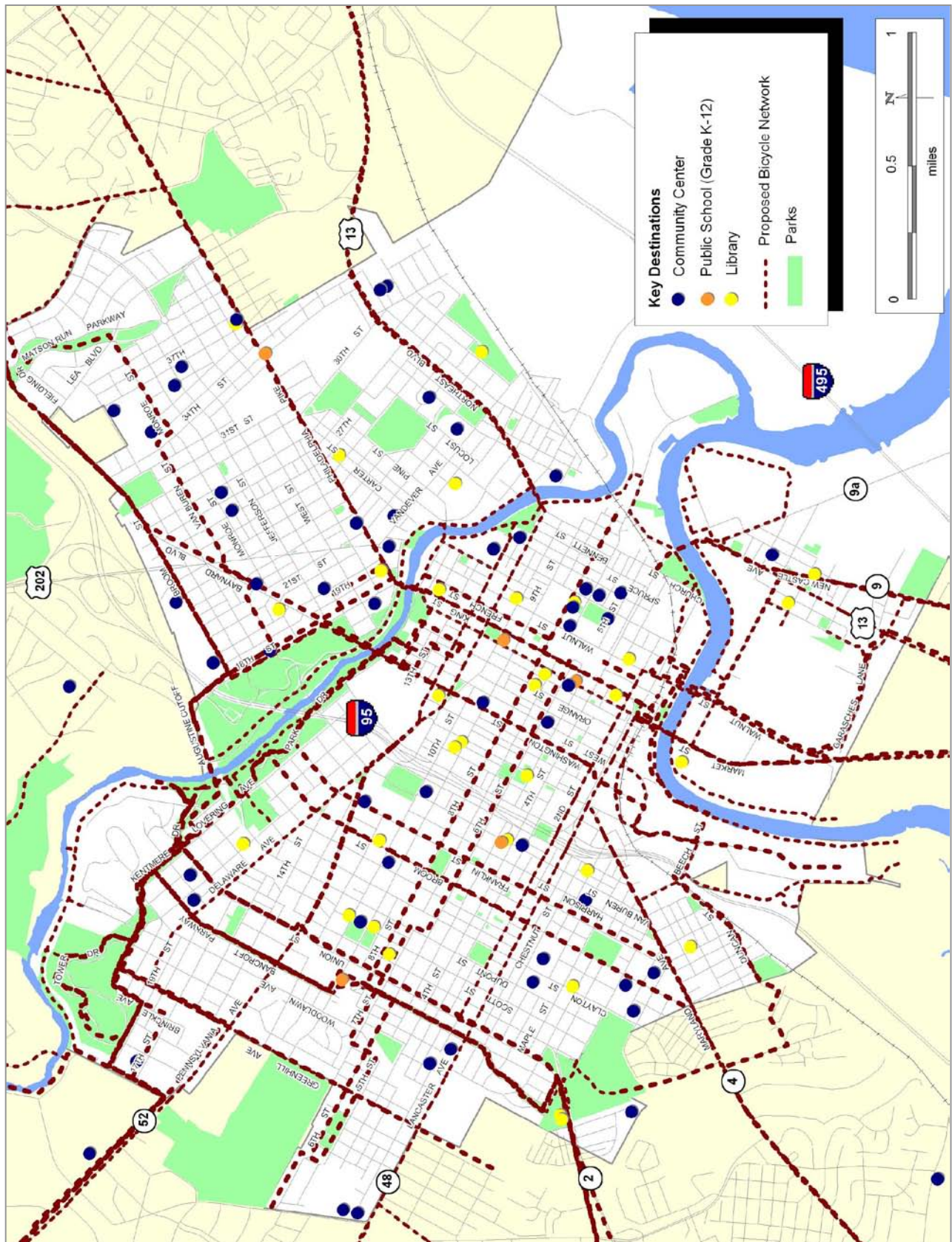


Artist-designed bike chain bike racks in Los Angeles, California

- ❖ **Objective 2**—Identify locations where public bicycle parking should be provided. Encourage adequate and secure bicycle parking at all major destinations.

Again, to encourage frequent bicycle use, a reasonable amount of parking facilities must be provided and publicized. Key destinations along bicycle routes, such as schools, community centers, libraries, parks, commercial corridors, the Business District, and the Christina Riverfront, should provide bicycle parking. Providing bicycle parking is also an integral step in introducing a Bike Share Program to Wilmington. A comprehensive city-wide bicycle parking study should be conducted with input from the cycling public and agencies, such as Downtown Visions, whose staff utilize bicycle transportation. The list of recommended locations should include sites that have existing parking but require rack upgrades as well. WILMAPCO will work with Downtown Visions to determine the locations of security cameras to help determine optimal bike parking locations that are secure.

Figure 8: Key Destinations with Proposed Bicycle Routes



Our Approach

To assess current storage conditions, a preliminary inventory was conducted within the City's downtown area. Our strategy was to identify where parking demand already exists, and later prioritize the locations based on a technical ranking process. We found there are 12 parking facilities located along the King Street corridor and around the Amtrak Station. While not comprehensive, the inventory did, however, expose several locations within the downtown area that lack adequate bicycle parking. For instance, Wilmington's Public Library, located across from Rodney Square, has no facilities for cyclists. Also, an existing toast-style rack at Bank of America should be upgraded to a more acceptable standard.

Another integral location for investments in bike parking is along Market Street, especially on 8th and 9th Streets, to compliment its recommended bicycle boulevard designation. In light of the new residential presence at Ships Tavern, an adjacent parking garage absent of bicycle storage, retail and restaurants along this corridor, and the Lower Market Street Design District (LOMA), Market Street is a priority location for immediate bike parking implementation. Wilmington has hosted the annual Grand Prix Bicycle Race, a national cycling event, in the downtown area, providing the opportunity to exhibit support of bicycles as transportation and recreation.

Aside from short-term parking, long-term bicycle storage draws more residents by reinforcing that downtown Wilmington is a vibrant community in which to live, work and recreate, and can support a sustainable and alternative lifestyle to the automobile. Most encouraging is a current developer interest in possibly constructing a bike corral at 3rd and Market Streets. The City of Wilmington has already expressed interest in placing banners on pedestrian lighting to publicize bicycle parking. These banners are expected to be in sync with existing Riverfront banners and the downtown area street character.



Market Street along the Downtown area is already favorable for non-motorized travel, yet more accommodations are needed for cyclists.

Additional recommendations for formal bicycle parking are pictured below.



8th and King Streets



Christina Park at 4th and Church Streets



Barclay's at 100-125 S. West Street

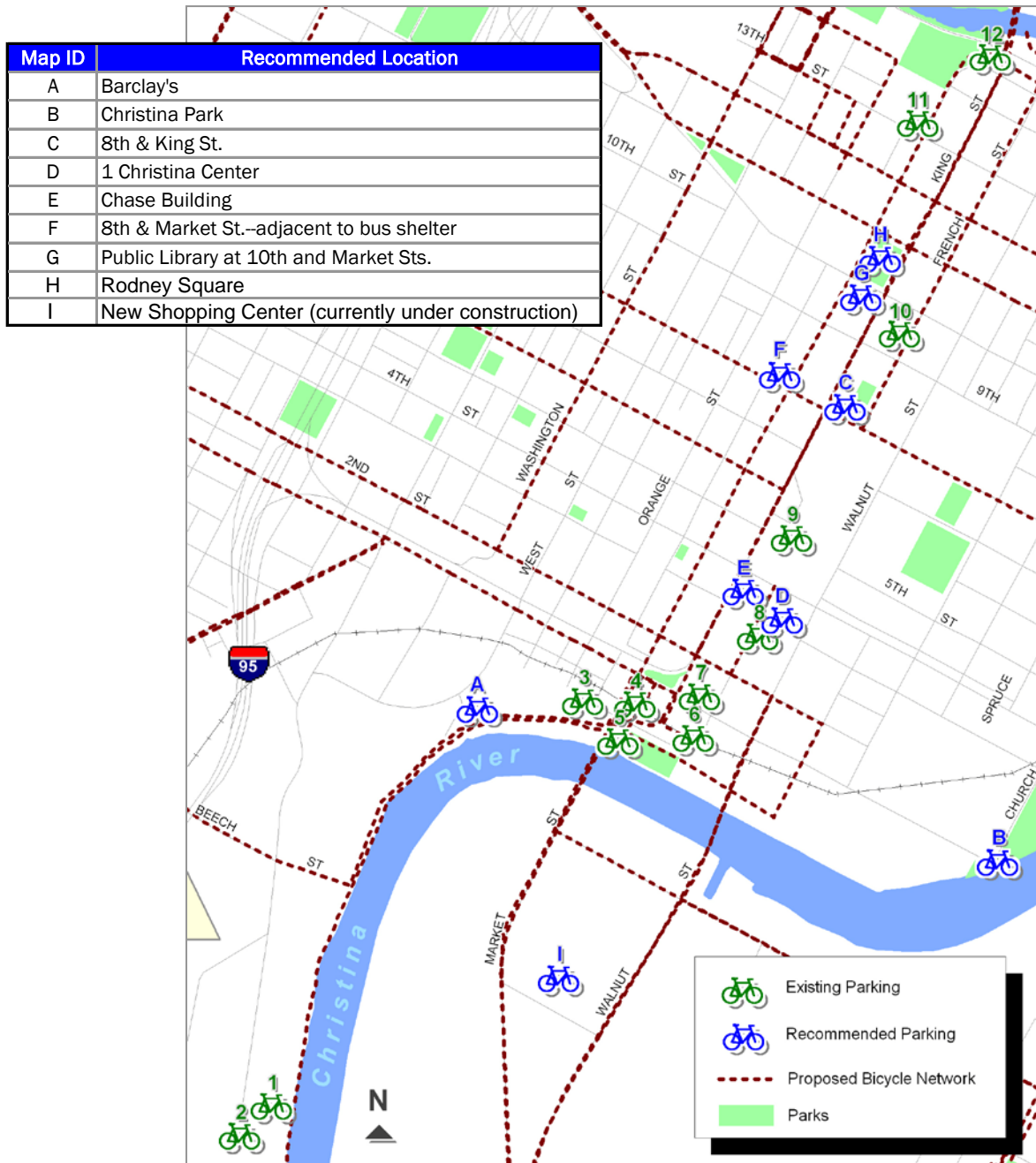


1 Christina Center at
301 N. Walnut Street



Chase Building at 4th & King Streets

Figure 9: Existing and Recommended Bicycle Parking Locations



Map ID	Existing Location	Sitting	Spaces	Type	Lighting
1	Shipyards - at the River	Riverwalk	7	Wave	Pedestrian scale
2	Shipyards - at the parking lot	Parking side	n/a	Wave	none
3	ING, Water & Shipley Sts.	At main entrance	4	Coil	none
4	Market St. at viaduct	Next to parking deck	12	Inverted U	Pedestrian scale
5	Tubman-Garrett Riverfront Park	Next to lot	9	Wave	none
6	Riverfront Parking Deck	At French St.	15	Inverted U	Interior
7	Amtrak Parking Garage	At entrance	5	n/a	none
8	Bank of America	Pedestrian plaza	8	Toast	none
9	New Castle County Courthouse	Side entrance, covered	8	T-style	Interior
10	French St. Parking Lot	Along 900 block	6	Wave	none
11	Hercules Plaza	13th St, right side of Plaza	4	Inverted U	none
12	Fletcher Brown Park	At King St. pavilion	12	Inverted U	none

- ❖ **Objective 3**—Recommend locations where adequate and secure bicycle parking should be provided within the transit system, including the Amtrak station, Rodney Square, and other bus stops.

Providing adequate parking within the transit system ties directly into Goal 2: Objective 4, which aims to improve bicycle access to transit. This supports the rationale that once riders use the bicycle network to reach a location where mass transit is provided, safe and convenient parking must be available.

Rodney Square, in the downtown area, is the most notable location for mass transit and the most optimal for bike parking. There are multiple bus routes that stop at this location daily, yet there is no designated space for bikes. Numerous bicycles are commonly found informally tied to poles and parked along the walls of bus shelters, illustrating a need for parking. Considering the Downtown Wilmington Traffic Circulation Study which is currently underway, Rodney Square may or may not be a heavy bus transfer location in the future. Yet, as a prime urban park space, the fact remains that bicycle parking must be provided.



Bicycle parking is needed at Rodney Square, where large amounts of transit transfers take place.

Another site is at the Riverfront Parking Deck across from the Amtrak Station. Although adequate and secure parking is available, there is no adequate signage to notify cyclists of its existence. Signage should be placed near train station entrances so bike parking locations are apparent to cyclists boarding or disembarking from the train. To achieve suitable parking within the transit system, the City of Wilmington must work with the Delaware Transit Corporation to implement and publicize more bike racks and secure bike lockers at prime locations. Furthermore, a comprehensive inventory is needed to identify other bus locations within the transit system that warrant at least one bicycle rack.

GOAL FOUR: PROMOTE SAFETY AND EDUCATION

Objectives	
1	Recommend safe design practices for all bikeways and shared-use facilities, including lighting and signage.
2	Develop a public education program to promote safe bicycling practices.
3	Provide bicycle and pedestrian education and training for City police officers regarding bicycle-vehicle safety measures and issues faced by on-street bicyclists.
4	Develop signage aimed at motor vehicle drivers to improve awareness of the needs and rights of bicyclists.
5	Develop appropriate residential and commercial street designs to control vehicle speeds and encourage bicycle use.
6	Clean and maintain bicycle lanes and paths.

- ❖ **Objective 1**—Recommend safe design practices for all bikeways and shared-use facilities, including lighting and signage.

Since poorly designed bikeways can lead to severe injuries, bike lanes and bike boulevards should be designed with safety and security in mind. A total of 177 bicycle crashes were reported in Wilmington from 2000 to 2006. During that time, the City comprised twenty percent of total statewide bike crashes and accounted for 35 percent of county-wide bike crashes. As shown below, the total number of bicycle crash injuries and the rate of injuries have decreased; however, close to 90 percent of all crashes had reports of injuries.

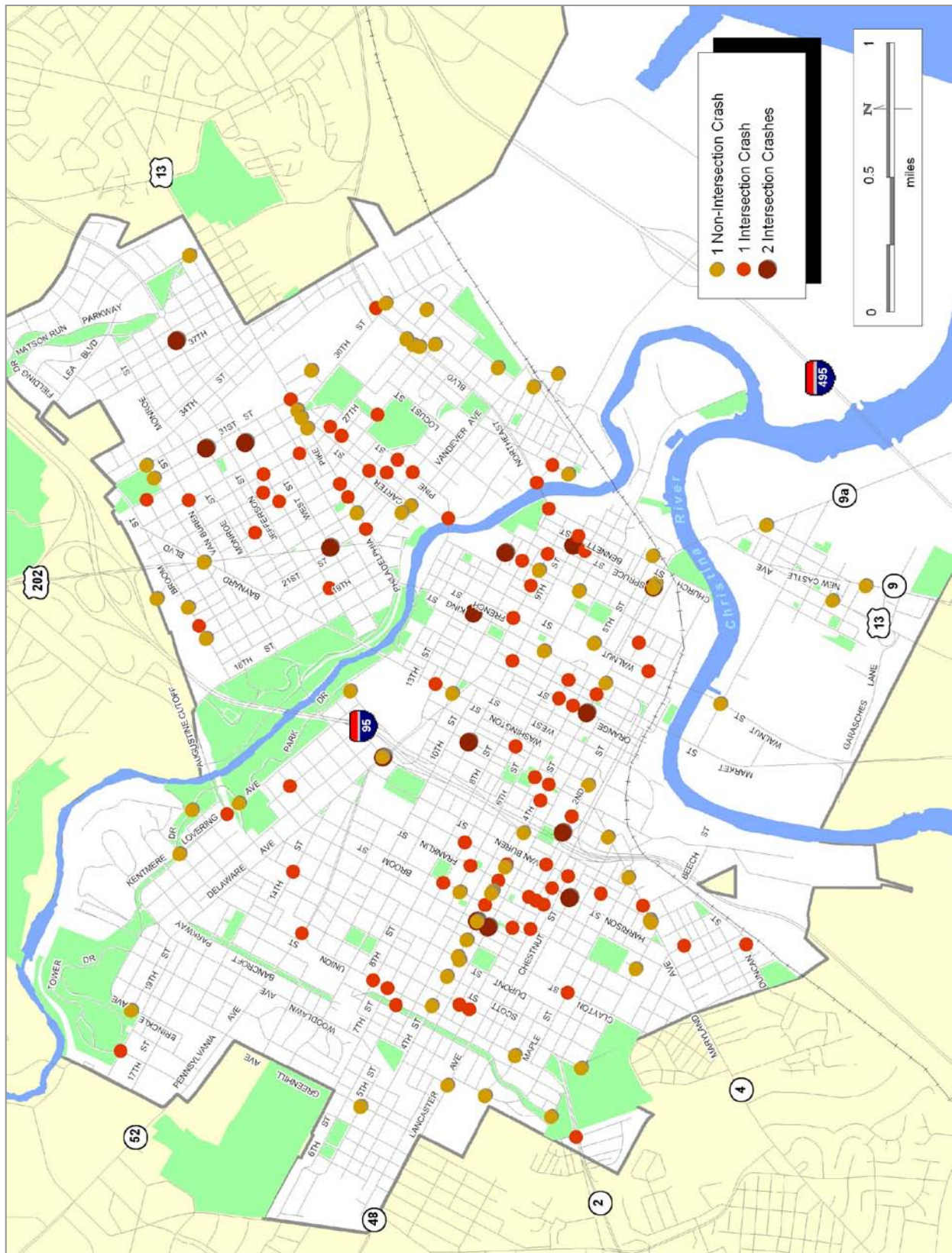
Figure 10: Injuries Related to Bicycle Crashes in Wilmington

Year	Total Crashes, Wilmington	Total Injuries*	% of Injuries	Injury Rate Per 10 Bike Crashes
2000	45	54	120.0%	12.0
2001	34	29	85.3%	8.5
2002	26	17	65.4%	6.5
2003	14	14	100.0%	10.0
2004	18	20	111.1%	11.1
2005	16	15	93.8%	9.4
2006	24	9	37.5%	3.8
2000-2006	177	158	89.3%	8.9

Source: DelDOT, WILMAPCO

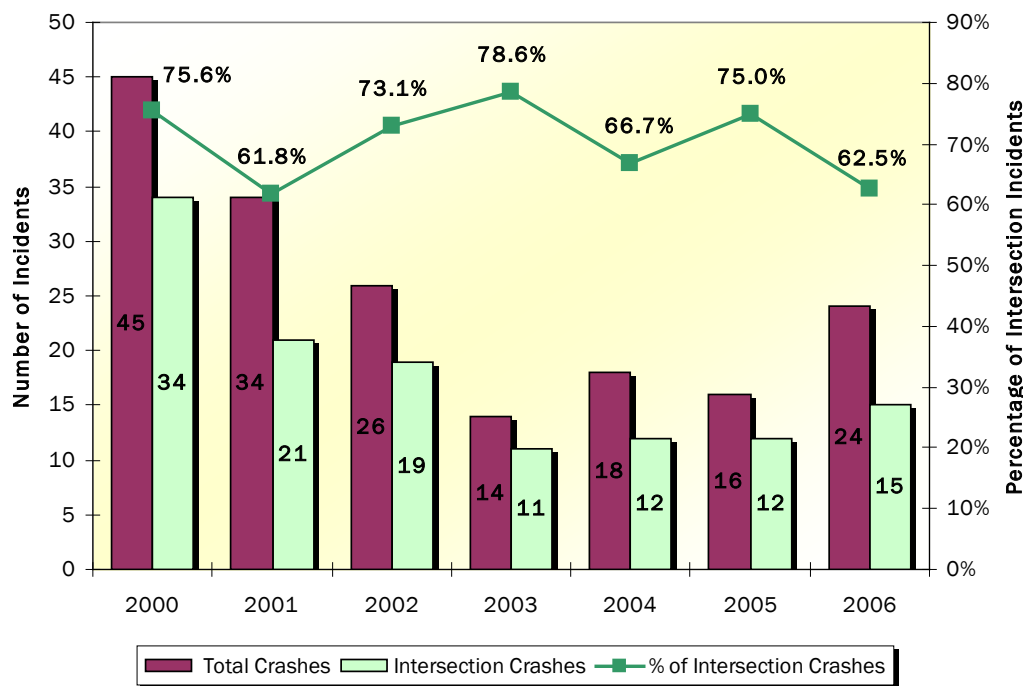
*Where injuries exceed total crashes, multiple injuries were reported for individual incidents.

Figure 11: Total Bicycle Crashes in Wilmington, 2000-2006



Generally, motorists turning right while bicyclists are going straight create the most common collision. Therefore, the highest number of motor vehicle and bicycle collisions tends to be reported at intersections. From 2000 to 2006, 70 percent of all the City's bike crashes occurred at an intersection. In comparison, 65 percent took place at intersections county-wide. Over a seven-year stretch, the percentage of intersection crashes dropped by 13 percent, translating into close to a two-percent drop annually. Accordingly, this plan aims for a continued decrease in total bicycle crashes and related injuries by way of added safety measures for cyclists, particularly at intersections.

Figure 12: Wilmington Bicycle Crashes at Intersections



Source: DeIDOT, WILMAPCO

Figure 13: Total Intersection Crashes by Bicycle Route Category

Category	Total Crashes	Intersection Only	Intersection %
DeIDOT Designated Routes	54	41	75.9%
Currently Used Routes	73	58	79.5%
Existing East Coast Greenway	2	2	100.0%
Proposed East Coast Greenway	n/a	n/a	n/a
Existing Delaware Greenway	6	4	66.7%
Proposed Delaware Greenway	12	10	83.3%

Thirty percent of City-wide bike crashes occurred along DeIDOT routes, while seventy-five percent of those crashes occurred at an intersection. In contrast, routes that cyclists

reported using frequently (beyond DeIDOT routes) accounted for forty percent of City-wide crashes, and about eighty percent occurred at an intersection. These figures indicate that cyclists are already biking in various places throughout the City, even places that are not regarded as formal bicycle routes. Cyclists are at risk using DeIDOT's designated routes but are at an even greater risk when using their current routes. To create a safe bicycling environment, physical improvements need to be made where cyclists are actually traversing, in addition to enhancements along existing route designations.

To counteract collisions, traffic controls and intersection treatments should be integrated at problem intersections. The three standard on-street bicycle facilities—shared bicycle routes, marked wide curb lanes, and bicycle lanes—should be designed to comply with AASHTO and MUTCD requirements. Shared bicycle routes do not require additional lane width for bicycles, but route signage is necessary. Bicycle lanes should never be planned for two-way traffic; instead, cyclists should travel one-way in the direction of travel of adjacent traffic. Along designated roads, grates for lateral storm drains should be designed at an angle or perpendicular to the direction of bike travel to avoid lodged bicycle wheels. Currently, there are 512 perpendicular grates on Wilmington Streets and approximately 297 parallel grates that need to be replaced.



Appropriate design practices keep children safe.

As another safety solution, a bike box can be incorporated at intersections. Motorists are given an advanced stop bar, while bike boxes are painted on the road with a bike symbol inside. This design makes cyclists more visible to motorists by placing the cyclists in front of them at a red light, and reminds motorists and cyclists to watch for each other. As shown below, bicycle boxes and lane striping can be brightly colored to create a visual barrier. In Wilmington, more analysis is needed to identify the most problematic intersections for cyclists and, once completed, should be included as a factor in the prioritization of bicycle improvements.

Figure 14: Example of Intersection Configuration with Bicycle Box



A Bike Box is an intersection safety design that promotes awareness and visibility of cyclists, while preventing collisions between motorists turning right and cyclists going straight.

To maximize safety for all modes of transportation, crossings should be constructed at locations where bicycle or pathway facilities intersect major roadways. Intersecting roadways can be managed with various crossing treatments such as signed crossing, a raised median island, or signalized crossing. Where bike routes intersect major roads with light traffic flow, it's acceptable that signed crossings denote an existing bike route.

As shown to the right, a raised median island will allow cyclists to cross one direction of traffic at a time, instead of waiting for a gap in both directions of traffic flow. Additionally, signalized crossings can be activated by a cyclist push button located next to the curb, or by an in-pavement loop detector. These bike loops are designed to detect the weight of a bicycle located directly above the loop and will trigger the signal to turn green for the cyclist to proceed. If a detector device is being used, pavement markings should indicate the "hot-spot" for cyclists to activate the signal.



Another useful bicycle facility design is a wheel gutter, which allows bicycles to easily navigate a series of steps. It directs bicycle traffic to one side, creating a safe separation from pedestrian movement. The structure should be mounted to the stairway underneath the handrail and can be designed with a new or pre-existing staircase. Signage should be posted at the top and bottom of the stairs to ensure proper use of the facility. This design is feasible in downtown Wilmington at the plaza on Market Street, which is adjacent to the Federal Building and provides access to the City/County Building on 8th and French Streets.



Bicycle wheel gutter in
Portland, Oregon

Finally, bicycle facilities should also incorporate adequate lighting for rider security and comfort. Overhead roadway lighting is generally sufficient for marked wide-curb lanes and bike lanes, but separated paths or off-street bike facilities and bike parking areas require appropriate-scale lighting, particularly where evening cycling is expected.

❖ **Objective 2**—Develop a public education program to promote safe bicycling practices.

Designing and initiating an effective public education program will require a host of partners, such as the City of Wilmington, local law enforcement, a bicycle coalition, and other interested parties. The development of this program is suggested to be carried out through or in conjunction with Wilmington’s Cycling Center, in which the Urban Bike Project, Inc. currently operates. The program should employ different outreach methods for various bicycle groups, for example, youth, college students, and adult commuters.

Once partners and sponsors have been identified, a timeframe should be established for ideas that can be integrated immediately, in the mid-term, and for the long-term. For instance, the distribution of informational flyers about cycling etiquette can be accomplished in the near-term. Distributed information should include how cyclists should communicate with motorists using hand and arm motions. For the mid-term, a series of television and radio public service announcements can be launched that provide safety traveling tips for cyclists and motorists and reinforce the “share-the-road” concept. In the long run, bicycle laws and cyclist safety can be integrated into high-school curriculums for student driver education courses. In addition, educational material can be developed and intertwined with Delaware’s Safe Routes to School Program. Safety education should also target law officers. The City has also considered tying bicycle safety into Wilmington’s “IN-the middle of it all” Campaign, which focuses on marketing the City as an exciting place to live and visit. Other ideas would be developed with the partners and sponsors.



Programs are needed to promote safe bicycling.

In addition, existing statewide programs and initiatives can be adapted to Wilmington’s public education efforts. For example, DelDOT’s Bicycle Safety Checkpoints initiative has been successfully implemented in Sussex County. Members from bicycle advocacy groups,



Establishing Bicycle Safety Checkpoints is one strategy to promote public education and safety.

bicycle-deployed police officers, and other transportation staff stop cyclists along the roads during the summer months to adjust bikes, provide safety information and give away reflectors and helmets as incentives. Wilmington can also seek to host New Castle County’s annual event for Safe Kids, which is an organization dedicated to preventing unintentional injury to youth. Establishing a bicycle safety element for the yearly event would serve as another medium for disseminating bicycle safety information to the public. Furthermore, DelDOT’s recent Neighborhood Speeding Campaign can be used to underline the need for motorists to slow down to make road conditions safer and more comfortable for pedestrians and cyclists.

- ❖ **Objective 3**—Provide bicycle and pedestrian education and training for City police officers regarding bicycle-vehicle safety measures and issues faced by on-street bicyclists.

The Wilmington Police Department is authorized to deploy a number of officers on bicycles, in addition to those in motor vehicles and on foot. Proper training for all modes of deployment should provide background information, resources, and the tools needed to uphold the laws pertaining to bicycle movement. Several states nationwide have been successful in implementing training programs for officers, which are administered in various formats and lengths. For instance, Massachusetts distributes a very detailed reference guide for law officers to review regarding bicycle safety. The Bicycle Coalition of Maine provides a four-hour workshop for all police officers and county sheriffs to cover pertinent enforcement material. For police, Wisconsin has a bicycle safety enforcement program that teaches all levels of bicycle safety and is administered through the state's Department of Transportation. Also, the National Highway Traffic Safety Administration (NHTSA) offers a self-paced interactive CD for law enforcers, which include all of vehicle and traffic laws that can have a possible effect on the safety of cyclists.

To better serve Wilmington residents, the Police Department should consider hosting a recurring training program for officers that will:

- **Examine the details of bicycle laws**—to better understand traffic laws and how they apply to bicyclists. This should equip officers to be more helpful in increasing public safety by sharpening their awareness that bicycles are also vehicles on the roadways.
- **Review “Share-the-Road” rules**—to promote proper enforcement of cyclists who disregard traffic control devices and proper enforcement for motorists who exhibit dangerous behavior toward cyclists. Officers should learn how to approach and handle offenses committed by children versus adult riders.
- **Evaluate accident reporting for bicycle incidents**—to ensure adequate documentation of incidents to help guide future planning of safety improvements along troublesome roadways.

- ❖ **Objective 4**—Develop signage aimed at motor vehicle drivers to improve awareness of the needs and rights of bicyclists.

A common concern of motorists is bikes traveling against traffic. A viable and cost-effective solution would be to incorporate pavement markings along the bicycle network for cyclists to follow. A combination of retroreflective words and symbols, such as a painted bike symbol with a directional arrow, would communicate to cyclists what movements are allowed. To discourage incorrect bicycle traffic behavior along on-street facilities, the Bicycle “Wrong Way” and “Ride with Traffic” signs should be placed facing wrong-way bicycle traffic. Markings or other regulatory signage can also provide warning messages for traffic conditions up ahead, such as



intersection approaches, hills, turns and curves, bicycle surface conditions, or other activities that may cause conflicts.

In addition to directional signage, guide signs are needed to inform cyclists of nearby attractions, destinations (parks, business district, libraries, transit, etc.), and distances and directions to neighborhoods. Wayfinding guidance provides a number of benefits—it ensures easy and efficient route navigation for cyclists, makes routes more likely to be accessed, and serves as a visible and permanent marketing tool to encourage bicycling. Wayfinding signage should also coincide with published maps of bicycle routes in Wilmington.

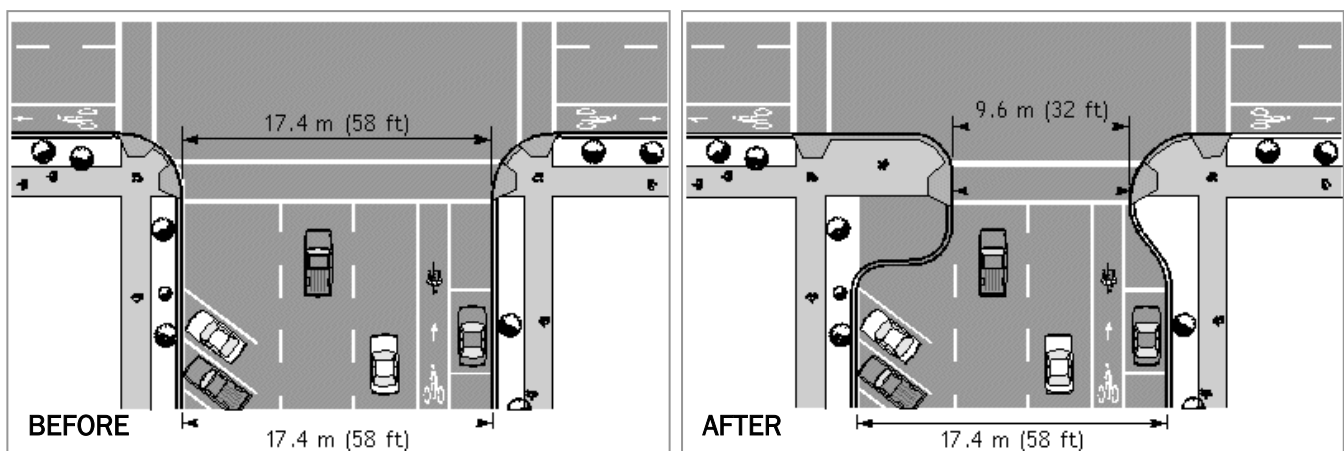
The better the directional and wayfinding signage that is provided for cyclists, the more it will communicate to motorists that the presence of cyclists should be expected. Other regulatory signs for motorists to follow could include “Share the Road,” “Pass with Care,” and “Begin Right Turn Lane Yield to Bikes.” All signage and placement of signage should follow Traffic Control for Bicycle Facilities guidelines listed in the MUTCD.



- ❖ **Objective 5**—Develop appropriate residential and commercial street designs to control vehicle speeds and encourage bicycle use.

Traffic calming techniques can be applied to suitable residential streets and commercial corridors in Wilmington. For instance, slightly reducing travel lane widths to accommodate bicycle lanes would be applicable along roadways that can physically support them. Bike lanes tend to slow traffic as the driver has less space to travel. Additionally, curb extensions (bulb-outs) can be built. The illustration below demonstrates how extending the curb visually narrows the travel lanes, without actually altering the lane width.

Figure 15: Example of Intersection Configuration with Curb Extensions



❖ **Objective 6**—Clean and maintain bicycle lanes and paths.

Regular maintenance is necessary to ensure bicycle facilities are safe and comfortable to use. Keeping facilities well-maintained preserves the network and protects investments made for improvements. Road and pathway surfaces should be swept regularly to remove glass and other debris, potholes should be filled as soon as possible, catch basins should be cleared when needed, and eroded signage should be replaced. Bicycle pavement markings should be repainted when necessary, and done in conjunction with the regular schedule for re-striping travel lanes. Critical times to maintain the bicycle network are after a vehicular crash, after construction activity, and during the winter months for snow removal. The City of Wilmington should provide a phone number or web-based submittal form so public users of the bicycle network can report problems and maintenance requests. Generally, the best way to achieve a clean and friendly bicycle network is to establish a schedule for routine care in conjunction with regular roadway maintenance.

GOAL FIVE: CREATE BICYCLE POLICIES

Objectives	
1	Add criteria for bicycle amenities to design review procedures and provide incentives for bicycle accommodations.
2	Incorporate bicycle elements into transportation and development action plans.
3	Add criteria for non-motorized facilities into all construction and maintenance activities of Public Works or Transportation Departments.
4	Review bicycle parking requirements in zoning codes and recommend revisions as needed.
5	Encourage the appointment of a City non-motorized coordinator.

- ❖ **Objective 1**—Add criteria for bicycle amenities to design review procedures and provide incentives for bicycle accommodations.

Federal legislation and state policy is in place to support bicycle planning in the larger scheme of transportation planning. Yet, local bicycle policies do not exist in Wilmington, even though they are an integral step toward fulfilling the vision of this plan. An underlying policy should be endorsed that relates bicycling as a component of the transportation system in Wilmington. To encourage bicycle facilities, standard criteria for design and development incentives should be given. For example, reductions on the vehicle parking requirement could be lowered if bike parking is provided. Successful incentive strategies, applicable to Wilmington, should be explored further. In addition, Wilmington can apply language from New Castle County's Unified Development Code (UDC) found under Subdivision Design, General Plan Review Standards. An excerpt from Section 40.20.110 states, "Within the context of overall community development, the internal circulation system should promote and encourage the increased use of pedestrian and bicycle movement among residential, local shopping, schools, and other areas." Similar provisions should be made for bicycles along City-maintained roads.

- ❖ **Objective 2**—Incorporate bicycle elements into transportation and development action plans.

Initially, provisions for bicycle accommodations should also be incorporated in the City's Code under activities relating to zoning codes, site plan applications, urban renewal plans, and comprehensive plans. Wilmington's Planning Department should strive to incorporate bicycle facility accommodations (refer to Goal Four) into all roadway improvement plans and neighborhood comprehensive development plans. When the department assists in the

identification of community needs, bicycle transportation issues and solutions should be addressed with the communities, which align with the goals of this plan. Considering Wilmington's historic districts and neighborhood conservation districts, additional provisions for bicycle facilities and accommodations should be included for design and construction in these areas which respect the historic nature or traditional designs.

- ❖ **Objective 3**—Add criteria for non-motorized facilities into all construction and maintenance activities of Public Works or Transportation Departments.

Wilmington's Department of Public Works should carry out transportation improvements in line with WILMAPCO's Complete Streets Policy. A complete streets agenda—incorporating the travel of all persons—should be mandated in all transportation activities throughout Wilmington. Added attention and specific criteria should be given to all non-motorized modes, as they are most often overlooked or undervalued, but remain a component of the overall transportation system. Additionally, a plan to replace the remaining 297 parallel storm drain grates should be devised, utilizing planned maintenance schedules and construction projects to manage costs.

- ❖ **Objective 4**—Review bicycle parking requirements in zoning codes and recommend revisions as needed.

Goal 3: Objective 2, seeks to provide parking at all major destinations, which include public parks and schools. However, no policies exist for bicycle accommodations at these locations. To implement bicycle parking facilities, building codes for City parks and public schools should be reviewed and revised to include such facilities. Bicycle parking can be retrofitted into existing structures through design review procedures, rehabilitation, or reconstruction plans. Generally, providing bicycle accommodations, where applicable, should be a requirement to obtain a building permit approval for the construction of a new building structure or the alteration or repair/renovation of an existing structure. Also, the Existing Building Rehabilitation Code (Subchapter 6 of the Wilmington Renovation Code) should be reviewed to include provisions for bicycle facility retrofits.

- ❖ **Objective 5**—Encourage the appointment of a City non-motorized coordinator.

To date, there is no full-time staff position to handle bicycle and pedestrian planning within Wilmington. Although DelDOT has a Bicycle and Pedestrian coordinator, the state-wide scope of responsibilities limits the amount of time and attention that can be given to any one locale. Although a non-motorized coordinator is encouraged, a more practical approach for the City to circumvent a new professional position is to endorse the Urban Bike Project of Wilmington to help implement this plan, as mentioned previously. Allocating local funds and support to this bicycle organization would effectively eliminate the current need for a new position.

GOAL SIX: DEVELOP A PHASED IMPLEMENTATION PLAN

Objectives	
1	Identify and target factors with highest needs and most benefits. Short- term goals should include providing bicycle parking.
2	Use prioritization factors such as connectivity between existing facilities, high-hazard roadways near schools and employment centers, opportunities for major linkages, and high-hazard roadways, which can be improved for bicycle travel in conjunction with the TIP and RTP.
3	Secure dedicated funding for non-motorized facilities and retrofitting, and seek private/corporate partners for project funding and event sponsorship.
4	Provide adequate resources to achieve the goals of this plan, including training and technical assistance.
5	Develop a plan to maintain and improve the quality, operation, and integrity of bikeway network facilities.
6	Provide for integration and coordination of bicycle planning between the State, New Castle County, other municipalities, and the City.

- ❖ **Objective 1**—Identify and target factors with highest needs and most benefits. Short-term goals should include providing bicycle parking.

As outlined in Goal 5, policies must be in place before implementation can begin. Identifying what entity will be responsible for maintaining the bicycle facilities must be established before facility construction. Then, short-term and long-term actions should be addressed systematically based on a cost-benefit analysis. Considering cost and impact, bicycle parking should cap short-term priorities.

- ❖ **Objective 2**—Use prioritization factors such as connectivity between existing facilities, high-hazard roadways near schools and employment centers, opportunities for major linkages (railroad rights-of-way, utility lines, etc.), and other high-hazard roadways, which can be improved for bicycle travel in conjunction with the Transportation Improvement Program and Regional Transportation Plan.

Fiscal constraints for transportation improvements make project prioritization an integral process to maximize investment returns. Using quantitative methods and a project-by-project approach, improvements can be scored and ranked based on the multiple factors mentioned above. The ranked bicycle improvement projects can be submitted to DeIDOT for

consideration onto the statewide process, which ultimately get added into WILMAPCO's four-year Transportation Improvement Program (TIP). Projects with an identified local and/or private funding match should move forward in the development process.

- ❖ **Objective 3**—Secure dedicated funding for non-motorized facilities and retrofitting, and seek private/corporate partners for project funding and event sponsorship.

For implementation, Wilmington should pursue funding from federal improvement programs such as Transportation Enhancement (TE), Congestion Mitigation and Air Quality (CMAQ), and Safe Routes to School (SRTS)—all of which are administered through DelDOT. TE funds can be used for projects such as new or reconstructed sidewalks, walkways, curb ramps, bike lane striping, bike parking, off-road shared use and non-motorized trails. The CMAQ program provides a flexible funding source for transportation projects that will significantly reduce traffic congestion and improve air quality. CMAQ funding can be used on a wide-range of improvements, including pedestrian and bicycle projects.

The SRTS Program uses a community approach to encourage and enable more students to walk and bicycle to school safely. SRTS works with schools in identifying the safest routes from children's homes to their schools and identifies ways to improve school area safety. Funding and planning assistance is available to establish a school program and implement the recommendations. This program would be useful in getting bicycle parking financed at the participating schools.

Further, securing resources for bicycle improvements should extend beyond traditional funding sources and measures. The City of Wilmington should seek partnerships and/or sponsorship through employers which offer employee Wellness Programs. Employee Wellness Programs are initiated by an employer to improve the overall health of their employees and can cover a range of health-related topics; most frequently the programs provide employees with opportunities to incorporate exercise into their daily lives. Another potential partnership can be established with Nemours Health and Prevention Services and their KidsHealth Program to focus more attention on the health benefits of bicycling.

- ❖ **Objective 4**—Provide adequate resources to achieve the goals of this plan, including training and technical assistance.

Having access to adequate resources is a common dilemma faced by many cities to accomplish a myriad of transportation improvements. Yet ample opportunities exist to create partnerships with interested stakeholders. Once Wilmington has established key partnerships needed to move forward, the plan needs to be kept current and relevant to serve the needs of cyclists. WILMAPCO will provide continued technical support for this bicycle plan.

- ❖ **Objective 5**—Develop a plan to maintain and improve the quality, operation, and integrity of bikeway network facilities.

This plan is not only a blueprint for establishing and linking the network, but for maintenance guidelines as well. Goal Four: Objective 6 should be referred to for maintenance actions. Additionally, a schedule to monitor the progress of this plan's goals and objectives is needed. Performance measures should include bike route mileage, bicycle crash statistics, the percentage of workers who commute to work, the number of bicycle-friendly storm drain retrofits, new bicycle accommodations added (parking and signage), and other relevant data.

- ❖ **Objective 6**—Provide for integration and coordination of bicycle planning between the State, New Castle County, other municipalities, and the City.

Statewide bicycle planning and a framework for implementation already exist. In 2005, DelDOT published the Delaware Bicycle Facility Master Plan, calling for a state-wide system of on-road bicycle routes along DelDOT's maintained roads. To reduce overlap, this city-wide plan should align with the cited statewide and regional bicycle routes and recreational connectors through Wilmington. However, the Master Plan did not offer on-the-ground improvements, so these must be examined for needs.

Working with municipalities to include provisions for regional bike corridors in the transportation element of their comprehensive plans would be useful in connecting the local bicycle network to a regional system. In addition, greater inter-city cooperation and involvement from representatives at all levels of planning is needed.

GOAL SEVEN: INVOLVE THE COMMUNITY

Objectives	
1	Involve the community in the development of the Plan with public outreach and workshops.
2	Develop grassroots support at the neighborhood level to assist in the legislative adoption and implementation of the Bicycle Plan.
3	Create education and outreach materials to raise awareness and encourage use of the Bicycle Network.

- ❖ **Objective 1**—Involve the community in the development of the Plan with public outreach and workshops.

Community support and consent is one of the most vital components to the successful implementation of a bicycle plan. Ultimately, the community helps to push the plan through Wilmington's City Council and City administration. Working with city residents provides a means for identifying their transportation needs and creates a transparent planning process. Also, promoting community involvement and appealing to a broad spectrum of residents encourages diversity of opinions and ideas, which are needed for a bike network, intended to serve a diverse group of cyclists. Outreach should be geared toward a variety of interest groups, schools, churches, businesses, and related organizations where potential users of the bicycle network may be found.



- ❖ **Objective 2**—Develop grassroots support at the neighborhood level to assist in the legislative adoption and implementation of the Bicycle Plan.

Involvement at the neighborhood grassroots level pinpoints advocates of not only bicycles, but of non-motorized transportation in general. Building cooperative relationships with identified supporters of this plan would help achieve a coordinated and balanced multi-modal transportation network throughout Wilmington. Urban Bike Project of Wilmington, Inc., a grassroots organization, has already shown support for the implementation of this city-wide plan. More outreach should be carried out to inform and seek participation from additional grassroots organizations, such as the Latin American Community Center, which has expressed interest in getting involved to promote bicycling. Getting other active statewide bicycle councils involved would be a next step.

- ❖ **Objective 3**—Create education and outreach materials to raise awareness and encourage use of the Bicycle Network.

Education and outreach materials should be disseminated in many forms such as flyers, bike maps, rules for safe riding, public meetings, and forums. Wilmington communities should be provided with tools commonly used to assess biking conditions, such as bikeability checklists and a bike compatibility index. In addition, pertinent information should be provided online. The City of Wilmington or the Wilmington Cycling Center should host a website with up-to-date information such as state bicycle laws, maps for riding, information for adolescent cyclists, and links to other web pages.

Our Approach

The Bicycle Plan Advisory Committee and WILMAPCO staff has identified the Wilmington Neighborhood Planning Council (NPC) as a key player with an interest and concern for providing safe and practical bicycle transportation. The NPC addresses physical, social, and economic needs using a community-wide approach and informs citizens about activities and initiatives scheduled to take place within the City. This Council has been briefed about the vision and direction for this plan and will be included in future planning discussions and implementation phases.

To ignite interest and obtain feedback for this plan, several strides have been taken to reach the general public, avid cyclists, and stakeholders. Aside from meeting with Wilmington's NPC leadership and soliciting online submissions for bicycle routes, the plan has been promoted through WILMAPCO's website and *Transporter*, a newsletter distributed quarterly to over 300 recipients. Attending Wilmington's Annual Grand Prix Bike Race in May 2008 was also a successful strategy. At the race, cyclists mapped their bicycle routes and packets of information about the plan were dispersed to inquiring residents. An additional stakeholder was also identified who expressed interest in constructing or at least providing a funding match for downtown bicycle parking. Finally, to capture additional public comments, the Bicycle Plan's public outreach will be combined with Wilmington's Downtown Circulation Study workshop in the fall of 2008.

PATH FORWARD

Based on the aforementioned observations and analysis, below is a list of recommendations that should be actively pursued once Wilmington's City Council and City administration endorse this Bicycle Plan.

Summary of Recommendations

Short-Term

- Identify and engage key stakeholders and supporters and the general public.
 - Continue to work with Wilmington's Neighborhood Planning Council
 - Coordinate with the Urban Bike Project of Wilmington, Inc.
 - Contact Wilmington's Downtown Visions group, which manages the Clean and Safe Program
- Begin to discuss and develop local bicycle policies best suited for Wilmington.
- Designate bicycle boulevards (including Market Street in the downtown area) and evaluate additional roadways where bicycle lane striping is feasible.
- Conduct a comprehensive city-wide bicycle parking demand study. The study should consider parking needs related to a potential Bike Share Program as well. Coordinate with Downtown Visions staff to locate bicycle parking within security camera coverage areas, which are optimal locations for bike parking.
- Develop a City-wide signage plan for the proposed coordinated network.
- Provide bicycle parking and signage at key sites, including locations mentioned in this document.
- Include regularly scheduled bicycle facility maintenance in the City's current roadway maintenance plans.
- Allocate funding for a Cycling Center to carry out pertinent services and ongoing bicycle-related tasks.
- Pursue funding for a city-wide Bike Share Program.
- Initiate a public education program for bicycle safety. Identify partners and sponsors and then establish short-, mid-, and long-term actions to promote safety.
- Establish an ongoing schedule to measure the progression of this plan. Incorporate bike commuter counts, additional bike route mileage, new signage, and other related data.

Long-Term

- Adopt local bicycle policies that make provisions for bicycle facilities.
- Incorporate bicycle lanes on suitable roadways (including Northeast Blvd.)
- Continue to support and expand the Cycling Center.
- Enhance the public education program for bicycle safety.

To achieve a safe and convenient bicycle transportation network throughout Wilmington, the City must first pursue solid bicycle policies. Next, securing the right partnerships will help the City move forward this bicycle agenda. WILMAPCO is a partner at all planning levels with the City of Wilmington and will continue to provide technical assistance and support to

ensure the realization of this bicycle plan. The Wilmington Bicycle Plan will be included under monitoring of sub-regional studies in WILMAPCO's Unified Planning Work Plan (UPWP), an annual document produced to outline the scope of work for staff during each fiscal year. Additional information can be found on WILMAPCO's website at <http://www.wilmapco.org/BikeWilmington/index.htm>.

Appendix: Currently Used Bicycle Routes

Bicycle routes navigated daily by cyclists

