

# CITY OF OXFORD



# BICYCLE PLAN



FINAL PLAN WINTER 2013

Prepared By





# ACKNOWLEDGEMENTS

## CITIZEN INVOLVEMENT

A special thanks to the 200+ local residents who participated in the 2012 - 2013 pedestrian and bicycle planning process through comment forms, public workshops, and meetings.

## PROJECT STEERING COMMITTEE

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# 1

# PROJECT OVERVIEW

## CHAPTER OUTLINE

PURPOSE | BACKGROUND | VISION & GOALS  
THE PLANNING PROCESS | 5 E'S OF BICYCLE PLANNING  
BENEFITS OF A BIKEABLE COMMUNITY

## PURPOSE

This Bicycle Plan will guide the City of Oxford, NCDOT, and other local and regional partners in improving the existing infrastructure and constructing new facilities for bicyclists in Oxford and creating a more bicycle-friendly community through the development of related programs.

## BACKGROUND

### COMMUNITY INITIATIVE & NCDOT BICYCLE AND PEDESTRIAN PLANNING GRANT

In 2011, the North Carolina Department of Transportation (NCDOT) Bicycle and Pedestrian Planning Grant Initiative awarded the City of Oxford a matching grant for pedestrian planning. The purpose of the planning grant is to encourage municipalities to develop comprehensive bicycle plans and pedestrian plans. This program has assisted more than 100 North Carolina communities and is administered through NCDOT's Division of Bicycle and Pedestrian Transportation (DBPT). The Bicycle and Pedestrian Planning Grant Initiative funded a Comprehensive Pedestrian Transportation Plan for the City of Oxford in 2012.

In 2012, the City of Oxford commissioned planning and design consultants, Alta/Greenways, to conduct bicycle planning services, building upon work completed for the City's Pedestrian Plan. This Bicycle Plan provides an overall vision and strategy for the City of Oxford to grow into a bicycle-friendly community. This Plan's Steering Committee met in July 2012 to confirm project visions and goals, identify desired outcomes of the Plan, and determine areas of need for bicyclists.

This Bicycle Plan combines past planning efforts with new research and analysis. A proposed on- and off-street bikeway network is included in this Plan, as well as recommended programs to encourage more bicycling activity and to promote safe bicycling and driving practices. These combined elements establish a complete, up-to-date framework for moving forward with improvements to the bicycling environment. For more implementation resources, such as funding resources and State & Federal policies, please refer to the City's recently adopted Comprehensive Pedestrian Plan.



## VISION AND GOALS

The following vision statement and goals were developed during the Steering Committee meeting and reinforce the goals and vision of the City's 2012 Comprehensive Pedestrian Plan. The vision statement applies to both the Bicycle Plan itself and the desired outcome of its implementation.

### BICYCLE PLAN VISION STATEMENT

In the future Oxford will:

1. Retain its **rural atmosphere** where friendly citizens foster a positive community spirit.
2. Be a **regional destination** for tourists and visitors attracted by the city's heritage and historic character.
3. Provide **recreation opportunities** for all citizens.
4. Be a **walkable, bikeable, and safe** community with tree-lined streets, citywide sidewalk connectivity, traffic calming, bicycle facilities and treatments, and wayfinding signage.
5. **Educate** our citizens on the **benefits** of being a walkable and bikeable community with greenways, trails, on-road bicycle facilities, and pedestrian facilities.
6. **Plan for future growth** by requiring new development to construct sidewalks and the appropriate bicycle facilities and treatments, while protecting its environmental resources and maintaining quality public services at an affordable cost.
7. Create **gateways** into the community that welcome visitors and give residents a "**sense of place**" by protecting and enhancing priority corridors.



### MEASURABLE GOALS OF THE BICYCLE PLAN

- Amend the City subdivision ordinance to require all streets, with the exception of cul-de-sacs, be constructed with curb & gutter and sidewalks on both sides. Alternatives in areas without municipal sewer service will be considered, providing there is clear and adequate separation as per AASHTO and NACTO standards and guidelines, between pedestrians and vehicles (ex: swales, ditches and retaining walls, etc), and the appropriate bicycle facilities and treatments, to create a more multi-modal environment for City residents.
- Achieve local and regional connectivity through bicycle facility development, wayfinding and signage, awareness initiatives, and education opportunities for all users.
- Increase the miles of bicycle facilities and treatments as a percent of total City roadways.
- Review City ordinances and revise to acknowledge the importance of pedestrian and bicyclist safety, and the role of bicycle and pedestrian design standards, for the overall health of the community.

## THE PLANNING PROCESS

### THE PROJECT STEERING COMMITTEE

City of Oxford staff and the Project Steering Committee guided the development of this Bicycle Plan. The Committee was made up of citizen advocates and representatives from multiple stakeholder organizations and local groups, including the Kerr-Tarr COG, among others (listed in the Acknowledgements section of this Plan). The Steering Committee met at the kick-off of the planning process and provided guidance throughout the process on facility recommendations and draft plan development.

### DATA COLLECTION AND ANALYSIS

Baseline information about the study area was collected during the planning process for the Pedestrian Plan in Spring 2012, including the review of existing plans and programs, 2010 US Census demographic information, preliminary field analysis, and study-area base maps. In Summer 2012, project consultants held a second round of fieldwork investigations to confirm current conditions for bicycle



transportation. Consultants also reviewed aerial photography and geographic information systems (GIS) data from the Pedestrian Plan, to further identify opportunities and constraints for bicycle facility development.

## PUBLIC INVOLVEMENT

Citizen representatives served on this Plan's Steering Committee, providing guidance during the kick-off meeting and the draft plan presentation meeting. The draft for this Plan was also made available to the public for review and comment.

## PLAN DEVELOPMENT

In the Summer and Fall of 2012, the Draft Plan was developed through input gathered during the steps described above. The Draft Plan was developed under the guidance of the Steering Committee and City staff, and was made available for their review in the Fall of 2012. Comments from the Steering Committee, and City staff were collected, and the Plan was then revised into the final version that was delivered to the Steering Committee in the Winter of 2012/2013.

# FIVE E'S OF BICYCLE PLANNING

Research has shown that a comprehensive approach to bicycle-friendliness is more effective than a singular approach that addresses only one issue, such as tackling only infrastructure or bicyclist education.<sup>1</sup> Recognizing this, the national Bicycle Friendly Community program, administered by the League of American Bicyclists, recommends a multi-faceted approach based on the five "E" categories: Engineering, Education, Encouragement, Enforcement, and Evaluation. This Plan has been developed using the five E's approach as a means of providing action steps in each arena that the community can take towards becoming more bicycle-friendly.

The five E's are described below. For the purposes of this Plan, a sixth 'E', Equity, is considered an integral component of each of the five E's. 'Equity' takes into account the distribution of impacts (benefits and costs) of bicycling programs, policies, and infrastructure improvements, and whether that distribution is appropriate.

## ENGINEERING

Designing, engineering, operating, and maintaining quality roadways and bicycle facilities is a critical element in producing a bicycle-friendly environment. Safe and connected infrastructure for bicyclists is one crucial piece of a comprehensive approach to increasing bicycling activity. This category may include adding new bicycle specific infrastructure, improvements to street crossings, traffic calming, trail design, traffic management, school zones, or other related strategies.

## EDUCATION

Providing bicycle educational opportunities is critical for bicycle safety. Education should span all age groups and include motorists as well as cyclists. The focus of an educational campaign can range from information about the rights and responsibilities of road users to tips for safe behavior; from awareness of the community-wide benefits of bicycling to technical trainings for municipality staff.

## ENCOURAGEMENT

Encouragement programs are critical for promoting and increasing bicycling. These programs should address all ages and user groups from school children, to working adults, to the elderly and also address recreation and transportation users. The goal of encouragement programs is to increase the amount of bicycling that occurs in a community. Programs can range from work-place commuter incentives to "Bike to School Day" at an elementary school; and from bicycle-friendly route maps to a bicycle co-op.

## ENFORCEMENT

Enforcement is critical to ensure that motorists and bicyclists are obeying common laws. It serves as a means to educate and protect all users. The goal of enforcement is for bicyclists and motorists to recognize and respect each other's rights on the roadway.





In many cases, officers and citizens do not fully understand state and local laws for motorists and bicyclists, making targeted education an important component of every enforcement effort.

### EVALUATION

Evaluation methods can include quarterly meetings, the development of an annual performance report, update of bicycle infrastructure databases, bicycle counts, assessment of new facilities, and plan updates. The City of Oxford will monitor implementation of this Plan on a regular basis and establish policies that ensure long-term investment in the bikeway network. Monitoring progress of implementation will facilitate continued momentum and provide opportunities for updates and changes to process if necessary. Additionally, the City will adopt policies that promote investment in and improvements to the bicycling and walking environment in accordance with the recommendations of this Plan.

## BENEFITS OF BICYCLE FRIENDLINESS

A bicycle-friendly Oxford will help to improve the health and fitness of residents, transportation options, the local economy, and environmental conditions while contributing to a greater sense of community – and fun! Scores of studies from the fields of public health, urban planning, urban ecology, real estate, transportation, and economics consistently affirm the value of supporting bicycling as it relates to these issues. Small towns, big cities, and entire regions across the United States and throughout the world are implementing strategies for creating bicycle-friendly communities, and have been doing so for many years. They do this because of their obligations to promote health, safety and welfare, and also because of the growing awareness of the many benefits of bicycling.



### INCREASED HEALTH AND PHYSICAL ACTIVITY

A growing number of studies show that the design of our communities and the built environment—including neighborhoods, towns, transportation systems, parks, trails and other public recreational facilities—affects people's ability to reach the recommended daily 30 minutes of moderately intense physical activity (60 minutes for youth).<sup>1</sup> According to the Centers for Disease Control and Prevention (CDC), "physical inactivity causes numerous physical and mental health problems, is responsible for an estimated 200,000 deaths per year, and contributes to the obesity epidemic."<sup>2</sup> The increased rate of disease associated with inactivity reduces quality of life for individuals and increases medical costs for families, companies, and local governments.

Oxford faces the same challenges as the Piedmont Region. According to the 2011 Granville-Vance Community Health Assessment, 63 percent of Piedmont Region adults are overweight or obese and only 46 percent meet physical activity recommendations.

The CDC has determined that creating and improving places to be active could result in a 25 percent increase in the number of people who exercise at least three times a week.<sup>3</sup> Granville County Greenway Master plan was developed on this premise. For people who are inactive, even small increases in physical activity can bring measurable health benefits. Establishing a safe and reliable bicycle network in Oxford will positively impact the health of local residents. The Rails-to-Trails Conservancy puts it simply: "Individuals must choose to exercise, but communities can make that choice easier."<sup>4</sup>

### TRANSPORTATION CHOICES

A National Household Travel Survey found that roughly 40% of all trips taken by car are less than two miles.<sup>5</sup> By replacing short car trips with bicycle trips, residents have a significant positive impact on local traffic and congestion. Traffic congestion reduces mobility, increases auto-operating costs, adds to air pollution, and causes stress in drivers. Substituting bicycling for some of these trips relieves the congestion, benefiting all road users. In addition, an improved bicycle network provides greater and safer mobility for residents who do not have access to a motor vehicle. Based on a review of the demographic mapping analysis performed during the Pedestrian Plan, nearly five percent of Oxford households do not have access to a vehicle



and over 30 percent have access to only one. American demographics show that typically around 30 percent of a community's population do not or cannot drive or own a car due to age (under 16), physical or mental disabilities or old age, and/or income. Bicycling for transportation is an important option for these populations, especially those with more than one working family member. Oxford residents were noted during field work already taking advantage of the transportation benefits of bicycling.

## ECONOMIC DEVELOPMENT

The economic benefits of bicycling are being realized in cities throughout the country and the Southeast. From mountain biking destinations to cyclist touring routes, from bike shop businesses to premier special events, bicycling can have a significant impact on a local economy. For example, in Greenville, SC has seen a dramatic increase in the number of bike shops that exist and in bike shop sales in the last five years. In a 2011 survey, nearly every shop owner identified the City's Bicycle Friendly Community initiative to be a leading contributor to that growth.<sup>6</sup> The Augusta, GA area estimates the economic impact of cycling-related sporting events in just the last three years (2009-2011) to total \$15.5 million. As one example, the region hosted the 2010 International Mountain Bike Association (IMBA) Summit in 2010, which brought nearly \$0.5 million in local spending.<sup>7</sup> Beyond bicycle shops, bicycle rentals, and major cycling events, there are others ways that communities are benefiting economically from investments in bicycling.

## BICYCLE TOURISM

Investments in the bicycling environment can lead to increases in bicycling tourism. In the Outer Banks, NC, bicycling is estimated to have a positive annual economic impact of \$60 million; 1,407 jobs are supported by the 40,800 visitors for whom bicycling was an important reason for choosing to vacation in the area. The annual return on bicycle facility development in the Outer Banks is approximately nine times higher than the initial investment.<sup>8</sup> Even though there are substantial differences between the City of Oxford and the Outer Banks (such as beach access and available lodging), Oxford could still achieve positive economic gains proportional to its own attractions and its own future investments in community-wide bicycle facilities. The quality of bicycling in the Outer Banks region positively impacts vacationers'

planning—it is not all about the beaches:

- 12% of vacationers report staying three to four days longer to bicycle
- 43% of vacationers report that bicycling is an important factor in their decision to come to the area
- 53% of vacationers report that bicycling will strongly influence their decision to return to the area in the future<sup>9</sup>

In terms of tourism, Oxford has the benefit of its proximity to the Triangle area, the Kerr Lake State Recreation Area, and future regional connections planned in the Lakes District Bicycle Plan, the Granville County Greenway Master Plan, and scenic, low-volume rural roads that are already popular with existing cyclists from around the region. As Oxford expands its attractive network of trails, bikeways, and bicycle routes, the City will win over some bicycle-related tourism from other regions, and attract new tourists as an easily accessible bicycling destination.

## REAL ESTATE VALUES

From a real estate standpoint, consider the positive impact of trails and greenways, which are essential components of a complete bicycle network. According to a 2002 survey of homebuyers by the National Association of Home Realtors and the National Association of Home Builders, trails ranked as the second most important community amenity out of a list of 18 choices.<sup>10</sup> Additionally, the study found that 'trail availability' outranked 16 other options including security, ball fields, golf courses, parks, and access to shopping or business centers. Findings from the American Planning Association (How Cities Use Parks for Economic Development, 2002), the Rails-to-Trails Conservancy (Economic Benefits of Trails and Greenways, 2005), and CEOs for Cities (Walking the Walk: How Walkability Raises Home Values in U.S. Cities, 2009) further substantiate the positive connection between trails and property values across the country.





## HOUSEHOLD SAVINGS

Bicycling is an affordable form of transportation, recreation, and exercise. According to the Pedestrian and Bicycle Information Center (PBIC), of Chapel Hill, NC, the cost of operating a bicycle for a year is approximately \$120, compared to \$7,800 for operating a car over the same time period.<sup>11</sup>

The average annual cost of a gym membership is about \$500 to \$775.<sup>12</sup> Bicycling for transportation becomes even more attractive from an individual's standpoint when the unstable price of gas is factored into the equation (e.g., in May 2011, gasoline prices were \$4 a gallon).<sup>13</sup>

Whether bicycling for transportation, fun, or exercise, bicyclists who are physically active on a regular basis can avoid costly medical expenses in the long run, and can avoid the cost of gym memberships in the short run.

## ENVIRONMENTAL IMPROVEMENTS

As demonstrated by the Southern Resource Center of the Federal Highway Administration, when people get out of their cars and onto their bicycles, they reduce measurable volumes of pollutants.<sup>14</sup> Other environmental impacts include a reduction in overall neighborhood noise levels and improvements in local water quality as fewer automobile-related discharges wind up in the local rivers, streams, and lakes. Trails and greenways are also part of an attractive bicycle network, conveying unique environmental benefits. Greenways protect and link fragmented habitat and provide opportunities for protecting plant and animal species. Trails and greenways connect places without the use of emission-producing vehicles, while also reducing air pollution by protecting large areas of plants that create oxygen and filter pollutants such as ozone, sulfur dioxide, carbon monoxide and airborne particles of heavy metal.



Finally, greenway corridors can improve water quality by creating a natural buffer zone that protects streams, rivers and lakes, preventing soil erosion and filtering pollution caused by agricultural and road runoff.

## QUALITY OF LIFE

Many factors go into determining quality of life for the citizens of a community: the local education system, prevalence of quality employment opportunities, and affordability of housing are all items that are commonly cited. Increasingly though, citizens claim that access to alternative means of transportation and access to quality recreational opportunities such as parks, trails, greenways, and bicycle routes, are important factors for them in determining their overall pleasure within their community.

Communities with bikeway and trail amenities can attract new businesses, industries, and in turn, new residents. Furthermore, quality of life is positively impacted by bicycling through the increased social connections that take place by residents being active, talking to one another and spending more time outdoors and in their communities. According to the Brookings Institution, the number of older Americans is expected to double over the next 25 years.<sup>15</sup> All but the most fortunate seniors will confront an array of medical and other constraints on their mobility even as they continue to seek both an active community life, and the ability to age in place. Off-road trails built as part of the bicycle transportation network generally do not allow for motor vehicles; however, they do accommodate motorized wheelchairs, which is an important asset for the growing number of senior citizens who deserve access to independent mobility. For those seniors who remain very ambulatory, off-road trails provide an excellent and safe opportunity for exercise and fitness.

Children under 16 are another important subset of our society who deserve access to safe mobility and a higher quality of life. According to the U.S. Environmental Protection Agency, fewer children walk or bike to school than did so a generation ago. In 1969, 48 percent of students walked or biked to school, but by 2001, less than 16 percent of students between 5 and 15 walked or biked to or from school.<sup>16</sup> According to the National Center for Safe Routes to School, "Walking or biking to school gives children time for physical activity and a sense of responsibility and independence; allows them to enjoy being outside; and provides them with time to socialize with their parents and



friends and to get to know their neighborhoods.”<sup>17</sup>

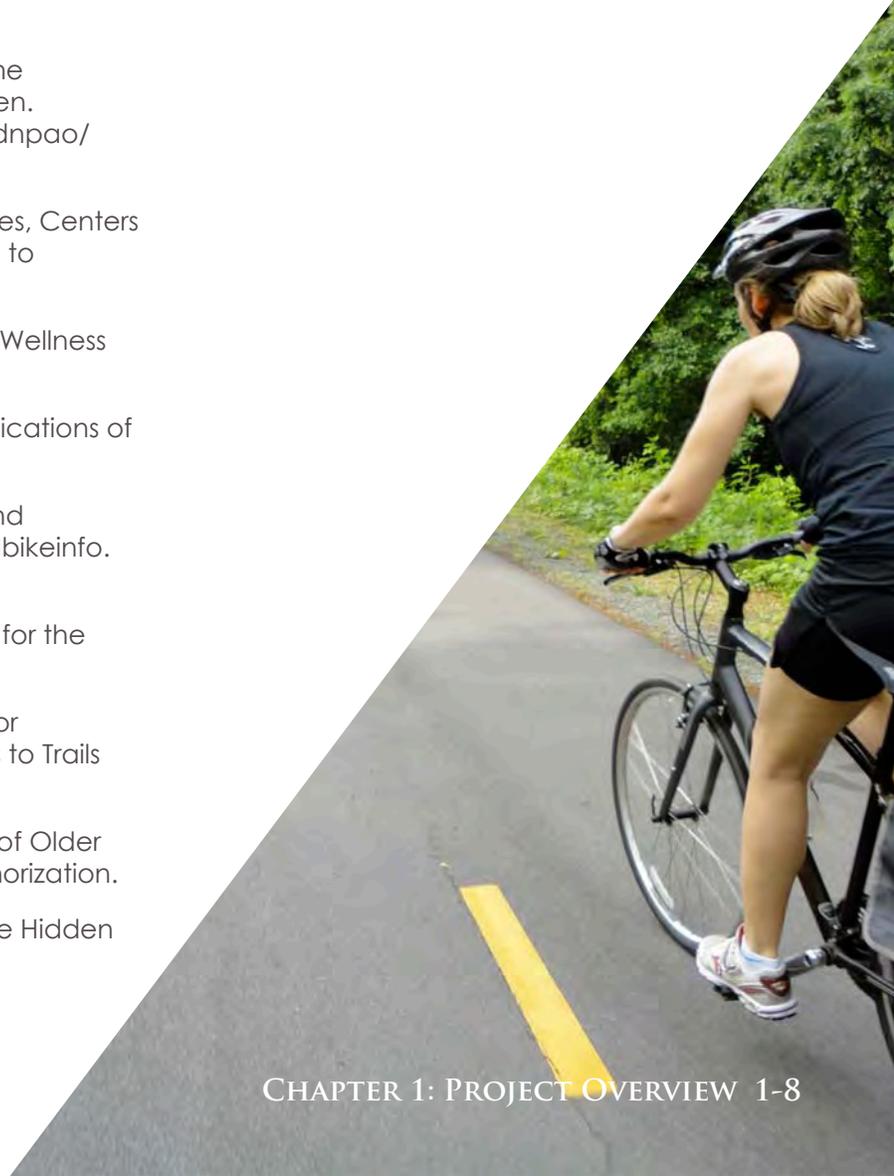
In a 2004 CDC survey, 1,588 adults answered questions about barriers to walking to school for their youngest child aged 5 to 18 years.<sup>18</sup> The main reasons cited by parents included distance to school, at 62%, and traffic-related danger, at 30%. A network of bikeways in Oxford could reduce the travel distance from homes to schools, and overall bicycle improvements can improve the safety of our roadways. The availability of a good bicycle network has become a hallmark of a community with a high quality of life – one of the reasons that they are almost always included in new planned communities.





### Footnotes from, “The Benefits of Bicycle Friendliness”:

1. CEOs for Cities. (2010) Walking the Walk: How Walkability Raises Home Values in U.S. Cities
2. <http://www.charmeck.org/mecklenburg/county/ParkandRec/Greenways/Documents/1benefits.pdf>
3. How Cities Use Parks for Economic Development, 2002.
4. Economic Benefits of Trails and Greenways, 2005.
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6. Active Transportation for America: The Case for Federal Investment in Bicycling and Walking. Rails to Trails Conservancy and Bikes Belong Coalition 2008 / Sissel, S., Cost per Highway Mile, 2008.
7. Krizek, K.e Guidelines for Analysis of Investments in Bicycle Facilities, 2006.
8. Active Transportation for America: The Case for Federal Investment in Bicycling and Walking. Rails to Trails Conservancy and Bikes Belong Coalition 2008.
9. National Center for Safe Routes to School. (2006). National Center for Safe Routes to School Talking Points.
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11. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (2002). Guide to Community Preventive Services.
12. Rails-to-Trails Conservancy. (2006) Health and Wellness Benefits.
13. U.S. EPA (2003). Travel and Environmental Implications of School Siting.
14. 'Daily Trip Distances' chart from the Bicycle and Pedestrian Information Center website, [www.pedbikeinfo.org](http://www.pedbikeinfo.org).
15. U.S. Census Bureau, American Housing Survey for the United States: 2005. 2006.
16. Active Transportation for America: The Case for Federal Investment in Bicycling and Walking. Rails to Trails Conservancy and Bikes Belong Coalition 2008.
17. Brookings Institution. 2003. The Mobility Needs of Older Americans: Implications for Transportation Reauthorization.
18. American Public Health Association. (2010) The Hidden Health Costs of Transportation.



# 2

# EXISTING CONDITIONS

## CHAPTER OUTLINE

OVERVIEW | FIELD INVENTORY & OBSERVATIONS  
GEOGRAPHIC INFORMATION SYSTEMS ANALYSIS

## OVERVIEW

The bicycle environment of a community is determined by the complex relationships that exist between the existing roadway network, automobile traffic speeds and volumes, existing bicycle facilities, the locations of destinations, physical geography, local policies and regulations and land uses.

This chapter provides an overview of the major components of the bicycling environment of the City of Oxford. The assessment of existing conditions is based on regional geographic information systems (GIS) data collected and analyzed during the 2012 pedestrian planning process, internet research, reviewing the 2010 US Census demographic information presented in the 2012 Comprehensive Pedestrian Plan, and conducting field work investigations.

## FIELD INVENTORY AND OBSERVATIONS

The Alta/Greenways consultant team conducted an extensive field analysis of the roadway network throughout Oxford. The analysis focused on existing strengths and deficiencies of the current roadway network as related to bicycling and the potential for bicycle facilities. The summary of existing conditions are summarized below:

### STRENGTHS OF EXISTING BICYCLE FACILITIES:

- **Narrow paved shoulders:** Existing 1-2 foot paved shoulders on numerous two-lane roadways throughout the community is a starting point for separated space (4 feet is the desired minimum standard).
- **Neighborhood roads:** The majority of neighborhood roads have low speed limits and low traffic volumes, allowing for safe and comfortable bicycle travel.
- **New neighborhoods:** There are residential neighborhoods that offer continuous sidewalk networks for their residents, and that were designed with wide automobile roads, creating opportunity for future on-road bicycle facilities.
- **Potential greenway trail opportunities exist in active and inactive railroad corridors and along existing infrastructure easements:**
  - 1) Tally Ho Chase / Trail is a multi-use Rail with Trail recommendation in the Granville County Greenway Master Plan and the 2012 Comprehensive Pedestrian Plan that runs through downtown Oxford. This will require railroad cooperation.
  - 2) There is an opportunity to connect Hillsboro Street with the neighborhoods along Granville Street and Orange Street, and connect to Industry Drive just west of Granville Corners.
  - 3) There is also an opportunity to connect the Oxford Park neighborhood to the Mary Potter School and ultimately downtown with a multi-use Rail with Trail. This will require railroad cooperation.





### DEFICIENCIES OF EXISTING BICYCLE FACILITIES:

- **Lack of connectivity:** There are limited on-road and off-road bicycle facilities within Oxford.
- **No bicycle parking:** There are limited bicycle racks at public locations, shopping centers, and schools.
- **Bicyclist behavior:** Only a few recreational bicyclists were observed, and of the bicyclists that were observed, half were not wearing bicycle helmets. All cyclists were bicycling on the correct side of the road.

### STRENGTHS OF EXISTING ROAD NETWORK:

- **Residential street network:** Many collector roadways generally connect to destinations and to more than one arterial roadway.
- **Spring Street and College Street:** Spring Street features wider lanes and a planted center median. Traffic moves through this main arterial relatively slowly (though some speeding was noted during fieldwork investigations). There are opportunities for on-road bicycle facilities on Spring Street, creating an east-west connector route. College Street features wide lanes offering opportunity for an on-road bicycle facility, creating a north-south connector route.
- **Shoulders:** Several roadways throughout the City have clear and level shoulders and/or on-street parking, offering opportunities to add bicycle lanes, paved shoulders, or multi-use side paths.

### DEFICIENCIES OF EXISTING ROAD NETWORK: CONNECTIVITY ISSUES:

- **High-volume, high-speed roadways:** There are several high-volume roadways with traffic speeds greater than 30mph, and two-lane roadways with little shoulder width where bicyclists are not safe. Some of these roads include Linden Avenue, Lewis Street, Roxboro Road,

Country Club Drive, Goshen Street, College Street, and Cherry Street.

- **Roadways currently designed for automobiles only:** Many roads were designed around the automobile and need to be redesigned to become more bicycle friendly. Narrowing existing lanes and adding planted medians, sidewalks, shade trees, on-road bicycle facilities, and utilizing mini traffic circles could also help reduce speeding and the hazards that speeding presents to cyclists, pedestrians, and drivers.

## GEOGRAPHIC INFORMATION SYSTEMS (GIS) ANALYSIS

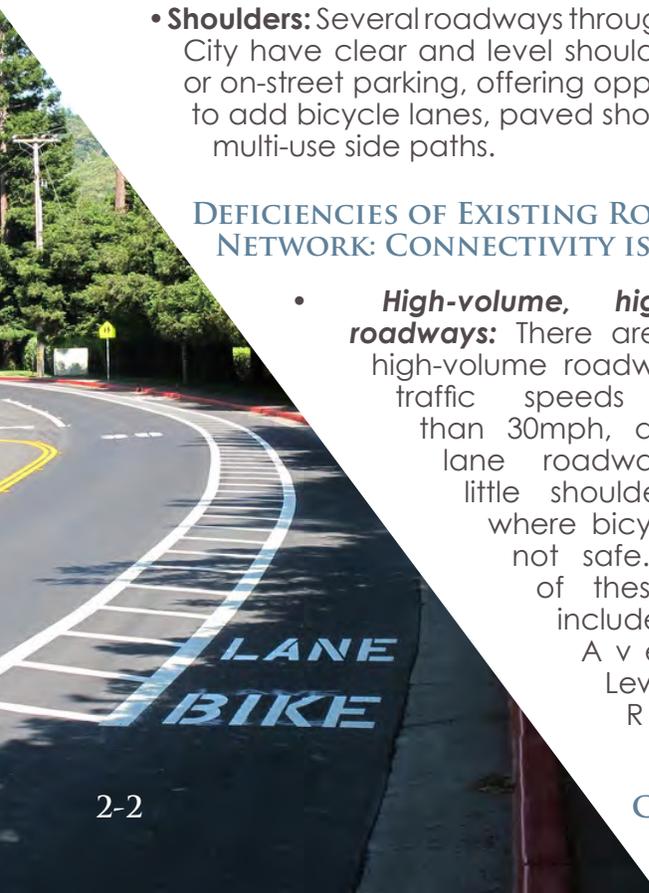
Geographic Information Systems (GIS) data was received from the City of Oxford and the NCDOT during the development of the 2012 Comprehensive Pedestrian Plan and was analyzed as part of the development of this Bicycle Plan. The analysis included information about popular destinations, land use, the road network, and demographic patterns that may be useful in assessing need for future bicycle facilities. Map 2.1 illustrates existing conditions in Oxford including the road network, trip attractors, and water features.

### TRIP ATTRACTORS

People currently drive, walk, or bicycle to a variety of destinations throughout for various purposes. These potential destinations and points of origin for bicyclists are referred to as 'trip attractors'. Examples include:

- Downtown
- Schools
- Shopping locations (Grocery Stores, Pharmacies, etc.)
- Places of worship
- Places of employment
- Parks
- Thornton Library
- Post Office

Each of these categories of bicycle trip attractors were considered when determining



locations for recommended bicycle improvements. They represent important starting and ending points for bicycle travel and provide a good basis for planning ideal routes.

### DEMOGRAPHIC ANALYSIS (MAPS 2.2-2.4)

Needs and demands related to bicycling can be better understood through an analyses of demographic information. US Census demographic data provide geographic information such as population density, the means of transportation to work and median family income, however data regarding mode to work showed zero people bicycling for transportation to work in Oxford.

The City has a 2010 population of 8,461<sup>1</sup> up from 8,338 in 2000. With new development planned and continued development pressure across this region, the population should continue to grow.

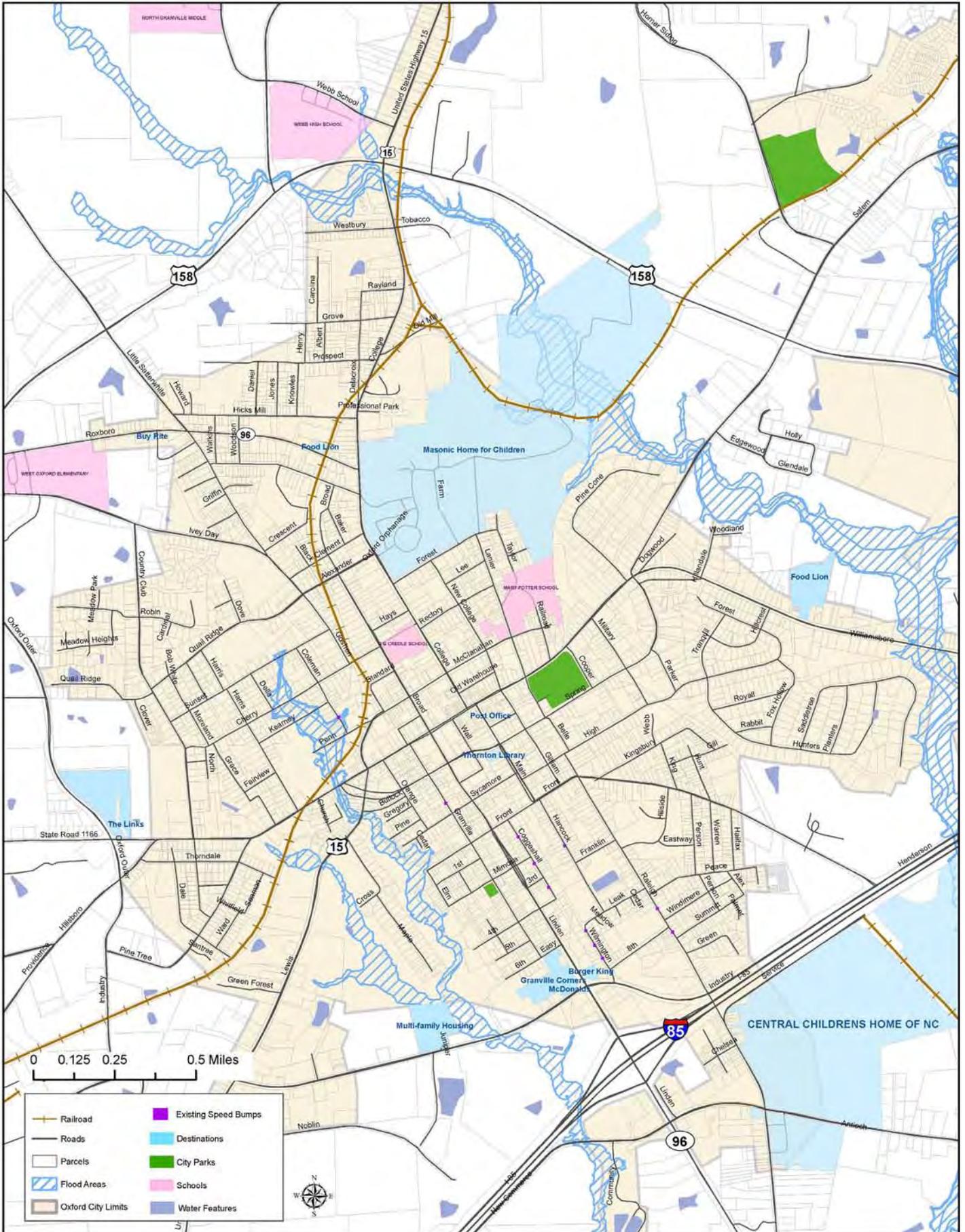
Maps 2.2 - 2.4 were developed during the 2012 pedestrian planning process and illustrate census-related information (population density, median family income by block group, and population percentage not owning a vehicle by block group). This information was used to help determine areas where there is greater need for bicycle facility enhancements. Dense areas will be important to connect with the bicycle network, serving a greater numbers of residents. The need for greater bicycle and pedestrian access and mobility may be greater for lower-income communities and high-density areas, where more people would be impacted.

### NCDOT REPORTED BICYCLE CRASHES IN OXFORD (MAP 2.5)

Since 2000 there have been seven reported bicycle accidents in Oxford. There was one disabling bicycle accident. The statistics presented in the table on page 2-8 are for the City of Oxford, North Carolina, during the reporting period of January 1, 2000 to May 31, 2012. These crash locations were visited during field work evaluations and appropriate recommendations have been made in this Plan to address any unsafe conditions at each location.

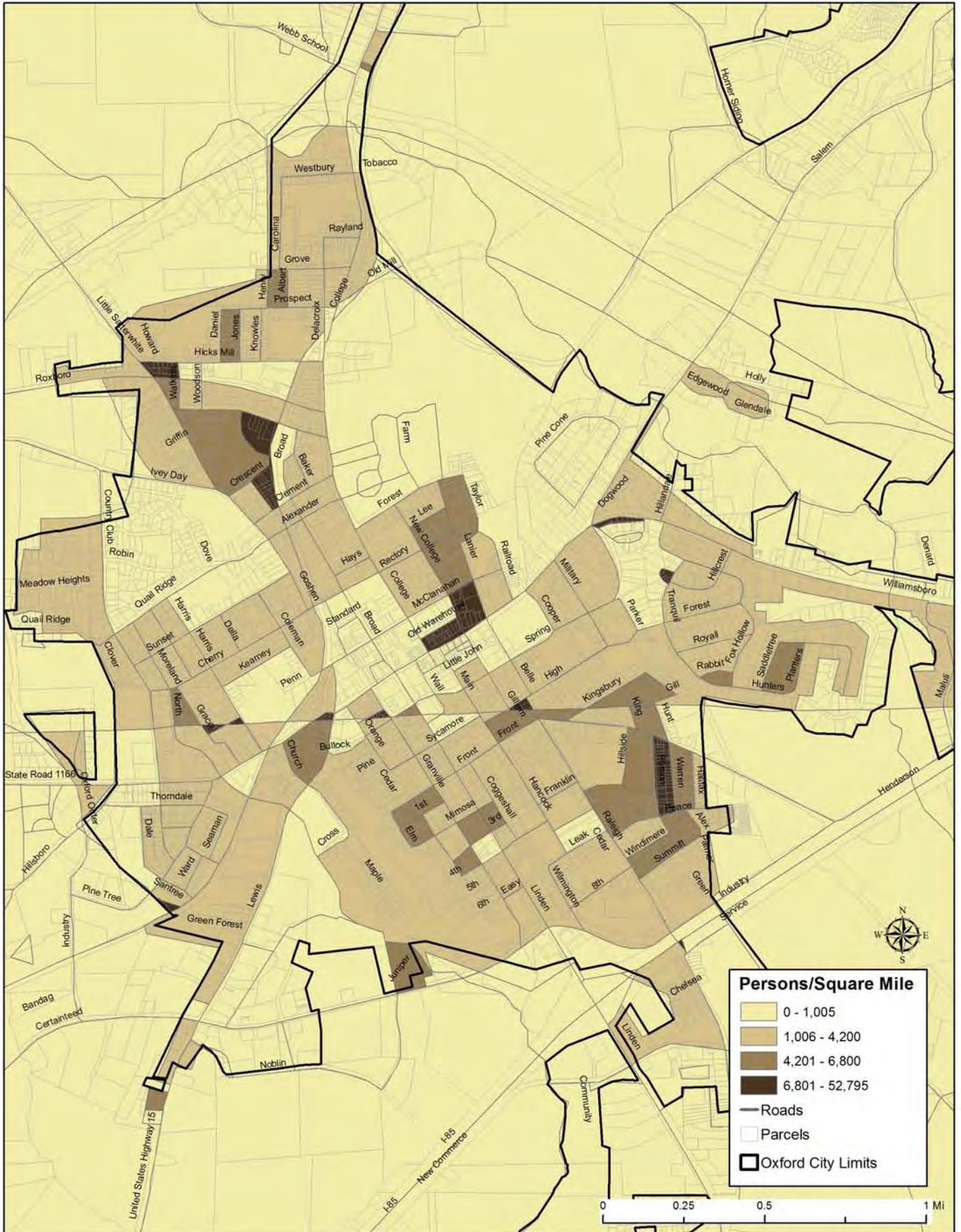


# MAP 2.1 EXISTING CONDITIONS





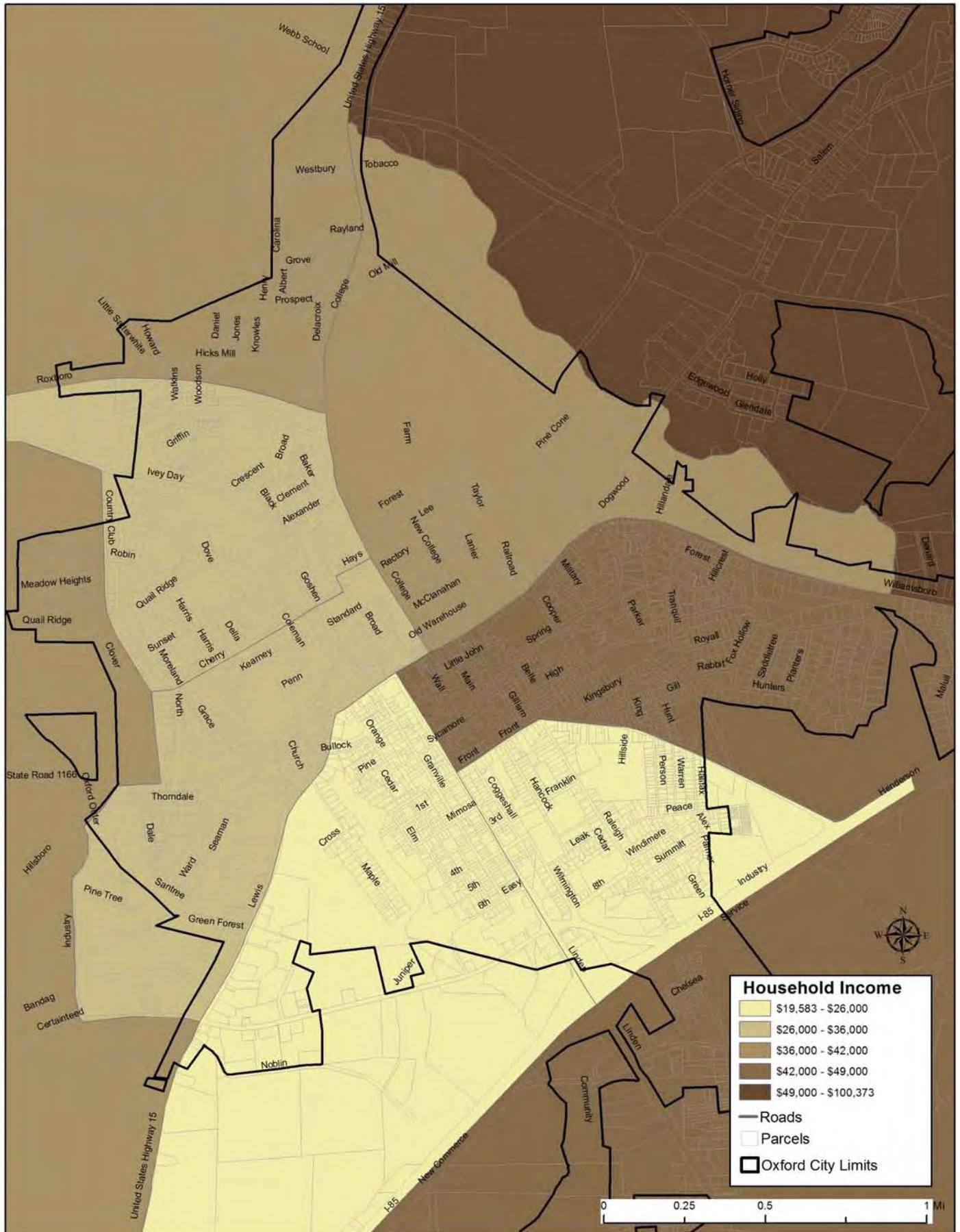
# MAP 2.2 POPULATION DENSITY



Maps from 2012 Comprehensive Pedestrian Plan  
 Data Source: US Census Block Data

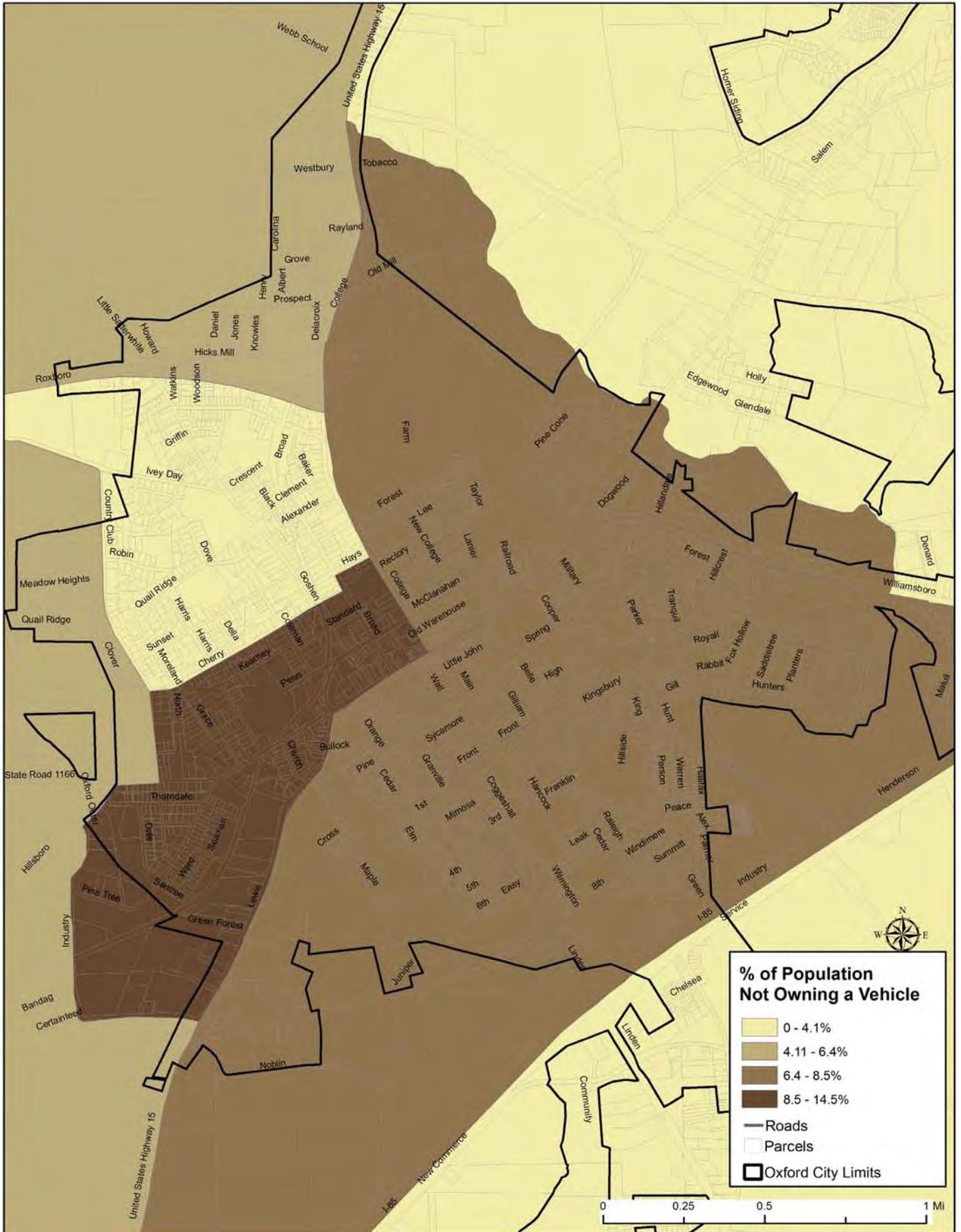


# MAP 2.3 MEDIAN HOUSEHOLD INCOME





# MAP 2.4 VEHICLE OWNERSHIP



Maps from 2012 Comprehensive Pedestrian Plan  
 Data Source: US Census Block Group Data



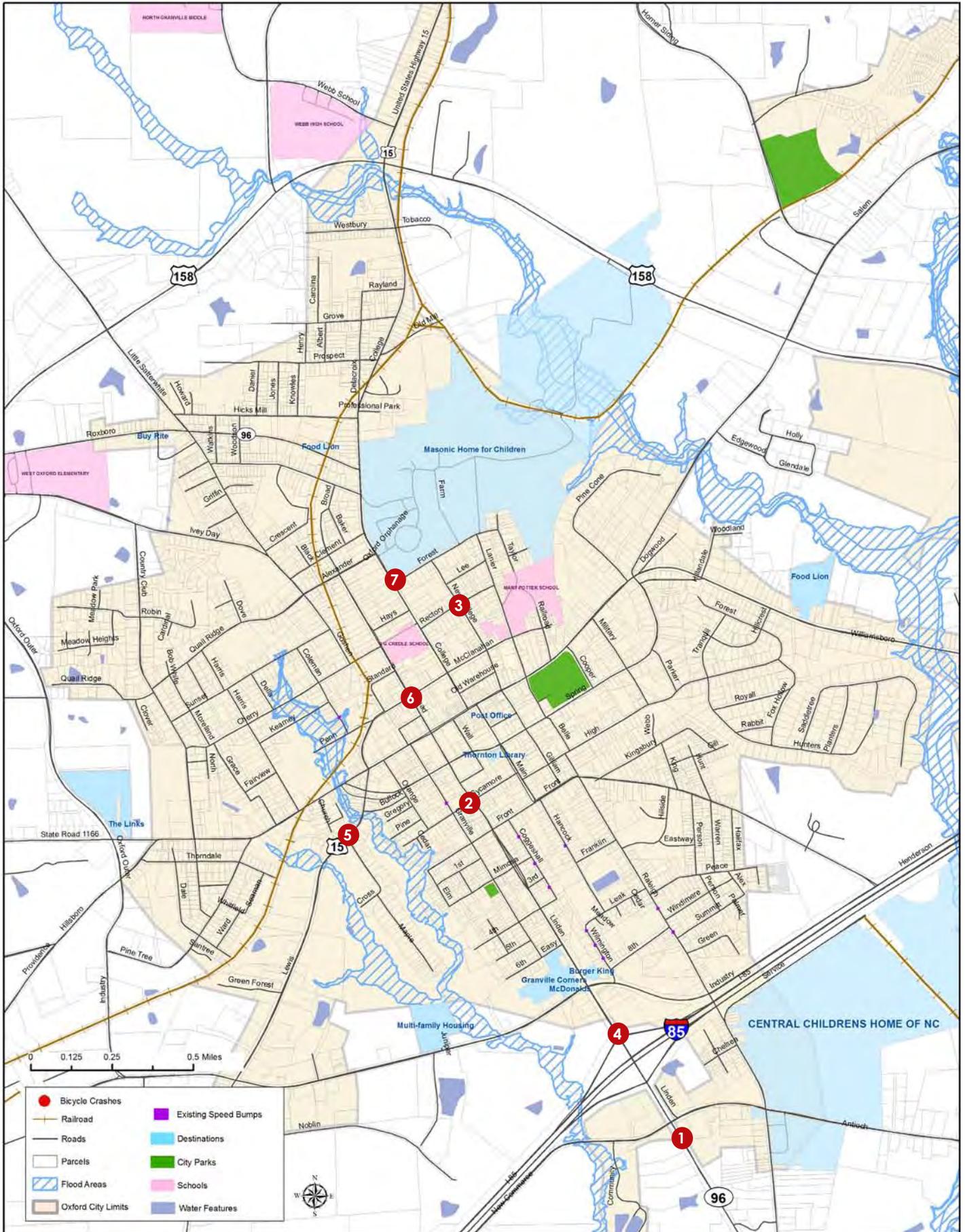
## NCDOT REPORTED BICYCLE CRASHES 2000-2012

*For the Reporting Period of January 1, 2000 to May 31, 2012*

Map ID	NCDMV Crashid	On Road	Miles	Dir	From Road	Toward Road	Mileposted Route Number	Milepost Number	Crash Severity	Date of the Crash	Time of the Crash	Crash Type
1	100112980	LINDEN AVE	0.568	S	INDUSTRY DR	ANTIOCK RD	30000096	16.002	C-Injury (Possible)	4/11/2000	8:30:00 PM	Pedalcyclist
2	100981760	SYCAMORE ST	0.057	W	LINDEN AVE	MAIN ST	40001207	0.173	Property Damage	9/1/2003	7:53:00 PM	Pedalcyclist
3	101203160	NEW COLLEGE ST	0		RECTORY ST	LANIER ST	50021221	0.18	B-Injury (Evident)	7/5/2004	10:37:00 AM	Pedalcyclist
4	101719080	LINDEN AVE	0.009	N	I 85	LOOP RD	30000096	16.359	C-Injury (Possible)	9/2/2005	5:06:00 PM	Pedalcyclist
5	102291467	LEWIS ST	0	S	MAPLE DR	MAPLE DR	20000015	20.27	B-Injury (Evident)	2/4/2008	4:53:00 PM	Pedalcyclist
6	102723662	BROAD ST	0	W	MCCLANAHAN ST	LINDEN AVE	50003816	0.832	C-Injury (Possible)	4/28/2009	4:56:00 PM	Pedalcyclist
7	103279454	COLLEGE ST	0	S	FOREST AVE	RECTORY ST	20000015	21.295	C-Injury (Possible)	8/10/2011	4:23:00 PM	Pedalcyclist



# MAP 2.5 NCDOT REPORTED BICYCLE CRASHES



FOOTNOTES FROM, "DEMOGRAPHIC ANALYSIS":

1. <http://quickfacts.census.gov/qfd/states/37/3749800.html>



# 3

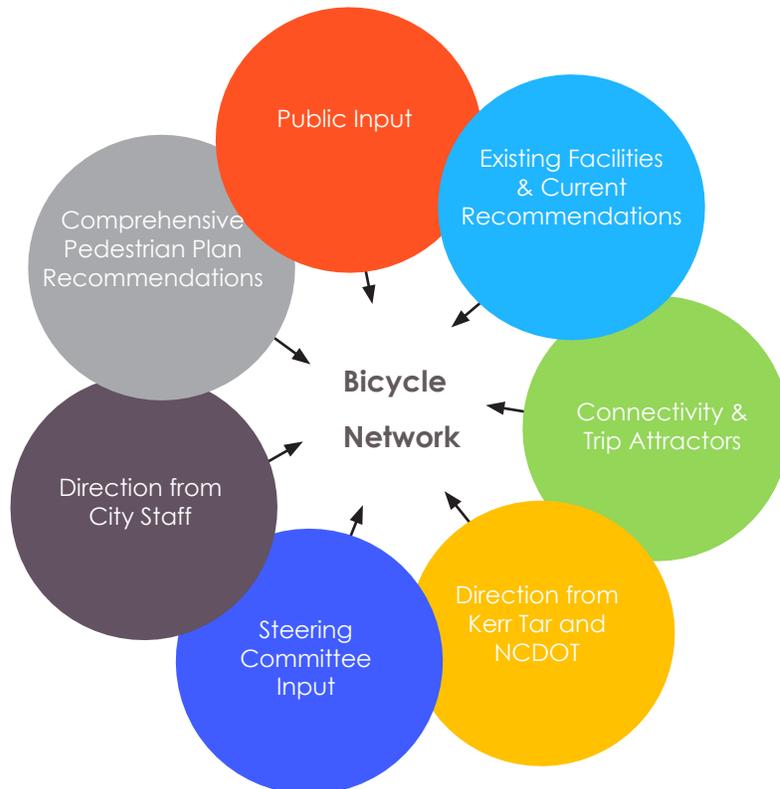
## NETWORK RECOMMENDATIONS

### CHAPTER OUTLINE

OVERVIEW & METHODOLOGY | BICYCLIST “TYPES”  
RECOMMENDED BICYCLE FACILITY NETWORK | PRIORITY PROJECT  
RECOMMENDATIONS

### OVERVIEW & METHODOLOGY

The recommended bicycle network presented in this chapter takes into account that bicyclists (both current bicyclists and potential future bicyclists) have a wide range of skill and comfort levels while bicycling. Recommendations include both on-street and off-street bicycle facilities that will accommodate cyclists of all skill levels and will create a more connected, comprehensive bicycle network. The core focus is on methodology, the overall bicycle facility network map, and the identification of key roadways that present opportunity for safe and convenient bicycle travel. The diagram below illustrates the various indicators and inputs that serve to guide and inform the recommendations made in this Plan.





# BICYCLIST “TYPES”

As previously mentioned, the recommended bicycle network builds on a key principle that bicyclists (both current bicyclists and potential future bicyclists) have a range of skill levels. Type “C” bicyclists are beginners, often seniors and children. Type “B” bicyclists are intermediate level, typically occasional commuters and recreational cyclists. Type “A” bicyclists are experienced, regular commuters and recreational cyclists who are comfortable sharing the road with motor vehicles. These groups are not always exclusive – some elite level athletes still like to ride on shared-use paths with their families, and recreational bicyclists will sometimes use their bicycles for utilitarian travel. Most importantly, the majority of the population falls in the “Type B” or “Type C” category.

## TYPE “B” BICYCLISTS



*Type “B” bicyclists are intermediate level, typically occasional commuters and recreational cyclists.*

## TYPE “A” BICYCLISTS



*Type “A” bicyclists are experienced, regular commuters and recreational cyclists who are comfortable sharing the road with motor vehicles.*

## TYPE “C” BICYCLISTS



*Type “C” bicyclists are beginners, often seniors and children.*



## RECOMMENDED BICYCLE FACILITY NETWORK

According to North Carolina State Law, bicyclists have the same rights and responsibilities as motorists and are allowed to ride on all roads in Oxford. Modifications to roadways in Oxford as well as the addition of off-street pathways, will make bicycling a safer and more viable form of transportation. The key facility types for this plan are shared-lane markings (sharrows), bicycle lanes, paved shoulders, buffered bicycle lanes, multi-use greenways, multi-use sidepaths and bicycle parking. These facilities should be included in all new roadway design and roadway reconstruction/widening projects in the City of Oxford especially as they are recommended in the Map 3.1 of this Plan. Collaboration with the City of Oxford, Granville County and the Kerr-Tar RPO will be important for regional connectivity and to offer Oxford residents more opportunities for longer distance bicycle trips. Bike route signage may be considered for any of the six bicycle facilities. Below are brief descriptions of six types of bicycle facilities recommended in Oxford. Complete design guidelines can be found in Appendix A of this Bicycle Plan.



### BICYCLE SHARED-LANE MARKINGS (SHARROWS)

Shared lane markings, or "sharrows," as shown in the picture above, are placed in a linear pattern along a corridor, typically every 100-250 feet and after intersections. They function in several important ways:

- They make motorists more aware of the potential presence of cyclists;
- Direct cyclists to ride in the proper direction; and
- Remind cyclists to ride further from parked cars to avoid 'dooring' collisions.

### GRANVILLE STREET, OXFORD, NC (VISUALIZATION)



Visualization of Granville Street in Oxford, with the addition of bicycle shared-lane markings and bicycle signage.



## BICYCLE LANES



A bicycle lane, as shown in the picture to the left, is a portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential and exclusive use of bicyclists. The minimum width for a bicycle lane is four feet; five- and six-foot bicycle lanes are typical for collector and arterial roads. There are opportunities for bicycle lanes in Oxford on several existing roadways that feature wide automobile travel lanes and have curb and gutter. As a general practice in the future, any local roadway that is widened or reconstructed with curb and gutter, should incorporate bicycle lanes, with consideration for speed limit reductions.

An advanced visualization of bicycle lanes on Linden Avenue / NC 96 is presented on page 3-19, with existing conditions on Linden Avenue presented on page 3-18.

## SPRING STREET, OXFORD, NC (VISUALIZATION)



Visualization of Spring Street in Oxford, with the addition of a buffered bicycle lane, a bicycle lane, and bicycle lane signage.



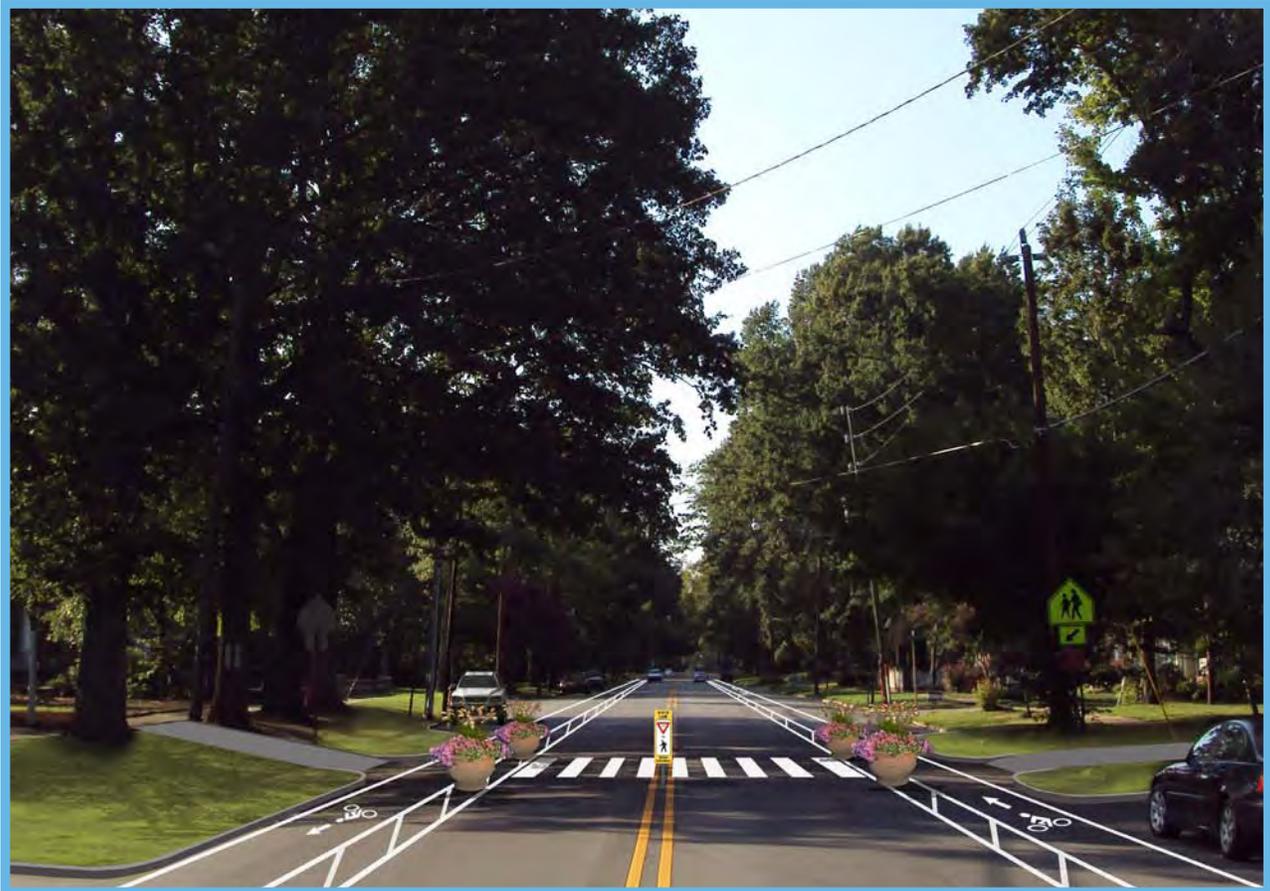
## BUFFERED BICYCLE LANES

A buffered bike lane, as shown in the picture to the right, is similar to a regular bike lane, but also includes a marked buffer between the bike lane and adjacent travel lanes. The purpose of a buffered bike lane is to provide distance between the automobile travel lane and the bicycle lane to increase safety.

The buffer is placed between the bike lane and automobile travel lane. The buffer is marked with white chevrons to indicate that no vehicles are allowed to travel in the buffered area. There are opportunities for bicycle lanes in Oxford on several existing roadways that feature wide automobile travel lanes and have curb and gutter.



## COLLEGE STREET, OXFORD, NC (VISUALIZATION)



Visualization of College Street in Oxford, with the addition of buffered bicycle lanes, cement planters at the mid-block pedestrian crossing, and in-road pedestrian crossing signage.



## PAVED SHOULDERS



Paved shoulders, as shown in the picture to the left, are the part of a roadway which is contiguous and on the same level as the regularly traveled portion of the roadway. There is no minimum width for paved shoulders; however a width of at least four feet is preferred. Ideally, paved shoulders should be included in the construction of new roadways and/or the upgrade of existing roadways, especially where there is a need to more safely accommodate bicycles. Recreational bicycling is very common across this region of North Carolina. Most rural roadways in their existing configuration, either feature no shoulder or only a 1-2 foot paved shoulder which is not adequate for bicyclists. Roadways in which paved shoulders should be added or widened to a minimum of four feet are shown on Map 3.1. Sidewalks on one or both sides of the street were recommended in the 2012 Comprehensive Pedestrian Plan for several roadways that currently have open drainage. When sidewalks are constructed on these roads and curb and gutter are added, bike lanes should be included in the new roadway design. Current two-lane roads that would still benefit from short-term paved shoulder widening include:

- Country Club Drive
- Ivey Day Road
- Roxboro Road
- Salem Road
- Henderson Street
- Hillsboro Street

## BIKE PARKING



This Plan recommends adding bicycle racks to destinations throughout the City, including Downtown Oxford, at parks, schools, the library, post office, grocery stores, shopping/employment centers, and multi-family housing communities. Bicycle parking is recommended at the following locations in Oxford:

- Downtown Core
- Mary Potter School
- Webb High School
- Grocery Stores
- Thornton Library
- Granville Corners
- Shoppes at Oxford
- All Parks
- Credle Elementary School
- Post Office School
- All Multi-Family Residential Areas
- Central Childrens Home & Masonic Home for Children



**INVERTED "U"**  
One rack element supports two bikes.



**POST AND LOOP**  
One rack element supports two bikes.



## MULTI-USE TRAILS (ALSO CALLED GREENWAYS)

A greenway, as shown in the picture to the right, is defined as a linear corridor of land that can be either natural, such as rivers and streams, or man-made, such as utility corridors or abandoned railroad beds. Many greenways contain trails that can be designed to accommodate a variety of trail users, including bicyclists, walkers, hikers, joggers, skaters, horseback riders, and those confined to wheelchairs (hence, the term 'multi-use trail'). Greenway corridors can also serve environmental purposes, protecting forests and water quality, and offering ample opportunities for environmental education. Greenway trails in Oxford should be integrated with and serve as an off-road extension of the on-road bicycle network.

This is a planning level of analysis for trails. Trails can be constructed of many different materials, however, for trails that serve the purpose of bicycle transportation, hard surfaces such as asphalt or concrete are recommended. Each trail project will also require close coordination with nearby property owners. Design features such as landscaped screening, fencing, and other treatments should be considered to help ensure privacy where desired.



## MULTI-USE SIDE PATHS

In order to best serve different types of bicyclists (see page 3-2) multi-use side paths located adjacent to roadways, as shown in the pictures to the right, should not prohibit the provision of adequate on-road bicycle facilities (such as paved shoulders or bicycle lanes). Furthermore, multi-use trails next to roadways are most appropriate in corridors with few driveways and intersections and should be at least 10' wide.

Families and novice bicyclists are most comfortable in an off-road situation. Therefore, the multi-use trail network is a very integral part of the overall bicycle network, and it's development should be a priority of the City of Oxford.

A visualization is presented to the right of Lewis Street / US 15, with the addition of a 10' wide multi-use side path on the eastern side of the road. This proposed side path would connect the Shoppes at Oxford with Downtown Oxford and nearby residential areas along Lewis Street / US 15 and Industry Drive.

### MULTI-USE SIDE PATH VISUALIZATION: LEWIS STREET / US 15, NEAR THE SHOPPES AT OXFORD





# PRIORITY PROJECT RECOMMENDATIONS

The recommendations for on-road and off-road bicycle facilities are presented in Map 3.1 on page 3-9. The Steering Committee, City staff, and planning consultants worked together to develop this comprehensive set of recommendations for Oxford.

The recommendations take into account the impact of physical and environmental forces, and the relationships between these forces, that govern the successful creation of a comprehensive bicycle facility network. Special attention was given to how citizens will use the different types of facilities (on-road and off-road) and how these facilities will impact the surrounding built and natural environments. The built and natural environments were thoroughly evaluated during the existing conditions analysis presented in Chapter 2, and specific design standards and guidelines for every facility recommendation are available in Appendix A of this Plan.

## MAP 3.1 “RECOMMENDED BICYCLE NETWORK”

Map 3.1 illustrates the overall recommendations for the entire City of Oxford. Both short and longer term projects, on and off-road facilities, as well as bicycle parking are included on the map.

## PRIORITY CORRIDORS

Detailed information on four higher priority corridors is introduced beginning on page 3-10. Two key “north-south” routes and two key “east-west” corridors were identified during discussions with the Steering Committee and City staff, and were further evaluated during field work investigations. Improvements to these corridors to accommodate cyclists will offer the citizens of Oxford convenient and safe access to basic needs and will create connections between neighborhoods, downtown, commercial areas, schools, parks and municipal services. The bicycle facility recommendations for the four roadways listed below can be made in the short term, as the recommendations can be implemented within the existing roadway corridor and additional corridor width is not needed. The corresponding number for each of these roadways are included in Map 3.1

- #1. College Street
- #2. Cherry Street
- #3. Granville Street
- #4. Spring Street

## LONGER TERM PROJECT IMPLEMENTATION

Implementation of on-road bicycle facility projects that are not located on one of the four roadway corridors identified in the previous section should be included in the City's phased implementation plan. To offer a truly comprehensive bicycle network to residents and visitors of Oxford, the roadway corridors listed below, along with the remaining projects identified on Map 3.1, should be incorporated into future roadway expansion or improvement projects, or when land uses change or there is an increase in development density along the roadway.

The following roadway corridors were identified by the Steering Committee as needing bicycle facilities.

- Quail Ridge Road
- Ivey Day Road
- Salem Road
- Antioch Road
- Henderson Road

## ADVANCED VISUALIZATION OF LINDEN AVENUE / NC 96

An advanced visualization of Linden Avenue/NC 96 was developed during the Comprehensive Pedestrian Plan process. The existing conditions image for Linden Avenue/NC 96 is shown on page 3-18 of this chapter, and the advanced visualization on page 3-19. The advanced visualization includes a recommendation for bicycle lanes in both the north and southbound directions.

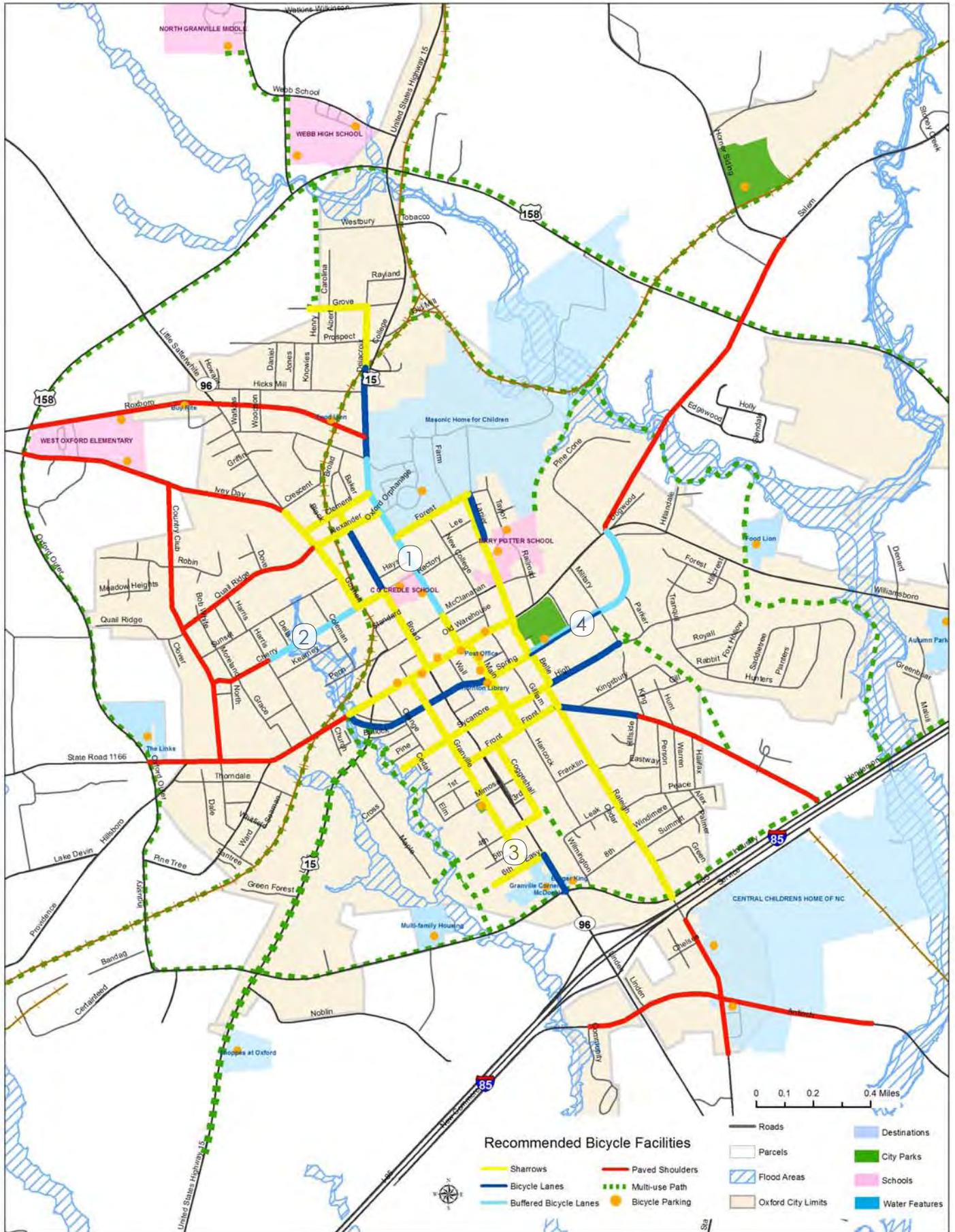
## PLANNING-LEVEL PER UNIT COST ESTIMATES FOR PLANNING PURPOSES ONLY

ITEM	PER UNIT COST
Bike Route Signage	\$200
Asphalt Side Path per Linear Foot	\$70
Shared Lane Marking (Thermo)	\$40
4" Striping (Thermo) per Linear Foot per Single Line	\$0.60
Bicycle Rack	\$150 - \$300

\*Project costs vary over time and by geography. Further evaluation will be needed to determine exact project costs.



# MAP 3.1 RECOMMENDED BICYCLE NETWORK





# 1 | CORRIDOR #1: COLLEGE STREET, OXFORD, NC



## PHOTOS: COLLEGE STREET, OXFORD, NC - VISUALIZATION

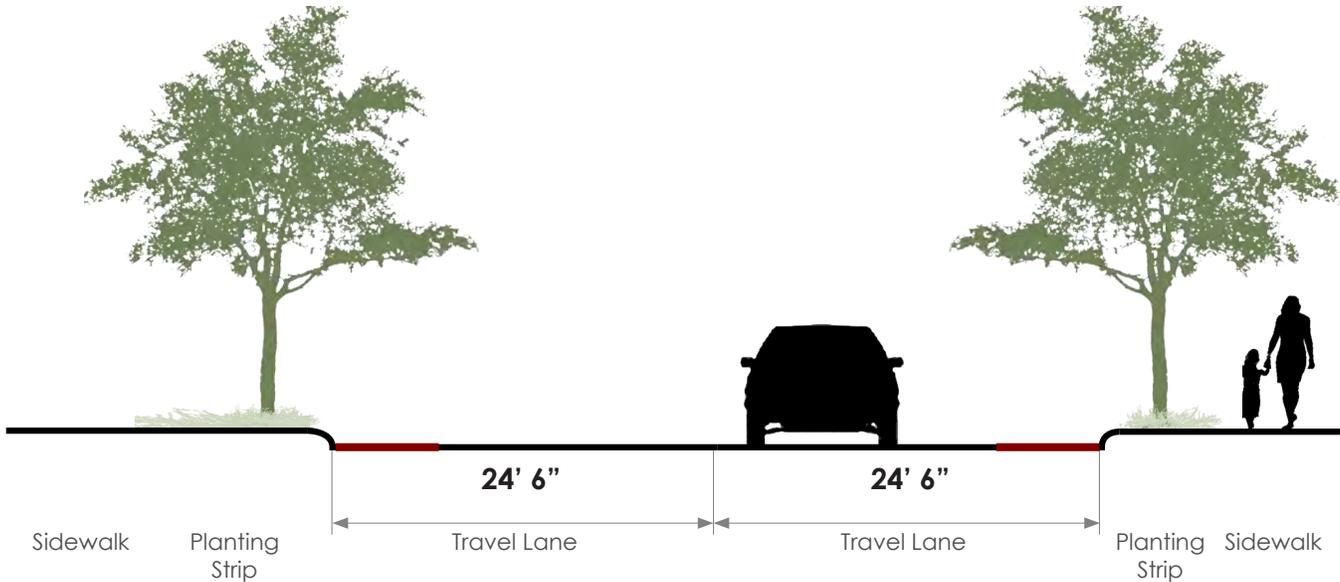




## EXISTING CROSS SECTION: COLLEGE STREET (FROM W. COLLEGE TO MCCLANAHAN)

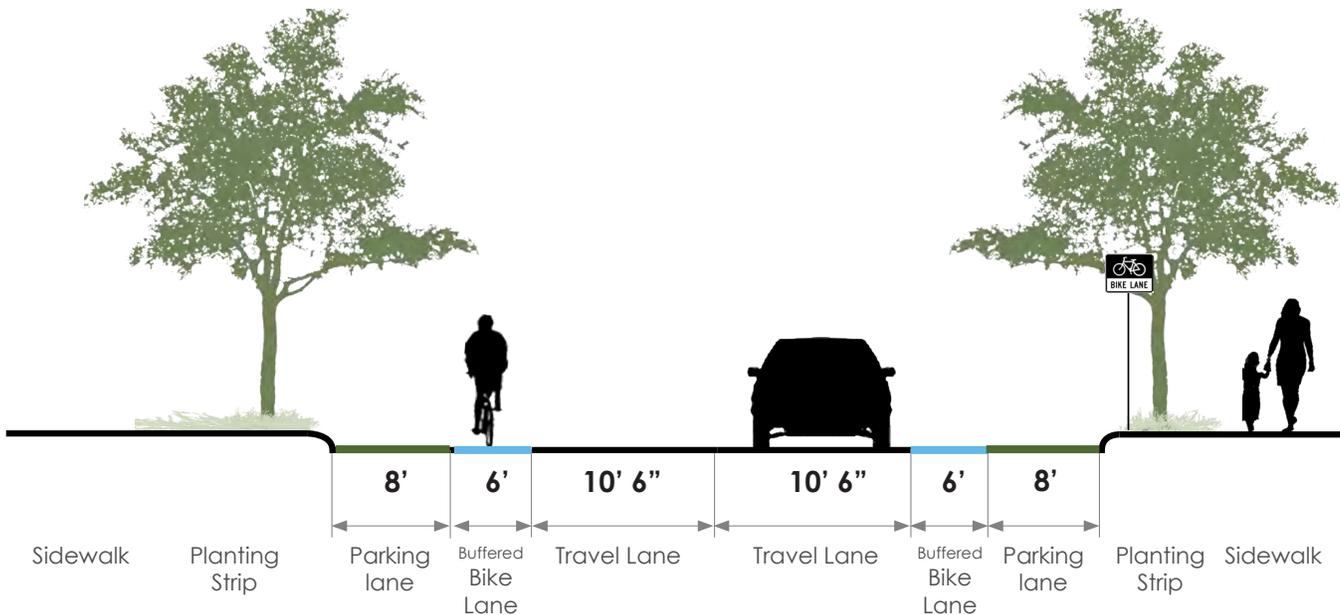
Two lane street with on-street parking allowed on both sides of the street.

- parallel parking (unmarked)
- parallel parking (marked)
- buffered bike lane



## RECOMMENDED CROSS SECTION: COLLEGE STREET (FROM W. COLLEGE TO MCCLANAHAN)

Two lane street with a parking lane striped on both sides of the street, buffered bicycle lanes and bicycle lane signage. Speed limit reduction is recommended.





## 2 CORRIDOR 2: CHERRY STREET, OXFORD, NC



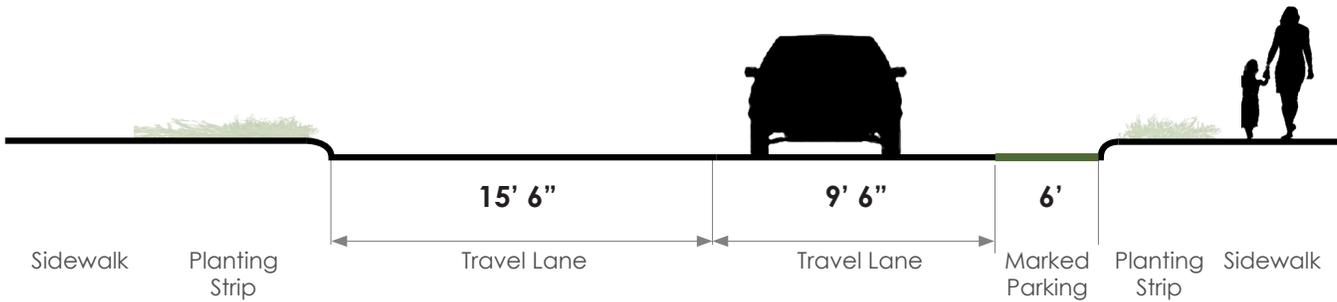
PHOTO: CHERRY STREET, OXFORD, NC - EXISTING CONDITIONS



## EXISTING CROSS SECTION: CHERRY STREET (FROM BROAD TO GOSHEN)

Two lane neighborhood street with marked on-street parking.

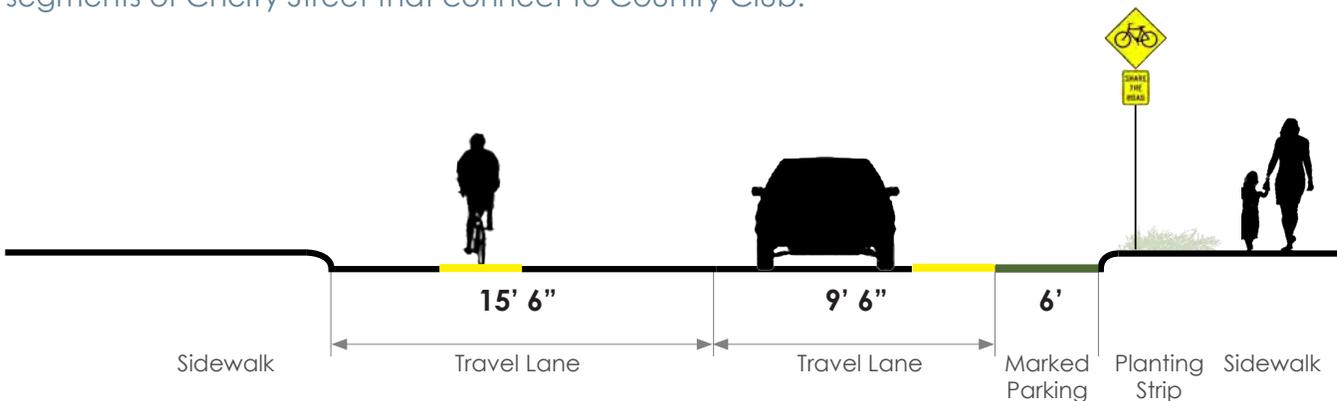
-  parallel parking (marked)
-  shared lane making



## RECOMMENDED CROSS SECTION: CHERRY STREET (FROM BROAD TO GOSHEN)

Two lane neighborhood street with marked on-street parking, shared lane markings and share the road signage are shown on the recommended cross section below. Speed limit reduction is recommended.

The existing cross section of Cherry Street changes after Goshen, and as shown on the map on page 3-12, buffered bicycle lanes and paved shoulders are recommended for the western segments of Cherry Street that connect to Country Club.





### 3 CORRIDOR #3: GRANVILLE STREET, OXFORD, NC



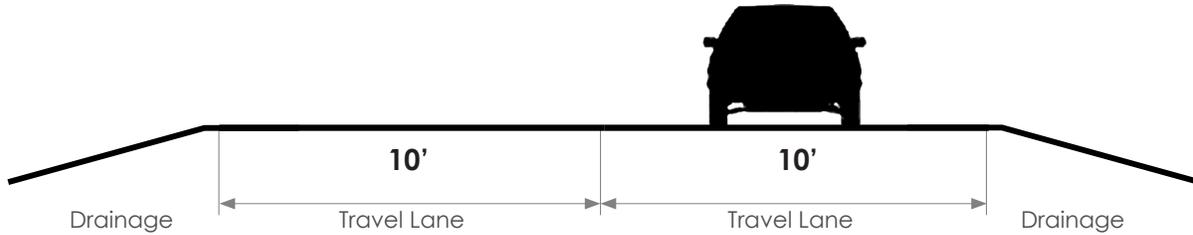
### PHOTOS: GRANVILLE STREET, OXFORD, NC - VISUALIZATION



## EXISTING CROSS SECTION: GRANVILLE STREET (FROM EASY TO MIMOSA)

Two lane neighborhood street with drainage on both sides of the street, between Easy Street and Mimosa Street. The roadway cross section of Granville Street changes north of Mimosa Street.

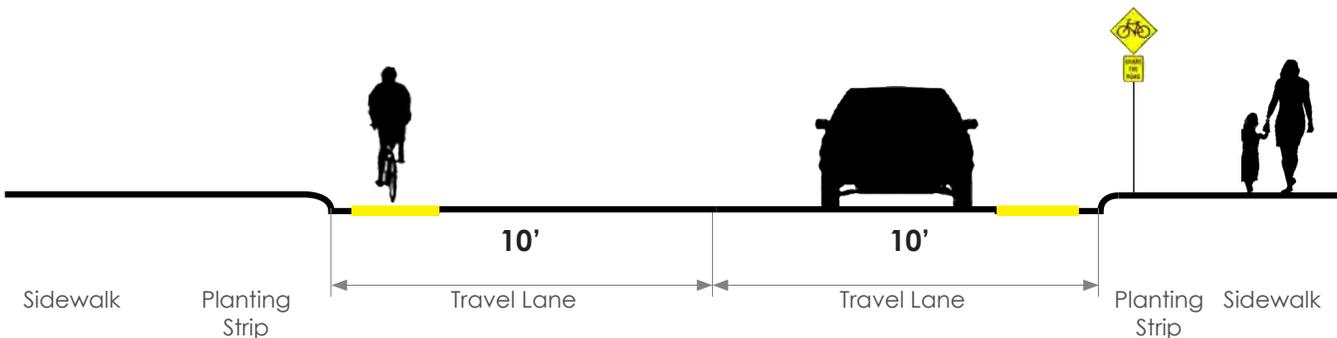
 shared lane marking



## RECOMMENDED CROSS SECTION: GRANVILLE STREET (FROM EASY TO MIMOSA)

Two lane neighborhood street with sidewalks added on both sides of street, shared lane markings, share the road signage, and speed limit reduction is recommended. Recommendations are shown specifically for segment of Granville Street between Easy Street and Mimosa Street.

The existing cross section of Granville changes between Mimosa Street and Spring Street, and improvements should be made between Mimosa and Spring that are consistent with the recommendations shown below.



## 4 CORRIDOR #4: SPRING STREET, OXFORD, NC



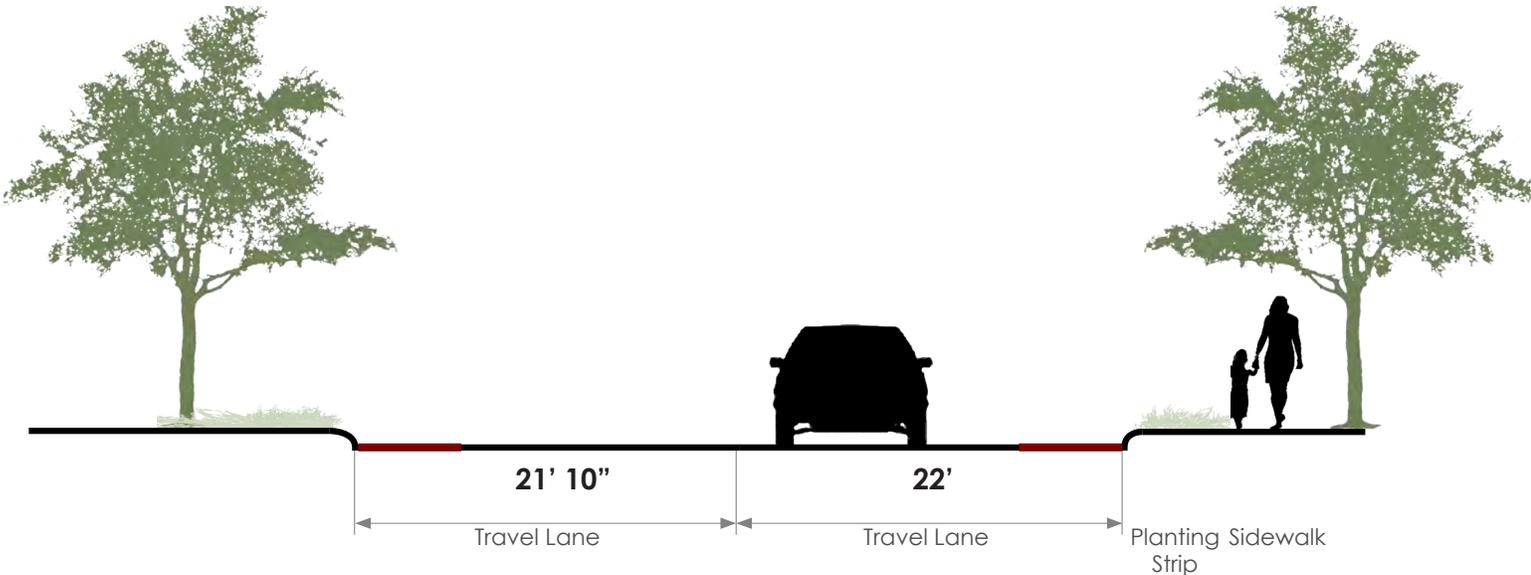
### PHOTOS: SPRING STREET, OXFORD, NC - VISUALIZATION



## EXISTING CROSS SECTION: SPRING STREET (FROM MILITARY TO BELLE)

Two lane arterial through-street with on-street parking allowed on both sides of the street.

-  parallel parking (unmarked)
-  parallel parking (marked)
-  bike lane
-  buffered bike lane

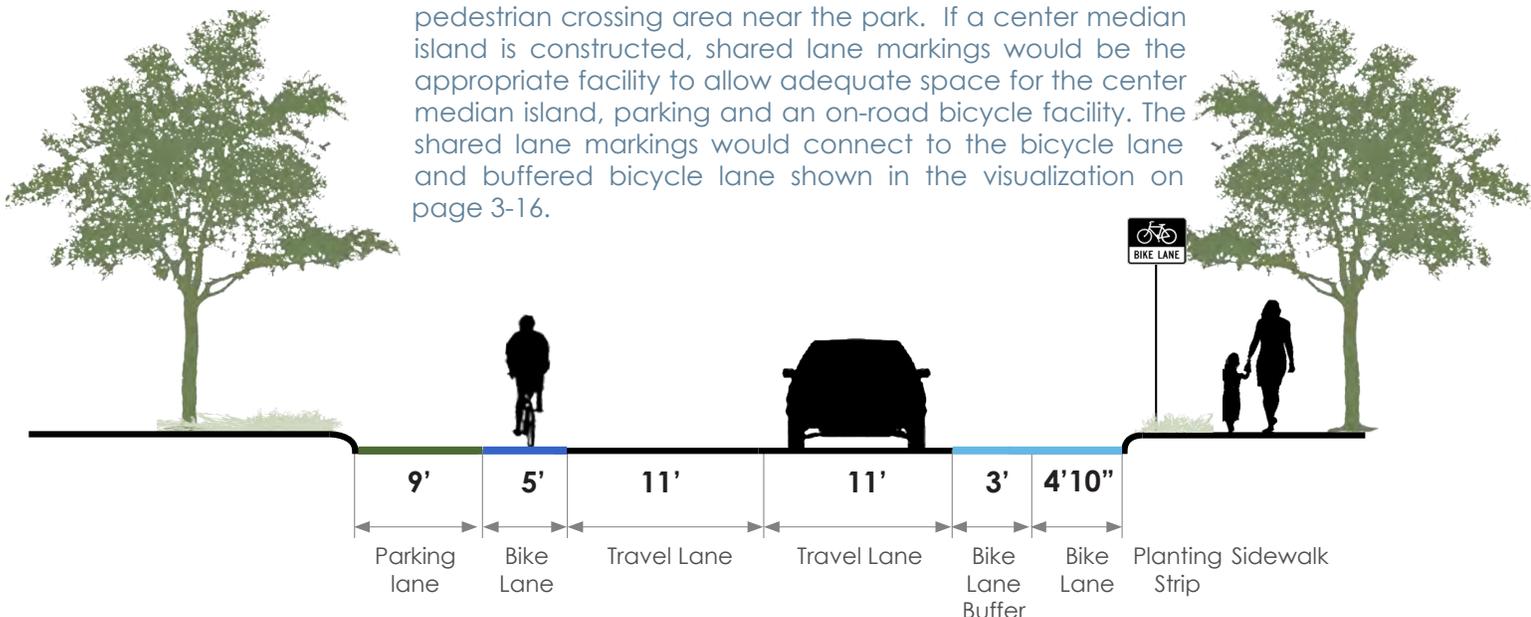


## RECOMMENDED CROSS SECTION: SPRING STREET (FROM MILITARY TO BELLE)

Two lane arterial through-street with a parking lane and bicycle lane striped on south of the street, buffered bicycle lane on north side of street, and bicycle lane signage. Speed limit reduction is recommended. Recommendations are shown specifically for segment of Spring Street between Military Street and Belle Street.

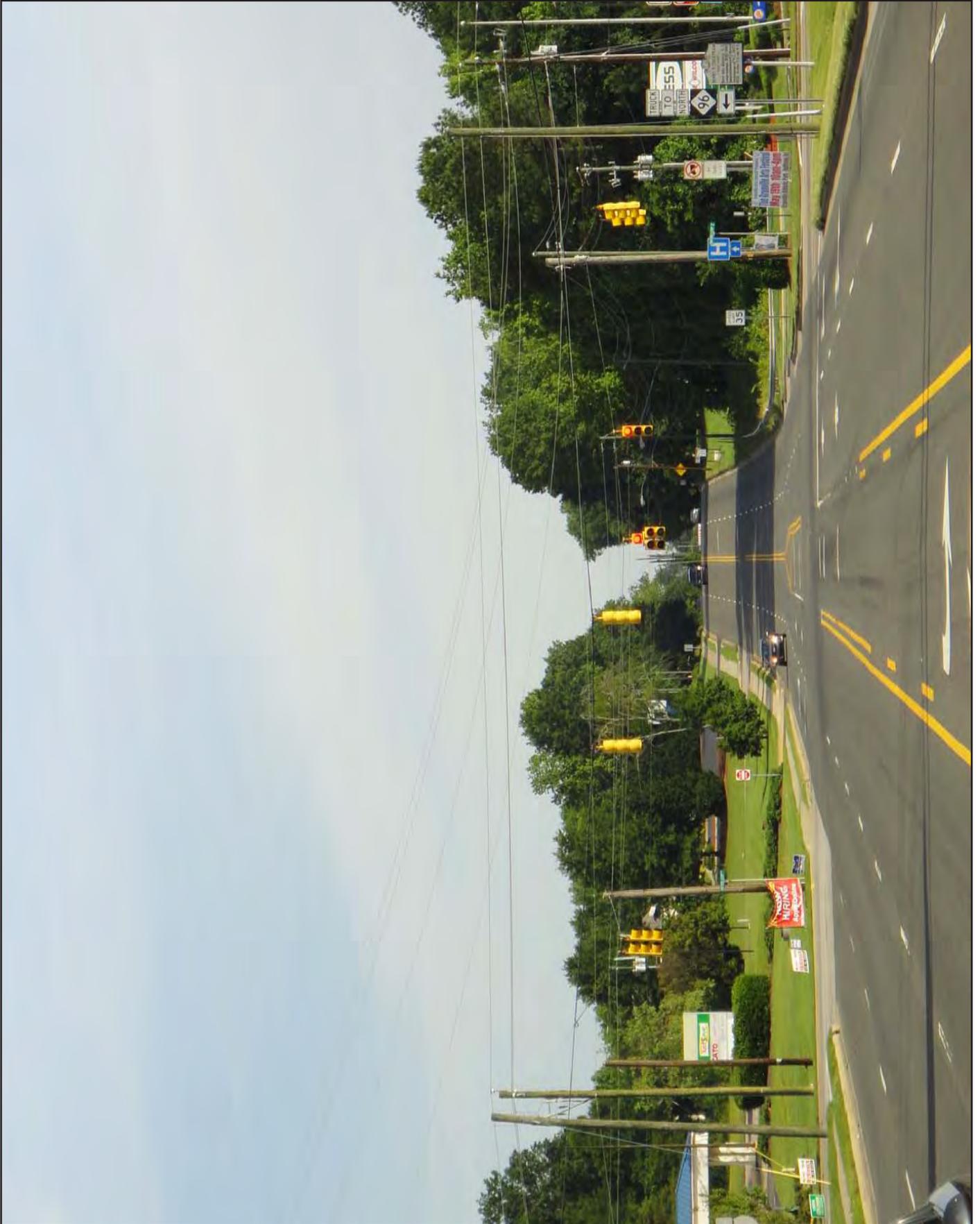
The existing cross section of Spring changes between Belle Street and Linden Street, and between Military Street and Williamsboro Street, and improvements should be made in these areas that are consistent with the recommendations shown below (see map on page 3-16). If the City of Oxford purchases additional property along Spring Street and expands the existing park facility, consideration should be given to extending the planted center median island that currently exists along Spring. Extending the existing planted center

median island would enhance this segment of Spring Street, create a "gateway" area into Oxford, and provide a safe pedestrian crossing area near the park. If a center median island is constructed, shared lane markings would be the appropriate facility to allow adequate space for the center median island, parking and an on-road bicycle facility. The shared lane markings would connect to the bicycle lane and buffered bicycle lane shown in the visualization on page 3-16.





## LINDEN AVENUE - EXISTING CONDITIONS





# LINDEN AVENUE - VISUALIZATION





# 4 IMPLEMENTATION STRATEGIES

## CHAPTER OUTLINE

OVERVIEW | KEY ACTION STEPS | KEY PARTNERS IN IMPLEMENTATION | FACILITY DEVELOPMENT METHODS

## OVERVIEW

This plan provides recommendations that will make the City of Oxford a more bicycle-friendly, livable community. This chapter outlines the implementation steps that need to happen to make these recommendations a reality. It provides implementation priorities, key partners in implementation, and facility development methods.

## KEY ACTION STEPS

### ADOPT THIS PLAN

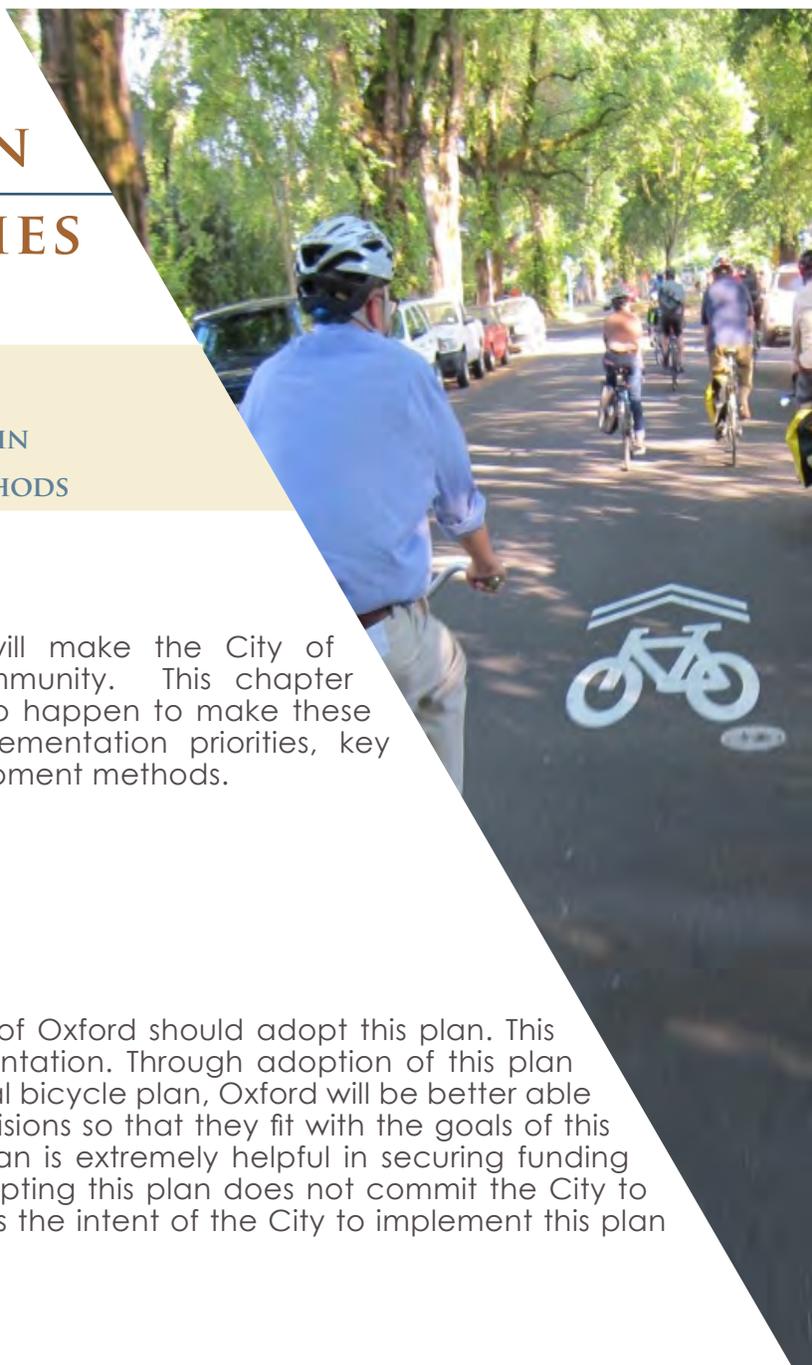
Before any other action takes place, the City of Oxford should adopt this plan. This should be considered the first step in implementation. Through adoption of this plan and its accompanying maps as the City's official bicycle plan, Oxford will be better able to shape transportation and development decisions so that they fit with the goals of this plan. Most importantly, having an adopted plan is extremely helpful in securing funding from state, federal, and private agencies. Adopting this plan does not commit the City to dedicate or allocate funds, but rather indicates the intent of the City to implement this plan over time, starting with these action steps.

### DESIGNATE STAFF

Designate staff to oversee the implementation of this plan and the proper maintenance of the facilities that are developed. It is recommended that a combination of existing Planning, Engineering, Parks and Recreation, and Public Works staff oversee the day-to-day implementation of this plan. In many municipalities, this task is covered by a full-time bicycle and bicycle coordinator, but in Oxford, it may make more sense to fold these responsibilities into current staff responsibilities. In the long term, a full-time Kerr-Tar Regional Council of Governments multi-modal coordinator position with Kerr-Tar COG should be considered.

### ESTABLISH A BICYCLE AND PEDESTRIAN ADVISORY COMMISSION (BPAC)

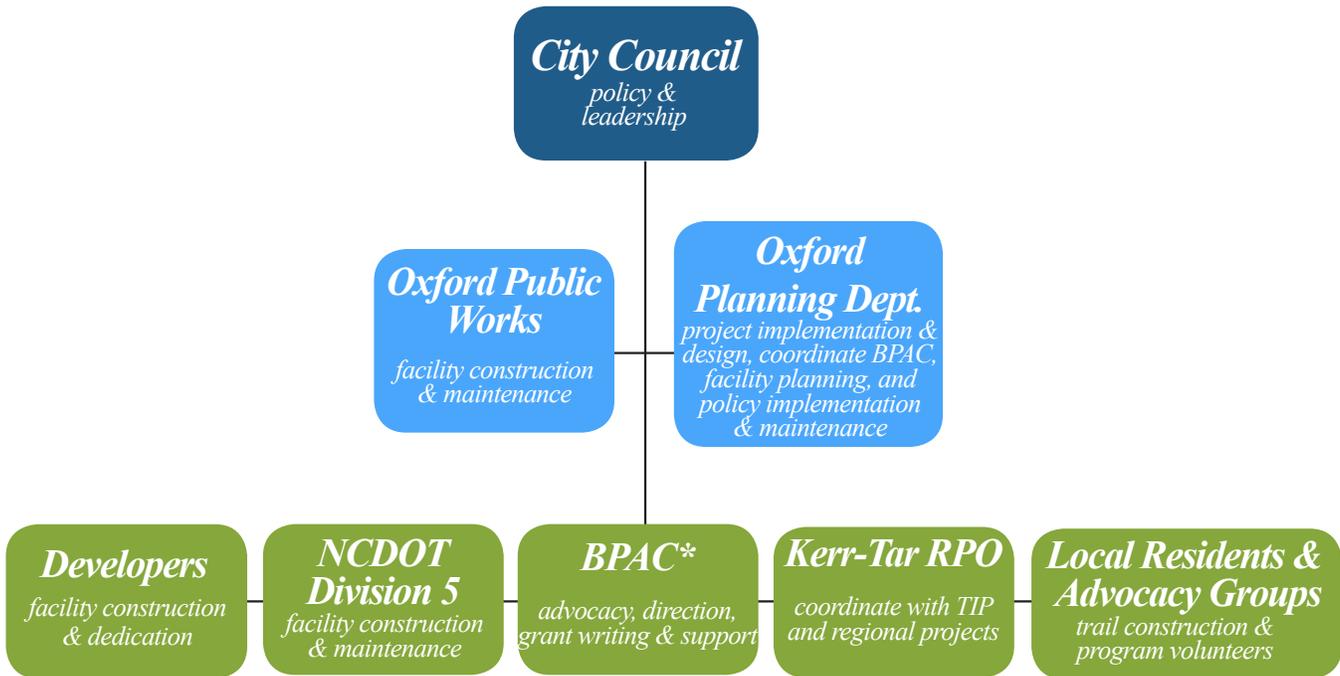
The City of Oxford should establish a Bicycle and Pedestrian Advisory Commission (BPAC) to assist in the implementation of this Plan. The City of Oxford Planning Department would oversee this group. The BPAC would be comprised of both commuting and recreational cyclists and bicycle advocates, and should champion the recommendations of this Plan and the recently adopted 2012 Comprehensive Pedestrian Plan. Formation of the BPAC will also represent a significant step in becoming a Bicycle Friendly Community through the League of American Bicyclists. The BPAC's role would be to provide a communications link between the citizens of the community and City government. The BPAC should meet periodically, be tasked with assisting the City staff in community outreach, marketing and educational activities recommended by this plan.





Models for BPAC exist throughout North Carolina. Durham, NC, has had in place their own BPAC (www.bikewalkdurham.org) for many years. In Raleigh, a BPAC was recently formed in response to the adoption of their 2009 Bicycle Transportation Plan. These organizations, and others like them, traditionally focus on education, advocacy, partnerships, events and community service. Each BPAC member could represent one key functional area: planning, design, safety, maintenance, education, health, recreation, etc. Oxford would greatly benefit by supporting the creation of such an organization.

## ORGANIZATIONAL FRAMEWORK FOR IMPLEMENTATION



\*BPAC = Bicycle and Pedestrian Advisory Committee to be formed after adoption of this plan





## BEGIN QUARTERLY MEETING WITH KEY PROJECT PARTNERS

Coordination between key project partners will establish a system of checks and balances, provide a level of accountability, and ensure that recommendations are implemented. This meeting should be organized by the designated City staff, and should include representatives from the Organizational Chart shown on the previous page. The purpose of the meeting should be to ensure that this Plan's recommendations are integrated with other transportation planning efforts in the region, as well as long-range and current land use planning, economic development planning, and environmental planning. Attendees should work together to identify and secure funding necessary to immediately begin the first year's work, and start working on a funding strategy that will allow the City to incrementally complete each of the suggested physical improvements, policy changes and programs over a 5-10 year period. A brief progress benchmark report should be a product of these meetings, and goals for the year should be reconfirmed by participants. The meetings could also occasionally feature special training sessions on pedestrian, bicycle, and trail issues.

## SEEK MULTIPLE FUNDING SOURCES AND FACILITY DEVELOPMENT OPTIONS

Multiple approaches should be taken to support bicycle facility development and programming. It is important to secure the funding necessary to undertake priority projects but also to develop a long-term funding strategy to allow continued development of the overall system. A priority action is to immediately evaluate the recommendations against transportation projects that are currently programmed in the Transportation Improvement Program (TIP) to see where projects overlap, compliment, or conflict with each other. The City should also evaluate which of the proposed projects could be added to future TIP updates.

Capital and local funds for bicycle facilities and trail construction should be set aside every year, even if only for a small amount. Small amounts of local funding can be matched to outside funding sources or could be used to enhance NCDOT projects with bicycle or bicycle features that may otherwise not be budgeted for by the state. A variety of local, state, and federal options and sources exist and should be pursued.

## BECOME DESIGNATED AS A BICYCLE-FRIENDLY COMMUNITY

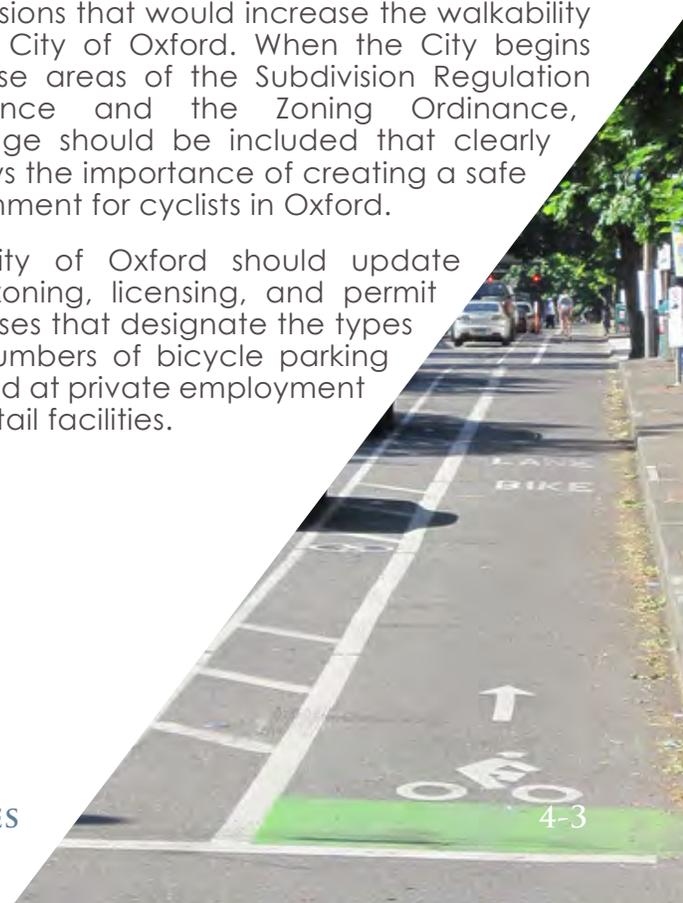
A long term goal for the City of Oxford may be for the City to seek a "Bicycle-Friendly Community" (BFC) designation. The Bicycle Friendly Community Campaign is an award program that recognizes municipalities that actively support bicycling activities and safety. A Bicycle Friendly Community provides safe accommodation for bicycling and encourages its residents to bicycle for transportation and recreation. The program is administered through the League of American Bicyclists and many North Carolina communities have become designated as "Bicycle-Friendly Community" or are currently seeking designation.

The development and implementation of this Plan is an essential first step in eventually becoming a Bicycle Friendly Community. With ongoing efforts and the short term work program recommended here, the City should be in a position to apply for and receive BFC status within a few short years.

## UPDATE LOCAL POLICIES & REGULATIONS

The 2012 Comprehensive Pedestrian Plan provided a review of existing City ordinances and regulations, and made recommendations for revisions that would increase the walkability of the City of Oxford. When the City begins to revise areas of the Subdivision Regulation Ordinance and the Zoning Ordinance, language should be included that clearly portrays the importance of creating a safe environment for cyclists in Oxford.

The City of Oxford should update local zoning, licensing, and permit processes that designate the types and numbers of bicycle parking required at private employment and retail facilities.





These facilities should offer bicycle parking in safe, well illuminated areas, and near entrances. Providing secure bicycle parking is a key ingredient in efforts to encourage bicycling as a form of transportation.

Incorporating bicycle parking in any plans for transit stations or park-and-ride locations will provide opportunities for multi-modal travel and supports alternative transportation choices.

### DEVELOP THE RECOMMENDED PROGRAMS OF THE 2012 COMPREHENSIVE PEDESTRIAN PLAN

Creating a safe and inviting bicycle and pedestrian transportation system requires attention to more than physical infrastructure; it requires a diverse toolkit of complementary programmatic recommendations. Targeted education, encouragement, enforcement, and evaluation strategies that improve Oxford residents' health, safety, and their ability to incorporate walking and bicycling into everyday life important as strategies that support the development and success of physical infrastructure. Successful programs must reach users and motorists in all different sectors of the community. A program may be presented as a campaign, effort, on-going initiative or one-time event, depending on its purpose. Every initiative should have a well-defined purpose or focus, a clearly identified goal (or goals), a lead agency/organization, and a logical timeline or schedule. In essence, these different efforts market walking and bicycling to the general public and ensure the maximum "return on investment" in the form of increased mode shift to walking and bicycling.

The City of Oxford should refer to the programmatic recommendations of the 2012 Comprehensive Pedestrian Plan and during implementation of the recommendations, consider how to include cyclists in the programs, and consider additional programmatic education,



encouragement, enforcement, and evaluation strategies that will compliment the infrastructure improvements the City will undertake.

## KEY PARTNERS IN IMPLEMENTATION

### ROLE OF OXFORD CITY COUNCIL

The City Council will be responsible for adopting this Plan. Through adoption, the City's leadership is further recognizing the value of bicycle transportation and is putting forth a well-thought out set of recommendations for improving public safety and overall quality of life (see the 'Benefits of a Bikeable Community' in Chapter 1). By adopting this Plan, the City Council is also signifying that they are prepared to support the efforts of other key partners in the plan's implementation, including the work of City departments and the local NCDOT, Division 5.

### ROLE OF THE LOCAL NCDOT, DIVISION 5

Division 5 of the NCDOT is responsible for the construction and maintenance of bicycle facilities on NCDOT-owned and maintained roadways in the City of Oxford, OR is expected to allow for the City to do so with encroachment agreements. Division 5 should be prepared to:

- Recognize this Plan as not only as an adopted plan of the City of Oxford, but also as an approved plan of the NCDOT.
- Become familiar with the bicycle facility recommendations for NCDOT roadways in this Plan (Chapter 3); take initiative in incorporating this plan's recommendations into the Division's schedule of improvements whenever possible.
- Become familiar with the standards set forth in Appendix A of this Bicycle Plan as well as state and national standards for bicycle facility design; construct and maintain bicycle facilities using the highest standards allowed by the State (including the use of innovative treatments on a trial-basis).
- Notify the City of Oxford Engineering, and Public Works Departments of all upcoming roadway reconstruction or resurfacing/ restriping projects in Oxford, no later than



the design phase and provide sufficient time for comments from the planning staff.

- If needed, seek guidance and direction from the NCDOT Division of Bicycle and Pedestrian Transportation on issues related to this Plan and its implementation.

### ROLE OF THE KERR-TAR REGIONAL COUNCIL OF GOVERNMENTS (COG)

The Kerr-Tar Regional Council of Governments is the transportation planning agency serving the City of Oxford, and the surrounding communities. Local governments are represented by an elected official on the Transportation Advisory Committee (TAC) and staff members, NCDOT, and FHWA staff comprise the Technical Coordinating Committee (TCC).

The COG should be prepared to:

- Become familiar with the recommendations of this Plan, and support its implementation.
- Serve as lead coordinator and planner for a newly formed BPAC and for quarterly meetings with project partners.
- Oversee long range transportation planning and ensure the development of a multi-modal transportation network.
- Ensure recommendations from this Bicycle Plan are integrated into regional planning and project implementation.
- Produce updates to the Long Range Transportation Plan (LRTP) that incorporate recommendations from this Bicycle Plan.
- Ensure that TIP projects are updated with recommendations from this Plan.
- Follow upcoming roadway reconstruction and resurfacing projects and work early in the design process with City and NCDOT to ensure bicycle facilities are incorporated into the design.
- Keep up-to-date on current and changing funding sources and opportunities such as Safe Routes to School.
- Kerr-Tar COG is developing a regional bicycle plan. The Kerr-Tar Lakes District Regional Bike Plan project will be developed by COG staff in collaboration with NCDOT, local governments, other key stakeholders, and the general public. The project timeline is June 1, 2012 through June 30, 2014. The plan will recommend bicycle transportation connections between the region's lakes,

towns, public lands, and landmarks within the Kerr-Tar region. Special attention will be paid to how the regional bike route system is connected to the proposed East Coast Greenway and Southeast High Speed Rail Station in Henderson and proposed regional commuter bus transit stations in Butner and Roxboro. Improvements to existing roadways and construction of new facilities will be recommended. The Kerr-Tar Lakes District Regional Bike Plan will be developed in a five-phase process. A Steering Committee will be established to work with KTCOG staff in development of the plan. During the development of the Kerr-Tar Lake District Regional Bicycle Plan, the COG should review the recommendations of this Bicycle Plan to ensure consistency and regional connectivity.

### ROLE OF THE CITY OF OXFORD PLANNING DEPARTMENT

The planning staff handles comprehensive planning, zoning and code enforcement. The department will take primary responsibility for the contact with new development to implement the plan (with support from the Public Works Department). For example, the staff should be prepared to:

- Communicate and coordinate with local developers on adopted recommendations for bicycle facilities, including paved multi-use trails.
- Assist the Public Works Department in communicating with NCDOT and regional partners
- Maintain and update the bicycle and bicycle facility GIS database which includes sidewalks, greenways, bicycle facilities and crossing facilities.





### ROLE OF THE CITY OF OXFORD ENGINEERING DEPARTMENT

The Engineering Department manages improvements to the City's infrastructure and manages construction inspections and engineering design. The department should be prepared to:

- Become familiar with the recommendations of this Plan, and support its implementation.
- Become familiar with the standards set forth in Appendix A of this Bicycle Plan, as well as state and national standards for bicycle facility design.
- Assist with local roadway projects and ensure bicycle accommodations are being made.
- Communicate with NCDOT regularly concerning upcoming state resurfacing projects to ensure bicycle facility recommendations are included in these projects.

### ROLE OF THE CITY OF OXFORD PUBLIC WORKS DEPARTMENT

The Public Works Department handles the responsibility for the construction and maintenance of bicycle facilities on City-owned and maintained roadways, as well as on NCDOT roadways, where encroachment agreements are secured. The department also operates and maintains traffic signalization, traffic signs, and markings. The department should be prepared to:

- Communicate and coordinate with other City departments and the BPAC on priority bicycle projects.
  - Become familiar with the design standards set forth in Appendix A of this Bicycle Plan, as well as state and national standards for bicycle facility design.

- Secure encroachment agreements for work on NCDOT-owned and maintained roadways.
- Design, construct and maintain bicycle facilities.
- Communicate and coordinate with NCDOT Division 5 on this Plan's recommendations for NCDOT-owned and maintained roadways. Provide comment and reminders about this Plan's recommendations no later than the design phase.
- Work with Division 5 to ensure that when NCDOT-owned and maintained roadways in Oxford are resurfaced or reconstructed, that this Plan's adopted recommendations for bicycle facilities are included on those streets. If a compromise to the original recommendation is needed, then contact NCDOT Division of Bicycle and Bicycle Transportation for guidance on appropriate alternatives.

### ROLE OF THE BPAC

The Committee should be prepared to:

- Meet with staff from the COG, Engineering, Planning, and the Public Works Department; evaluate progress of the plan's implementation and offer input regarding bicycle-related issues; assist City staff in applying for grants and organizing bicycle-related events and educational activities.
- Build upon current levels of local support for bicycle issues and advocate for local project funding.

### ROLE OF THE CITY OF OXFORD POLICE DEPARTMENT

The City of Oxford Police Department is responsible for providing the community the highest quality law enforcement service and protection to ensure the safety of the citizens and visitors to the City of Oxford. The Police Department should be prepared to:

- Become experts on bicycle-related laws in North Carolina.
- Continue to enforce not only bicycle-related laws, but also motorist laws that affect the safety of bicyclists, such as speeding, running red lights, aggressive driving, etc.
- Participate in bicycle-related education programs.





- Review safety considerations with the Public Works Department as projects are implemented.

### ROLE OF DEVELOPERS

Developers in Oxford can play an important role in facility development whenever a project requires the enhancement of transportation facilities or the dedication and development of sidewalks, trails or crossing facilities. Developers should be prepared to:

- Become familiar with the benefits, both financial and otherwise, of providing amenities for walking and biking (including trails) in residential and commercial developments.
- Become familiar with the standards set forth in Appendix A of this Plan, as well as state and national standards for bicycle facility design.
- Be prepared to account for bicycle and bicycle circulation and connectivity in future developments.

### ROLE OF LOCAL & REGIONAL STAKEHOLDERS

Stakeholders for bicycle facility development and related programs, surrounding jurisdictions, the Granville County School system, and local economic development organizations play important roles in the implementation of this plan. Local and regional stakeholders should be prepared to:

- Become familiar with the recommendations of this Plan, and communicate & coordinate with the City for implementation, specifically in relation to funding opportunities, such as grant writing and developing local matches for facility construction.
- Granville County should coordinate with the City on regional trail development and SRTS grants.
- The local school system and school leaders should assist in carrying out SRTS work-shops, programs, and also assist in SRTS grant applications.

### ROLE OF LOCAL RESIDENTS, CLUBS AND ADVOCACY GROUPS

Local residents, clubs and advocacy groups play a critical role in the success of this plan. They should be prepared to:

- Continue offering input regarding bicycling issues in Oxford.
- Assist City staff and BPAC by volunteering for bicycle-related events and educational activities and/or participate in such activities.
- Assist City staff and BPAC by speaking at City Council meetings and advocating for local bicycle project and program funding.

### ROLE OF VOLUNTEERS

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





# FACILITY DEVELOPMENT METHODS

## REMOVING PARKING

Some neighborhood collector roadways are wide enough to stripe with bike lanes, but they are used by residents for on-street parking, especially in the evening. In locations like this, removing parking is likely to create considerable controversy and is not recommended unless there is no other solution (unless the parking is never used). In the rare case that removing parking is being considered, the parking should not be removed unless there is a great deal of public support for the bike lanes on that particular roadway, and a full public involvement process with adjacent residents and businesses is undertaken prior to removing parking.

If it is not practical to add a bike lane, edgelines and shared lane markings may be considered. On roads where the outside lane and parking area combined are more than 17-foot-wide, 10-foot-wide travel lanes can be striped with an edgeline, leaving the rest of the space on either side for parking. The stripe would help slow motor vehicles and provide extra comfort for bicyclists, especially during the daytime when fewer cars would be parked along the curb. On roads with outside lane and parking areas that are narrower than 17-foot-wide, shared lane markings can be provided every 100 to 200 meters on the right side of the motor vehicle travel lane to increase the visibility of the bike route.

## REPAVING

Repaving projects provide a clean slate for revising pavement markings. When a road is repaved, the roadway should be restriped to create narrower lanes and provide space for bike lanes and shoulders, where feasible.



In addition, if the spaces on the sides of non-curb and gutter streets have relatively level grades and few obstructions, the total pavement width can be widened to include paved shoulders.

## INSTALLING SHARED LANE MARKINGS

The City of Oxford should adopt the use of shared lane markings, or “sharrows” as one of its bicycle facility types. Shared lane markings have been newly incorporated into the Manual on Uniform Traffic Control Devices (MUTCD). They take the place of traditional bicycle lanes where lanes are too narrow for striping, where speeds do not exceed 35 mph, and/or where there is on-street parking. The intent of the shared lane marking is threefold:

- 1) they draw attention to the fact that the roadway is accommodating bicycle use and traffic;
- 2) they clearly define direction of travel for both bicyclists and motorists; and
- 3) with proper placement, they remind bicyclists to bike further from parked cars to prevent “dooring” collisions.

While shared-lane markings are not typically recommended or needed on local, residential streets, they are sometimes used along such streets when part of a signed route or bicycle boulevard.

## ROADWAY CONSTRUCTION AND RECONSTRUCTION

Bicyclists should be accommodated any time a new road is constructed or an existing road is reconstructed. In the long-term, all roadways should have on-road bicycle facilities. However, sidepaths can be an acceptable solution when a road has few driveways and high-speed, high-volume traffic.

## BRIDGE REPLACEMENT

All new or replacement bridges should accommodate bicycles with on-road facilities on both sides of the bridge. If the bridge is in a developed area or an area that may experience development in the future, it should also have wide sidewalks on both sides to accommodate all types of bicyclists and bicycles.

Federal law, as established in the Transportation Equity Act for the 21st Century (TEA-21), makes



the following statement with respect to bridges:

“In any case where a highway bridge deck is being replaced or rehabilitated with Federal financial participation, and bicyclists are permitted on facilities at or near each end of such bridge, and the safe accommodation of bicyclists can be provided at reasonable cost as part of such replacement or rehabilitation, then such bridge shall be so replaced or rehabilitated as to provide such safe accommodations.” (23 U.S.C. Section 217)

Bridge replacement projects on controlled access freeways where bicycles and bicyclists are prohibited by law should not include facilities to accommodate bicyclists and bicycles. In cases, however, where a bridge replacement project on a controlled access freeway impacts a non-controlled access roadway (i.e., a new overpass over an arterial roadway), the project should include the necessary access for bicycles and bicyclists on the non-limited access roadway (i.e., paved shoulders, sidewalks, and pedestrian/bicycle crossing improvements).

Existing and planned greenway crossings, both at-grade and below new bridges, should be similarly accommodated during bridge replacement projects.

### RETROFIT ROADWAYS WITH NEW BICYCLE FACILITIES

There may be critical locations in the Bicycle Network that have bicycle safety issues or are essential links to destinations. In these locations, it may be justifiable to add new bicycle facilities before a roadway is scheduled to be repaved or reconstructed.

In some places, it may be relatively easy to add extra pavement for shoulders, but others may require removing trees, moving landscaping or fences, or regrading ditches or hills. Retrofitting roadways with sidepaths creates similar challenges. Improvements in these locations are typically recommended in the long-term.

Some roads may require a “road diet” solution in order to accommodate bicycle facilities. Road diets involve removing vehicle travel lanes and replacing these lanes with on-road bicycle facilities and sidewalks or sidepaths. These are generally recommended only in situations where the vehicular traffic count can be safely and efficiently accommodated

with a reduced number of travel lanes. Further study may be necessary for recommended road diets to ensure that capacity and level-of-service needs are balanced against bicycle level of service needs.

### SIGNAGE AND WAYFINDING PROJECTS

Signage along specific routes or in an entire community can be updated to make it easier for people to find destinations. Bicycle route signs are one example of these wayfinding signs, and they should be installed along routes independently of other signage projects or as a part of a more comprehensive wayfinding improvement project.





# 5

# FUNDING RESOURCES

## CHAPTER OUTLINE

OVERVIEW | FEDERAL FUNDING RESOURCES | STATE  
RESOURCES | LOCAL RESOURCES | PRIVATE SECTOR & NON-  
PROFIT/VOLUNTEER RESOURCES

## OVERVIEW

When considering possible funding sources for the City of Oxford's bicycle projects, it is important to remember that not all construction activities will be accomplished with a single funding source. It will be necessary to consider several sources of funding, that when combined, would support full project construction. Also, as described in Chapter 4, it is likely that many bicycle facilities will be built as part of future roadway restriping, widening, and reconstruction projects in which the direct funding necessary may be minimized. This chapter outlines the most likely sources of funding for the projects at the federal, state, local government level and from the private & non-profit sector.

## FEDERAL FUNDING RESOURCES

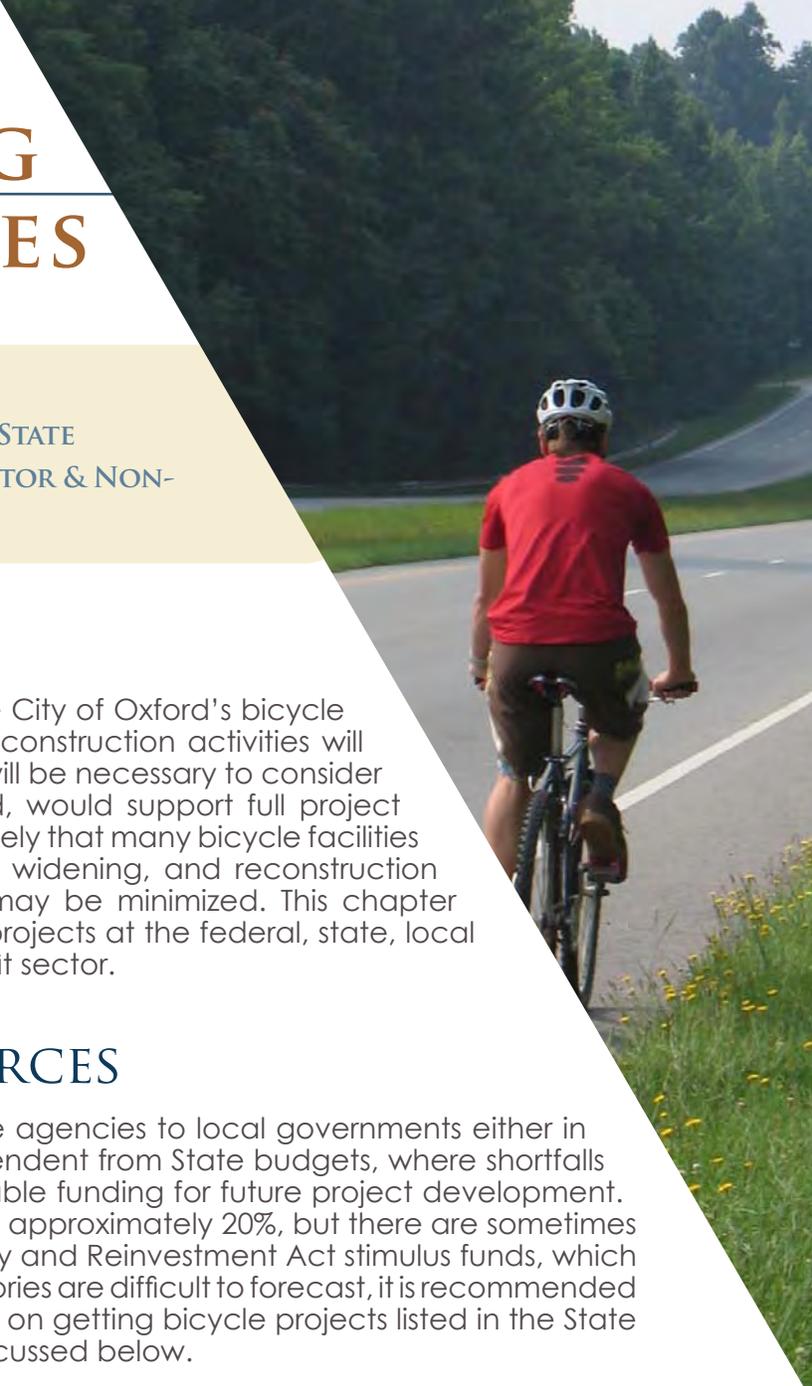
Federal funding is typically directed through State agencies to local governments either in the form of grants or direct appropriations, independent from State budgets, where shortfalls may make it difficult to accurately forecast available funding for future project development. Federal funding typically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

The following is a list of possible Federal funding sources that could be used to support construction of many bicycle and pedestrian improvements. Most of these are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits.

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

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

MAP-21 authorizes funding for federal surface transportation programs including highways and transit for the 27 month period between July 2012 and September 2014. It is not possible to guarantee the continued availability of any listed MAP-21 programs, or to predict their future funding levels or policy guidance. Nevertheless, many of these programs have been included in





some form since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, and thus may continue to provide capital for active transportation projects and programs.

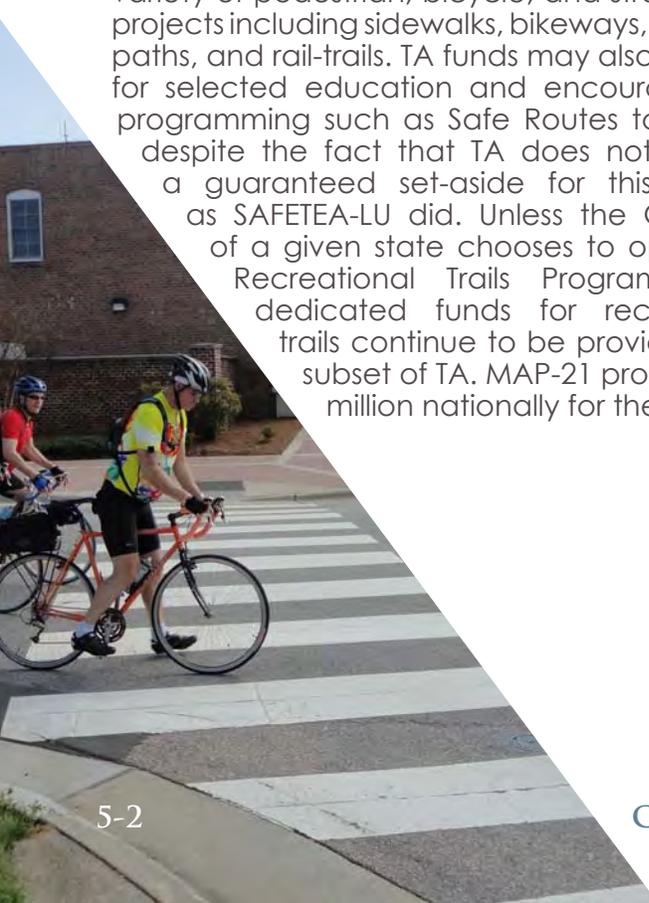
In North Carolina, federal monies are administered through the North Carolina Department of Transportation (NCDOT) and Metropolitan Planning Organizations (MPOs). Most, but not all, of these programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing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

There are a number of programs identified within MAP-21 that are applicable to bicycle and pedestrian projects. These programs are discussed below.

More information: <http://www.fhwa.dot.gov/map21/summaryinfo.cfm>

### TRANSPORTATION ALTERNATIVES

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



Complete eligibilities for TA include:

1. Transportation Alternatives as defined by Section 1103 (a)(29). This category includes the construction, planning, and design of a range of bicycle and pedestrian infrastructure including "on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990." Infrastructure projects and systems that provide "Safe Routes for Non-Drivers" is a new eligible activity.

For the complete list of eligible activities, visit: [http://www.fhwa.dot.gov/environment/transportation\\_enhancements/legislation/map21.cfm](http://www.fhwa.dot.gov/environment/transportation_enhancements/legislation/map21.cfm)

2. Recreational Trails. TA funds may be used to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other non-motorized and motorized uses. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

Recreational Trails Program funds may be used for:

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



- NC's dedicated annual RTC funds for 2012 total \$1,506,344.

For funding levels in subsequent years, please visit: <http://www.fhwa.dot.gov/MAP21/funding.cfm>

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

Eligible projects may include:

- Engineering improvements. These physical improvements are designed to reduce potential bicycle and pedestrian conflicts with motor vehicles. Physical improvements may also reduce motor vehicle traffic volumes around schools, establish safer and more accessible crossings, or construct walkways, trails or bikeways. Eligible improvements include sidewalk improvements, traffic calming/speed reduction, pedestrian and bicycle crossing improvements, on-street bicycle facilities, off-street bicycle and pedestrian facilities, and secure bicycle parking facilities.
- Education and Encouragement Efforts. These programs are designed to teach children safe bicycling and walking skills while educating them about the health benefits, and environmental impacts. Projects and programs may include creation, distribution and implementation of educational materials; safety based field trips; interactive bicycle/pedestrian safety video games; and promotional events and activities (e.g., assemblies, bicycle rodeos, walking school buses).
- Enforcement Efforts. These programs aim to ensure that traffic laws near schools are obeyed. Law enforcement activities apply to cyclists, pedestrians and motor vehicles alike. Projects may include development of a crossing guard program, enforcement equipment, photo enforcement, bicyclist and pedestrian sting operations.

4. Planning, designing, or constructing roadways within the right-of-way of former Interstate routes or divided highways. At the time of writing, detailed guidance from the Federal Highway Administration on this new eligible activity was not available.

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

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

## SURFACE TRANSPORTATION PROGRAM

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





### HIGHWAY SAFETY IMPROVEMENT PROGRAM

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

### CONGESTION MITIGATION/AIR QUALITY PROGRAM

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

### NEW FREEDOM INITIATIVE

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



More information: <http://www.hhs.gov/newfreedom/>

### PILOT TRANSIT-ORIENTED DEVELOPMENT PLANNING

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

### FEDERAL TRANSIT ADMINISTRATION PROGRAMS

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

### FTA JOB ACCESS AND REVERSE COMMUTE PROGRAM

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

More information: [http://www.fta.dot.gov/funding/grants/grants\\_financing\\_3550.html](http://www.fta.dot.gov/funding/grants/grants_financing_3550.html)

### PAUL S. SARBANES TRANSIT IN PARKS PROGRAM

This program addresses the challenge of increasing vehicle congestion in and around our national parks and other federal lands. Eligible recipients include state, tribal, or local governmental authorities with jurisdiction over land in the vicinity of an eligible area acting with the consent of the Federal Lands Management Area. The funds may support capital and



planning expenses for new or existing alternative transportation systems in the vicinity of an eligible area. It includes non-motorized transportation systems such as pedestrian and bicycle trails.

More information: [http://www.fta.dot.gov/funding/grants/grants\\_financing\\_6106.html](http://www.fta.dot.gov/funding/grants/grants_financing_6106.html)

### FTA URBANIZED AREA FORMULA PROGRAM

FTA capital/Operating grant for urbanized areas over 50,000. This grant can be used for pedestrian or bicyclist access to transit.

More information: [http://www.fta.dot.gov/funding/grants/grants\\_financing\\_3561.html](http://www.fta.dot.gov/funding/grants/grants_financing_3561.html)

### FORMULA GRANTS FOR OTHER THAN URBANIZED AREAS

This program is formula-based and provides funding to states for supporting public transportation in rural areas with populations of less than 50,000. This grant funds routes to transit, bike racks, shelters, and equipment for public transportation vehicles.

More information: [http://www.fta.dot.gov/funding/grants/grants\\_financing\\_3555.html](http://www.fta.dot.gov/funding/grants/grants_financing_3555.html)

### TRANSPORTATION FOR ELDERLY PERSONS AND PERSONS WITH DISABILITIES

This program can be used for capital expenses that support transportation to meet the special needs of older adults and persons with disabilities, including providing access to an eligible public transportation facility.

More information: [http://www.fta.dot.gov/funding/grants/grants\\_financing\\_3556.html](http://www.fta.dot.gov/funding/grants/grants_financing_3556.html)

### BUS AND BUS RELATED FACILITIES

This is capital assistance for new and replacement buses, related equipment and facilities. It has traditionally been designated to specific projects at a federal level. This grant can be used for pedestrian or bicycle access to transit and bus racks.

More information: [http://www.fta.dot.gov/funding/grants/grants\\_financing\\_3557.html](http://www.fta.dot.gov/funding/grants/grants_financing_3557.html)

## METROPOLITAN AND STATEWIDE PLANNING

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

More information: [http://www.fta.dot.gov/funding/grants/grants\\_financing\\_3563.html](http://www.fta.dot.gov/funding/grants/grants_financing_3563.html)

### PARTNERSHIP FOR SUSTAINABLE COMMUNITIES

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

The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including both TIGER I and TIGER II grants).





North Carolina jurisdictions should track Partnership communications and be prepared to respond proactively to announcements of new grant programs. Initiatives that speak to multiple livability goals are more likely to score well than initiatives that are narrowly limited in scope to bicycle and/or pedestrian improvement efforts.

More information: <http://www.epa.gov/smartgrowth/partnership/>

### COMMUNITY DEVELOPMENT BLOCK GRANT FUNDS

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

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

State CDBG funds are provided by the U.S. Department of Housing and Urban Development (HUD) to the state of North Carolina. Some urban counties and cities in North Carolina receive CDBG funding directly from HUD.



Each Year, CDBG provides funding to local governments for hundreds of critically-needed community improvement projects throughout the state. Approximately \$50 million is available statewide to fund a variety of projects.

More information: <http://www.nccommerce.com/en/CommunityServices/CommunityDevelopmentGrants/CommunityDevelopmentBlockGrants/>

### LAND AND WATER CONSERVATION FUND

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

More information: [http://www.ncparks.gov/About/grants/lwcf\\_main.php](http://www.ncparks.gov/About/grants/lwcf_main.php)

### RIVERS, TRAILS, AND CONSERVATION ASSISTANCE PROGRAM

The Rivers, Trails, and Conservation Assistance Program (RTCA) is a National Parks Service (NPS) program providing technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance—there are no implementation funds available. Projects are prioritized for assistance based on criteria including conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. This program may benefit trail development in North Carolina locales indirectly through technical assistance, particularly for community organizations, but is not a capital funding source.

More information: <http://www.nps.gov/ncrc/programs/rtca/> or contact the Southeast Region RTCA Program Manager Deirdre “Dee” Hewitt at (404) 507-5691



## NATIONAL SCENIC BYWAYS DISCRETIONARY GRANT PROGRAM

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

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

More information: <http://www.bywaysonline.org/grants/>

## FEDERAL LANDS HIGHWAY PROGRAM

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

## DEPARTMENT OF ENERGY

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

More information: <http://www.eecbg.energy.gov>

## PUBLIC LANDS HIGHWAY - DISCRETIONARY

The Public Lands Highway - Discretionary (PLH-D) Program is intended for the planning, design, construction, reconstruction or improvement of roads and bridges that are within or adjacent to, or provide access to public lands and Indian reservations. PLH-D funding has been used for bike trails, walkways, and transportation planning activities.

More information: <http://flh.fhwa.dot.gov/programs/plh/discretionary/>





# STATE FUNDING SOURCES

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

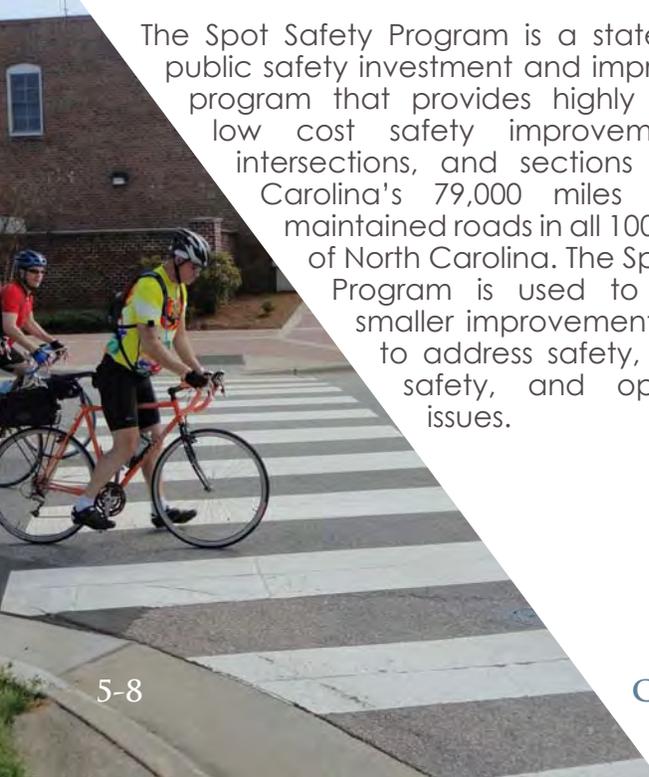
NCDOT's Policy to Projects process uses data regarding pavement condition, traffic congestion and road safety, as well as input from local governments and NCDOT staff, to determine transportation priorities. This approach ranks projects for all modes of transportation in priority order, based on the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

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

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

### SPOT SAFETY PROGRAM

The Spot Safety Program is a state funded public safety investment and improvement program that provides highly effective low cost safety improvements for intersections, and sections of North Carolina's 79,000 miles of state maintained roads in all 100 counties of North Carolina. The Spot Safety Program is used to develop smaller improvement projects to address safety, potential safety, and operational issues.



The program is funded with state funds and currently receives approximately \$9 million per state fiscal year. Other monetary sources (such as Small Construction or Contingency funds) can assist in funding Spot Safety projects, however, the maximum allowable contribution of Spot Safety funds per project is \$250,000.

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

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

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

### HIGH HAZARD ELIMINATION PROGRAM

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

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



## NCDOT DISCRETIONARY FUNDS

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

## NCDOT CONTINGENCY FUND

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

More information: [http://www.ncdot.gov/doh/preconstruct/traffic/tepl/Topics/F-19/F-19\\_mm.pdf](http://www.ncdot.gov/doh/preconstruct/traffic/tepl/Topics/F-19/F-19_mm.pdf)

## SMALL URBAN FUNDS

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

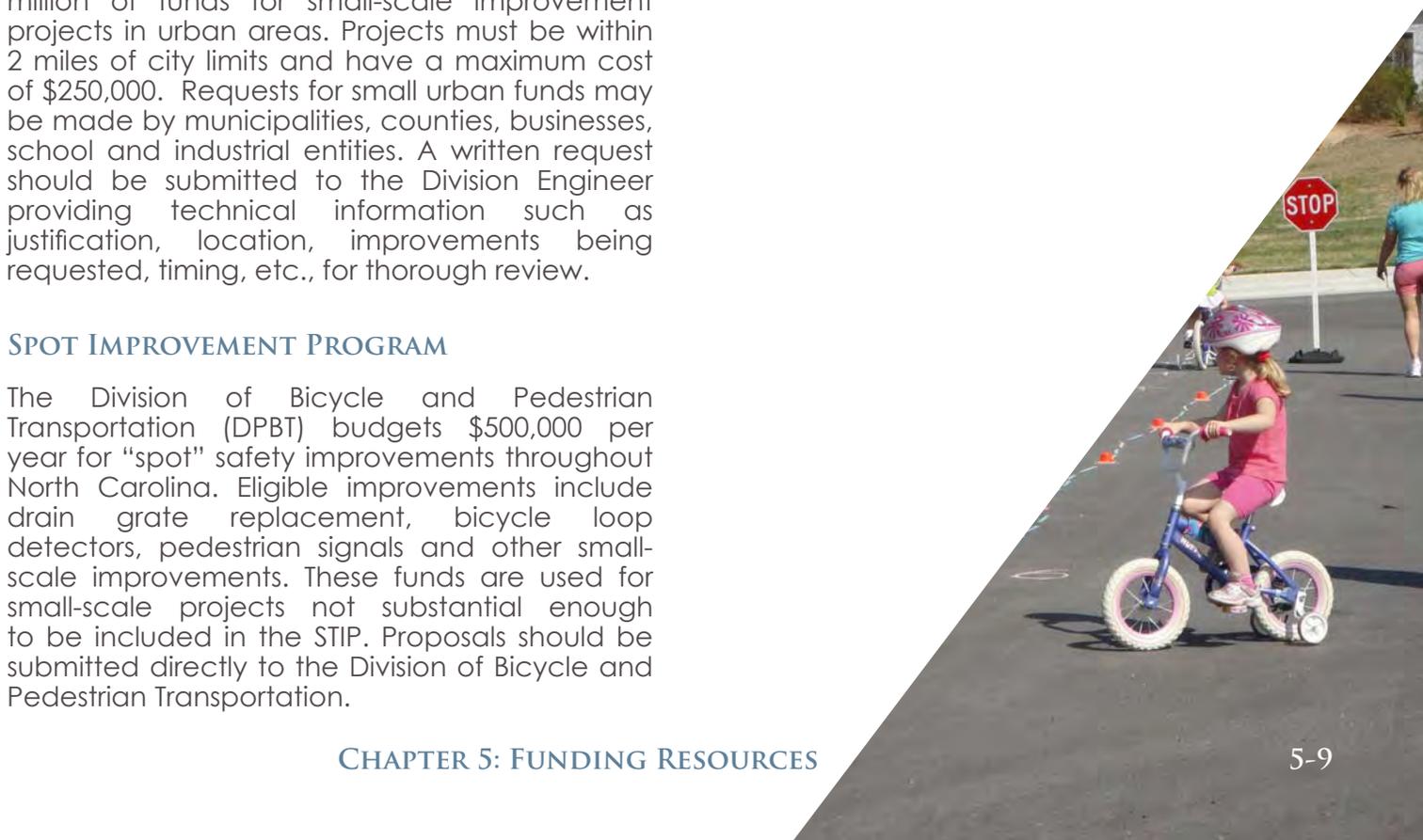
## SPOT IMPROVEMENT PROGRAM

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

## SMALL CONSTRUCTION FUNDS

The purpose of these funds is to finance improvements on the State System (US, NC, and SR routes) to be used for projects anywhere in the counties. These funds are used to fund a variety of transportation projects for municipalities, counties, businesses, schools, and industries throughout the state. There is a \$250,000 maximum amount per request per fiscal year. Any project with a total cost greater than \$150,000 requires a resolution or a letter of support for the project from the local jurisdiction.

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





## GOVERNOR'S HIGHWAY SAFETY PROGRAM

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

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

## BICYCLE AND PEDESTRIAN PLANNING GRANT INITIATIVE

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

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

## INCIDENTAL PROJECTS

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

## ROAD RESURFACING

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

## EAT SMART, MOVE MORE NORTH CAROLINA COMMUNITY GRANTS

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

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

## THE NORTH CAROLINA PARKS AND RECREATION TRUST FUND (PARTF)

The Parks and Recreation Trust Fund (PARTF) provides dollar-for-dollar matching grants to counties, incorporated municipalities and public authorities, as defined by G.S. 159-7. Through this program, several million dollars each year are available to local governments to fund the acquisition, development and renovation of recreational areas. A local government can request a maximum of \$500,000 with each application. An applicant must match the grant dollar-for-dollar, 50% of the total cost of the





project, and may contribute more than 50%. The appraised value of land to be donated to the applicant can be used as part of the match. The value of in-kind services, such as volunteer work, cannot be used as part of the match.

More information: [http://www.ncparks.gov/About/grants/partf\\_main.php](http://www.ncparks.gov/About/grants/partf_main.php)

## THE NORTH CAROLINA DIVISION OF PARKS AND RECREATION

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

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

## RECREATIONAL TRAILS PROGRAM

The Recreational Trails Program (RTP) of the federal transportation bill provides funding to states to develop and maintain recreational trails and trail-related facilities for both nonmotorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, and equestrian use. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

Recreational Trails Program funds may be used for:

- Maintenance and restoration of existing trails
- Purchase and lease of trail construction and maintenance equipment
- Construction of new trails, including unpaved trails
- Acquisition or easements of property for trails
- State administrative costs related to this program (limited to seven percent of a state's RTP dollars)
- Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a state's RTP dollars)

In North Carolina, the Recreational Trails Program is administered by the North Carolina Division of Parks and Recreation. This grant is specifically designed to pay for recreational trail projects rather than utilitarian transportation-based projects. Grants up to \$75,000 per project, and applicants must be able to contribute 20% of the project costs with cash or in-kind contributions. Projects must be consistent with the Statewide Comprehensive Outdoor Recreation Plan (SCORP).

More information: [http://www.ncparks.gov/About/trails\\_grants.php](http://www.ncparks.gov/About/trails_grants.php)

## ADOPT-A-TRAIL PROGRAM

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

More information: [http://www.ncparks.gov/About/grants/docs/AAT\\_info.pdf](http://www.ncparks.gov/About/grants/docs/AAT_info.pdf)

## POWELL BILL FUNDS

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

More information: [http://www.ncdot.org/programs/Powell\\_Bill/](http://www.ncdot.org/programs/Powell_Bill/)





### CLEAN WATER MANAGEMENT TRUST FUND (CWMTF)

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

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

### STATE ADMINISTERED COMMUNITY DEVELOPMENT BLOCK GRANTS

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

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

### NORTH CAROLINA HEALTH AND WELLNESS TRUST FUND

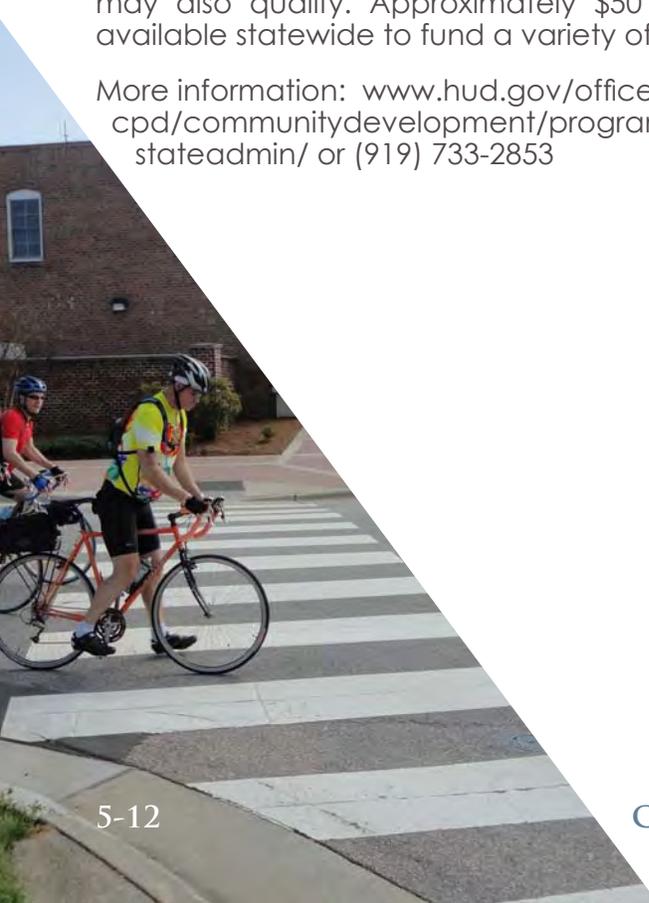
The North Carolina Health and Wellness Trust Fund (HWTF) in partnership with Blue Cross and Blue Shield of North Carolina (BCBSNC) offers the Fit Community Grants, designed to help communities become Fit Community designees. Up to eight communities that demonstrate a compelling need, proven capacity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

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

### URBAN AND COMMUNITY FORESTRY GRANT

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

For more about Tree City USA status, including application instructions, visit: [http://ncforestservice.gov/Urban/urban\\_grant\\_overview.htm](http://ncforestservice.gov/Urban/urban_grant_overview.htm)





## LOCAL GOVERNMENT RESOURCES

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

### CAPITAL RESERVE FUND

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

### CAPITAL PROJECT ORDINANCES

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

### LOCAL IMPROVEMENT DISTRICTS (LIDS)

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

allocated based on property frontage or other methods such as traffic trip generation.

### MUNICIPAL SERVICE DISTRICT

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

### TAX INCREMENT FINANCING

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





## INSTALLMENT PURCHASE FINANCING

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

## TAXES

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

### SALES TAX

In North Carolina, the state has authorized a sales tax at the state and county levels. Local governments that choose to exercise the local option sales tax (all counties currently do), use the tax revenues to provide funding for a wide variety of projects and activities. Any increase in the sales tax, even if applying

to a single county, must gain approval of the state legislature. In 1998, Mecklenburg County was granted authority to institute a one-half cent sales tax increase for mass transit.

### PROPERTY TAX

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

### EXCISE TAXES

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

### OCCUPANCY TAX

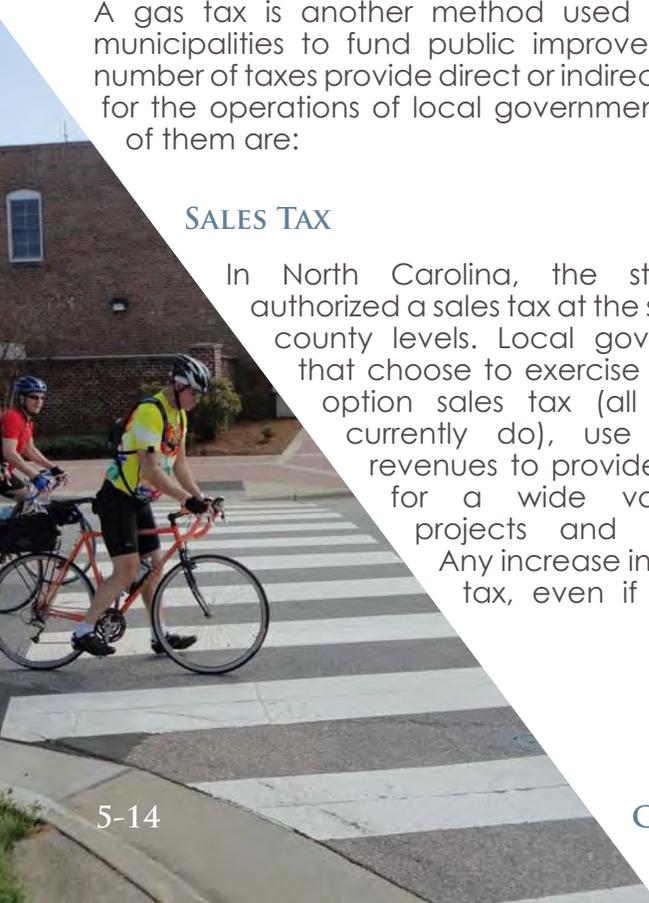
The NC General Assembly may grant towns the authority to levy occupancy tax on hotel and motel rooms. The act granting the taxing authority limits the use of the proceeds, usually for tourism-promotion purposes.

### FEES

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

### STORMWATER UTILITY FEES

Greenway trail property may be purchased with stormwater fees, if the property in question is used





to mitigate floodwater or filter pollutants.

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

### STREETSCAPE UTILITY FEES

Streetscape Utility Fees could help support streetscape maintenance of the area between the curb and the property line through a flat monthly fee per residential dwelling unit. Discounts would be available for senior and disabled citizens. Non-residential customers would be charged a per-foot fee based on the length of frontage streetscape improvements. This amount could be capped for non-residential customers with extremely large amounts of street frontage. The revenues raised from Streetscape Utility fees would be limited by ordinance to maintenance (or construction and maintenance) activities in support of the streetscape.

### IMPACT FEES

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

In North Carolina, impact fees are designed to reflect the costs incurred to provide sufficient capacity in the system to meet the additional needs of a growing community. These charges are set in a fee schedule applied uniformly to all new development. Communities that institute impact fees must develop a sound financial

model that enables policy makers to justify fee levels for different user groups, and to ensure that revenues generated meet (but do not exceed) the needs of development. Factors used to determine an appropriate impact fee amount can include: lot size, number of occupants, and types of subdivision improvements. A developer may reduce the impacts (and the resulting impact fee) by paying for on- or off-site bicycle improvements that will encourage residents/tenants to walk or use transit rather than drive. Establishing a clear nexus or connection between the impact fee and the project's impacts is critical in avoiding a potential lawsuit.

### EXACTIONS

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

### IN-LIEU-OF FEES

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





## BONDS AND LOANS

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

### REVENUE BONDS

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

### GENERAL OBLIGATION BONDS

Cities, counties, and service districts generally are able to issue general obligation (G.O.) bonds that are secured by the full faith and credit of the entity. A general obligation pledge is stronger than a revenue pledge, and thus may carry a lower interest rate than a revenue bond. The local government issuing the bonds pledges to raise its property taxes, or use any other sources of revenue, to generate sufficient revenues to make the debt service payments on the bonds. Frequently, when local governments issue G.O. bonds for public enterprise improvements, the public enterprise will make the debt service payments on the G.O. bonds with revenues generated through the public entity's rates and charges.

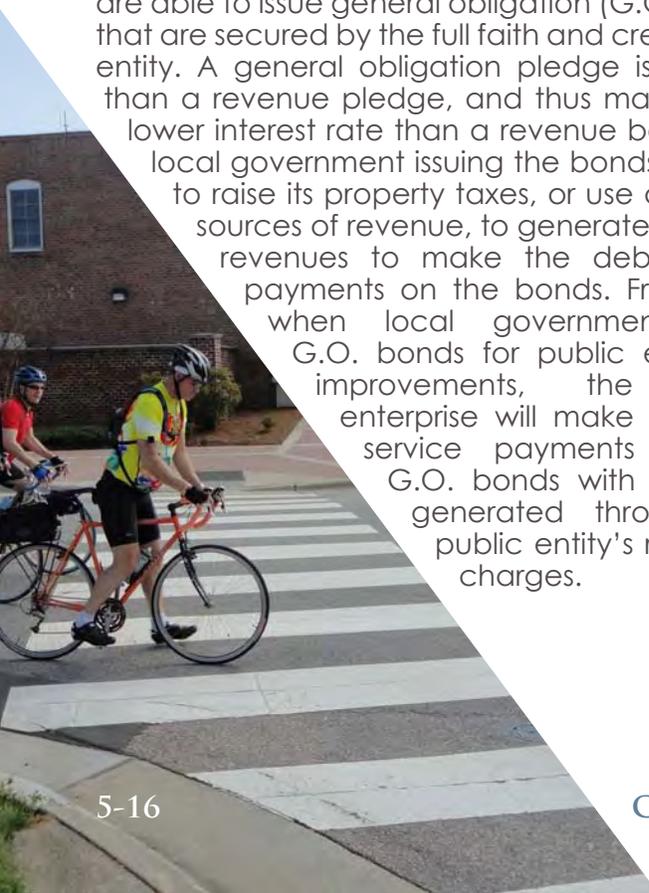
However, if those rate revenues are insufficient to make the debt payment, the local government is obligated to raise taxes or use other sources of revenue to make the payments. Bond measures are typically limited by time, based on the debt load of the local government or the project under focus. Funding from bond measures can be used for right-of-way acquisition, engineering, design, and construction of pedestrian and bicycle facilities. Voter approval is required.

### SPECIAL ASSESSMENT BONDS

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

### STATE REVOLVING FUND LOANS

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





## PRIVATE/NON-PROFIT FOUNDATIONS AND ORGANIZATIONS

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

### LAND FOR TOMORROW CAMPAIGN

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

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

### THE ROBERT WOOD JOHNSON FOUNDATION

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

- To assure that all Americans have access to basic health care at a reasonable cost
- To improve care and support for people with chronic health conditions
- To promote healthy communities and lifestyles

- To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs

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

### NORTH CAROLINA COMMUNITY FOUNDATION

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

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

### WALMART STATE GIVING PROGRAM

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

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





### THE RITE AID FOUNDATION GRANTS

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

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

### Z. SMITH REYNOLDS FOUNDATION

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

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

### BANK OF AMERICA CHARITABLE FOUNDATION, INC.

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

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

### DUKE ENERGY FOUNDATION

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

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

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

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

### AMERICAN GREENWAYS EASTMAN KODAK AWARDS

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

More information: [http://www.conservationfund.org/kodak\\_awards](http://www.conservationfund.org/kodak_awards)

### THE TRUST FOR PUBLIC LAND

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

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





## NATIONAL TRAILS FUND

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

Projects the American Hiking Society will consider include:

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

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

## THE CONSERVATION ALLIANCE

The Conservation Alliance is a non-profit organization of outdoor businesses whose collective annual membership dues support grassroots citizen-action groups and their efforts to protect wild and natural areas. One hundred percent of its member companies' dues go directly to diverse, local community groups across the nation - groups like Southern Utah Wilderness Alliance, Alliance for the Wild Rockies, The Greater Yellowstone Coalition, the South Yuba River Citizens' League, RESTORE: The North Woods and the Sinkyone Wilderness Council (a Native American-owned/operated wilderness park). For these groups, who seek to protect the last great wild lands and waterways from resource extraction and commercial development, the Alliance's grants are substantial in size (about \$35,000 each), and have often made

the difference between success and defeat. Since its inception in 1989, The Conservation Alliance has contributed \$4,775,059 to grassroots environmental groups across the nation, and its member companies are proud of the results: To date the groups funded have saved over 34 million acres of wild lands and 14 dams have been either prevented or removed-all through grassroots community efforts.

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

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

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





### BLUECROSS BLUESHIELD OF NORTH CAROLINA FOUNDATION

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

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

### ANNUAL AZALEA CELEBRATION

NC Beautiful has promoted environmental education, beautification, and stewardship in North Carolina for 40 years and holds the Annual Azalea Celebration to help non-profit organizations enhance their community spaces. Winning applicants receive 100 azalea plants free of charge to beautify school- and church grounds, parks, greenways, public rights-of-way, and community and senior centers. In addition, recipients who sustain their projects and keep their azaleas healthy for a 3-year period are eligible to receive cash awards and additional plants through the A.J. Fletcher Award.

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

### BIKE BELONG GRANTS

The Bikes Belong Grant program funds important and influential projects that leverage federal funding and build momentum for bicycling in communities across the U.S. These projects include greenways and rail trails accessible by pedestrians and bicyclists.



Applicants can request a maximum amount of \$10,000 for their project, and priorities are given to areas that have not received Bikes Belong funding in the past three years.

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

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

### THE CINERGY FOUNDATION

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

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

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

### LOCAL TRAIL SPONSORS

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



## CORPORATE DONATIONS

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

## PRIVATE INDIVIDUAL DONATIONS

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

## FUNDRAISING / CAMPAIGN DRIVES

Organizations and individuals can participate in a fundraiser or a campaign drive. It is essential to market the purpose of a fundraiser to rally support and financial backing. Often times fundraising satisfies the need for public awareness, public education, and financial support.

## VOLUNTEER WORK

Residents and other community members are excellent resources for garnering support and enthusiasm for a greenway corridor or pedestrian or bicycle facility. Furthermore volunteers can substantially reduce implementation and maintenance costs. Individual volunteers from the community can be brought together with groups of volunteers from church groups, civic groups, scout troops and environmental groups to work on greenway development on special community workdays. Volunteers can also be used for fundraising, maintenance, and programming needs, education or scientific research projects, but rather for active campaigns. All projects should be quantifiable, with specific goals, objectives and action plans and should include a measure for evaluating success. The project should

have a good chance for closure or significant measurable results over a fairly short term (one to two years). Funding emphasis may not be on general operating expenses or staff payroll.

Web site: [www.conservationalliance.com/index.m](http://www.conservationalliance.com/index.m).

E-mail: [john@conservationalliance.com](mailto:john@conservationalliance.com).

## NATIONAL FISH AND WILDLIFE FOUNDATION (NFWF)

The National Fish and Wildlife Foundation (NFWF) is a private, nonprofit, tax-exempt organization chartered by Congress in 1984. The National Fish and Wildlife Foundation sustains, restores, and enhances the Nation's fish, wildlife, plants and habitats. Through leadership conservation investments with public and private partners, the Foundation is dedicated to achieving maximum conservation impact by developing and applying best practices and innovative methods for measurable outcomes.

The Foundation awards matching grants under its Keystone Initiatives to achieve measurable outcomes in the conservation of fish, wildlife, plants and the habitats on which they depend. Awards are made on a competitive basis to eligible grant recipients, including federal, tribal, state, and local governments, educational institutions, and non-profit conservation organizations. Project proposals are received on a year-round, revolving basis with two decision cycles per year. Grants generally range from \$50,000-\$300,000 and typically require a minimum 2:1 non-federal match.





Funding priorities include bird, fish, marine/coastal, and wildlife and habitat conservation. Other projects that are considered include controlling invasive species, enhancing delivery of ecosystem services in agricultural systems, minimizing the impact on wildlife of emerging energy sources, and developing future conservation leaders and professionals.

Website: <http://www.nfwf.org/AM/Template.cfm?Section=Grants> where additional grant programs are described.

### THE TRUST FOR PUBLIC LAND

Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the Trust for Public Land is the only national nonprofit working exclusively to protect land for human enjoyment and well being. TPL helps conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities. TPL's legal and real estate specialists work with landowners, government agencies, and community groups to:

- Create urban parks, gardens, greenways, and riverways
- Build livable communities by setting aside open space in the path of growth
- Conserve land for watershed protection, scenic beauty, and close-to home recreation safeguard the character of communities by preserving historic landmarks and landscapes.

The following are TPL's Conservation Services:

- Conservation Vision: TPL helps agencies and communities define conservation priorities, identify lands to be protected, and plan networks of conserved land that meet public need.
- Conservation Finance: TPL helps agencies and communities identify and raise funds for conservation from federal, state, local, and philanthropic sources.

- Conservation Transactions: TPL helps structure, negotiate, and complete land transactions that create parks, playgrounds, and protected natural areas.
- Research and Education: TPL acquires and shares knowledge of conservation issues and techniques to improve the practice of conservation and promote its public benefits.
- Since 1972, TPL has worked with willing landowners, community groups, and national, state, and local agencies to complete more than 3,000 land conservation projects in 46 states, protecting more than 2 million acres. Since 1994, TPL has helped states and communities craft and pass over 330 ballot measures, generating almost \$25 billion in new conservation-related funding. For more information, visit [www.tpl.org/](http://www.tpl.org/).

### BLUECROSS BLUESHIELD OF NORTH CAROLINA FOUNDATION (BCBS)

Blue Cross Blue Shield (BCBS) focuses on programs that use an outcome approach to improve the health and well-being of residents. The Health of Vulnerable Populations grants program focuses on improving health outcomes for at-risk populations. The Healthy Active Communities grant concentrates on increased physical activity and healthy eating habits. Eligible grant applicants must be located in North Carolina, be able to provide recent tax forms and, depending on the size of the nonprofit, provide an audit.

BlueCross BlueShield of NC Foundation

P.O Box 2291

Durham, NC 27702

919-765-7347

<http://www.bcbsncfoundation.org/>





## LOCAL TRAIL SPONSORS

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

## VOLUNTEER WORK

It is expected that many citizens will be excited about the development of a greenway corridor. Individual volunteers from the community can be brought together with groups of volunteers from church groups, civic groups, scout troops and environmental groups to work on greenway development on special community workdays. Volunteers can also be used for fund-raising, maintenance, and programming needs.





# A DESIGN GUIDELINES

## OVERVIEW

The sections that follow serve as an inventory of bicycle design treatments and provide guidelines for their development. These treatments and design guidelines are important because they represent the tools for creating a bicycle-friendly, safe, accessible community. The guidelines are not, however, a substitute for a more thorough evaluation by a landscape architect or engineer upon implementation of facility improvements. Some improvements may also require cooperation with the NCDOT for specific design solutions. The following standards and guidelines are referred to in this guide.

- The Federal Highway Administration's **Manual on Uniform Traffic Control Devices** (MUTCD) is the primary source for guidance on lane striping requirements, signal warrants, and recommended signage and pavement markings.
- American Association of State Highway and Transportation Officials (AASHTO) **Guide for the Development of Bicycle Facilities**, updated in June 2012 provides guidance on dimensions, use, and layout of specific bicycle facilities.
- The National Association of City Transportation Officials' (NACTO) 2012 **Urban Bikeway Design Guide** is the newest publication of nationally recognized bikeway design standards, and offers guidance on the current state of the practice designs. All of the NACTO Urban Bikeway Design Guide treatments are in use internationally and in many cities around the US.
- Meeting the requirements of the Americans with Disabilities Act (ADA) is an important part of any bicycle facility project. The United States Access Board's proposed **Public Rights-of-Way Accessibility Guidelines** (PROWAG) and the **2010 ADA Standards for Accessible Design** (2010 Standards) contain standards and guidance for the construction of accessible facilities.

Should the national standards be revised in the future and result in discrepancies with this chapter, the national standards should prevail for all design decisions. A qualified engineer or landscape architect should be consulted for the most up to date and accurate cost estimates.

*The Pedestrian and Bicycle Information Center, NACTO, AASHTO, the MUTCD, nationally recognized bikeway standards, and other sources have all informed the content of this appendix.*



## Pedestrian and Bicycle Information Center



**APPENDIX OUTLINE:**

- OVERVIEW
- DESIGN NEEDS OF BICYCLISTS
- BICYCLE FACILITY SELECTION GUIDELINES
- SHARED ROADWAYS
- SEPARATED BIKEWAYS
- SEPARATED BIKEWAYS AT INTERSECTIONS
- BIKEWAY SIGNING
- RETROFITTING EXISTING STREETS TO ADD BIKEWAYS
- GREENWAYS AND OFF-STREET FACILITIES
- BIKEWAY SUPPORT AND MAINTENANCE
- STANDARDS COMPLIANCE



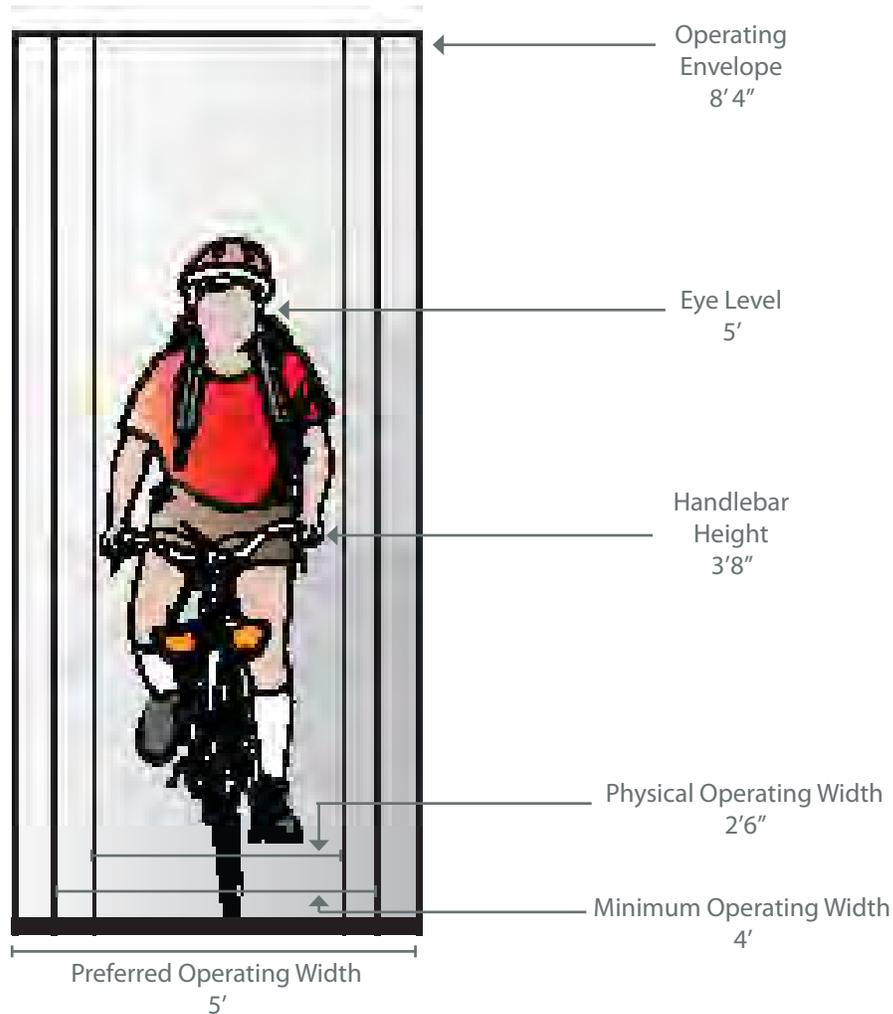
## DESIGN NEEDS OF BICYCLISTS

The purpose of this section is to provide the facility designer with an understanding of how bicyclists operate and how their bicycle influences that operation. Bicyclists, by nature, are much more affected by poor facility design, construction and maintenance practices than motor vehicle drivers. Bicyclists lack the protection from the elements and roadway hazards provided by an automobile's structure and safety features. By understanding the unique characteristics and needs of bicyclists, a facility designer can provide quality facilities and minimize user risk.

## BICYCLE AS A DESIGN VEHICLE

Similar to motor vehicles, bicyclists and their bicycles exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle or a tri-cycle), and behavioral characteristics (such as the comfort level of the bicyclist). The design of a bikeway should consider reasonably expected bicycle types on the facility and utilize the appropriate dimensions.

The figure below illustrates the operating space and physical dimensions of a typical adult bicyclist, which are the basis for typical facility design. Bicyclists require clear space to operate within a facility. This is why the minimum operating width is greater than the physical dimensions of the bicyclist. Bicyclists prefer five feet or more operating width, although four feet may be minimally acceptable.

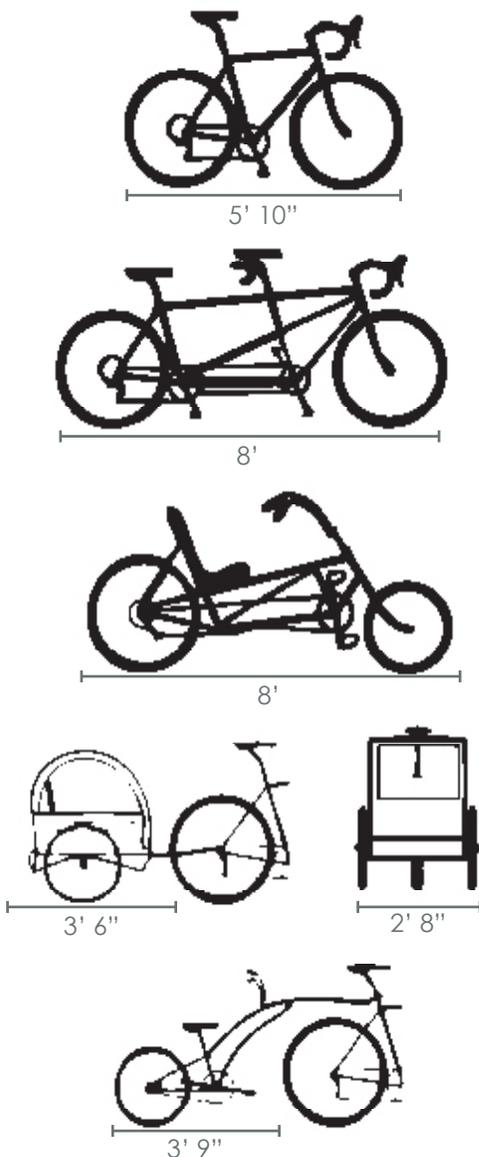


**Standard Bicycle Rider Dimensions**

Source: AASHTO Guide for the Development of Bicycle Facilities, 3rd Edition



In addition to the design dimensions of a typical bicycle, there are many other commonly used pedal-driven cycles and accessories to consider when planning and designing bicycle facilities. The most common types include tandem bicycles, recumbent bicycles, and trailer accessories. The figure and table below summarize the typical dimensions for bicycle types.



**Bicycle as Design Vehicle - Typical Dimensions**

Source: AASHTO Guide for the Development of Bicycle Facilities, 3rd Edition \*AASHTO does not provide typical dimensions for tricycles.

**Bicycle as Design Vehicle - Typical Dimensions**

Bicycle Type	Feature	Typical Dimensions
<b>Upright Adult Bicyclist</b>	Physical width	2 ft 6 in
	Operating width (Minimum)	4 ft
	Operating width (Preferred)	5 ft
	Physical length	5 ft 10 in
	Physical height of handlebars	3 ft 8 in
	Operating height	8 ft 4 in
	Eye height	5 ft
	Vertical clearance to obstructions (tunnel height, lighting, etc)	10 ft
<b>Recumbent Bicyclist</b>	Physical length	8 ft
	Eye height	3 ft 10 in
<b>Tandem Bicyclist</b>	Physical length	8 ft
<b>Bicyclist with child trailer</b>	Physical length	10 ft
	Physical width	2 ft 8 in

**Bicycle as Design Vehicle - Design Speed Expectations**

Bicycle Type	Feature	Typical Speed
<b>Upright Adult Bicyclist</b>	Paved level surfacing	15 mph
	Crossing Intersections	10 mph
	Downhill	30 mph
	Uphill	5-12 mph
<b>Recumbent Bicyclist</b>	Paved level surfacing	18 mph

\*Tandem bicycles and bicyclists with trailers have typical speeds equal to or less than upright adult bicyclists.

**DESIGN SPEED EXPECTATIONS**

The expected speed that different types of bicyclists can maintain under various conditions also influences the design of facilities such as multi-use paths. The table to the right provides typical bicyclist speeds for a variety of conditions.

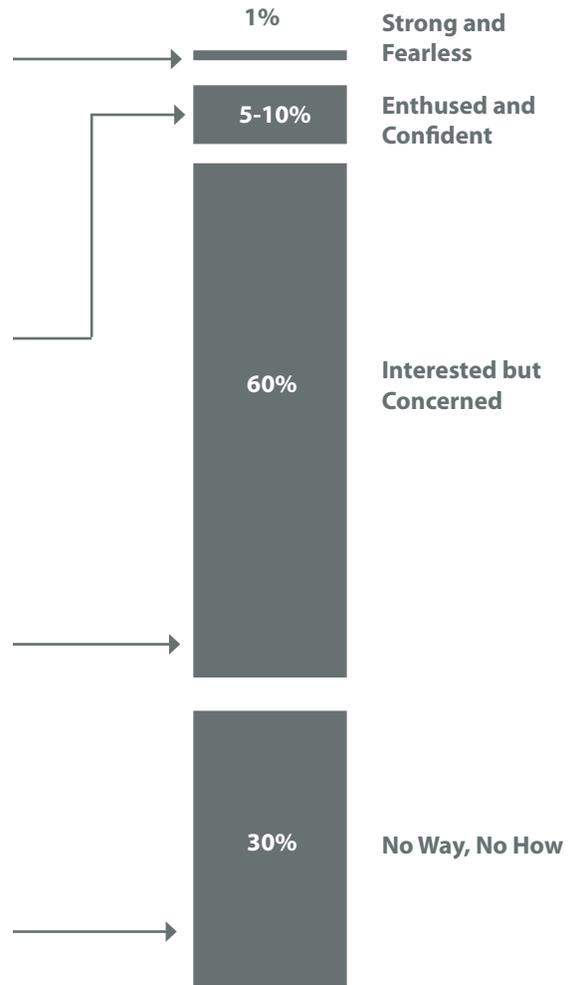


## TYPES OF BICYCLISTS

It is important to consider bicyclists of all skill levels when creating a non-motorized plan or project. Bicyclist skill level greatly influences expected speeds and behavior, both in separated bikeways and on shared roadways. Bicycle infrastructure should accommodate as many user types as possible, with decisions for separate or parallel facilities based on providing a comfortable experience for the greatest number of people.

The bicycle planning and engineering professions currently use several systems to classify the population, which can assist in understanding the characteristics and infrastructure preferences of different bicyclists. The most conventional framework classifies the "design cyclist" as *Advanced*, *Basic*, or *Child*<sup>1</sup>. A more detailed understanding of the US population as a whole is illustrated in the figure below. Developed by planners in Portland, OR<sup>2</sup> and supported by data collected nationally since 2005, this classification provides the following alternative categories to address varying attitudes towards bicycling in the US:

- **Strong and Fearless** (approximately 1% of population) – Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections -- even if shared with vehicles -- over separate bicycle facilities such as multi-use paths.
- **Enthusied and Confident** (5-10% of population) - This user group encompasses bicyclists who are fairly comfortable riding on all types of bikeways but usually choose low traffic streets or multi-use paths when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists such as commuters, recreationalists, racers and utilitarian bicyclists.
- **Interested but Concerned** (approximately 60% of population) – This user type comprises the bulk of the cycling population and represents bicyclists who typically only ride a bicycle on low traffic streets or multi-use trails under favorable weather conditions. These bicyclists perceive significant barriers to their increased use of cycling, specifically traffic and other safety issues. These people may become "Enthusied & Confident" with encouragement, education and experience.
- **No Way, No How** (approximately 30% of population) – Persons in this category are not bicyclists, and perceive severe safety issues with riding in traffic. Some people in this group may eventually become more regular cyclists with time and education. A significant portion of these people will not ride a bicycle under any circumstances.



Typical Distribution of Bicyclist Types

1 *Selecting Roadway Design Treatments to Accommodate Bicycles. (1994). Publication No. FHWA-RD-92-073*  
 2 *Four Types of Cyclists. (2009). Roger Geller, City of Portland Bureau of Transportation. <http://www.portlandonline.com/transportation/index.cfm?&a=237507>*



## BICYCLE FACILITY SELECTION GUIDELINES

This section summarizes the bicycle facility selection typology developed for the City of Oxford. The specific facility type that should be provided depends on the surrounding environment (e.g. auto speed and volume, topography, and adjacent land use) and expected bicyclist needs (e.g. bicyclists commuting on a highway versus students riding to school on residential streets).

### Facility Selection Guidelines

There are no 'hard and fast' rules for determining the most appropriate type of bicycle facility for a particular location – roadway speeds, volumes, right-of-way width, presence of parking, adjacent land uses, and expected bicycle user types are all critical elements of this decision. Studies find that the most significant factors influencing bicycle use are motor vehicle traffic volumes and speeds. Additionally, most bicyclists prefer facilities separated from motor vehicle traffic or located on local roads with low motor vehicle traffic speeds and volumes. Because off-street pathways are physically separated from the roadway, they are perceived as safe and attractive routes for bicyclists who prefer to avoid motor vehicle traffic. Consistent use of treatments and application of bikeway facilities allow users to anticipate whether they would feel comfortable riding on a particular facility, and plan their trips accordingly. This section provides guidance on various factors that affect the type of facilities that should be provided.

#### This section includes:

- Facility Classification
- Facility Continua





## FACILITY CLASSIFICATION

### DESCRIPTION

Consistent with bicycle facility classifications throughout the nation, these Bicycle Facility Design Guidelines identify the following classes of facilities by degree of separation from motor vehicle traffic.

**Shared Roadways** are bikeways where bicyclists and cars operate within the same travel lane, either side by side or in single file depending on roadway configuration. The most basic type of bikeway is a signed shared roadway. This facility provides continuity with other bicycle facilities (usually bike lanes), or designates preferred routes through high-demand corridors.



**Shared Roadways** may also be designated by pavement markings, signage and other treatments including directional signage, traffic diverters, chicanes, chokers and /or other traffic calming devices to reduce vehicle speeds or volumes. Shared-lane markings are included in this class of treatments.



**Separated Bikeways**, such as bike lanes, use signage and striping to delineate the right-of-way assigned to bicyclists and motorists. Bike lanes encourage predictable movements by both bicyclists and motorists. Paved Shoulders are also included in this classification.



**Cycle Tracks** are exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes.



**Multi-use Paths** are facilities separated from roadways for use by bicyclists and pedestrians. Greenways and sidepaths are included in this classification.



## FACILITY CONTINUA

The following continua illustrate the range of bicycle facilities applicable to various roadway environments, based on the roadway type and desired degree of separation. Engineering judgment, traffic studies, previous municipal planning efforts, community input and local context should be used to refine criteria when developing bicycle facility recommendations for a particular street. In some corridors, it may be desirable to construct facilities to a higher level of treatment than those recommended in relevant planning documents in order to enhance user safety and comfort. In other cases, existing and/or future motor vehicle speeds and volumes may not justify the recommended level of separation, and a less intensive treatment may be acceptable.

Least Protected

Most Protected

### Arterial/Highway Bikeway Continuum (without curb and gutter)



### Arterial/Highway Bikeway Continuum (with curb and gutter)



### Collector Bikeway Continuum





## SHARED ROADWAYS

On shared roadways, bicyclists and motor vehicles use the same roadway space. These facilities are typically used on roads with low speeds and traffic volumes, however they can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

Shared roadways employ a large variety of treatments from simple signage and shared lane markings to more complex treatments including directional signage, traffic diverters, chicanes, chokers, and/or other traffic calming devices to reduce vehicle speeds or volumes.



Signed Shared Roadway



Marked Shared Roadway



Bicycle Boulevard

### This section includes:

- Signed Shared Roadway
- Marked Shared Roadway
- Bicycle Boulevard



## SIGNED SHARED ROADWAY

### Guidance

Lane width varies depending on roadway configuration.

Bicycle Route signage (D11-1) should be applied at intervals frequent enough to keep bicyclists informed of changes in route direction and to remind motorists of the presence of bicyclists. Commonly, this includes placement at:

- Beginning or end of Bicycle Route.
- At major changes in direction or at intersections with other bicycle routes.
- At intervals along bicycle routes not to exceed ½ mile.

### Description

Signed Shared Roadways are facilities shared with motor vehicles. They are typically used on roads with low speeds and traffic volumes, however can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.



### Discussion

Signed Shared Roadways serve either to provide continuity with other bicycle facilities (usually bike lanes) or to designate preferred routes through high-demand corridors.

This configuration differs from a **Bicycle Boulevard** due to a lack of traffic calming, wayfinding, pavement markings and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices.

### Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs, and will need periodic replacement due to wear.



## MARKED SHARED ROADWAY

### Guidance

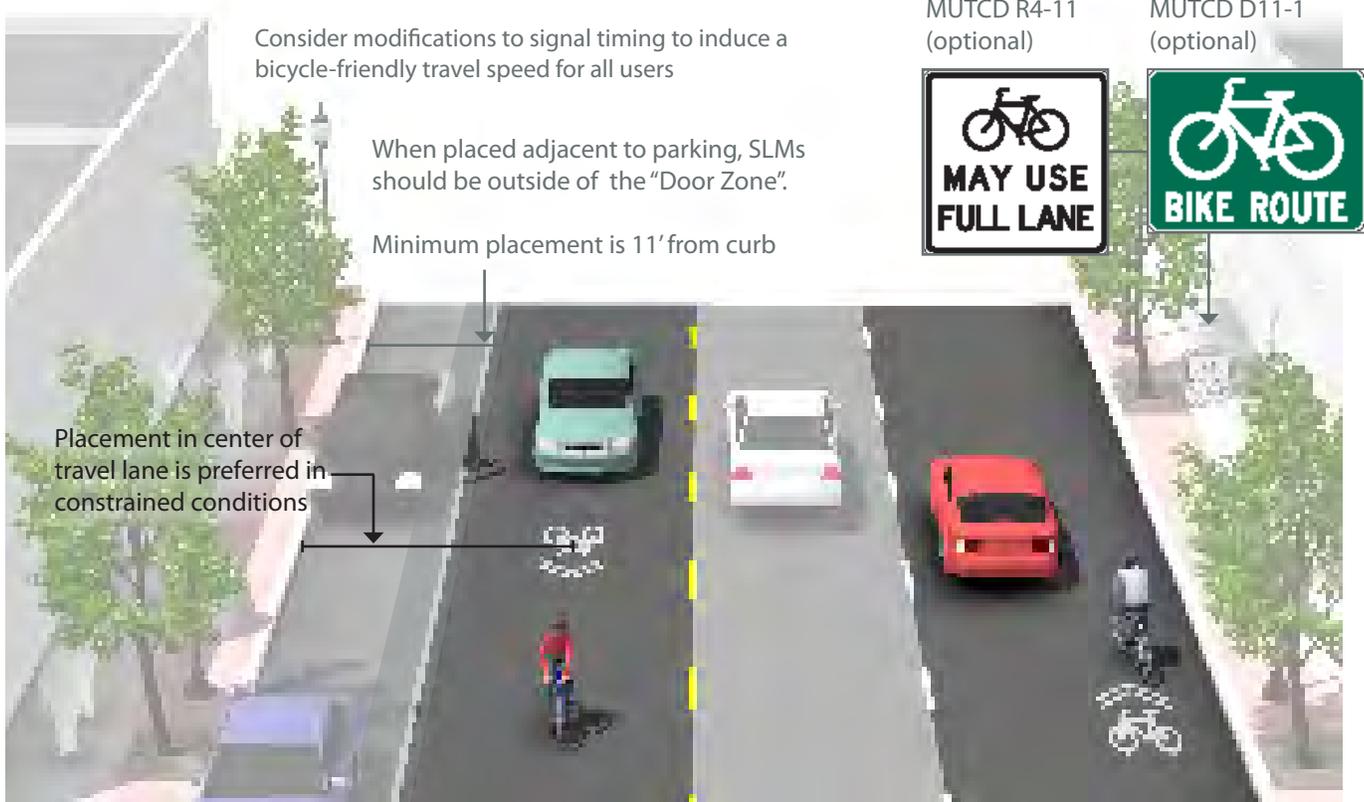
- In constrained conditions, preferred placement is in the center of the travel lane to minimize wear and promote single file travel.
- Minimum placement of SLM marking centerline is 11 feet from edge of curb where on-street parking is present, 4 feet from edge of curb with no parking. If parking lane is wider than 7.5 feet, the SLM should be moved further out accordingly.

### Description

A marked shared roadway is a general purpose travel lane marked with shared lane markings (SLM) used to encourage bicycle travel and proper positioning within the lane.

In constrained conditions, the SLMs are placed in the middle of the lane to discourage unsafe passing by motor vehicles. On a wide outside lane, the SLMs can be used to promote bicycle travel to the right of motor vehicles.

In all conditions, SLMs should be placed outside of the door zone of parked cars.



### Discussion

**Bike Lanes** should be considered on roadways with outside travel lanes wider than 15 feet, or where other lane narrowing or removal strategies may provide adequate road space. SLMs shall not be used on shoulders, in designated **Bike Lanes**, or to designate **Bicycle Detection** at signalized intersections. (MUTCD 9C.07)

This configuration differs from a **Bicycle Boulevard** due to a lack of traffic calming, wayfinding, and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.

### Additional References and Guidelines

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices.
- NACTO. (2012). Urban Bikeway Design Guide.
- NCDOT. (2000). Traditional Neighborhood Development (TND) Guidelines.

### Materials and Maintenance

Placing SLMs between vehicle tire tracks will increase the life of the markings and minimize the long-term cost of the treatment.



## BICYCLE BOULEVARD

### Guidance

- Signs and pavement markings are the minimum treatments necessary to designate a street as a bicycle boulevard.
- Bicycle boulevards should have a maximum posted speed of 25 mph. Use traffic calming to maintain an 85th percentile speed below 22 mph.
- Implement volume control treatments based on the context of the bicycle boulevard, using engineering judgment. Target motor vehicle volumes range from 1,000 to 3,000 vehicles per day.
- Intersection crossings should be designed to enhance safety and minimize delay for bicyclists.

### Description

Bicycle boulevards are a special class of shared roadways designed for a broad spectrum of bicyclists. They are low-volume, low-speed local streets modified to enhance bicyclist comfort by using treatments such as signage, pavement markings, traffic calming and/or traffic reduction, and intersection modifications. These treatments allow through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic.

**Signs and Pavement Markings** identify the street as a bicycle priority route.



**Enhanced Crossings** use signals, beacons, and road geometry to increase safety at major intersections.

**Partial Closures** and other volume management tools limit the number of cars traveling on the bicycle boulevard.

**Speed Humps** manage driver speed.

**Curb Extensions** shorten pedestrian crossing distance.

**Mini Traffic Circles** slow drivers in advance of intersections.



### Discussion

Bicycle boulevard retrofits to local streets are typically located on streets without existing signalized accommodation at crossings of collector and arterial roadways. Without treatments for bicyclists, these intersections can become major barriers along the bicycle boulevard and compromise safety.

Traffic calming can deter motorists from driving on a street. Anticipate and monitor vehicle volumes on adjacent streets to determine whether traffic calming results in inappropriate volumes. Traffic calming can be implemented on a trial basis.

### Additional References and Guidelines

Alta Planning + Design and IBPI. (2009). Bicycle Boulevard Planning and Design Handbook.  
 BikeSafe. (No Date). Bicycle countermeasure selection system.  
 Ewing, Reid. (1999). Traffic Calming: State of the Practice.  
 Ewing, Reid and Brown, Steven. (2009). U.S. Traffic Calming Manual.

### Materials and Maintenance

Vegetation should be regularly trimmed to maintain visibility and attractiveness.

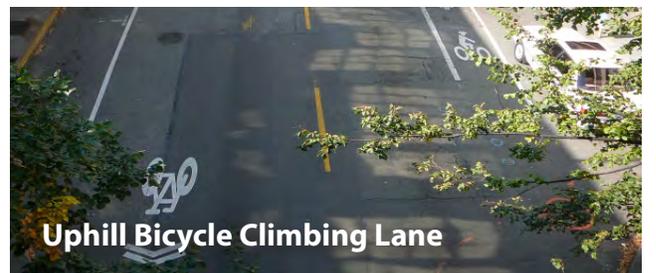


## SEPARATED BIKEWAYS

Designated exclusively for bicycle travel, separated bikeways are segregated from vehicle travel lanes by striping, and can include pavement stencils and other treatments. Separated bikeways are most appropriate on arterial and collector streets where higher traffic volumes and speeds warrant greater separation.

Separated bikeways can increase safety and promote proper riding by:

- Defining road space for bicyclists and motorists, reducing the possibility that motorists will stray into the bicyclists' path.
- Discouraging bicyclists from riding on the sidewalk.
- Reducing the incidence of wrong way riding.
- Reminding motorists that bicyclists have a right to the road.



### This section includes:

- Shoulder Bikeways
- Bicycle Lanes
- Buffered Bike Lanes
- Uphill Bicycle Climbing Lane
- Cycle Tracks

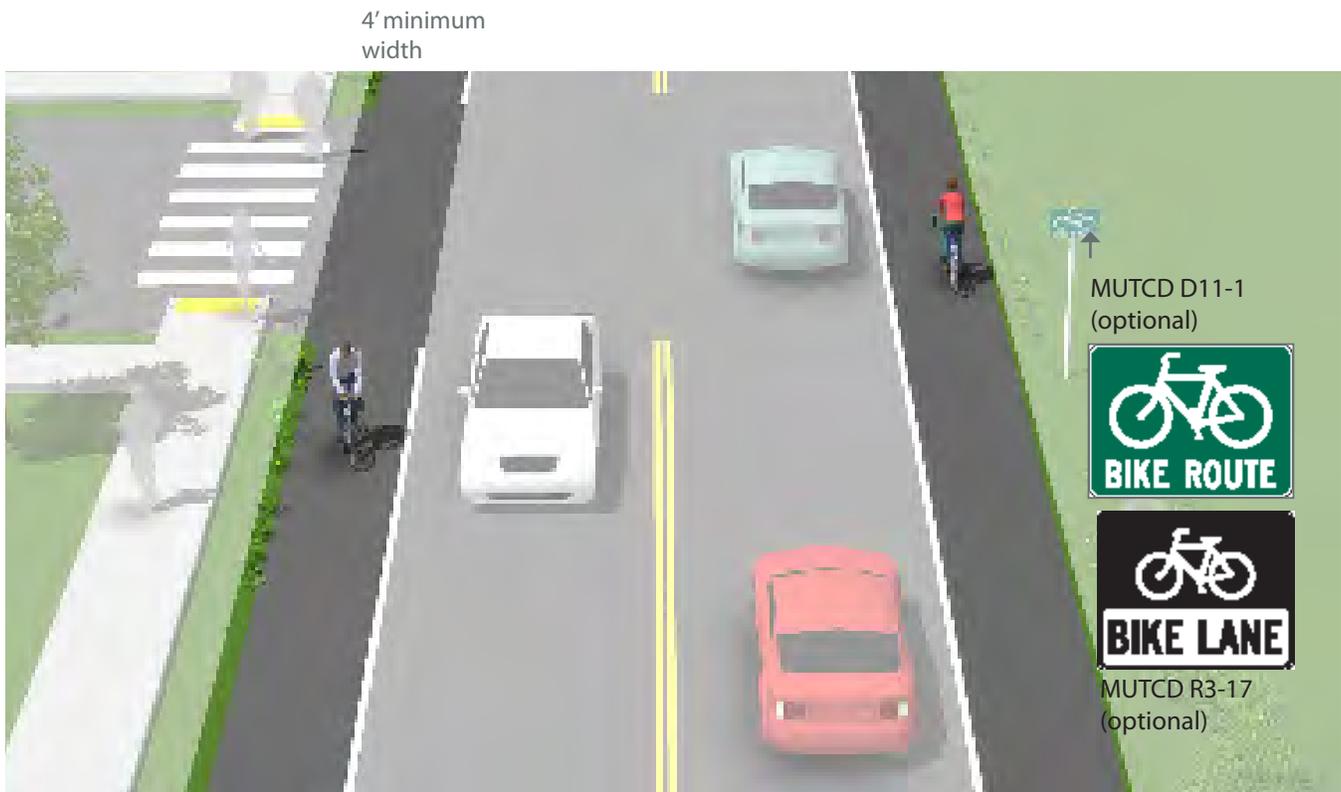
## SHOULDER BIKEWAYS

### Guidance

- 4 foot minimum width. Greater widths preferred.
- If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. In these situations, a minimum of 3 feet of operating space should be provided.

### Description

Typically found in less-dense areas, shoulder bikeways are paved roadways with striped shoulders (4'+) wide enough for bicycle travel. Shoulder bikeways often, but not always, include signage alerting motorists to expect bicycle travel along the roadway. Shoulder bikeways should be considered a temporary treatment, with full bike lanes planned for construction when the roadway is widened or completed with curb and gutter. This type of treatment is not typical in urban areas and should only be used where constraints exist.



### Discussion

A wide outside lane may be sufficient accommodation for bicyclists on streets with insufficient width for bike lanes but which do have space available to provide a wider (14'-16') outside travel lane. Consider configuring as a **marked shared roadway** in these locations.

Where feasible, **roadway widening** should be performed with pavement resurfacing jobs.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices. NCDOT. (1994). Bicycle Facilities Planning and Design Guidelines.

### Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Shoulder bikeways should be cleared of snow through routine snow removal operations.



## BICYCLE LANES

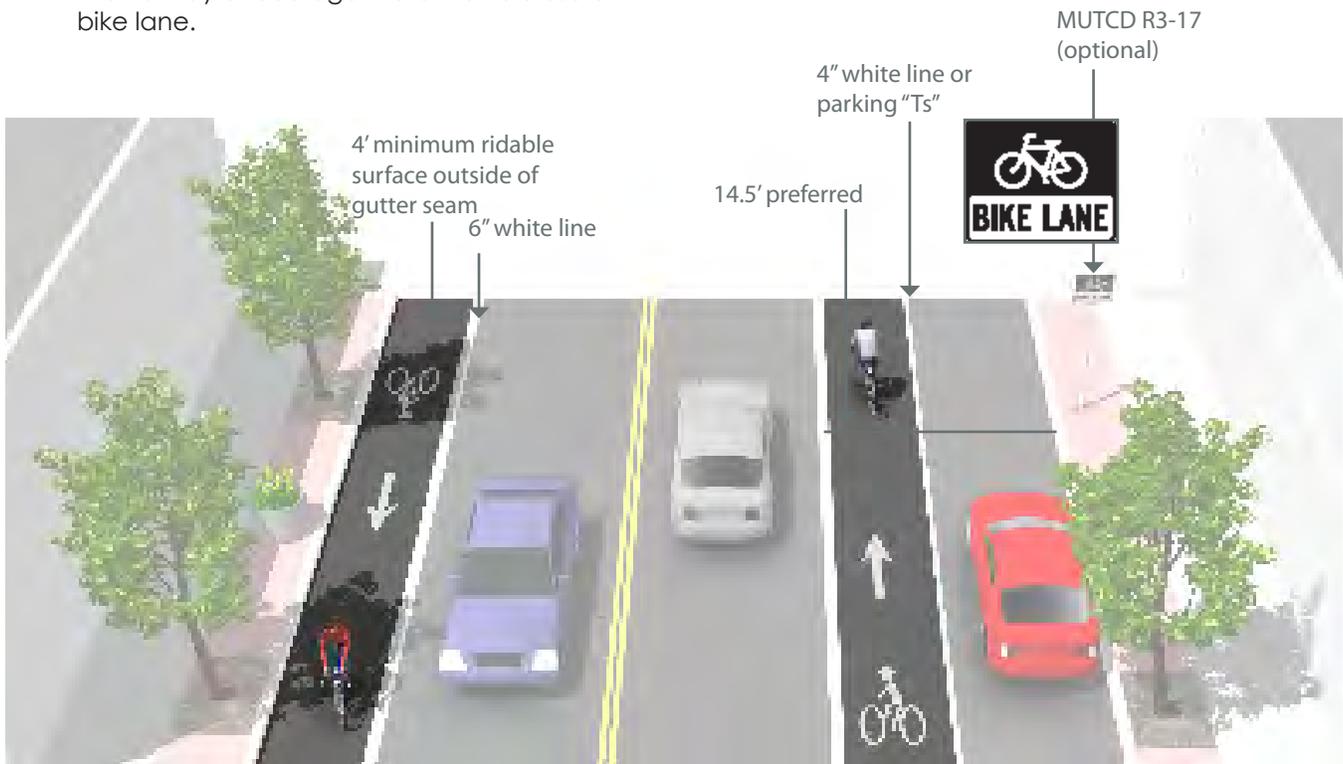
### Guidance

- 4 foot minimum when no curb and gutter is present.
- 5 foot minimum when adjacent to curb and gutter or 3 feet more than the gutter pan width if the gutter pan is wider than 2 feet.
- 14.5 foot preferred from curb face to edge of bike lane. (12 foot minimum).
- 7 foot maximum width for use adjacent to arterials with high travel speeds. Greater widths may encourage motor vehicle use of bike lane.

### Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is located adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge or parking lane.

Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway than if they are expected to share a lane with vehicles.



### Discussion

Wider bicycle lanes are desirable in certain situations such as on higher speed arterials (45 mph+) where use of a wider bicycle lane would increase separation between passing vehicles and bicyclists. Appropriate signing and stenciling is important with wide bicycle lanes to ensure motorists do not mistake the lane for a vehicle lane or parking lane. Consider **Buffered Bicycle Lanes** when further separation is desired.

### Additional References and Guidelines

- AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices. NACTO. (2012). Urban Bikeway Design Guide. NCDOT. (2000). Traditional Neighborhood Development (TND) Guidelines. NCDOT. (1994). Bicycle Facilities Planning and Design Guidelines.

### Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

## BUFFERED BIKE LANES

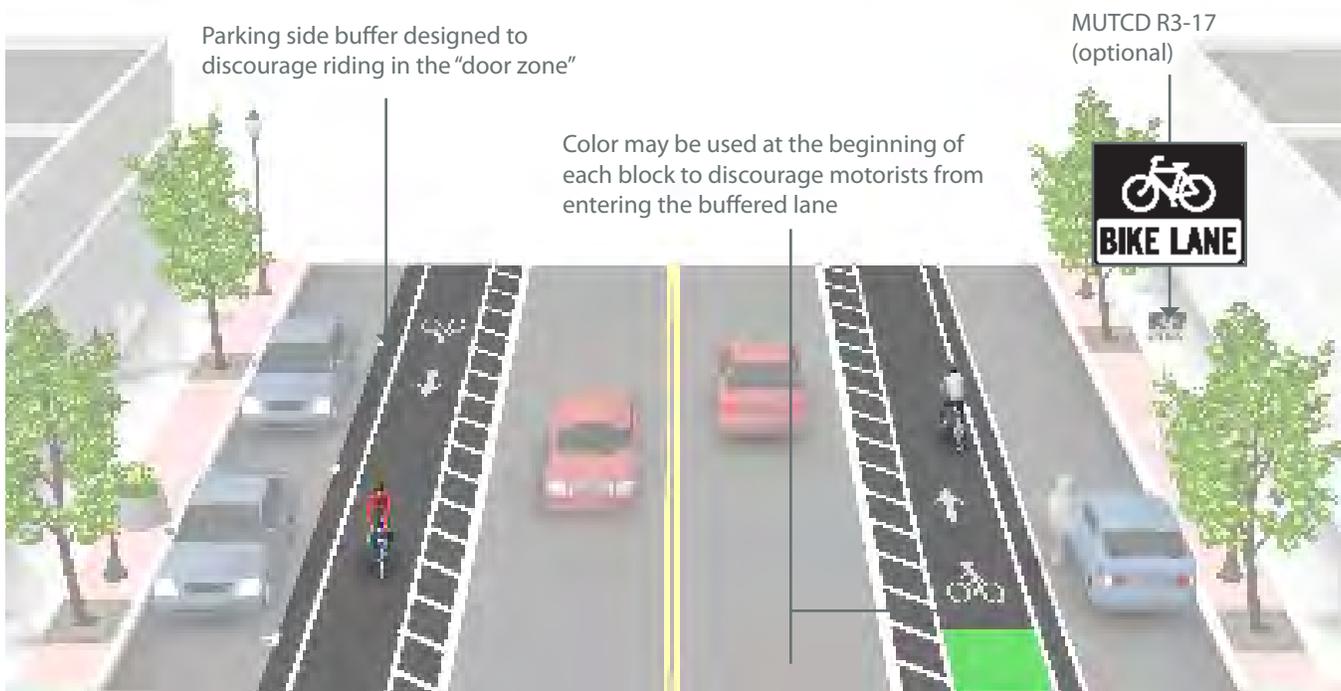
### Guidance

- Where bicyclist volumes are high or where bicyclist speed differentials are significant, the desired bicycle travel area width is 7 feet.
- Buffers should be at least 2 feet wide. If 3 feet or wider, mark with diagonal or chevron hatching. For clarity at driveways or minor street crossings, consider a dotted line for the inside buffer boundary where cars are expected to cross.

### Description

Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Buffered bike lanes are allowed as per MUTCD guidelines for buffered preferential lanes (section 3D-01).

Buffered bike lanes are designed to increase the space between the bike lane and the travel lane or parked cars. This treatment is appropriate for bike lanes on roadways with high motor vehicle traffic volumes and speed, adjacent to parking lanes, or a high volume of truck or oversized vehicle traffic.



### Discussion

Frequency of right turns by motor vehicles at major intersections should determine whether continuous or truncated buffer striping should be used approaching the intersection. Commonly configured as a buffer between the bicycle lane and motor vehicle travel lane, a parking side buffer may also be provided to help bicyclists avoid the 'door zone' of parked cars.

### Additional References and Guidelines

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices. (3D-01)
- NACTO. (2012). Urban Bikeway Design Guide.

### Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.



## UPHILL BICYCLE CLIMBING LANE

### Guidance

- Uphill bike lanes should be 6-7 feet wide (wider lanes are preferred because extra maneuvering room on steep grades can benefit bicyclists).
- Can be combined with **Shared Lane Markings** for downhill bicyclists who can more closely match prevailing traffic speeds.

### Description

Uphill bike lanes (also known as “climbing lanes”) enable motorists to safely pass slower-speed bicyclists, thereby improving conditions for both travel modes.



### Discussion

This treatment is typically found on retrofit projects as newly constructed roads should provide adequate space for bicycle lanes in both directions of travel. Accommodating an uphill bicycle lane often includes delineating on-street parking (if provided), narrowing travel lanes and/or shifting the centerline if necessary.

### Additional References and Guidelines

NACTO. (2012). Urban Bikeway Design Guide.  
 AASHTO. (2012). Guide for the Development of Bicycle Facilities.  
 FHWA. (2009). Manual on Uniform Traffic Control Devices.

### Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

## CYCLE TRACKS

### Guidance

Cycle tracks should ideally be placed along streets with long blocks and few driveways or mid-block access points for motor vehicles.

### One-Way Cycle Tracks

- 7 foot recommended minimum to allow passing. 5 foot minimum width in constrained locations.

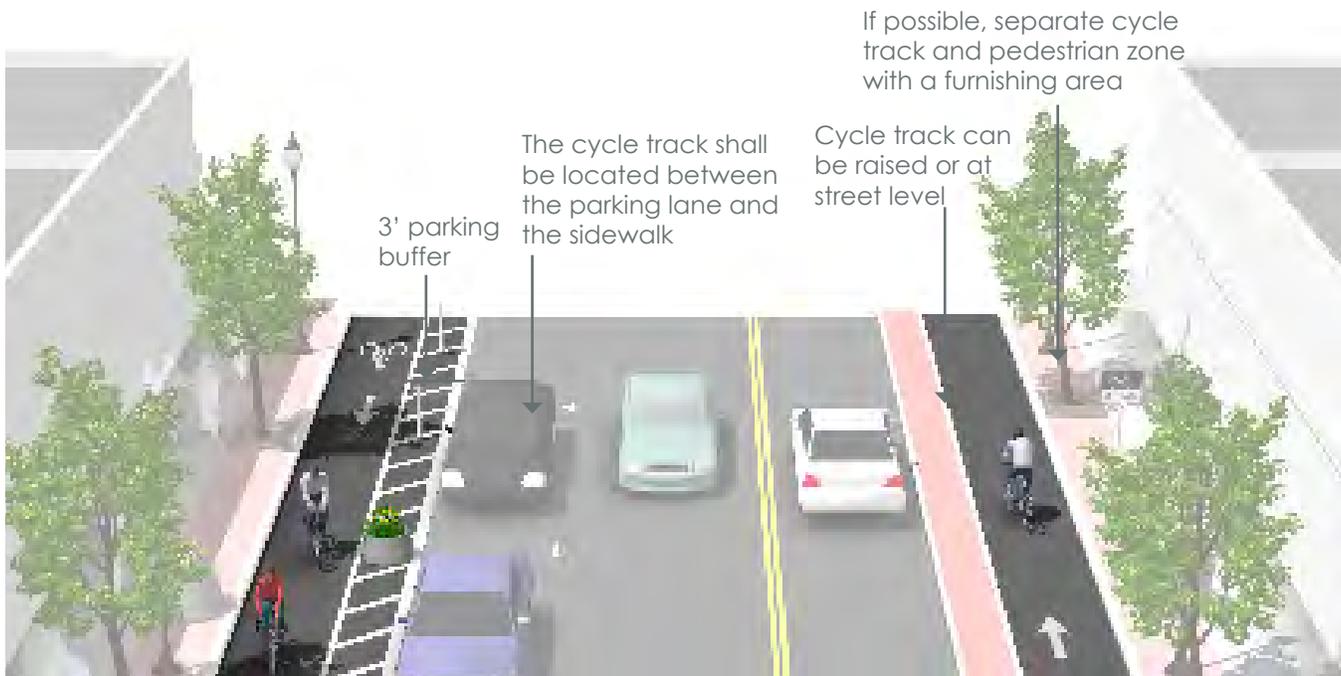
### Two-Way Cycle Tracks

- Cycle tracks located on one-way streets have fewer potential conflict areas than those on two-way streets.
- 12 foot recommended minimum for two-way facility. 8 foot minimum in constrained locations.

### Description

A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. Cycle tracks have different forms but all share common elements—they provide space that is intended to be exclusively or primarily used by bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks.

Raised cycle tracks may be at the level of the adjacent sidewalk or set at an intermediate level between the roadway and sidewalk to separate the cycle track from the pedestrian area.



### Discussion

Special consideration should be given at transit stops to manage bicycle and pedestrian interactions. Driveways and minor street crossings are unique challenges to cycle track design. Parking should be prohibited within 30 feet of the intersection to improve visibility. Color, yield markings and “Yield to Bikes” signage should be used to identify the conflict area and make it clear that the cycle track has priority over entering and exiting traffic. If configured as a raised cycle track, the crossing should be raised so that the sidewalk and cycle track maintain their elevation through the crossing.

### Additional References and Guidelines

NACTO. (2012). Urban Bikeway Design Guide.

### Materials and Maintenance

In cities with winter climates, barrier separated and raised cycle tracks may require special equipment for snow removal.



## SEPARATED BIKEWAYS AT INTERSECTIONS

Intersections are junctions at which different modes of transportation meet and facilities overlap. An intersection facilitates the interchange between bicyclists, motorists, pedestrians and other modes in order to advance traffic flow in a safe and efficient manner. Designs for intersections with bicycle facilities should reduce conflict between bicyclists (and other vulnerable road users) and vehicles by heightening the level of visibility, denoting clear right-of-way and facilitating eye contact and awareness with other modes. Intersection treatments can improve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals.

The configuration of a safe intersection for bicyclists may include elements such as color, signage, medians, signal detection and pavement markings. Intersection design should take into consideration existing and anticipated bicyclist, pedestrian and motorist movements. In all cases, the degree of mixing or separation between bicyclists and other modes is intended to reduce the risk of crashes and increase bicyclist comfort. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, whether bicycle facilities are intersecting, and the adjacent street function and land use.



Bike Lanes at Right Turn Only Lanes



Colored Bike Lanes in Conflict Areas



Combined Bike Lane/Turn Lane



Intersection Crossing Markings



Bicyclists at Single Lane Roundabouts

### This section includes:

- Bike Lanes at Right Turn Only Lanes
- Colored Bike Lanes in Conflict Areas
- Combined Bike Lane/Turn Lane
- Intersection Crossing Markings
- Bicycles at Single Lane Roundabouts



## BIKE LANES AT RIGHT TURN ONLY LANES

### Description

The appropriate treatment at right-turn lanes is to place the bike lane between the right-turn lane and the right-most through lane or, where right-of-way is insufficient, to use a **shared bike lane/turn lane**.

The design (right) illustrates a bike lane pocket, with signage indicating that motorists should yield to bicyclists through the conflict area.

### Guidance

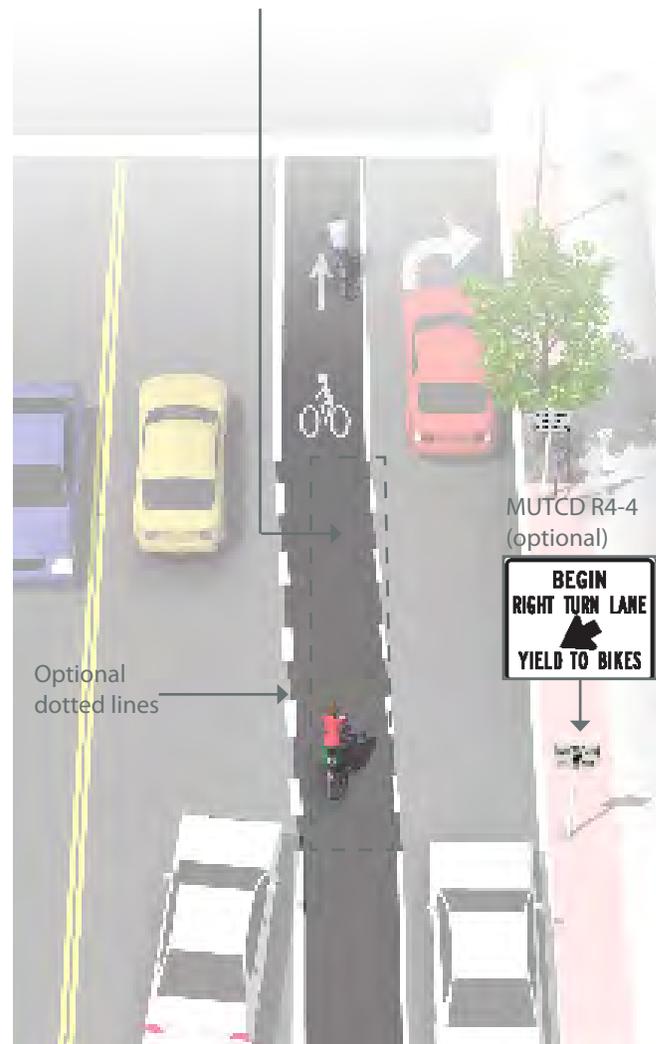
#### At auxiliary right turn only lanes (add lane):

- Continue existing bike lane width; standard width of 5 to 6 feet or 4 feet in constrained locations.
- Use signage to indicate that motorists should yield to bicyclists through the conflict area.
- Consider using **colored conflict areas** to promote visibility of the mixing zone.

#### Where a through lane becomes a right turn only lane:

- Do not define a dotted line merging path for bicyclists.
- Drop the bicycle lane in advance of the merge area.
- Use shared lane markings to indicate shared use of the lane in the merging zone.

Colored pavement may be used in the weaving area to increase visibility and awareness of potential conflict



### Discussion

For other potential approaches to providing accommodations for bicyclists at intersections with turn lanes, please see **shared bike lane/turn lane**, **bicycle signals**, and **colored bike facilities**.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.  
 FHWA. (2009). Manual on Uniform Traffic Control Devices.  
 NACTO. (2012). Urban Bikeway Design Guide.

### Materials and Maintenance

Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.



## COLORED BIKE LANES IN CONFLICT AREAS

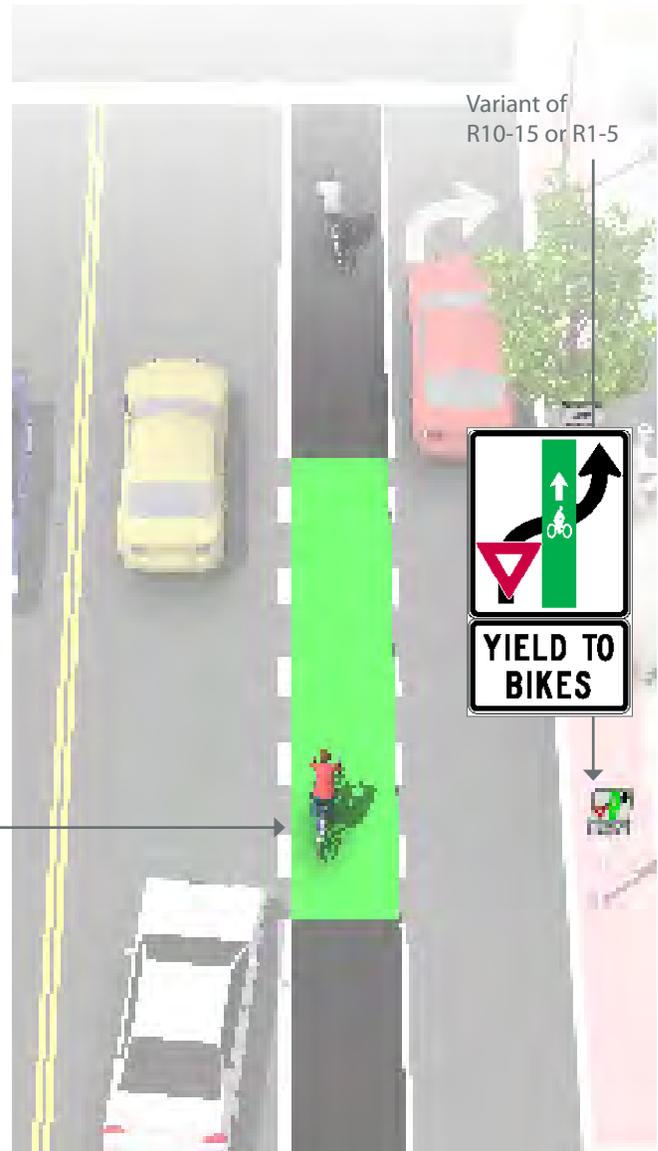
### Description

Colored pavement within a bicycle lane increases the visibility of the facility and reinforces priority of bicyclists in conflict areas.

### Guidance

- Green colored pavement was given interim approval by the Federal Highway Administration in March 2011. See interim approval for specific color standards.
- The colored surface should be skid resistant and retro-reflective.
- A “Yield to Bikes” sign should be used at intersections or driveway crossings to reinforce that bicyclists have the right-of-way in colored bike lane areas.

Normal white dotted edge lines should define colored space



### Discussion

Evaluations performed in Portland, OR, St. Petersburg, FL and Austin, TX found that significantly more motorists yielded to bicyclists and slowed or stopped before entering the conflict area after the application of the colored pavement when compared with an uncolored treatment.

### Additional References and Guidelines

FHWA. (2011). Interim Approval (IA-14) has been granted. Requests to use green colored pavement need to comply with the provisions of Paragraphs 14 through 22 of Section 1A.10

NACTO. (2012). Urban Bikeway Design Guide.

### Materials and Maintenance

Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

## COMBINED BIKE LANE / TURN LANE

### Description

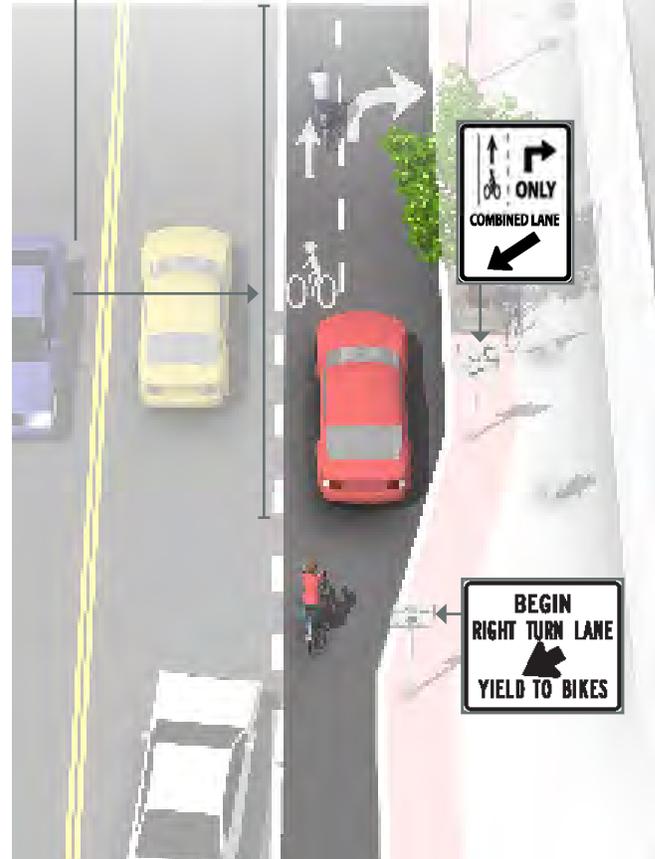
The combined bicycle/right turn lane places a standard-width bike lane on the left side of a dedicated right turn lane. A dotted line delineates the space for bicyclists and motorists within the shared lane. This treatment includes signage advising motorists and bicyclists of proper positioning within the lane.

This treatment is recommended at intersections lacking sufficient space to accommodate both a standard **through bike lane** and right turn lane.

### Guidance

- Maximum shared turn lane width is 13 feet; narrower is preferable.
- Bike Lane pocket should have a minimum width of 4 feet with 5 feet preferred.
- A dotted 4 inch line and bicycle lane marking should be used to clarify bicyclist positioning within the combined lane, without excluding cars from the suggested bicycle area.
- A "Right Turn Only" sign with an "Except Bicycles" plaque may be needed to make it legal for through bicyclists to use a right turn lane.

Short length turn pockets encourage slower motor vehicle speeds



### Discussion

Case studies cited by the Pedestrian and Bicycle Information Center indicate that this treatment works best on streets with lower posted speeds (30 MPH or less) and with lower traffic volumes (10,000 ADT or less). May not be appropriate for high-speed arterials or intersections with long right turn lanes. May not be appropriate for intersections with large percentages of right-turning heavy vehicles.

### Additional References and Guidelines

NACTO. (2012). Urban Bikeway Design Guide.  
This treatment is currently slated for inclusion in the next edition of the AASHTO Guide for the Development of Bicycle Facilities

### Materials and Maintenance

Locate markings out of tire tread to minimize wear. Because the effectiveness of markings depends on their visibility, maintaining markings should be a high priority.



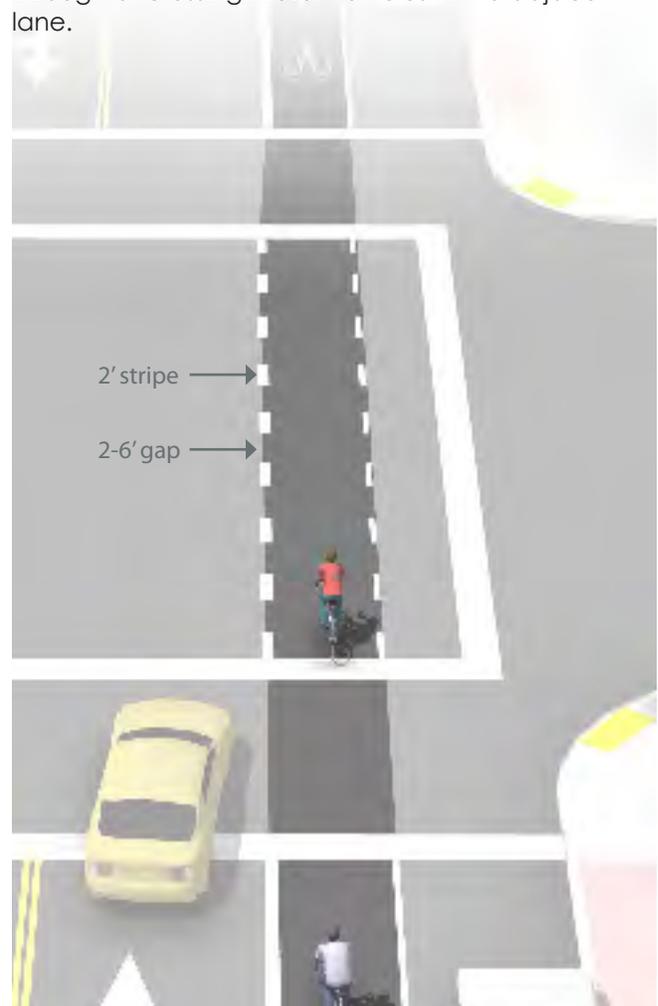
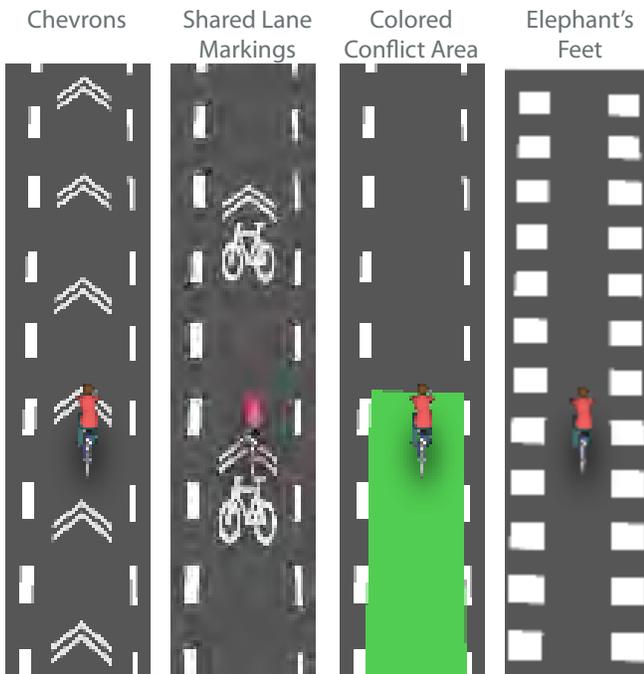
## INTERSECTION CROSSING MARKINGS

### Guidance

- See MUTCD Section 3B.08: “dotted line extensions”
- Crossing striping shall be at least six inches wide when adjacent to motor vehicle travel lanes. Dotted lines should be two-foot lines spaced two to six feet apart.
- Chevrons, shared lane markings, or **colored bike lanes in conflict areas** may be used to increase visibility within conflict areas or across entire intersections. Elephant’s Feet markings are common in Canada, and in use in Chicago, IL.

### Description

Bicycle pavement markings through intersections indicate the intended path of bicyclists through an intersection or across a driveway or ramp. They guide bicyclists on a safe and direct path through the intersection and provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane.



### Discussion

Additional markings such as chevrons, shared lane markings, or **colored bike lanes in conflict areas** are strategies currently in use in the United States and Canada. Cities considering the implementation of markings through intersections should standardize future designs to avoid confusion.

### Additional References and Guidelines

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices. (3A.06)
- NACTO. (2012). Urban Bikeway Design Guide.

### Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority.

## BICYCLISTS AT SINGLE LANE ROUNDABOUTS

### Guidelines

- 25 mph maximum circulating design speed.
- Design approaches/exits to the lowest speeds possible.
- Encourage bicyclists navigating the roundabout like motor vehicles to “take the lane.”
- Maximize yielding rate of motorists to pedestrians and bicyclists at crosswalks.
- Provide separated facilities for bicyclists who prefer not to navigate the roundabout on the roadway.

### Description

In single lane roundabouts it is important to indicate to motorists, bicyclists and pedestrians the right-of-way rules and correct way for them to circulate, using appropriately designed signage, pavement markings, and geometric design elements.

Crossings set back at least one car length from the entrance of the roundabout

Truck apron can provide adequate clearance for longer vehicles



### Discussion

Research indicates that while single-lane roundabouts may benefit bicyclists and pedestrians by slowing traffic, multi-lane roundabouts may present greater challenges and significantly increase safety problems for these users.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.  
 FHWA. (2000). Roundabouts: An Informational Guide  
 FHWA. (2010). Roundabouts: An Informational Guide, Second Edition. NCHRP 672

### Materials and Maintenance

Signage and striping require routine maintenance.



## BIKEWAY SIGNING

The ability to navigate through a city is informed by landmarks, natural features and other visual cues. Signs throughout the city should indicate to bicyclists:

- Direction of travel
- Location of destinations
- Travel time/distance to those destinations

These signs will increase users' comfort and accessibility to the bicycle systems.

Signage can serve both wayfinding and safety purposes including:

- Helping to familiarize users with the bicycle network
- Helping users identify the best routes to destinations
- Helping to address misperceptions about time and distance
- Helping overcome a "barrier to entry" for people who are not frequent bicyclists (e.g., "interested but concerned" bicyclists)

A community-wide bicycle wayfinding signage plan would identify:

- Sign locations
- Sign type – what information should be included and design features
- Destinations to be highlighted on each sign – key destinations for bicyclists
- Approximate distance and travel time to each destination

Bicycle wayfinding signs also visually cue motorists that they are driving along a bicycle route and should use caution. Signs are typically placed at key locations leading to and along bicycle routes, including the intersection of multiple routes. Too many road signs tend to clutter the right-of-way, and it is recommended that these signs be posted at a level most visible to bicyclists rather than per vehicle signage standards.

### This section includes:

- Sign Types
- Sign Placement



Sign Types



Sign Placement

## SIGN TYPES

### Description

A bicycle wayfinding system consists of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes. There are three general types of wayfinding signs:

#### Confirmation Signs

Indicate to bicyclists that they are on a designated bikeway. Make motorists aware of the bicycle route.

Can include destinations and distance/time. Do not include arrows.

#### Turn Signs

Indicate where a bikeway turns from one street onto another street. Can be used with pavement markings.

Include destinations and arrows.

#### Decisions Signs

Mark the junction of two or more bikeways.

Inform bicyclists of the designated bike route to access key destinations.

Destinations and arrows, distances and travel times are optional but recommended.

#### Alternative Designs

A customized alternative design may be used to include pedestrian-oriented travel times, local city logos, and sponsorship branding.



### Discussion

There is no standard color for bicycle wayfinding signage. Section 1A.12 of the MUTCD establishes the general meaning for signage colors. Green is the color used for directional guidance and is the most common color of bicycle wayfinding signage in the US, including those in the MUTCD.

### Additional References and Guidelines

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices.
- NACTO. (2012). Urban Bikeway Design Guide.

### Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.



## SIGN PLACEMENT

### Guidance

Signs are typically placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes.

### Decisions Signs

Near-side of intersections in advance of a junction with another bicycle route.

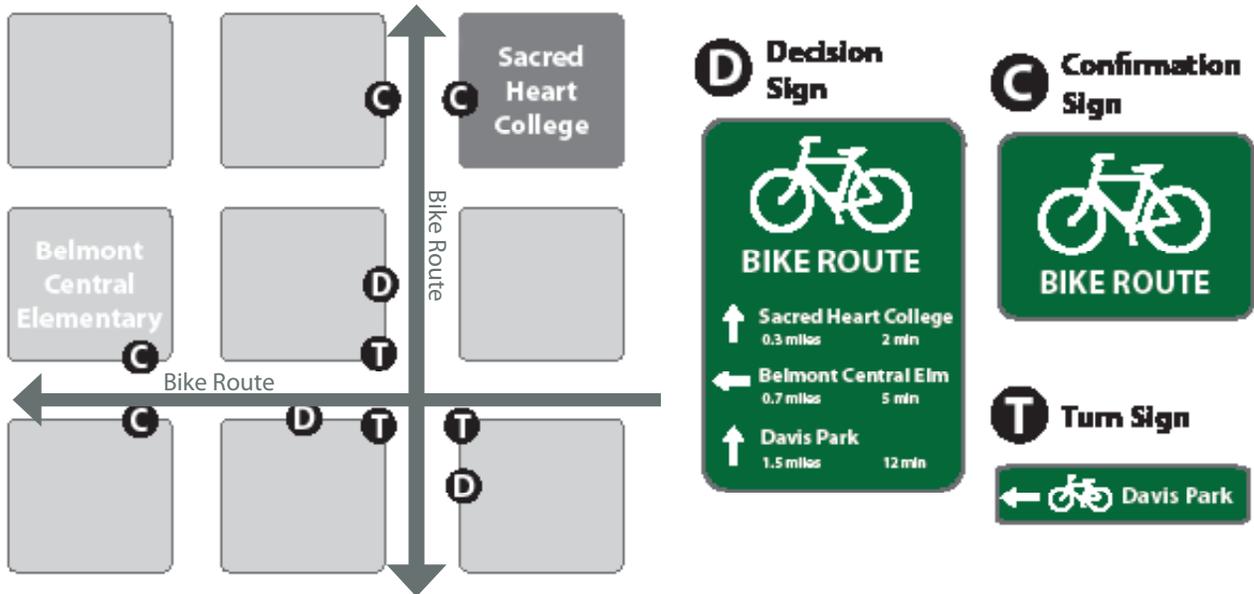
Along a route to indicate a nearby destination.

### Confirmation Signs

Every ¼ to ½ mile on off-street facilities and every 2 to 3 blocks along on-street bicycle facilities, unless another type of sign is used (e.g., within 150 ft of a turn or decision sign). Should be placed soon after turns to confirm destination(s). Pavement markings can also act as confirmation that a bicyclist is on a preferred route.

### Turn Signs

Near-side of intersections where bike routes turn (e.g., where the street ceases to be a bicycle route or does not go through). Pavement markings can also indicate the need to turn to the bicyclist.



### Discussion

It can be useful to classify a list of destinations for inclusion on the signs based on their relative importance to users throughout the area. A particular destination's ranking in the hierarchy can be used to determine the physical distance from which the locations are signed. For example, primary destinations (such as the downtown area) may be included on signage up to five miles away. Secondary destinations (such as a transit station) may be included on signage up to two miles away. Tertiary destinations (such as a park) may be included on signage up to one mile away.

### Additional References and Guidelines

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- FHWA. (2009). Manual on Uniform Traffic Control Devices.
- NACTO. (2012). Urban Bikeway Design Guide.

### Materials and Maintenance

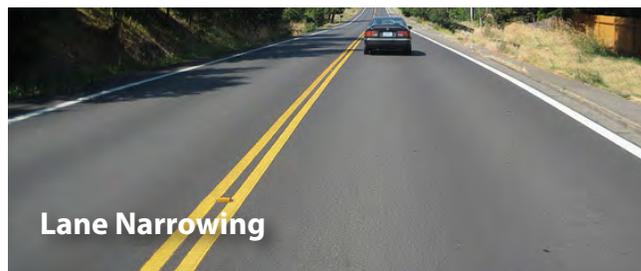
Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.



## RETROFITTING EXISTING STREETS TO ADD BIKEWAYS

Most major streets are characterized by conditions (e.g., high vehicle speeds and/or volumes) for which dedicated bike lanes are the most appropriate facility to accommodate safe and comfortable riding. Although opportunities to add bike lanes through roadway widening may exist in some locations, many major streets have physical and other constraints that would require street retrofit measures within existing curb-to-curb widths. As a result, much of the guidance provided in this section focuses on effectively reallocating existing street width through striping modifications to accommodate dedicated bike lanes.

Although largely intended for major streets, these measures may be appropriate for any roadway where bike lanes would be the best accommodation for bicyclists.



### This section includes:

- Roadway Widening
- Lane Narrowing
- Lane Reconfiguration
- Parking Reduction



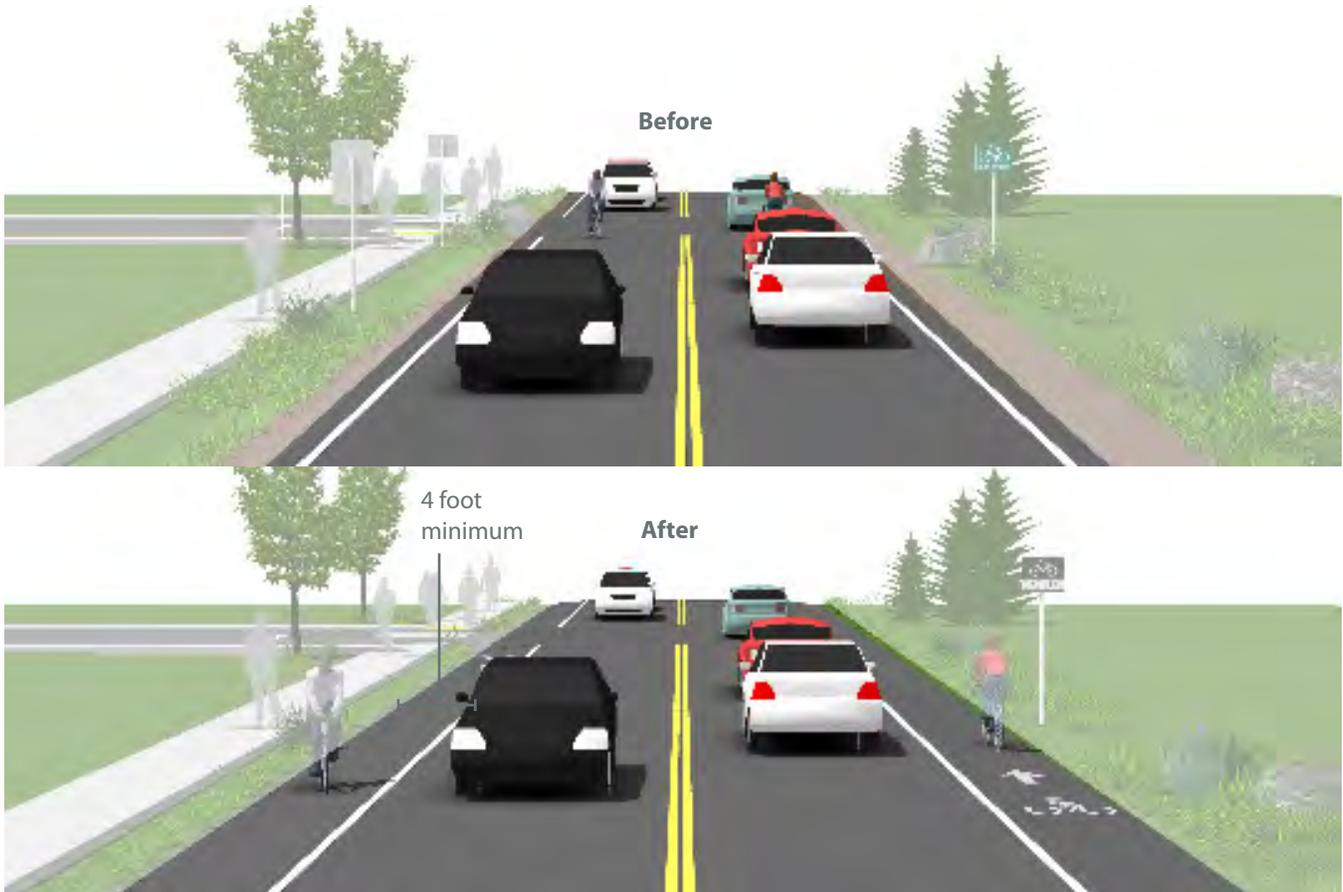
## ROADWAY WIDENING

### Guidance

- Guidance on **bicycle lanes** applies to this treatment.
- 4 foot minimum width when no curb and gutter is present.
- 6 foot width preferred.

### Description

Bike lanes can be accommodated on streets with excess right-of-way through shoulder widening. Although roadway widening incurs higher expenses compared with re-striping projects, bike lanes can be added to streets currently lacking curbs, gutters and sidewalks without the high costs of major infrastructure reconstruction.



### Discussion

Roadway widening is most appropriate on roads lacking curbs, gutters and sidewalks.

If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. In these situations, a minimum of 3 feet of operating space should be provided.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

### Materials and Maintenance

The extended bicycle area should not contain any rough joints where bicyclists ride. Saw or grind a clean cut at the edge of the travel lane, or feather with a fine mix in a non-ridable area of the roadway.

## LANE NARROWING

### Guidance

#### Vehicle lane width:

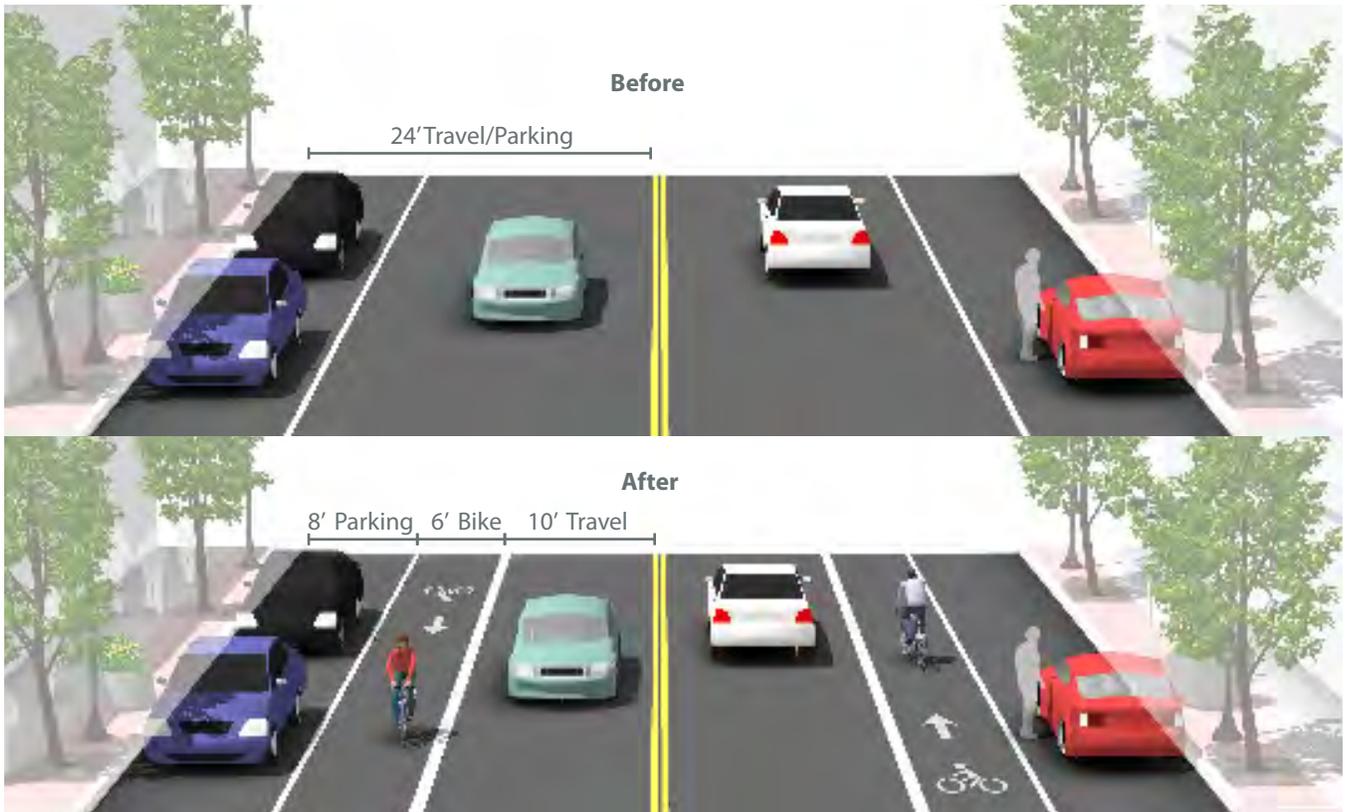
- Before: 10-15 feet
- After: 10-11 feet

#### Bicycle lane width:

- Guidance on **Bicycle Lanes** applies to this treatment.

### Description

Lane narrowing utilizes roadway space that exceeds minimum standards to provide the needed space for bike lanes. Many roadways have existing travel lanes that are wider than those prescribed in local and national roadway design standards, or which are not marked. Most standards allow for the use of 11 foot and sometimes 10 foot wide travel lanes to create space for bike lanes.



### Discussion

Special consideration should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. Center turn lanes can also be narrowed in some situations to free up pavement space for bike lanes.

AASHTO supports reduced width lanes in *A Policy on Geometric Design of Highways and Streets*: "On interrupted-flow operation conditions at low speeds (45 mph or less), narrow lane widths are normally adequate and have some advantages."

### Additional References and Guidelines

- AASHTO. (2012). Guide for the Development of Bicycle Facilities.
- AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

### Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.



## LANE RECONFIGURATION

### Guidance

#### Vehicle lane width:

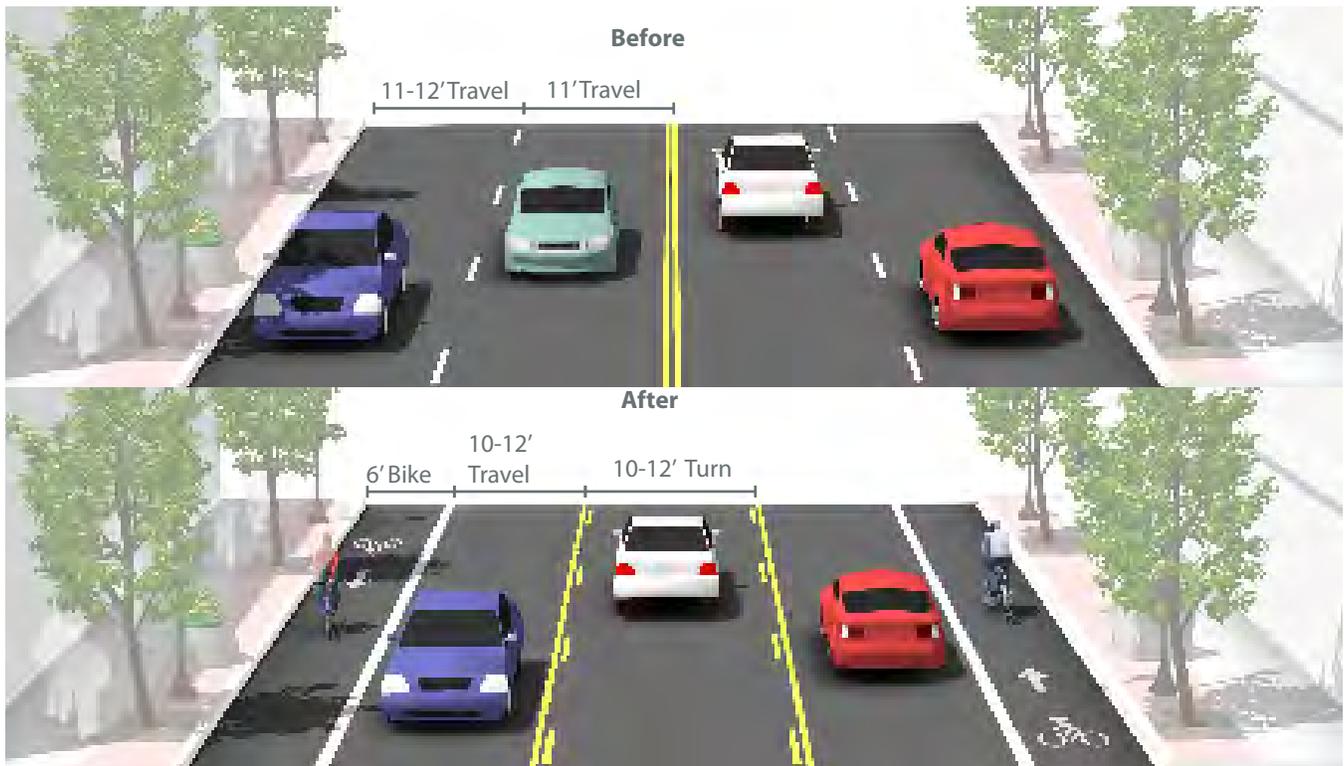
- Width depends on project. No narrowing may be needed if a lane is removed.

#### Bicycle lane width:

- Guidance on **Bicycle Lanes** applies to this treatment.

### Description

The removal of a single travel lane will generally provide sufficient space for bike lanes on both sides of a street. Streets with excess vehicle capacity provide opportunities for bike lane retrofit projects.



### Discussion

Depending on a street's existing configuration, traffic operations, user needs and safety concerns, various lane reduction configurations may apply. For instance, a four-lane street (with two travel lanes in each direction) could be modified to provide one travel lane in each direction, a center turn lane, and bike lanes. Prior to implementing this measure, a traffic analysis should identify potential impacts.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.  
 FHWA. (2010). Evaluation of Lane Reduction "Road Diet" Measures on Crashes. Publication Number: FHWA-HRT-10-053

### Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

## PARKING REDUCTION

### Guidance

#### Vehicle lane width:

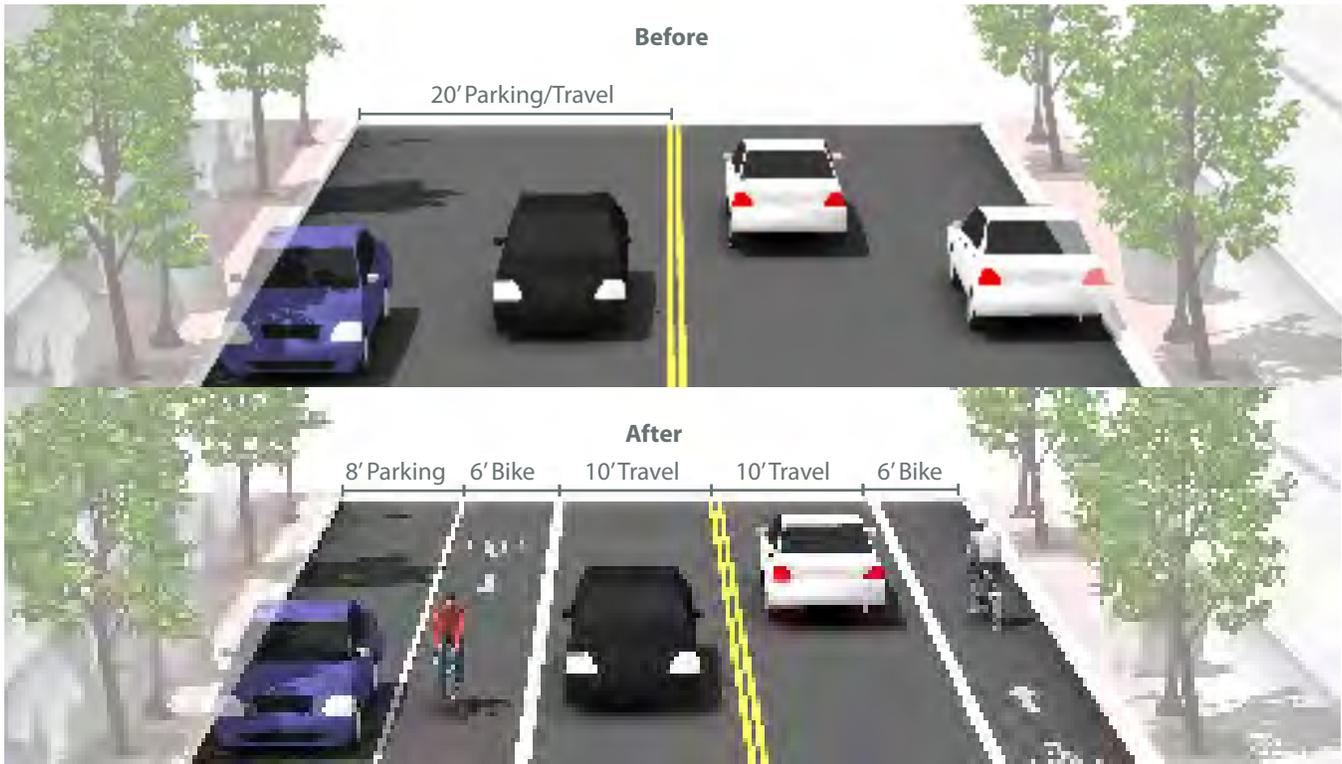
- Parking lane width depends on project. No travel lane narrowing may be required depending on the width of the parking lanes.

#### Bicycle lane width:

- Guidance on **Bicycle Lanes** applies to this treatment.

### Description

Bike lanes can replace one or more on-street parking lanes on streets where excess parking exists and/or the importance of bike lanes outweighs parking needs. For example, parking may be needed on only one side of a street. Eliminating or reducing on-street parking also improves sight distance for bicyclists in bike lanes and for motorists on approaching side streets and driveways.



### Discussion

Removing or reducing on-street parking to install bike lanes requires comprehensive outreach to the affected businesses and residents. Prior to reallocating on-street parking for other uses, a parking study should be performed to gauge demand and to evaluate impacts to people with disabilities.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.  
 AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

### Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement

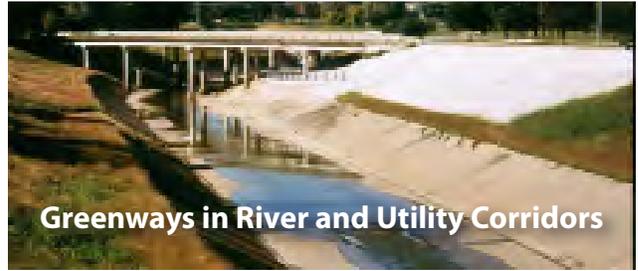


## GREENWAYS AND OFF-STREET FACILITIES

A greenway (also known as a multi-use path) allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles. Path facilities can also include amenities such as lighting, signage, and fencing (where appropriate).

Key features of greenways include:

- Frequent access points from the local road network.
- Directional signs to direct users to and from the path.
- A limited number of at-grade crossings with streets or driveways.
- Terminating the path where it is easily accessible to and from the street system.
- Separate treads for pedestrians and bicyclists when heavy use is expected.



**This Section Includes:**

- General Design Practices
- Trails in River and Utility Corridors
- Trails in Abandoned Rail Corridors
- Local Neighborhood Accessways
- Multi-Use Paths along Roadways



## GENERAL DESIGN PRACTICES

### Description

Shared use paths can provide a desirable facility, particularly for recreation, and users of all skill levels preferring separation from traffic. Bicycle paths should generally provide directional travel opportunities not provided by existing roadways.

### Guidance

#### Width

- 8 feet is the minimum allowed for a two-way bicycle path and is only recommended for low traffic situations.
- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users. A separate track (5' minimum) can be provided for pedestrian use.

#### Lateral Clearance

- A 2 foot or greater shoulder on both sides of the path should be provided. An additional foot of lateral clearance (total of 3') is required by the MUTCD for the installation of signage or other furnishings.

#### Overhead Clearance

- Clearance to overhead obstructions should be 8 feet minimum, with 10 feet recommended.

#### Striping

- When striping is required, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.

Terminate the path where it is easily accessible to and from the street system, preferably at a controlled intersection or at the beginning of a dead-end street.



### Discussion

The AASHTO Guide for the Development of Bicycle Facilities generally recommends against the development of **shared use paths along roadways**. Also known as “sidepaths”, these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding when either entering or exiting the path.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices.  
Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

### Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the



## GREENWAYS IN RIVER AND UTILITY CORRIDORS

### Guidance

Greenways in utility corridors should meet or exceed **general design practices**. If additional width allows, wider paths, and landscaping are desirable.

### Access Points

Any access point to the path should be well-defined with appropriate signage designating the pathway as a bicycle facility and prohibiting motor vehicles.

### Path Closure

Public access to the greenway may be prohibited during the following events:

- Canal/flood control channel or other utility maintenance activities
- Inclement weather or the prediction of storm conditions

### Description

Utility and waterway corridors often offer excellent greenway development and bikeway gap closure opportunities. Utility corridors typically include powerline and sewer corridors, while waterway corridors include canals, drainage ditches, rivers, and beaches. These corridors offer excellent transportation and recreation opportunities for bicyclists of all ages and skills.



### Discussion

Similar to railroads, public access to flood control channels or canals is undesirable by all parties. Hazardous materials, deep water or swift current, steep, slippery slopes, and debris all constitute risks for public access. Appropriate fencing may be required to keep path users within the designated travel way. Creative design of fencing is encouraged to make the path facility feel welcoming to the user.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices.  
Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

### Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

## GREENWAYS IN ABANDONED RAIL CORRIDORS

### Guidance

Greenways in abandoned rail corridors should meet or exceed **general design practices**. If additional width allows, wider paths, and landscaping are desirable.

In full conversions of abandoned rail corridors, the sub-base, superstructure, drainage, bridges, and crossings are already established. Design becomes a matter of working with the existing infrastructure to meet the needs of a rail-trail.

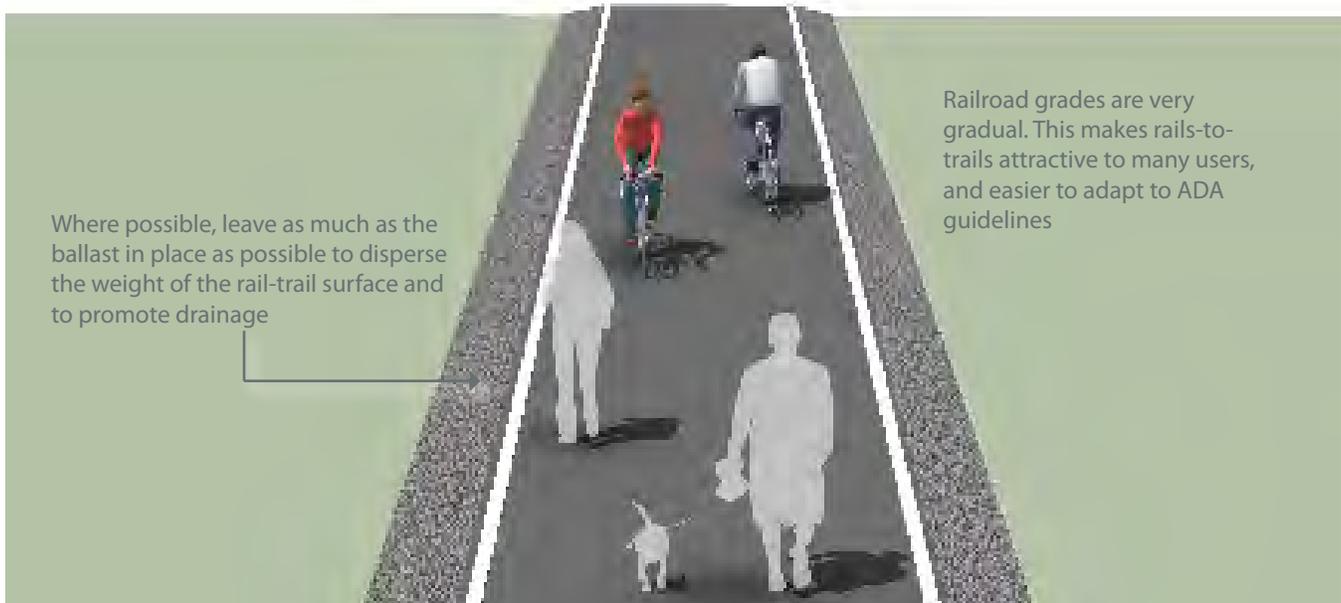
If converting a rail bed adjacent to an active rail line, see **Greenways in Existing Active Rail Corridors**.

### Description

Commonly referred to as Rails-to-Trails or Rail-Trails, these projects convert vacated rail corridors into off-street paths. Rail corridors offer several advantages, including relatively direct routes between major destinations and generally flat terrain.

In some cases, rail owners may rail-bank their corridors as an alternative to a complete abandonment of the line, thus preserving the rail corridor for possible future use.

The railroad may form an agreement with any person, public or private, who would like to use the banked rail line as a trail or linear park until it is again needed for rail use. Municipalities should acquire abandoned rail rights-of-way whenever possible to preserve the opportunity for trail development.



### Discussion

It is often impractical and costly to add material to existing railroad bed fill slopes. This results in trails that meet minimum path widths, but often lack preferred shoulder and lateral clearance widths.

Rail-to-trails can involve many challenges including the acquisition of the right of way, cleanup and removal of toxic substances, and rehabilitation of tunnels, trestles and culverts. A structural engineer should evaluate existing railroad bridges for structural integrity to ensure they are capable of carrying the appropriate design loads.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices.  
 Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

### Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.



## LOCAL NEIGHBORHOOD ACCESSWAYS

### Guidance

- Neighborhood accessways should remain open to the public.
- Trail pavement shall be at least 8' wide to accommodate emergency and maintenance vehicles, meet ADA requirements and be considered suitable for multi-use.
- Trail widths should be designed to be less than 8' wide only when necessary to protect large mature native trees over 18" in caliper, wetlands or other ecologically sensitive areas.
- Access trails should slightly meander whenever possible.

### Description

Neighborhood accessways provide residential areas with direct bicycle and pedestrian access to parks, trails, greenspaces, and other recreational areas. They most often serve as small trail connections to and from the larger trail network, typically having their own rights-of-way and easements.

Additionally, these smaller trails can be used to provide bicycle and pedestrian connections between dead-end streets, cul-de-sacs, and access to nearby destinations not provided by the street network.



### Discussion

Neighborhood accessways should be designed into new subdivisions at every opportunity and should be required by City/County subdivision regulations.

For existing subdivisions, Neighborhood and homeowner association groups are encouraged to identify locations where such connects would be desirable. Nearby residents and adjacent property owners should be invited to provide landscape design input.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices.  
 FHWA. (2006). Federal Highway Administration University Course on Bicycle and Pedestrian Transportation. Lesson 19: Greenways and Shared Use Paths.

### Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.



## MULTI-USE PATHS ALONG ROADWAYS

### Description

A multi-use path allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles.

Along roadways, these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding where bicyclists enter or leave the path.

The AASHTO Guide for the Development of Bicycle Facilities generally recommends against the development of multi-use paths directly adjacent to roadways.

### Guidance

- 8 feet is the minimum allowed for a two-way bicycle path and is only recommended for low traffic situations.
- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users such as joggers, bicyclists, rollerbladers and pedestrians. A separate track (5' minimum) can be provided for pedestrian use.
- Bicycle lanes should be provided as an alternate (more transportation-oriented) facility whenever possible.

Pay special attention to the entrance/exit of the path as bicyclists may continue to travel on the wrong side of the street.



### Discussion

When designing a bikeway network, the presence of a nearby or parallel path should not be used as a reason to not provide adequate shoulder or bicycle lane width on the roadway, as the on-street bicycle facility will generally be superior to the "sidepath" for experienced bicyclists and those who are cycling for transportation purposes.

### Additional References and Guidelines

AASHTO. (2012). Guide for the Development of Bicycle Facilities.  
 NACTO. (2012). Urban Bikeway Design Guide. See entry on Raised Cycle Tracks.  
 NCDOT. (1994). Bicycle Facilities Planning and Design Guidelines.

### Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.



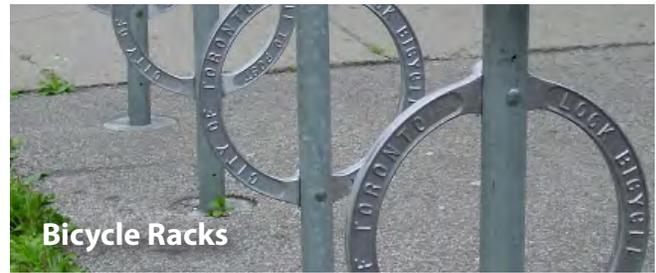
## BIKEWAY SUPPORT AND MAINTENANCE

### Bicycle Parking

Bicyclists expect a safe, convenient place to secure their bicycle when they reach their destination. This may be short-term parking of 2 hours or less, or long-term parking for employees, students, residents, and commuters.

### Maintenance

Regular bicycle facility maintenance includes sweeping, maintaining a smooth roadway, ensuring that the gutter-to-pavement transition remains relatively flat, and installing bicycle-friendly drainage grates. Pavement overlays are a good opportunity to improve bicycle facilities.



**Bicycle Racks**



**Sweeping**

### This Section Includes:

- Bicycle Racks
- Sweeping



## BICYCLE RACKS

### Guidance

- 2' minimum from the curb face to avoid 'dooring.'
- Close to destinations; 50' maximum distance from main building entrance.
- Minimum clear distance of 6' should be provided between the bicycle rack and the property line.
- Locate racks in areas that cyclists are most likely to travel.

Bicycle shelters include structures with a roof that provides weather protection.



### Description

Short-term bicycle parking is meant to accommodate visitors, customers, and others expected to depart within two hours. It should have an approved standard rack, appropriate location and placement, and weather protection. Racks should:

- Support the bicycle in at least two places, preventing it from falling over.
- Allow locking of the frame and one or both wheels with a U-lock.
- Is securely anchored to ground.
- Resists cutting, rusting and bending or deformation.

## SWEEPING

### Guidance

- Establish a seasonal sweeping schedule that prioritizes roadways with major bicycle routes.
- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility.
- In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.
- Pave gravel driveway approaches to minimize loose gravel on paved roadway shoulders.
- Perform additional sweeping in the Spring to remove debris from the Winter.
- Perform additional sweeping in the Fall in areas where leaves accumulate .

### Description

Bicyclists often avoid shoulders and bike lanes filled with gravel, broken glass and other debris; they will ride in the roadway to avoid these hazards, potentially causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks (pedestrians need a clean walking surface), nor should debris be swept from the sidewalk onto the roadway. A regularly scheduled inspection and maintenance program helps ensure that roadway debris is regularly picked up or swept.





## STANDARDS COMPLIANCE

Some of these treatments covered by these guidelines are not directly referenced in the current versions of the AASHTO Guide or the MUTCD, although many of the elements of these treatments are found within these documents. An "X" marking in the following table identifies the inclusion of a particular treatment within the national and state design guides. A "-" marking indicates a treatment may not be specifically mentioned, but is compliant assuming MUTCD compliant signs and markings are used.

In all cases, engineering judgment is recommended to ensure that the application makes sense for the context of each treatment, given the many complexities of urban streets.



	Manual of Uniform Traffic Control Devices (2009)	Guide for the Development of Bicycle Facilities (2012)	Urban Bikeway Design Guide (2012)	NCDOT Bicycle Facilities & Planning Design Guidelines
<b>Signed Shared Roadway</b>	X	X		X
<b>Marked Shared Roadway</b>	X	X	X	
<b>Bicycle Boulevard</b>		X	X	
<b>Shoulder Bikeway</b>	X	X		X
<b>Bicycle Lane</b>	X	X	X	X
<b>Buffered Bike Lane</b>	-	X	X	
<b>Uphill Bicycle Climbing Lane</b>	-	X	X	
<b>Cycle Tracks</b>	-	Called "one-way sidepath"	X	
<b>Bike Lanes at Right Turn Only Lanes</b>	X	X	X	X
<b>Colored Bike Lanes in Conflict Areas</b>	Interim Approval Granted	X	X	
<b>Combined Bike Lane/Turn Lane</b>	-		X	
<b>Intersection Crossing Markings</b>	X	X	X	
<b>Bicyclists at Single Lane Roundabouts</b>	-	X		
<b>Wayfinding Sign Types</b>	X	X	X	X
<b>Wayfinding Sign Placement</b>	X	X	X	X
<b>Greenways</b>	X	X		X
<b>Shared Use Paths along Roadways</b>	X	Discouraged		Discouraged