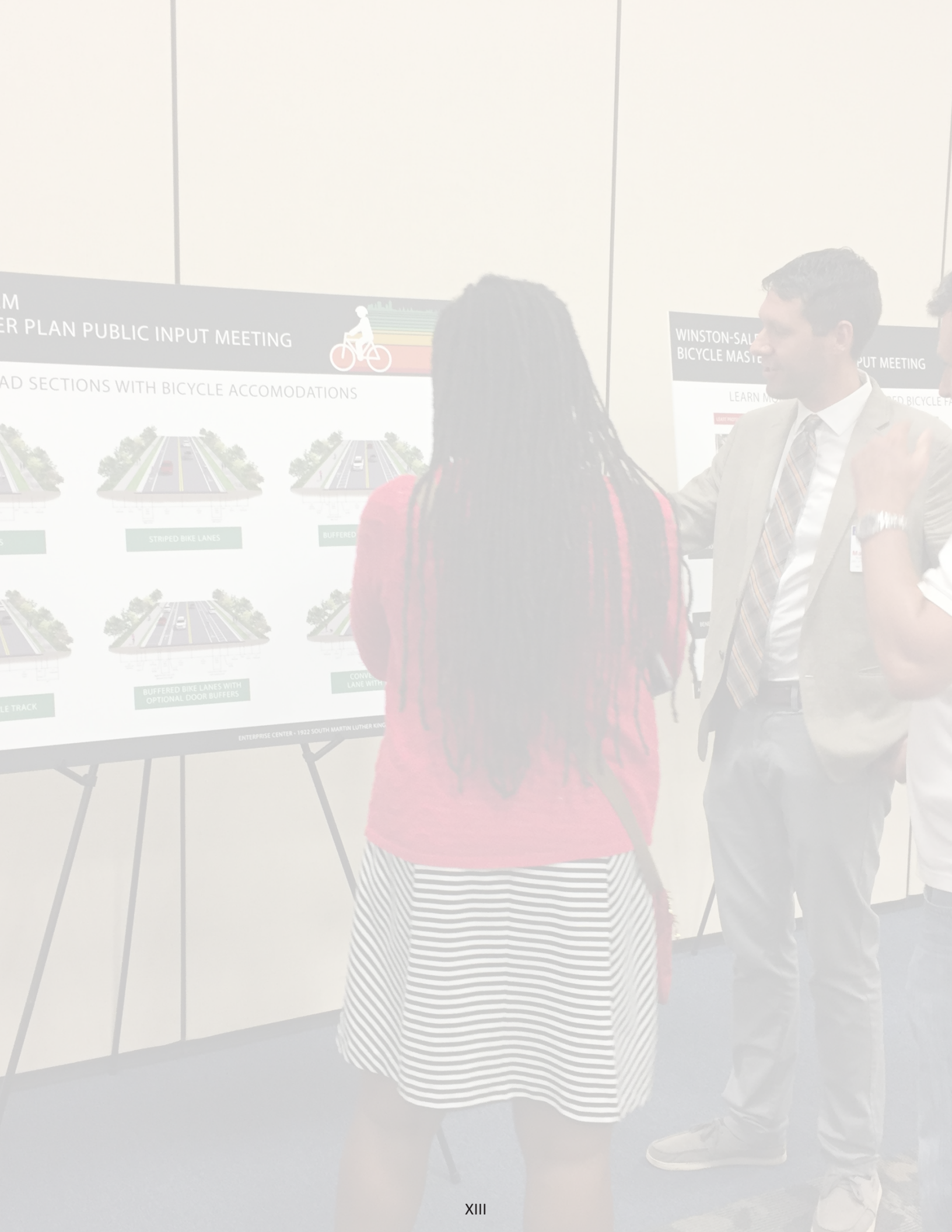
Winston-Salem Bicycle Master Plan

Winston-Salem

JULY 2019

AECOM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Acknowledgements

Thank you to the Steering Committee and local residents of the City of Winston-Salem for their involvement and support in the planning process and commitment to bicycle planning. Contributions from everyone who participated are greatly appreciated.

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Executive Summary

The ability to bicycle within a city is an important characteristic of a healthy city, and one that allows its citizens a freedom of choice. Bicycling indicates that a city has safe streets, that its citizens choose healthy lifestyles, and also allows its citizens an alternative to motor vehicles to travel to destinations within the city.

The Winston-Salem Bicycle Master Plan provides a basis for the future of bicycling in Winston-Salem. It offers a blueprint for bicycling improvements, city-wide, that will help the city develop a safe network of bicycle connections to schools, jobs, neighborhoods, parks, shopping, and recreational facilities throughout the city. It provides guidance to promote and expand the city's bicycling culture, making it available to citizens of all ages and cycling abilities.

The master plan contains a review of existing conditions in Winston-Salem as they relate to bicycling. The review includes identifying the location of traditionally underserved populations throughout the city, including many who may benefit from having access to bicycle facilities. It also incorporates the results of two surveys which indicate that with the provision of improved bicycle facilities, more residents might be willing to bicycle to destinations, particularly if facilities that separate bicyclists from vehicles are constructed. Challenges to improving bicycle mobility are also discussed, including the current network of very high and high stress roads identified in a stress analysis. However there are opportunities for improving bicycling conditions in the city in the form of gap closure projects, which are easily identifiable projects that can improve network connectivity.

The plan also identifies the locations of potential bicyclists and their potential destinations in the city based on a variety of socio-economic and location factors. A review of existing bicycle infrastructure is provided, and bicycle crash data is analyzed in an attempt to identify dangerous conditions for riders.

Recommendations Made in the Plan

These city-wide recommendations for improving bicycling conditions are based on the following six Es of creating a bicycle-friendly city.

- Engineering
- Equity
- Education
- Encouragement
- Enforcement
- Evaluation

Recommended infrastructure improvements in the plan attempt to satisfy the first two Es – Engineering and Equity – by making recommended improvements across all areas of the city. Based on the analysis of the existing conditions and input from the public, infrastructure improvements were identified on over 200 streets in the city. These improvements range from simple pavement striping, to bicycle lanes, and to bicycle facilities separated from vehicular traffic, with each type of improvements defined. The recommended improvements create a bicycling network that extends to all parts of the city. From the recommended network, 17 priority projects were identified that would provide corridor improvements and connections to numerous key destinations throughout the city. In addition, a network of bicycle boulevards is identified to provide improvements to neighborhood streets throughout the city. A bicycle boulevard is a neighborhood street or a connected series of neighborhood streets modified to encourage bicycle travel, while discouraging through-travel for motor vehicles. In addition, unsafe intersections are identified and recommended for improvement.

Beyond the infrastructure improvements, the plan also makes recommendations as to how to programmatically make Winston-Salem a safer bicycling community by addressing the remaining Es – Education, Encouragement, Evaluation and Enforcement. Recommended educational programs include programs that target both cyclists and drivers. Encouragement programs focus on community partnerships and transportation demand strategies. Evaluation programs allow the city to monitor the improvement in the bicycle conditions of the city, and enforcement would help keep bicyclists safe.

In addition, recommendations for the institutional efforts necessary to establish cycling as a fully integrated transportation mode in Winston-Salem are included in the plan. The recommendations include the establishment of new committees – such as a bicycle and pedestrian committee – policies, organizational structures, and ordinances that will contribute to long term improvements to cycling in the community. Finally, recommendations are made to create a bicycle-friendly community which includes providing infrastructure beyond the linear recommendations made, such as bicycle parking and bicycle share, that are critical to attracting more residents and visitors to cycling for transportation.

Finally, the plan lays the groundwork for accomplishing the recommendations made in the plan by providing key action steps, potential funding sources for the projects, implementation partners, and phasing strategies for the city.

Public Involvement

A good planning process must include robust public input to guide it and to help craft recommendations and priorities that come from the plan. The Winston-Salem Bicycle Master Plan includes direction from a steering committee, and is supported by input from the public collected from three public meetings, two surveys designed to garner input on needed improvements, small group meetings, and a website that allowed citizens to contact the planning team with suggestions and ideas. The public input is reflected in all aspects of the plan.


SYRACUSE
ORANGE

Chapter 1
Introduction

1 Introduction

1.1 OVERVIEW

This Winston-Salem Bicycle Master Plan (Plan) is an update to the 2005 Winston-Salem Bicycle Master Plan, presenting a renewed vision, current analysis, and concrete implementation guide for active transportation projects throughout the city. Community input from residents in the City of Winston-Salem informed the priorities and recommendations of the Plan. The development of this action-oriented guide was led by the City of Winston-Salem, with AECOM Technical Services of North Carolina, Inc., Stewart Inc., and Simon Resources providing technical support.

The Winston-Salem Bicycle Master Plan proposes a diverse set of recommendations, ranging from infrastructural and facility-focused to educational and programmatic improvements intended to create a holistic and comprehensive vision for the city's bicycle network. The Plan's content structure is indicative of this holistic approach. Key chapters include a summary of existing conditions (Chapter 3), which describes demographic conditions and bicycle-friendly features and infrastructure for bicycle use; a needs analysis (Chapter 4), emphasizing safety needs; bicycle facility vision and recommendations (Chapter 5); implementation, phasing, and funding (Chapter 7); and programmatic recommendations (Chapter 6).

1.2 PURPOSE AND BACKGROUND

The purpose of the Plan is to help the City of Winston-Salem prioritize needed bicycle initiatives that will enhance bicycle connectivity and safety for bicyclists and encourage active transportation for Winston-Salem residents and visitors. The analysis and recommendations outlined in this Plan will be used by the city as a guide to support effective and efficient project implementation.

1.3 VISION AND GOALS

The vision statement was developed to help provide a road map for the Winston-Salem Bicycle Master Plan.

Vision Statement:

"Winston-Salem is a place where people of all ages and abilities bicycle comfortably and safely for transportation and recreation. The City will work to extend bicycle infrastructure, educational opportunities, and promotional events to all neighborhoods and households, striving for equitable and affordable mobility options that improve city-wide public health, support the local economy, and reduce automobile dependency in Winston-Salem."

In addition to the vision statement, goals and objectives were identified to guide the development and implementation of the Plan. The goals are organized around the following six Es of creating a bicycle-friendly city.

- Equity
- Engineering
- Education
- Encouragement
- Enforcement
- Evaluation

The goals described in this section provide the strategic framework for developing and improving bicycle travel in Winston-Salem.

Goal 1:

The city will create a safe, comfortable and convenient network of bicycle facilities that aid and encourage cycling for people of all ages, abilities, and interests in all areas of Winston-Salem. (***Equity and Engineering***)

Bicycling is frequently considered limited to small groups who are willing to bicycle on virtually any street, regardless of whether bicycle facilities are present. Improvements should be directed towards the safety and comfort of bicyclists of all ages and abilities. In addition, infrastructure investments should be directed at areas where underserved populations reside in the interest of providing equitable transportation opportunities to all residents.

Goal 2:

Reduce the number of short vehicle trips in the city by making cycling a more attractive alternative to driving. (***Engineering and Encouragement***)

Keeping cars parked for short trips that are less than one mile can offer many benefits to the community that include health benefits and lower driving costs for the individual, as well as improved air quality and reduced congestion for the city overall. To achieve this goal, providing safe and adequate bicycle facilities and bike-friendly features will increase the number of opportunities for people to replace short vehicle trips with trips made with a bicycle. One of the purposes of developing encouragement programs is to promote the benefits and the practicality of making these short trips by bicycle to replace short vehicle trips.

Goal 3:

The city will foster a culture of safety and accountability on Winston-Salem's streets through the enforcement of traffic laws. (***Enforcement***)

Bicycle-friendly cities ensure that cyclists feel safe and protected on their streets. Most residents do not typically find it easy or safe to bicycle on city streets due to poor road safety and a lack of knowledge of traffic laws. Distracted driving, speeding, and failure to yield are some of the challenges when bicycling on the city's streets. Enforcement initiatives can include partnering with the North Carolina Department of Transportation (NCDOT) in a Watch for Me NC campaign which is aimed at reducing the number of pedestrians and bicyclists hit and injured in crashes with vehicles.

Goal 4:

The city will plan for and evaluate Winston-Salem's progress in becoming a bicycle-friendly community. (*Evaluation*)

As part of this planning process, a series of action steps, performance measures, and phasing strategies are provided to help the city in implementing the recommendations made in the Bicycle Master Plan.

Goal 5:

Launch/participate in programs that educate both bicyclists and automobile drivers on bicycle safety, and encourage bicycling in all areas of Winston-Salem. (*Equity, Education, and Encouragement*)

Work with new community partners to rebrand and relaunch the current Walk & Roll Winston-Salem "Open Streets" events in Winston-Salem to encourage residents to bicycle (and walk) on streets that they normally would not by closing a number of linked streets to vehicular traffic for a day. Open Street events allow residents to experience the city in ways that are not possible in cars. Finally, establish training and encouragement programs that target specific groups of potential cyclists who are traditionally not bicyclists.

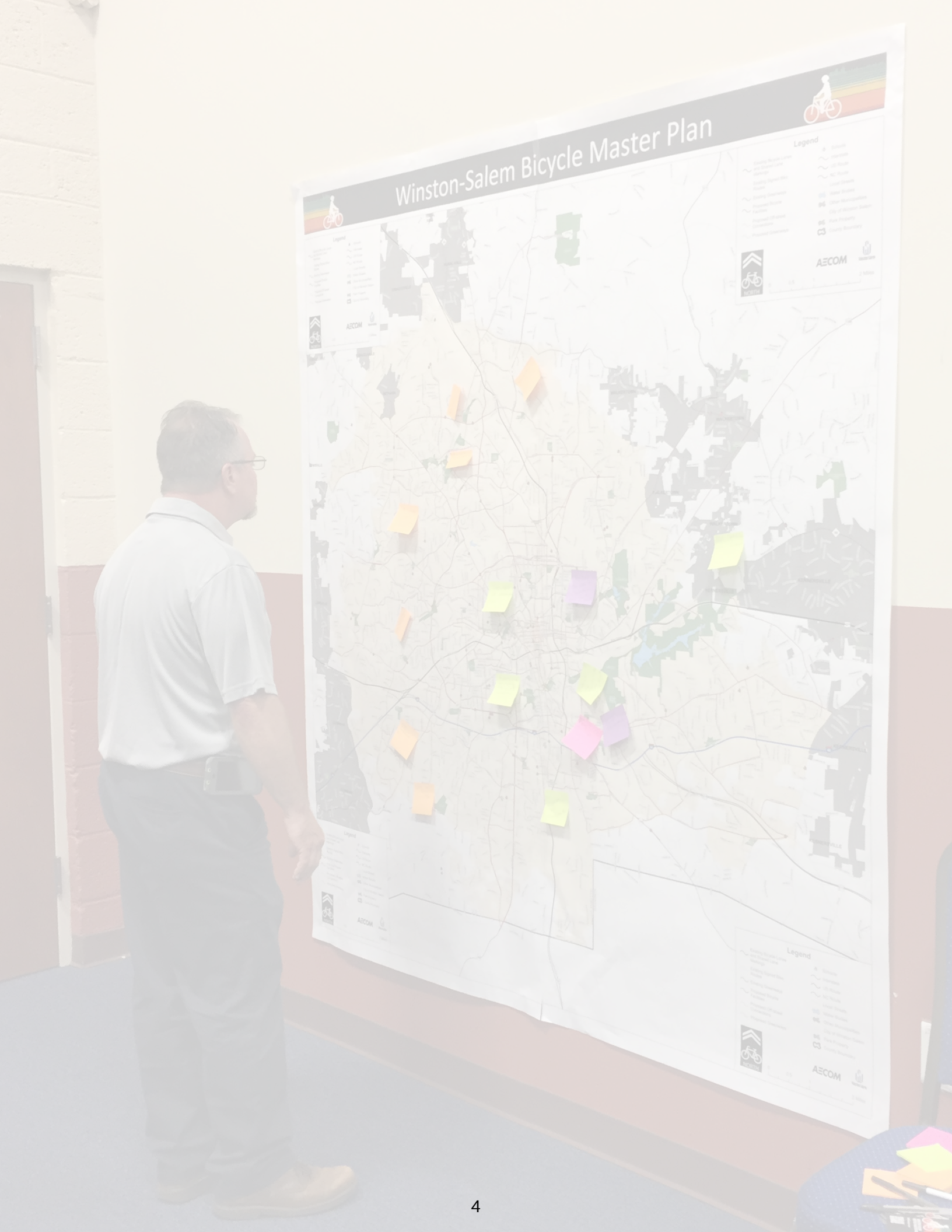
Goal 6:

Attain designation as a "Silver Level Bicycle Friendly Community".

This goal falls outside of the six Es and speaks to the city's dedication to growing its status as a bicycle friendly community. Winston-Salem was again awarded the bronze-level status for bicycle friendliness by the League of American Bicyclists (LAB) in 2017. The report card provided by the LAB includes steps required to attain silver status, including updating the 2005 Bicycle Plan as well as other elements contained in this Plan that address elements of the six Es.

1.4 PLAN DEVELOPMENT

The planning process for the Winston Salem Bicycle Master Plan began in December of 2017. Throughout the planning process, the public was engaged and encouraged to provide input on all aspects of the Plan. The city formed a steering committee that included local officials, representatives from local organizations, and community members that provided input on the planning process. Other outreach efforts included public meetings held in February and August of 2018 and April 2019, small group meetings with neighborhood organizations, pop-up events at festivals, and surveys. In addition, a website was maintained throughout the life of the planning process that provided public input opportunities and information on meetings and other relevant planning activities.


Winston-Salem Bicycle Master Plan

Chapter 2
Related Plans

2 Related Plans

The project team reviewed planning documents from Winston-Salem and Forsyth County as they related to bicycle planning. These plans were used to build a foundation for bicycle planning in the city as well as to steer the development of recommended projects and programs. The inclusion of a bicycle element in various plans indicates the importance of bicycling to the community.

2.1 THE LEGACY 2030 UPDATE

Adopted in 2012-2013, ***The Legacy 2030 Update offers a status update on the 2001 Legacy Comprehensive Plan*** for Winston-Salem, Forsyth County, and all its Towns. In addition, it proposes new actions and policies to guide implementation, incorporate changing trends in the area, and provide the city with policy recommendations to deal with shifting demographics. It is organized topically into functional elements, geographic elements, and implementation tools, with cross-cutting themes addressing fiscal responsibility, sustainable growth, and livable design. The Plan has a strong transportation component which identifies the following goal: "A balanced and sustainable multimodal transportation system that links highways, transit, greenways, bikeways and sidewalks into a seamless network that provides choices for people's travel needs." Key objectives prioritized within this Plan to meet this goal that are of particular relevance to the Winston-Salem Bicycle Master Plan include the following:

- Objective 1: Land use and transportation coordination.
- Objective 2: Integrated multimodal network
- Objective 3: Street design
- Objective 4: Bicycle and pedestrian transportation
- Objective 12: Protection of the environment
- Objective 13: Healthy, active transportation

City-County Planning Board of Forsyth County and Winston-Salem, NC. 2013. ***The Legacy 2013 Update.***

http://www.legacy2030.com/.

2.2 GREENWAY PLAN UPDATE

Adopted in 2012, the Greenway Plan Update advances the goals and actions of the 2002 Greenway Plan for the City of Winston-Salem and Forsyth County. It outlines priority corridors for greenway development and construction over the next two decades. Priority segments were selected in a participatory process led by the Bicycle-Greenway Planning Subcommittee of the Winston-Salem Urban Area Metropolitan Planning Organization (WSUAMPO), which included eight public meetings. This selection process used a multifaceted ranking system based on public input and construction feasibility. In addition, a strong emphasis was placed on connectivity to the area's existing 23-mile greenway network. The greenway system expansion is intended to support bicycle and pedestrian connections to community points of interest, recreational potential for residents, and environmental protection.

Winston-Salem and Forsyth County City-County Planning Board. 2012. ***Greenway Plan Update.***

http://www.cityofws.org/Portals/0/pdf/planning/publications/parks-greenways/Greenway%20Plan%20Update%202012.pdf.

2.3 COMPREHENSIVE TRANSPORTATION PLAN (2012)

A Comprehensive Transportation Plan (CTP) is a multi-modal plan that is developed through a collaborative process with all of the municipalities within the Metropolitan Planning Organization (MPO) participating, and also includes public input. The CTP provides the foundation of what will become the transportation priorities of the region over the next 20- plus years. The ***Winston-Salem Urban Area 2012 Comprehensive Transportation Plan*** was adopted in May 2012 by the WSUAMPO Transportation Advisory Committee and Technical Coordinating Committee. The CTP includes a Bicycle Map which delineates on-road, off-road, and multi-use paths categorized as existing, needs improvement, and recommended.

Winston-Salem Urban Area Metropolitan Planning Organization. 2012. ***Winston-Salem Urban Area 2012 Comprehensive Transportation Plan.***

http://www.cityofws.org/Departments/Transportation/Planning/Plans-and-Studies/Comprehensive-Transportation-Plan.

2.4 2040 METROPOLITAN TRANSPORTATION PLAN (2040)

The 2040 Metropolitan Transportation Plan (MTP) was developed by the WSUAMPO and was approved by the FHWA in 2015. The MTP is a fiscally constrained, federally mandated long-range transportation plan that is a sub-plan of the CTP. It outlines transportation infrastructure and facility projects that can feasibly be constructed by 2040. The Bicycle and Pedestrian Element of the MTP also outlines the objectives included in the 2035 Transportation Plan Update. Furthermore, it provides an on-street bicycle facilities project list, identifying streets, estimated

length, status, funding source, and state transportation improvement program (STIP) number for proposed projects from 2015-2021, 2022-2030, and 2031-2040.

Winston-Salem Urban Area Metropolitan Planning Organization. 2015. ***2040 Metropolitan Transportation Plan.***

http://www.cityofws.org/Departments/Transportation/Planning/Plans-and-Studies/2040-Metro-Transportation-Plan.

2.5 PUBLIC TRANSPORTATION - HUMAN SERVICES COORDINATION PLAN

Adopted in 2008, the Public Transportation – Human Services Coordination Plan outlines a strategy to support efforts of a variety of providers from community agencies and transportation service providers to stakeholders in an effort to facilitate public transportation human services projects in the WSUAMPO. It emphasizes the following guiding principles: the right to mobility, a customer service focus, the elimination of service gaps, and the maximization of service delivery efficiency. Proposed bicycle facilities in the Winston-Salem Bicycle Master Plan should seek to integrate with public transportation nodes to support a multimodal transportation network in the city.

Winston-Salem Urban Area Metropolitan Planning Organization. 2008. ***Public Transportation – Human Services Coordination Plan.***

http://www.cityofws.org/Departments/Transportation/Planning/Plans-and-Studies/Public-Transportation-Human-Services-Plan.

2.6 WAKE FOREST UNIVERSITY AREA BICYCLE, PEDESTRIAN, AND TRANSIT STUDY

Published in 2014, the Bicycle, Pedestrian, and Transit Study is a collaboration of the Winston-Salem Department of Transportation (WSDOT), the City-Council Planning Board of Forsyth and Winston-Salem, and Wake Forest University (WFU). The purpose of this study is to provide recommendations for bicycle, pedestrian, and public transportation linkages between WFU and the surrounding neighborhoods. Through a community engagement process, the following priority corridors were identified for bicycle and pedestrian improvements:

- Polo Road
- Reynolda Campus to Athletic Campus
- WFU campus to western neighborhoods
- WFU campus to Bethabara Greenway
- WFU campus to downtown

Given the population and economic prominence of WFU within the City of Winston-Salem, connectivity and coordination with the university should be an integral part of any city-wide transportation planning efforts.

Winston-Salem Department of Transportation, City-County Planning Board of Forsyth County and Winston-Salem, and Wake Forest University. 2014. ***Bicycle, Pedestrian, and Transit Study.***

https://sustainability.wfu.edu/wp-content/uploads/2009/08/WFU_BikePedTransit_Study_Full_LowRes.pdf.

2.7 COMPREHENSIVE BICYCLE MASTER PLAN (2005)

This Winston-Salem Bicycle Master Plan is an update to the Comprehensive Bicycle Master Plan adopted in 2005. The purpose of the Comprehensive Bicycle Master Plan is to improve the safety, efficiency, and usability of Winston-Salem's bicycle network. It provides guidance on current bicycling conditions, recommendations for the network's expansion, implementation strategies, and proposed infrastructure standards. The content of this Plan provided a starting point for the development of the 2019 Winston-Salem Bicycle Master Plan.

City of Winston-Salem, NC Department of Transportation. 2005. ***Winston-Salem Urban Area Comprehensive Bicycle Master Plan.***

http://www.cityofws.org/portals/0/pdf/transportation/forms-reports/bicycle/BikePlanExecutive%20Summary.pdf

2.8 DOWNTOWN WINSTON-SALEM STREET STUDY

Commissioned by the City of Winston-Salem and prepared in 2015, the Winston-Salem Downtown Street Study explores key facets of implementing the recommendations put forward by the Joint Chamber of Commerce/ Downtown Winston-Salem Partnership Business 40 Task Force. The recommendations outlined by this task force are proposed in conjunction with the NCDOT reconstruction of Business 40 in downtown Winston-Salem (STIP U-2827B). These recommendations are intended to improve bicycle and pedestrian connections in addition to the overall downtown environment. This study examines the feasibility, traffic impacts, and costs of the conversion of First/Second Streets and Liberty/Main Streets to two-way streets. Findings will support the City of Winston-Salem in implementation. The Winston-Salem Downtown Street Study also identifies areas of future research for the downtown area, many of which are relevant to this Winston-Salem Bike Master Plan, including the following:

- Potential traffic calming and road diet to support added right of way space for bicycle and pedestrian infrastructure at Old Salem Road (south of Brookstown Avenue), Broad Street (north of Business 40), Sixth Street (west of Trade).
- Bicycle and pedestrian infrastructure and wayfinding improvements on The Strollway (between First and Fourth Streets).
- Dedicated bike lanes on Liberty and Main streets (south of Second Street).
- Sharrows on Third Street between the Wake Forest Innovation Quarter Rail/Trail project and downtown.

City of Winston-Salem. 2015. ***Winston-Salem Downtown Street Study.***

http://www.cityofws.org/Portals/0/pdf/transportation/Studies/Downtown%20Street%20Study/downtownWSstreetstudy2015.pdf?ver=2017-04-10-174340-660

2.9 DOWNTOWN STREETSCAPE MASTER PLAN AND DESIGN STANDARDS

The city is in the process of developing a Streetscape Master Plan and Design Standards for downtown Winston-Salem. The general boundary for the plan is Martin Luther King Jr. Blvd/8th Street to the north, Patterson Avenue to the east, Interstate Business 40 to the south, and Broad Street to the west. The plan will provide a street typology of different street types based on use, current and future role within downtown, available right-of-way, and modes of travel. Cross-sections for each street type will be included with the plan that will delineate the presence and proposed widths for sidewalks, bike facilities, parking, and travel lanes. Also included in the plan will be a tree management study and design standards for elements such as street furniture and lighting. The plan is anticipated to be complete by summer 2019.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WALKERTOWN

Chapter 3
Existing Conditions

3 Existing Conditions

This chapter provides a snapshot of the status of bicycling in Winston-Salem today and the challenges that still exist. It discusses the make-up of the city, the challenges to bicycling and the existing infrastructure for bicyclists, and provides a summary of bicycling activities in Winston-Salem from the first survey.

3.1 DEMOGRAPHICS

As part of the review of existing conditions, a snapshot of the current demographics of Winston-Salem was developed. The snapshot included demographic factors that influence bicycling such as commuting patterns, vehicle ownership, and income.

3.1.1 Community Profile

Geography

The City of Winston-Salem is located in the north-central area of North Carolina in the Piedmont region and is the county seat of Forsyth County. It is one of the clustered three cities commonly referred to collectively as the Piedmont Triad, along with Greensboro and High Point. Surrounding large urban areas include Greensboro (32 miles to the east), Charlotte (84 miles southwest), and Raleigh (110 miles to the east). Geographically, the City of Winston-Salem spans 132.45 square miles and is located within the Yadkin-Pee Dee River Basin.

History

The City of Winston-Salem was founded in 1913 when the Town of Salem (established in 1763) and the Town of Winston (established 1849) were incorporated. Its nickname as the "Twin City" pays homage to this history. The primary industry in Winston-Salem after its founding was tobacco, thanks to the influence of R.J. Reynolds Tobacco Company. Founded in 1875, R.J. Reynolds produced a quarter of the nation's tobacco at the time and was a primary employer in the area.

Economy

In recent years in Winston-Salem, technology and information industries have emerged and surpassed the previous manufacturing-based industries. For example, healthcare is a large economic driver in Winston-Salem, largely due to the location of Wake Forest University Baptist Medical Center Hospital and Novant Health Healthcare. In 2016, three of the top five industries in terms of annual employment levels were all healthcare-related: hospitals, ambulatory health care services, and nursing and residential care. Finance and research are also established and growing fields in Winston-Salem. This can further be seen in Table 3-1, which identifies the top employers in Forsyth County as of July 2016, all of which

Table 3-1: Largest Employers in Forsyth County as of July 2016

Rank	Company	Employees
1	Wake Forest Baptist Medical Center	12,873
2	Novant Health	8,145
3	Winston-Salem/Forsyth County Schools	6,860
4	Reynolds American	3,000
5	Wells Fargo	2,745
6	Hanesbrands	2,500
7	City of Winston-Salem	2,420
8	Wake Forest University	2,784
9	BB&T	2,134
10	Forsyth County	2,275

Source: City of Winston-Salem Chamber of Commerce

are based or have a branch located in Winston-Salem.

As can be seen in the top employers list, the prominence of R.J. Reynolds (now called Reynolds American) has also persisted in the Winston-Salem area. Tobacco manufacturing remains a heavily concentrated industry in Winton-Salem relative to the national landscape. (Bureau of Labor Statistics, Quarterly Census of Employment and Wages 2016).

Population

The fifth-most populated city in North Carolina, the City of Winston-Salem has experienced growth in the last decades. In 2000, the city's population was 185,776 residents. By 2010, Winston-Salem's population grew by 23.6 percent, totaling 229,617 residents and outpacing North Carolina's population growth rate of 18.5 percent. As of 2016, the population of the City of Winston-Salem was 238,474. The median age of residents in Winston-Salem in both 2000 and 2010 was 34.6 years. In 2016, this increased slightly to 35.0 years.

The population of the City of Winston-Salem is predominantly White (56.7 percent). Black or African American residents make up 34.9 percent of the population. Other non-White groups make up the remaining population, including American Indian and Alaska Native (0.1 percent), Asian (2.0 percent), Native Hawaiian and Other Pacific Islander (0.1 percent), some other race (3.8 percent), and two or more races (2.4 percent). Winston-Salem is slightly more diverse than Forsyth County as a whole, which is 66.6 percent White, 26.1 percent Black or African American, followed by two or more races (2.0 percent), some other race (3.0 percent), Asian (2.0 percent), American Indian and Alaska Native (0.2 percent), and Native Hawaiian and Other Pacific Islander (0.1 percent). More information can be found on Figure 3-1. (American Community Survey (ACS) 5-Year Estimates 2012-2016; City of Winston-Salem, Forsyth County)

The Hispanic or Latino community in Winston-Salem makes up 14.9 percent of the total population. This is slightly higher than the overall Forsyth County rate of 13 percent, and over 5 percent higher than the statewide rate of 9.5 percent.

It is also important to note that Winston-Salem has a significant student population due to the number of residential educational institutions located in the area. These institutions vary in size, disciplinary focus, and public or private nature and include Wake Forest University, Winston-Salem State University, Forsyth Technical Community College, University of North Carolina School of the Arts, and Salem College, among others.

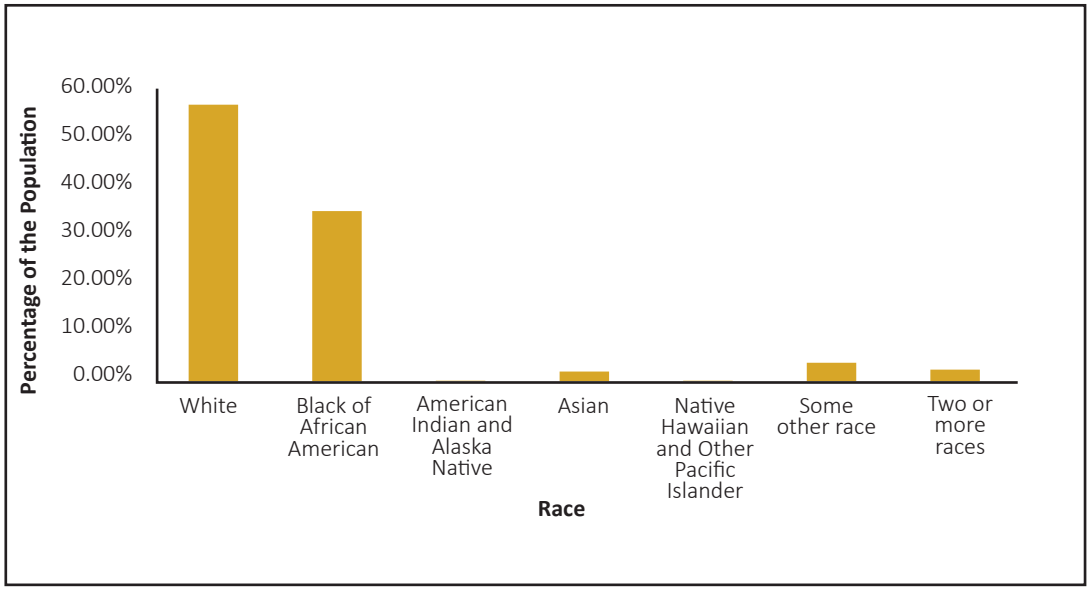
Income and poverty

In Winston-Salem, the median household income in 2016 inflation-adjusted dollars is $40,898. This is lower than the median household income of both Forsyth County ($46,283) and the state of North Carolina ($48,256) (ACS 5-Year Estimates 2012-2016; City of Winston-Salem, Forsyth County; North Carolina).In 2016, 18.1 percent of all families earned income below the poverty level, while 24.30 percent of all individuals earned below the poverty level. An important note is that the individual figure includes student population.

Transportation

Commuting behavior in Winston-Salem is motor vehicle dominated. In 2016, 82.5 percent of workers age 16 years and over drove alone to work, while 7.8 percent carpooled. For context, comparative rates in Charlotte and Raleigh, the state's two largest municipalities, are 76.5 percent residents commuted alone and 10.4 percent carpooled in Charlotte, and 78.6 percent of Raleigh residents commuted alone while 9.5 percent carpooled. The percentage of Winston-Salem residents who are walking to work is 2.2 percent, while 0.2 percent of the population bicycles to

Figure 3-1: Winston-Salem Population by Race (2012-2016)

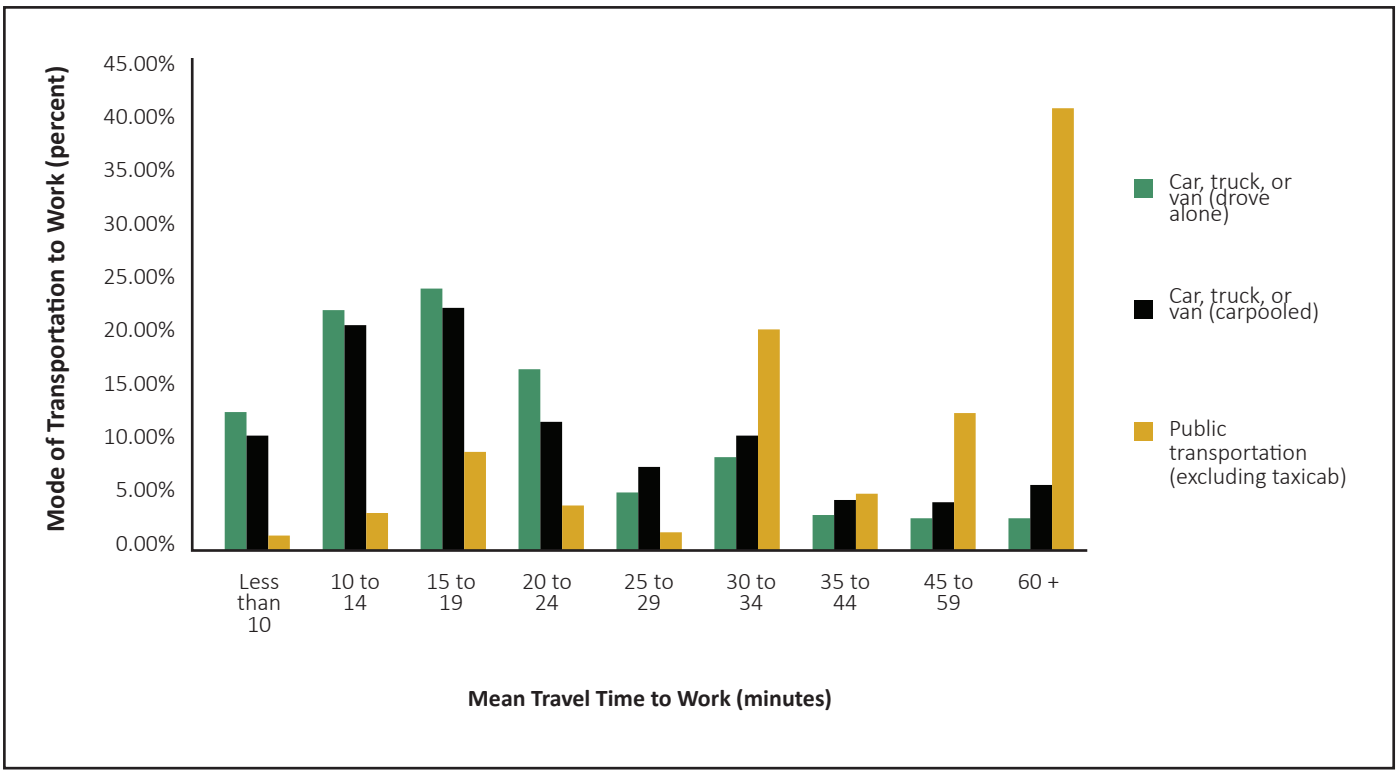


Source: ACS 5-Year Estimates (2012-2016)

work. Approximately 1.6 percent of workers used public transportation (excluding taxicab) to travel to work. These transportation patterns are supported by the extent of car ownership in the city. Most commonly, Winston-Salem households own two cars (42.5 percent), followed by one car (28.0 percent), and three cars (25.4 percent). A very small portion of the population—4.1 percent—does not own a car. (ACS 5-Year Estimates 2012-2016; City of Winston-Salem)

City-wide, the mean travel time to work is 20.2 minutes, slightly lower than the county (21.1 minutes) and state (24.1 minutes) means. Commuting time among Winston-Salem residents varies and tends to be much shorter for those who commute by a personal vehicle (driving alone or in a carpool). For both the drive alone group and the carpool group, the average commute time falls within 15 to 19 minutes. For residents commuting by public transportation (excluding taxicab), the average commute time is between 45 and 59 minutes. This mean travel time to work breakdown by mode of transportation can be seen on Figure 3-2. (ACS 5-Year Estimates 2012-2016; City of Winston-Salem)

Figure 3-2: Mean Travel Time to Work by Mode of Transportation to Work (2012-2016)



Source: ACS 5-Year Estimates (2012-2016)

3.1.2 Social Equity Considerations (Environmental Justice)

Equity in transportation seeks fairness in mobility and accessibility to meet the needs of all community members, including traditionally underserved populations such as low-income and minority populations. Identifying the location of underserved populations helps ensure that all areas of the city are included in the planning process. Underserved populations were identified using 2016 ACS Data obtained from the United States Census. In developing the proposed bicycle network presented in Chapter 5, the project team considered the location of underserved populations in providing connections between neighborhoods, employment centers, shopping, and other key community destinations.

Low-income and minority populations are predominantly located on the north and east side of the city. These areas also have a concentration of vehicle-less households which can be an indication of low-income, but can also in be used to identify the location of alternative transportation users, including bicyclists. Figure 3-3 displays block groups containing low income populations in Winston-Salem that are greater than 5 percent higher than the overall city rate. Figure 3-4 shows the location of block groups with minority rates that are greater than 10 percent higher than the overall city rate. And Figure 3-5 shows block groups with vehicleless households where the rates are more than 10 percent higher than the rest of the city.

Figure 3-3: Low Income Populations

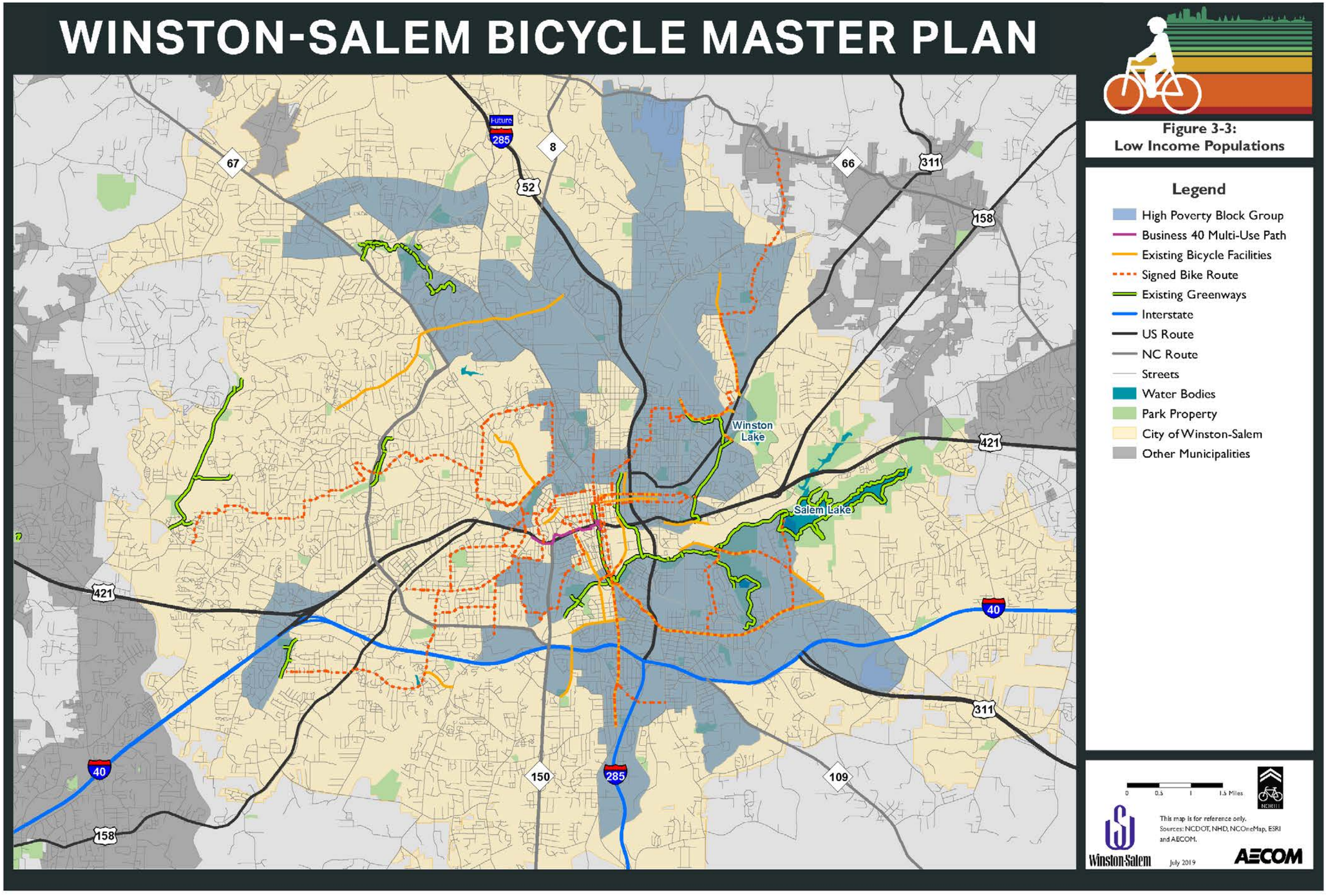


Figure 3-4: Minority Populations

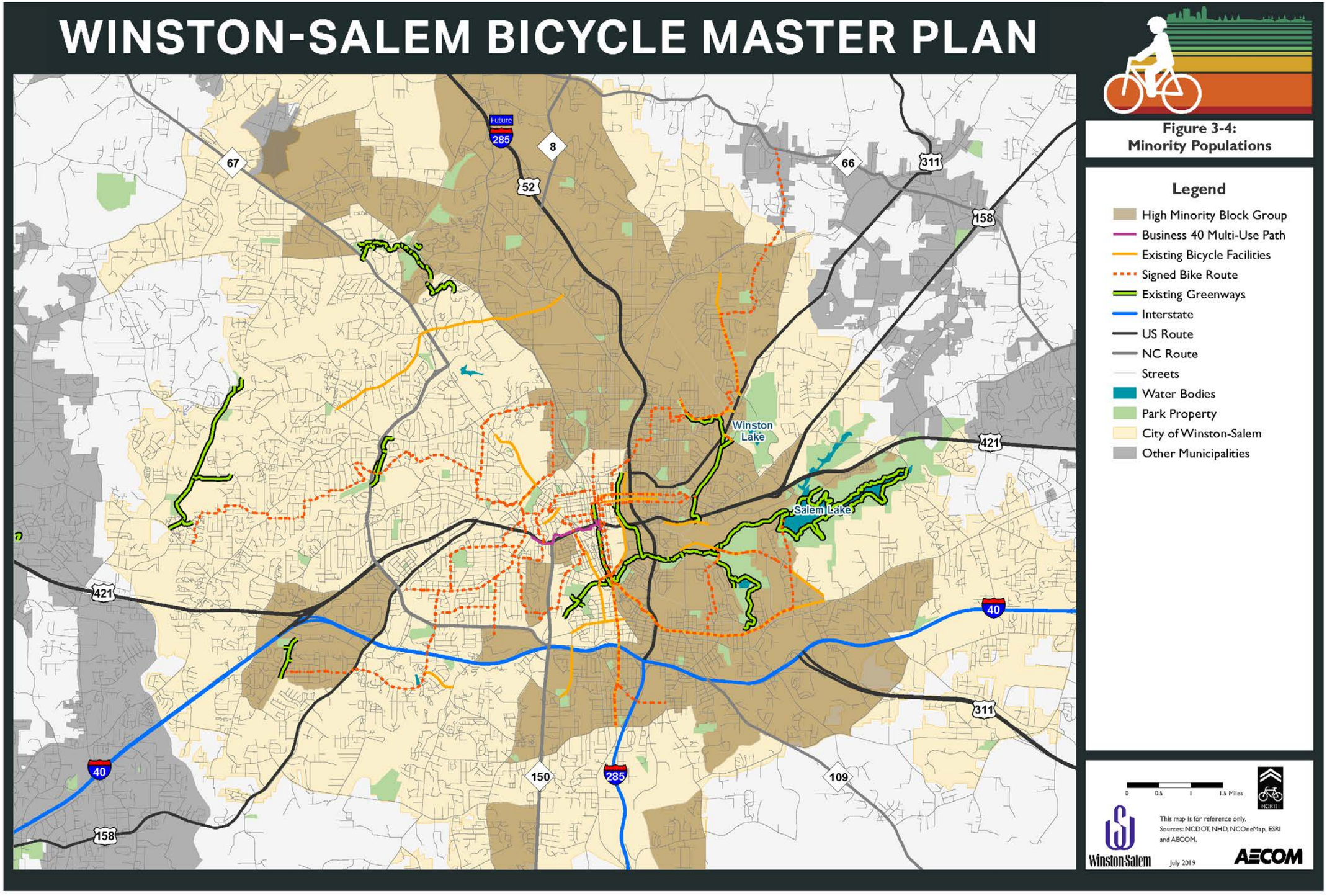
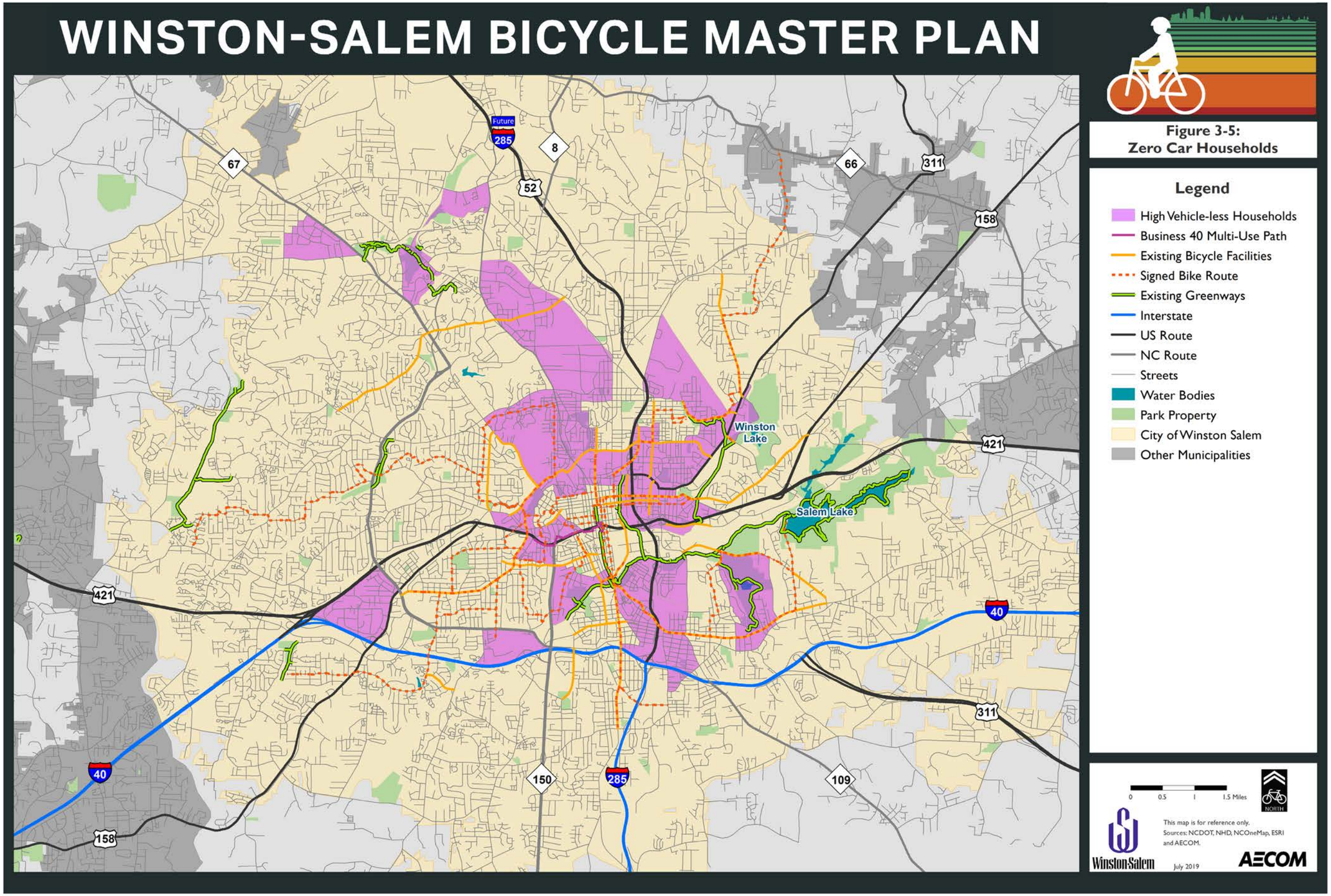


Figure 3-5: Vehicleless Households



3.2 EXISTING BICYCLE FACILITIES

Since the completion of the 2005 Bicycle Plan, the city has made bicycle investments on many streets, with plans for additional improvements planned over the next several years. As of 2018, there are a total of 25 miles of existing bicycle facilities in the city. As shown in the graphics below, the city now has numerous streets with dedicated bike lanes throughout the city, and other streets have shared lane markings. There are also numerous bicycle racks and bike share stations which are shown in Figure 3-6 and Figure 3-7, respectively.

Bicycle Lanes

Street	Length
Reynolda Road	0.74 miles
Peachtree Street	0.11 miles
East Salem Avenue	1.00 miles
Carver School Road	1.97 miles
Reynolds Park Road	1.24 miles
South Broad Street	0.66 miles
Waughtown Street	0.64 miles
Linden Street	0.33 miles
Salem Avenue	0.18 miles
Acadia Avenue	0.86 miles
South Main Street	2.38 miles
Lowery Street	0.71 miles
Buchanan Street	0.85 miles
Northwest Boulevard	0.41 miles
Reynolds Park Road	0.65 miles
Polo Road	1.08 miles
Broad Street	0.76 miles
Total Length	14.57 miles

Shared Lane Markings

Street	Length
Polo Road	3.08 miles
Burke Street	0.34 miles
East Forth Street	0.86 miles
East Fifth Street	0.87 miles
London Lane	0.52 miles
Reynolda Road	0.34 miles
Bowen Boulevard	1.03 miles
Waterworks Road	0.15 miles
Waughtown Street	3.10 miles
Total Length	10.29 miles

Figure 3-6: Existing Bike Racks

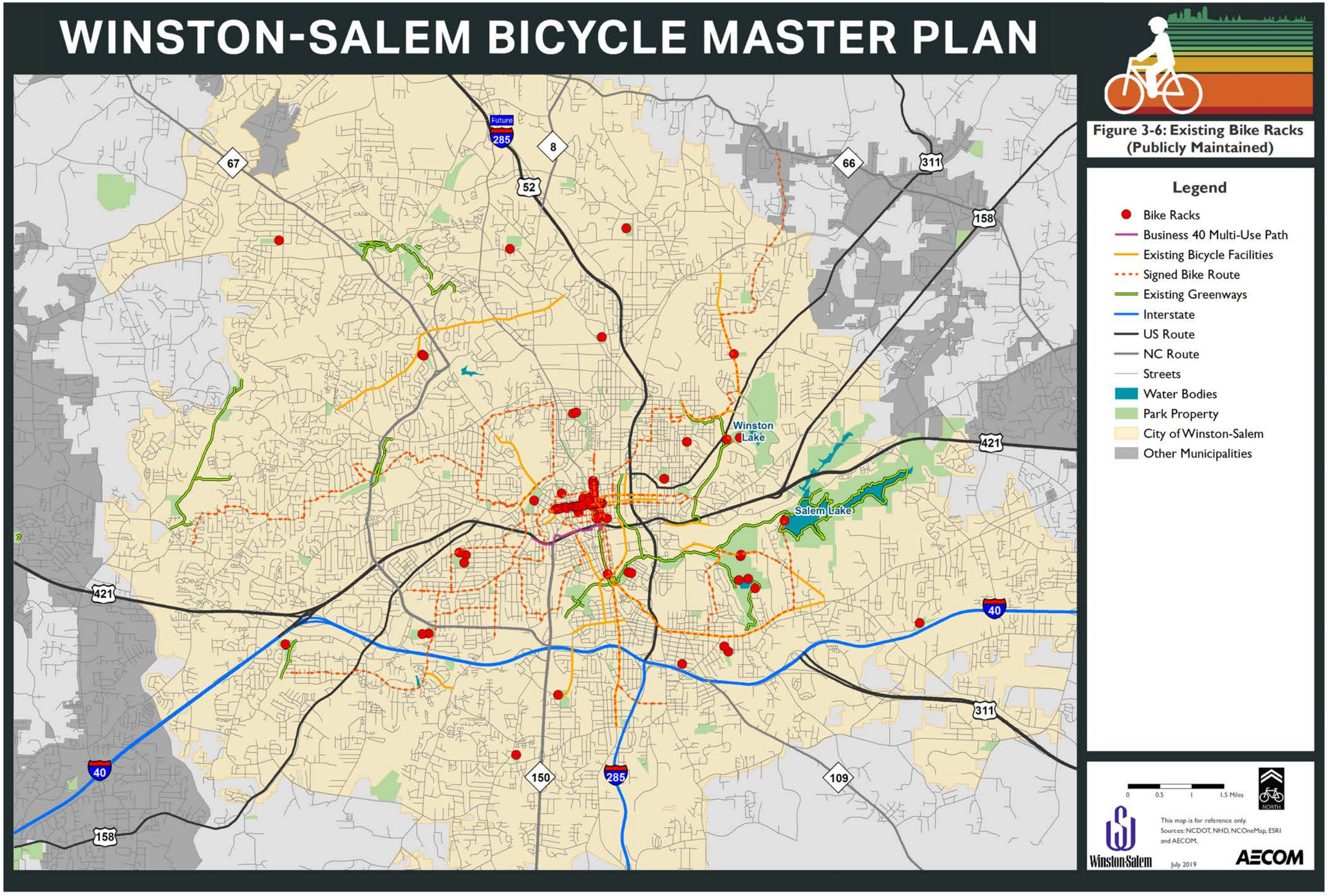
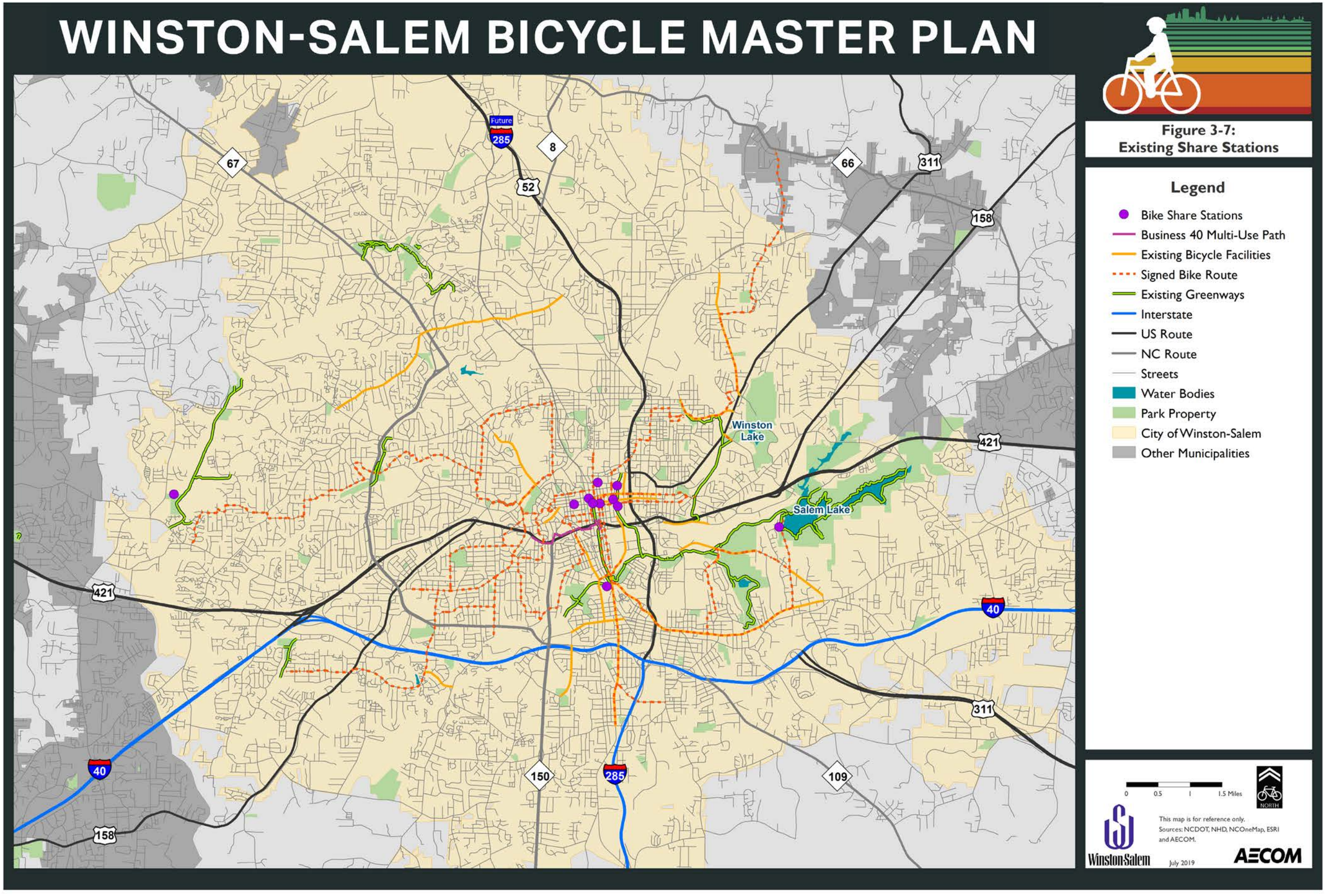


Figure 3-7: Existing Share Stations



In addition to the facilities that have already been constructed, the city has several upcoming projects that will add bicycle facilities to an additional 13 miles of streets within the city, including the following:

- Stratford Road
- Northwest Boulevard
- 14th Street
- Liberty Street
- Cleveland Avenue
- 5th Street
- Old Greensboro Road
- Academy Street
- Hawthorne Road
- Trade Street

The City of Winston-Salem and Forsyth County also maintain over 30 miles of greenways throughout the City and County, with nearly 19 miles of additional greenways planned.

Finally, the Winston-Salem Business 40 project will include the replacement of several bridges in the vicinity of downtown. Some of the bridge replacements will include bicycle facilities such as wide outside lanes and bike lanes. The Business 40 project also includes the planning and funding of the B40 Multiuse Path which will run adjacent to Business 40 from Lockland Avenue to Liberty Street.

As with many municipalities across the United States, Winston-Salem has recently experienced the roll out of electric scooters by private companies. These scooters are accessed by users using a mobile phone app which unlocks the scooter, and charges the user by time increments (e.g., 15 minutes) for their use. In addition, there is no need to dock the scooters, and they can be accessed wherever the previous user left it. These scooters are popular for both recreational use and for short-distance trips. Over time, these scooters may become more popular and be used for trips that bicycles could have been used for in the past. This is likely to be especially true in the downtown and in other urbanized areas of the city. The scooters are temporarily banned in the city while the Winston-Salem City Council evaluates options to regulate the scooters. These options include requiring users to be of a certain age, and banning them from trails, greenways, and sidewalks.

3.2.1 Gap Analysis of Existing Network

An analysis of the existing and proposed bicycle network was conducted to identify gaps in the network. A gap analysis can set the foundation for making infrastructure recommendations that lead to a more connected bicycle network. Several types of gaps were noted:

- Regional or corridor gaps, which include insufficient bicycle connectivity between origins and destinations,
- Barrier gaps such as roads with high vehicular volumes and speeds, or complex intersections that make crossing dangerous.
- Gaps in the network which are geographically disconnected bicycle facilities that discourage less confident bicyclists.

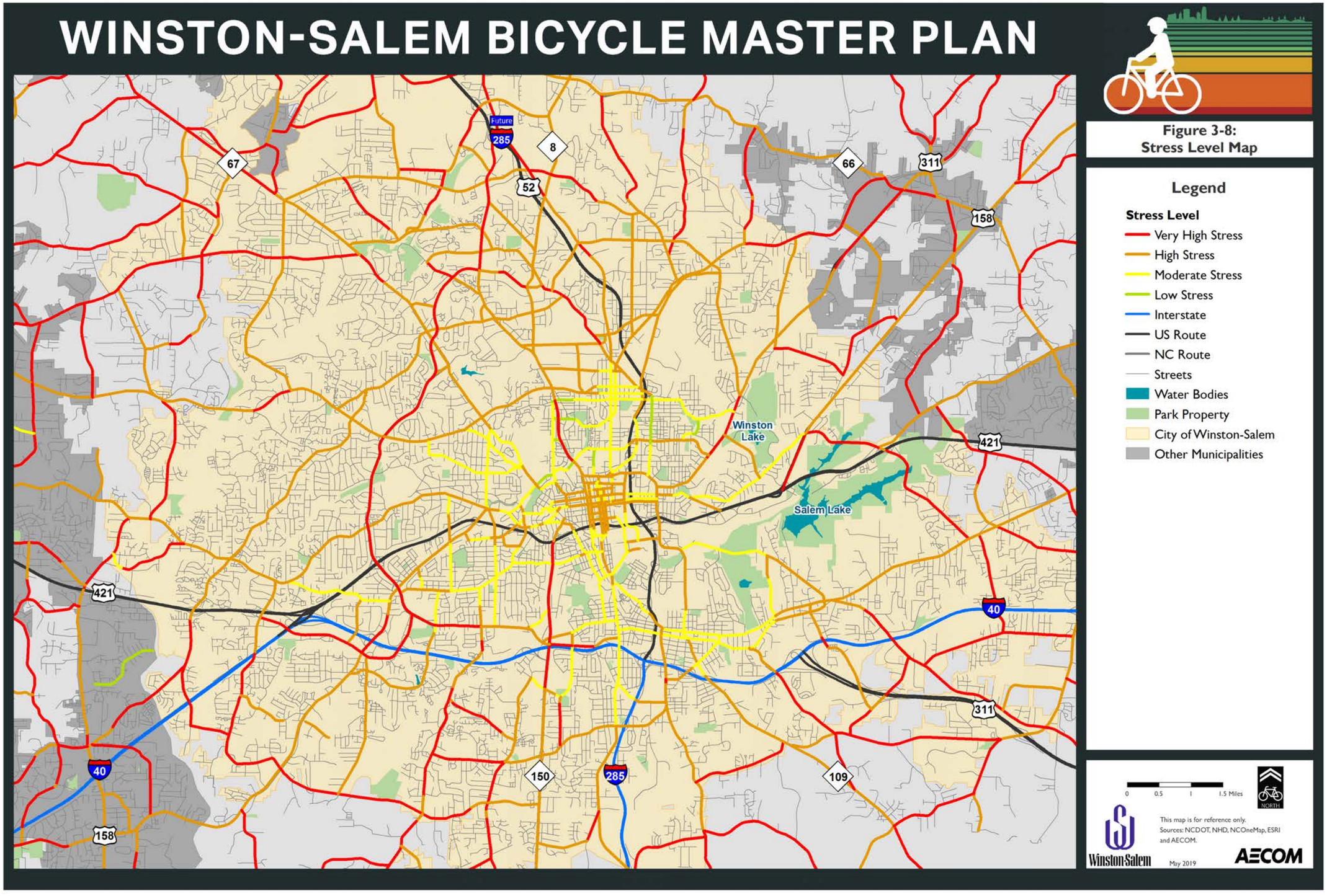
3.2.2 Stress Level Mapping

In addition to identifying bicycle network gaps, a bicycle stress level analysis was conducted on city and county streets. A bicycle stress level analysis is a GIS based analysis that rates roadways based on cycling compatibility. The results of the analysis identify which roadways in a network may not be suitable for on-road bicycling, and which roads may need infrastructure improvements for safety and comfortable of all users and abilities. The bicycle stress level analysis can be used in conjunction with known bicycling origins and destinations to identify gaps in the network which can then serve as the basis for recommended infrastructure and other improvements designed to improve overall safety in the network. The bicycle stress level analysis considers three variables: traffic volumes, speeds, and lane width. It also included existing bicycle infrastructure, and decreases the stress level of

roads with these facilities. The output of the bicycle stress level analysis classifies roadways into five categories: Very Low Stress, Low Stress, Moderate Stress, High Stress and Very High Stress.

A stress level analysis was conducted on key roads categorized as collector, arterials, and freeways that were divided into segments at intersections. The results of the analysis are shown below in Figure 3-8. Within the area there are a total of 5,851 road segments, of which 2,132 road segments scored Very High Stress, 2,884 were High Stress, 750 were Moderate Stress, and 85 were Low Stress. No road segments scored Very Low Stress, in part because the analysis did not include local and neighborhood streets, many of which would likely be very low stress. Many of the Moderate and Low Stress roads were located in and around downtown, where speeds are lower. Because variable conditions can change along the length of a road, it's important to note that the suitability score of a segment of road can change between intersections.

Figure 3-8: Stress Level Map



3.3 BICYCLING TODAY IN WINSTON-SALEM

This section summarizes comments and responses that were collected from two surveys that were promoted via email, at the first two public meetings, through targeted social media, and at various pop-up events. The first survey was initiated in February 2018 and the second survey was initiated in August 2018. The information gathered from the surveys helped the project team better understand the interests, desires, concerns, and vision for bicycling in Winston-Salem. The following section summarizes some of the key takeaways from the two surveys. A full summary of the two surveys can be found in Appendix E.

3.3.1 Survey 1

Survey 1 contained a total of 19 questions with 158 responses and was available from February 19th, 2018 until August 24th, 2018, two days before the second public meeting. The purpose of the survey was to provide a base of understanding for where, when, and why residents bicycle. Questions included demographic questions, questions on how frequently and why residents are bicycling, and the barriers to bicycling (e.g., safety, convenience, etc.) The following charts and tables provide more insight into the questions asked on the survey and responses provided.

Why do people currently bike in Winston-Salem?

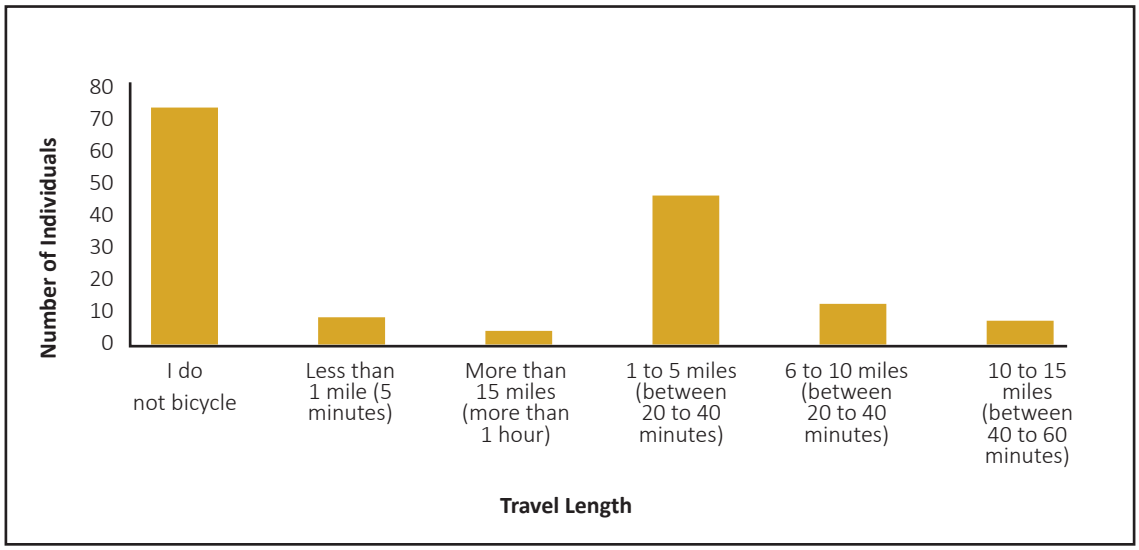
The reason residents bicycle was evenly distributed across the categories, with a narrow majority of the survey respondents responding that they bicycle for regular exercise, and that they do so approximately once a week. This category also had the highest number of respondents who bicycle daily. Residents also identified family outings and taking trips to civic places as bicycle trips that they are likely to take at least once a month. In terms of the type of bicycling trips that residents would not make, social trips had the most respondents, followed by commuting to work and conducting business, and trips to recreation facilities (Figure 3-9).

What's the average distance or travel time for a bicyclist commuting or running errands?

Survey respondents were asked how far they typically travel to work or to conduct personal business. A total of 75 respondents who do bicycle for these purposes noted that they travel between one and five miles or between five and twenty minutes. A smaller majority travel further, up to ten miles and or forty miles. Nearly half of the 145 respondents noted that they do not bicycle for these reasons (Figure 3-10).

Figure 3-9: Reasons Citizens Choose to Bike

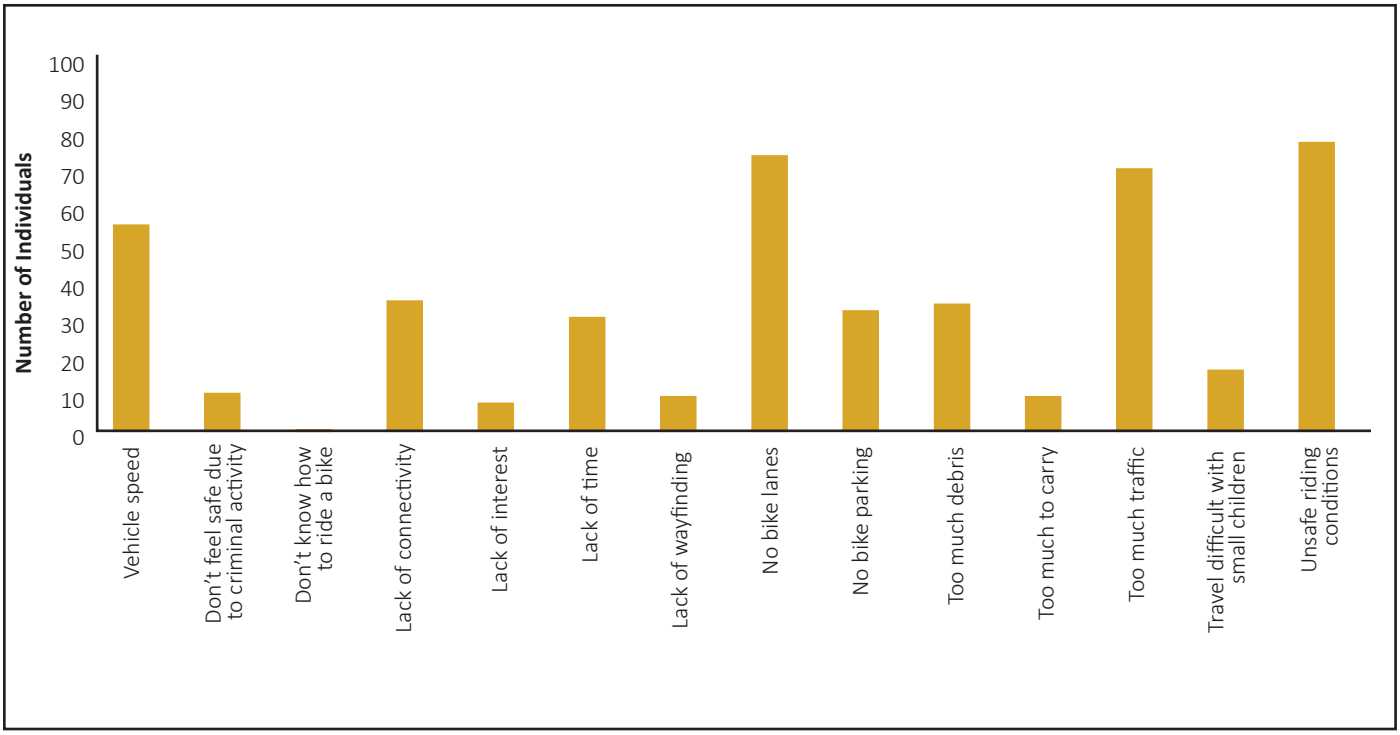
Figure 3-10: Travel Distances for Commuters and Personal Business



What keeps you from bicycling more often in Winston-Salem?

When asked what prevents residents from bicycling, respondents generally identified existing road and traffic conditions were unsafe and uncomfortable. Specifically, the unsafe condition of the roads for the riders was chosen, as well as too much traffic and the lack of bicycle lanes. Vehicular speed was also identified as a major contributing factor (Figure 3-11).

Figure 3-11: Reasons Why People Do Not Bicycle More Often



How comfortable are people bicycling on different bicycle facility types?

In terms of what types of facilities bicyclists would most feel comfortable on, the majority of the respondents indicated that they would prefer protected and separated facilities to facilities that would share the road with vehicles. Separated bike lanes, side paths/shared use paths were identified as providing the most comfort, followed by buffered and conventional bike lanes. Sharrows, or shared lane markings, were identified as the least comfort to bicyclists (Figure 3-12).

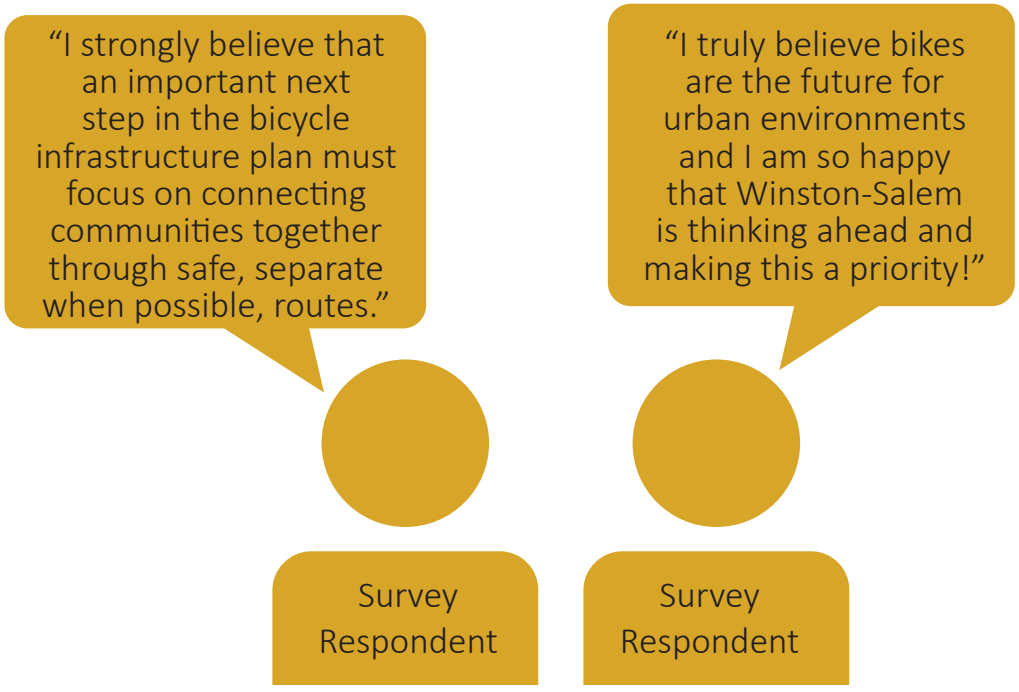
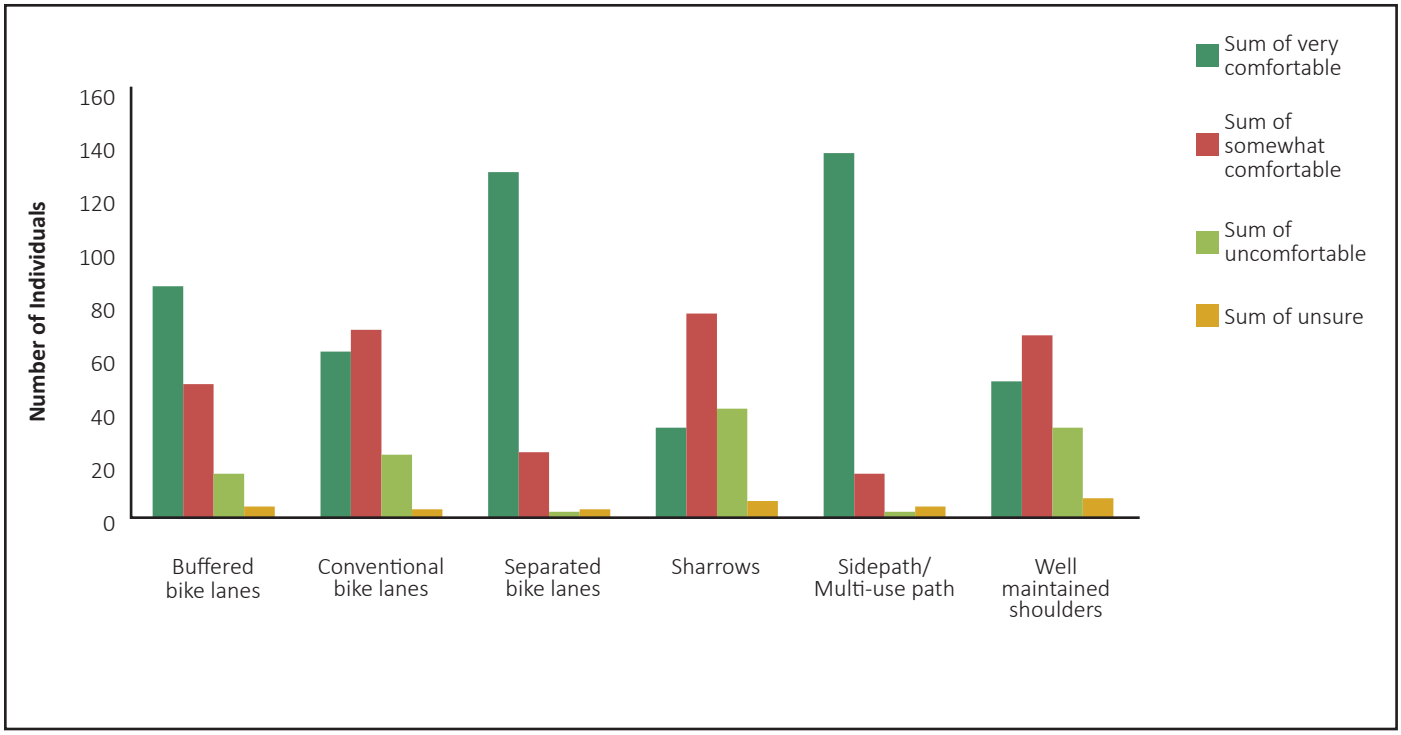


Figure 3-12: Bicycle Facility Preferences



3.3.2 Survey 2

Survey 2 went live online on August 14th, 2018; two days prior to the second public meeting. The survey was available online and a paper copy was available at the public meeting. The purpose of this survey was to gather feedback about different types of bicycle facilities and bicycle accommodations. This survey also garnered public sentiment about perceived levels of safety for different types of facilities, as well as asked what types of bike friendly features the respondents would like to see and what types of bicycle programs they would like to see implemented. Feedback from the survey was collected until January 16th, 2019. The survey consisted of eight questions with one being a basic identifier question and two of those being open-ended questions.

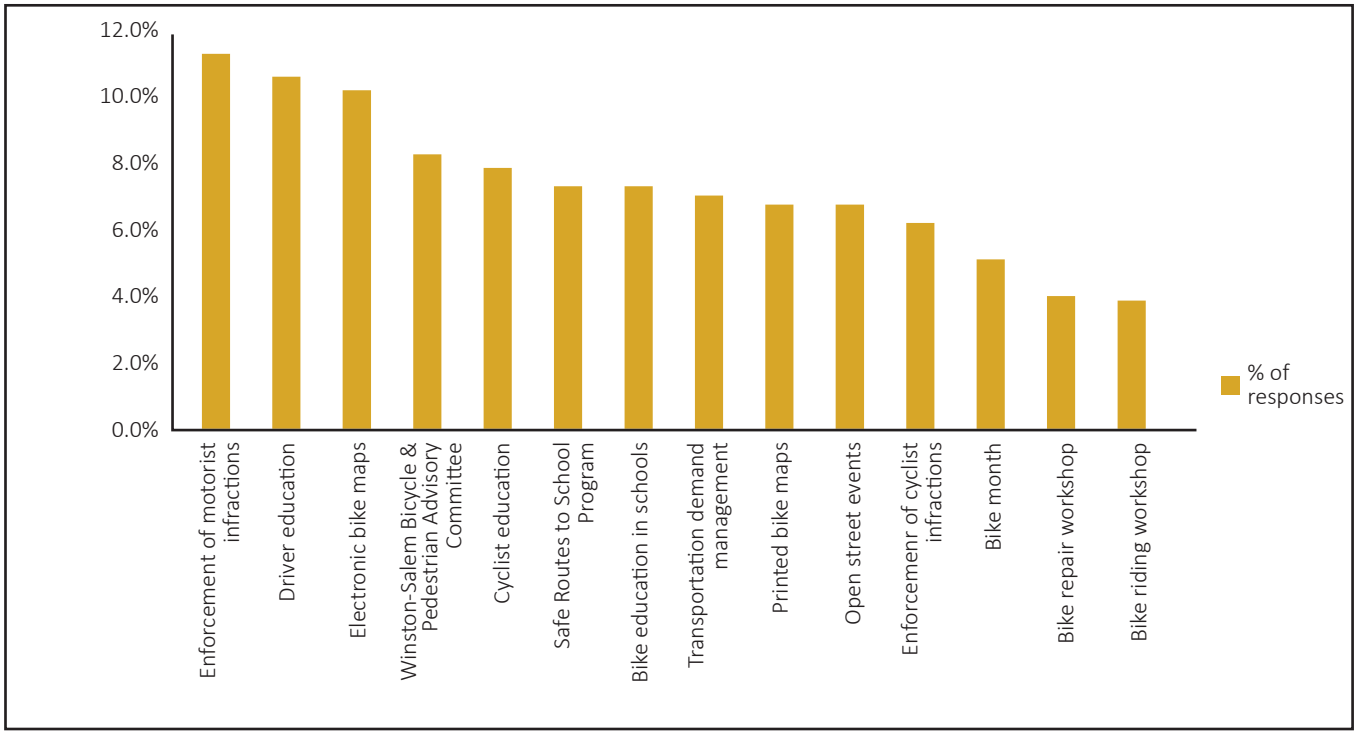
What bike related programs would you like to see implemented in our community?

Respondents could choose up to five bicycle related programs that they would like to see implemented. The categories that received the most votes were related to driver education and enforcement with enforcement of motorist infraction receiving the most votes. Programs that provide education to bicyclists also scored highly, including providing bicycle education in schools. The respondents also identified the formation of a Bicycle and Pedestrian Advisory Committee (BPAC) as something that they would like to see implemented. A BPAC would research funding opportunities, assist with submission of grant applications, and play a role in selecting and monitoring the work of consultants and contractors designing and constructing bicycle and pedestrian infrastructure. It would also serve to form partnerships between schools, businesses, and neighboring municipalities. A BPAC may also help the city gain Silver Level Bicycle Friendly Community status (Figure 3-13).

Which bike-friendly features would you prefer to have access to?

The public was also asked what type of bicycle-friendly features they would like to see installed in the city. A majority of the respondents indicated that bike racks are needed as well as bicycle service stations Respondents also identified bicycle loop detectors, or signal detectors for bicyclists at intersections, are features that they would like to have implemented (Figure 3-14).

Figure 3-13: Interest in Bicycle Related Programs



3.4 CONSTRAINTS AND OPPORTUNITIES

This section outlines some of the constraints and opportunities in Winston-Salem's bicycling network. There are numerous opportunities for improving bicycle conditions in Winston-Salem as well as potential constraints to overcome in achieving the community's vision for multimodal access and safety.

3.4.1 Constraints

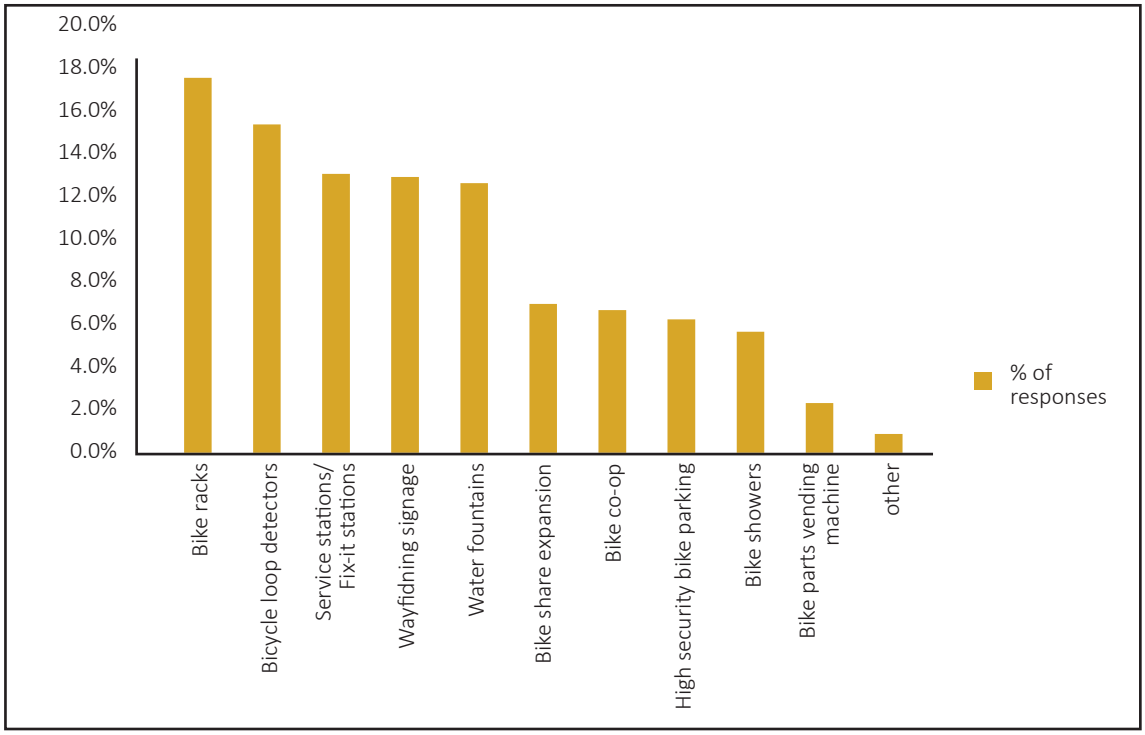
As with many cities that have grown and developed based on automobile mobility the city lacks a consistent street network that could accommodate bicycle connections between destinations on secondary roads. In addition, many of the primary roads are high stress roads with narrow pavement widths, and high-speed vehicular traffic. These factors combine to make the city challenging to bicyclists, particularly bicyclists who wish to travel to destinations outside of their neighborhoods.

Several roadways in Winston-Salem can serve as barriers to bicycling. These include I-40, I-285, and several high-volume urban freeways such as Peters Creek Parkway and Silas Creek Parkway. Roadways can present challenges in the form of physical barriers, where the road is a physical impediment to travel with crossing only allowed at interchanges or where bridges have been built (I-40 and I-285).They can also serve as facility barriers where no facilities exist for bicyclists (Peters Creek Parkway and Silas Creek Parkway).

Another constraint to bicycle travel is facility gaps discussed in Section 3.2.1. While the city has constructed numerous on-road and separated bicycle facilities since the original Bicycle Plan was written in 2005, there are still many gaps between facilities which is a challenge to bicyclists who would like to travel outside of their neighborhoods. Gaps in continuous bicycle facilities exist as significant constraints in Winston-Salem, while simultaneously presenting opportunities to provide network connectivity through gap-closure projects. Closings of gaps represent sound investment from the community by completing a vital connection to existing infrastructure.

Along some roadways in Winston-Salem the existing public right-of-way may not be sufficient to provide accommodation for bicycle facilities. Insufficient right-of-way can occur because the existing right of way is narrow, or because the built roadway takes up nearly all of the right-of-way. This is typically the case in urban areas where sidewalks and buildings are adjacent to the roadway, such as along Burke Street and 4th Street. In both cases, property acquisition either through sale or easement dedication may be needed to provide the necessary width for bicycle facilities.

Figure 3-14: Bike-friendly Features You Are Interested In



3.4.2 Opportunities

The availability of neighborhood streets and connections to greenways generally allow for the possibility of bicycle boulevards or informal bike ways to provide connections to destinations.

An additional opportunity is to encourage the expansion of the bike sharing programs that are currently operating within the city. The National Cycling Center operates the Zagster bike share system with docking stations downtown and other strategic locations including Salem Lake.

The National Cycling Center being located within Winston-Salem offers an opportunity for the city to partner on other bicycling related endeavors including educational programs for cyclists and community events such as sponsoring open streets events.

Development within the city also presents an opportunity. Winston-Salem is a growing city that is experiencing new development. As new development and redevelopment occurs, the city has an opportunity to ensure bicycle (and pedestrian) facilities are included in the design and construction phases through the plan review process.

3.5 SUMMARY OF EXISTING CONDITIONS

This section identified and discussed the existing conditions of Winston-Salem as they relate to bicycling. As identified, there are traditionally underserved populations throughout the city, including many who may benefit from having access to bicycle facilities. In addition, survey data revealed that if improved bicycle facilities were provided, more residents may be willing to bicycle to destinations, particularly if facilities that separate bicyclists from vehicles are constructed. Challenges to improving bicycle mobility include a network of very high and high stress roads identified in the stress analysis, which support survey responders who noted high vehicular speeds as being a significant barrier to bicycling. There are opportunities, however, for improving bicycling conditions in the city in the form of gap closure projects, which are easily identifiable projects that can improve network connectivity.

Chapter 4
Needs Analysis

4 Needs Analysis

This section discusses the steps that were taken during the planning process to identify the greatest need for bicycling facilities, as well as the types of facilities that bicyclists need to feel comfortable depending on their level of confidence.

4.1 LATENT DEMAND MODEL

The development and output of a bicycle latent demand model for the City of Winston-Salem was a critical step in conducting the needs analysis. The purpose of this model is to identify areas of the city with the most potential for bicycle infrastructure needs. In other words, the output of this model will answer the question: where should on-street bicycle facilities be installed to maximize use by bicyclists? This model, built in ArcGIS, takes into account a variety of factors (listed below) that influence bicycle use at any given location.

- Distance to schools
- Distance to colleges and universities
- Distance to parks
- Distance to greenway entrances
- Distance to bus stops
- Population density
- Short distance (less than 15 minutes) commuter density
- Zero-car household density
- Single-car household with multiple commuter density
- Job density
- Retail/accommodation/food service density

To create this model, scores were spatially assigned to the City of Winston-Salem based on their favorability to bicycle usage. This was performed through raster transformations in GIS where areas of the city were scored based on their proximity to the variables. The variables were then given weights based on which was most likely to influence bicycle demand. The assigned weights were 5, 10, 15 and 20 where 20 represents highest latent demand. Table 4-1 summarizes that assigned variable weights and Figure 4-1 shows these final values, with red displaying the highest predicted demand and blue displaying the lowest predicted demand. Areas of highest predicted demand (red) were prioritized for bicycle facilities infrastructure.

Figure 4-1: Latent Demand Model

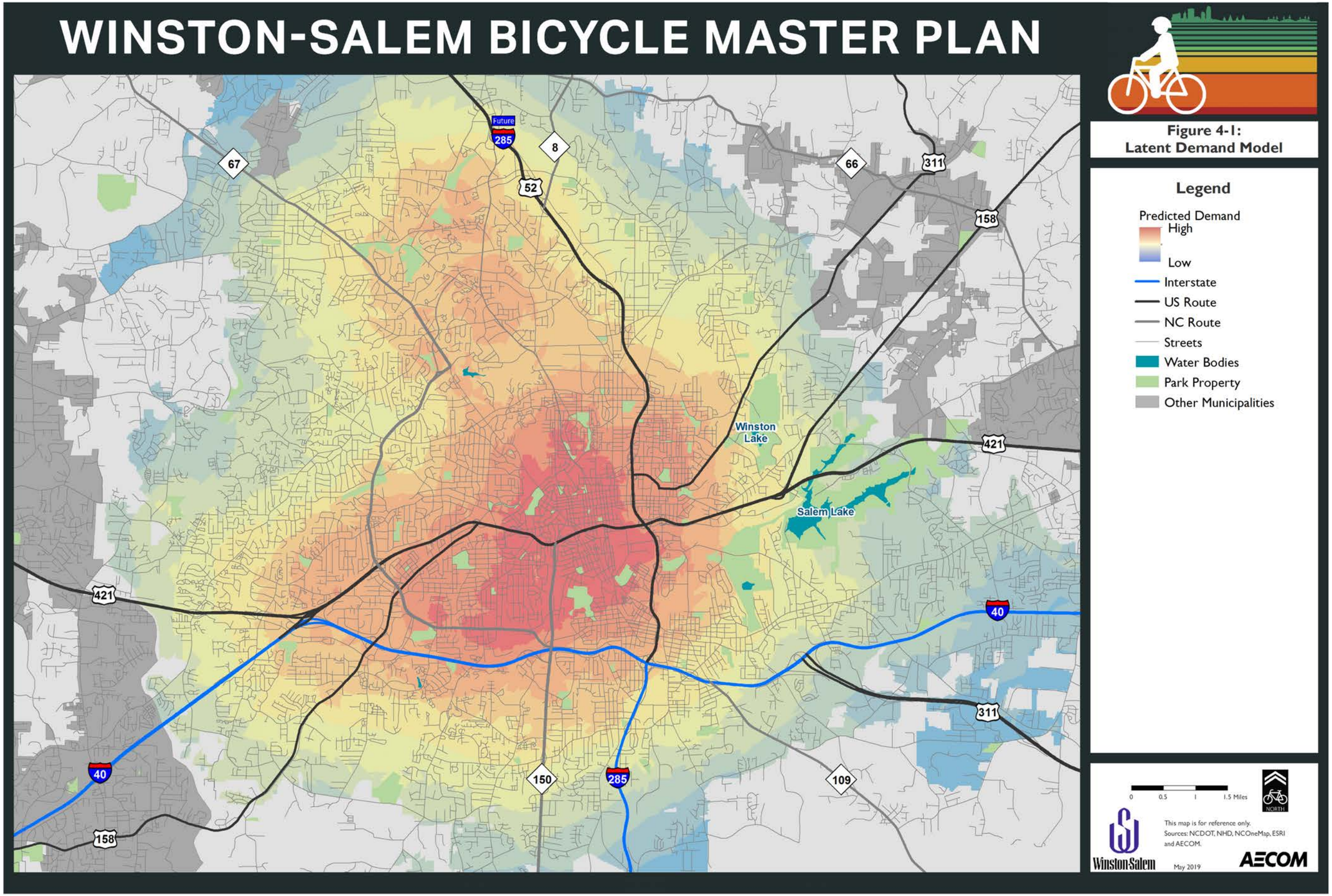


Table 4-1: Assigned Variable Weights

Variable	Model Weight
Schools	10
Colleges/Universities	10
Parks	5
Greenway Entrance	5
Bus Stops	5
Population Density	15
Short Distance Commuters	10
Zero-car	15
Single-car	5
Job Density	10
Retail/Accommodation/ Food Service Density	10

4.2 BICYCLE CRASH ANALYSIS

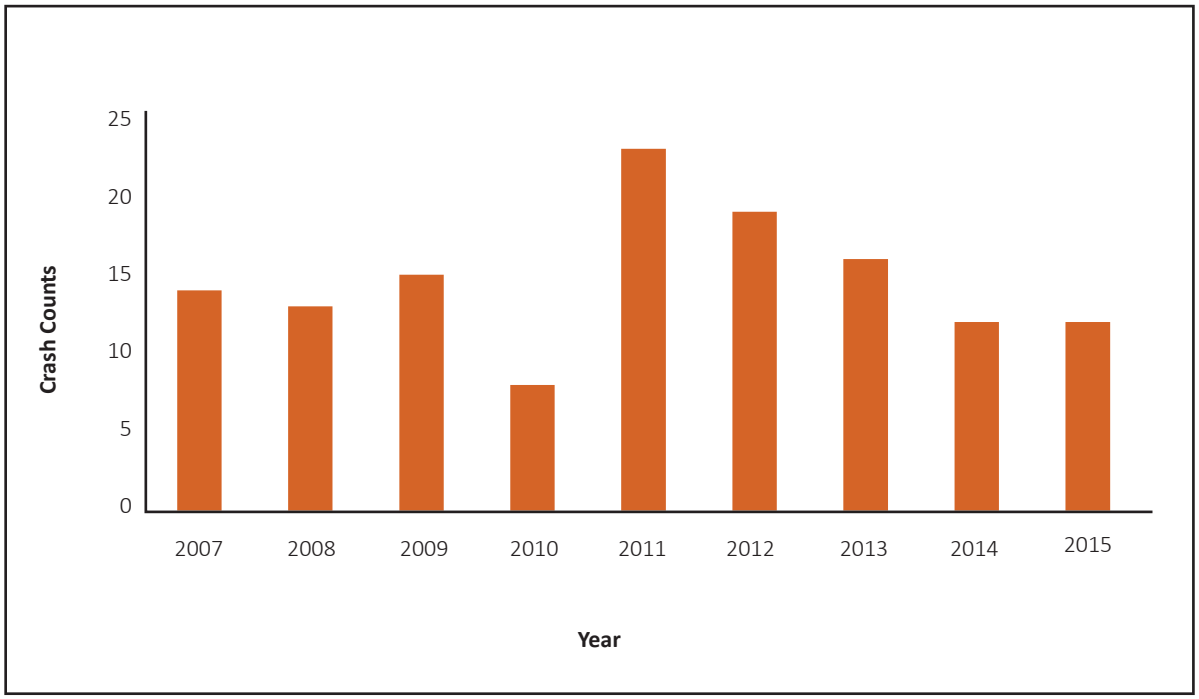
A central goal of the Bicycle Crash Analysis is to better understand the key elements of past bicycle crashes, including crash characteristics, location of crashes, and the typology of the crash (i.e., description of bicycle-motorist conflict). Key findings from this analysis will contribute to the body of knowledge informing the projects outlined in this Bicycle Master Plan for the City of Winston-Salem. The information is used in the development of projects in Section 5 and provides the basis for achieving the city's goal of becoming a safer community for bicyclists.

The data used in this Bicycle Crash Analysis was sourced from NCDOT and the Winston-Salem Police Department. Crash information in this dataset comes from police-reported bicycle-vehicle accidents on public roads, public areas, and private property (when reported) between January 2007 and December 2015. It is important to acknowledge that the nature of the available dataset means that unreported bicycle collisions are not included in this analysis (Figure 4-2).

Between 2007 and 2015 there were a total of 132 reported bicycle crashes in the City of Winston-Salem. Crash counts peaked in 2011, with 23 recorded collisions. These crashes range in severity for driver and bicyclist alike. Since 2011, there has been downward trend in bicycle crash counts, with 12 crashes reported in both 2014 and 2015.

Key crash characteristics are included in the graphs below (Figure 4-3, Figure 4-4, and Figure 4-5). In terms of age distribution, the majority of crashes - 32.8 percent - involved bicyclists between 30 and 49 years old, with 16.0 percent of all bicyclists in crashes between 30 and 39

Figure 4-2: Annual Bicycle Crashes in Winston-Salem



years old, and 16.8 percent between 40 and 49 years old. Crashes were distributed throughout all days of the week, with slightly more on Monday, Thursday, Wednesday, and Friday. In terms of hours of the day, 28.8 percent of all crashes occurred between 5:00pm to 7:59pm, likely correlated with peak rush hour. This time also coincides with early sunsets during the winter. Early sunset may have an impact due to darkness during the evening commuting time.

Figure 4-3: Percent Bike Crashes by Age Group

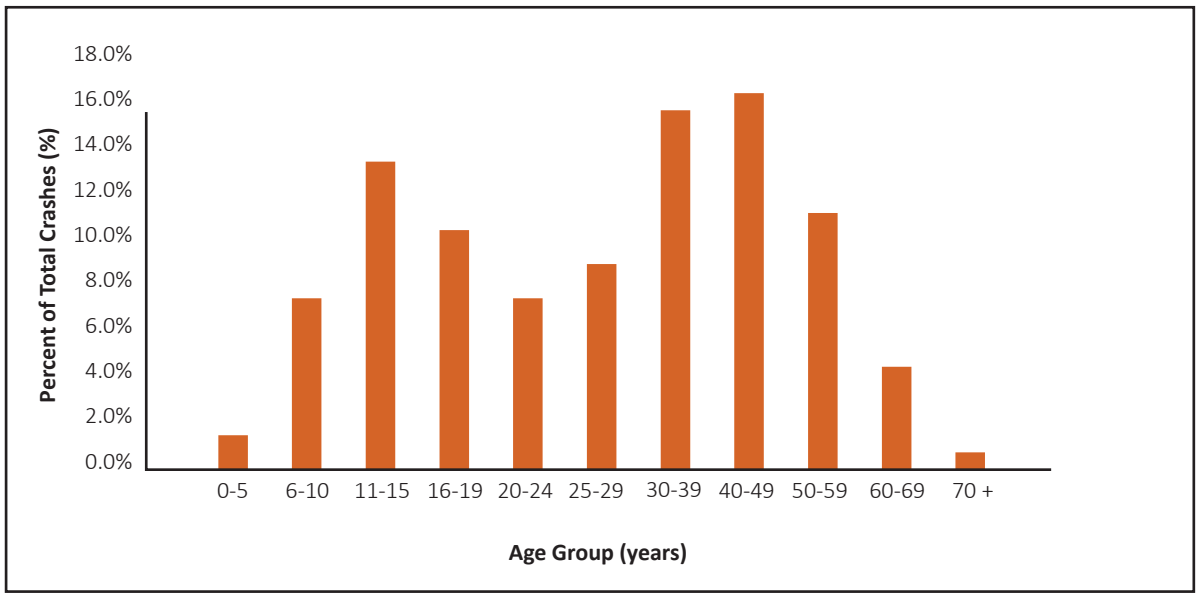


Figure 4-4: Percent Bike Crashes by Day of the Week

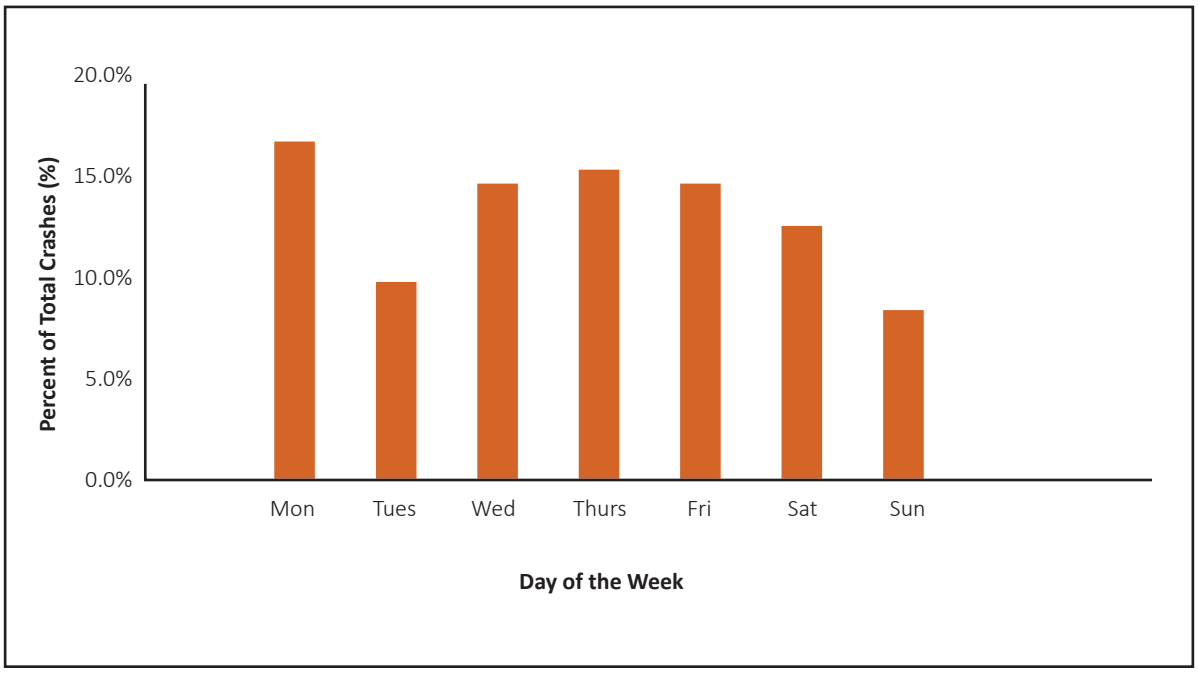
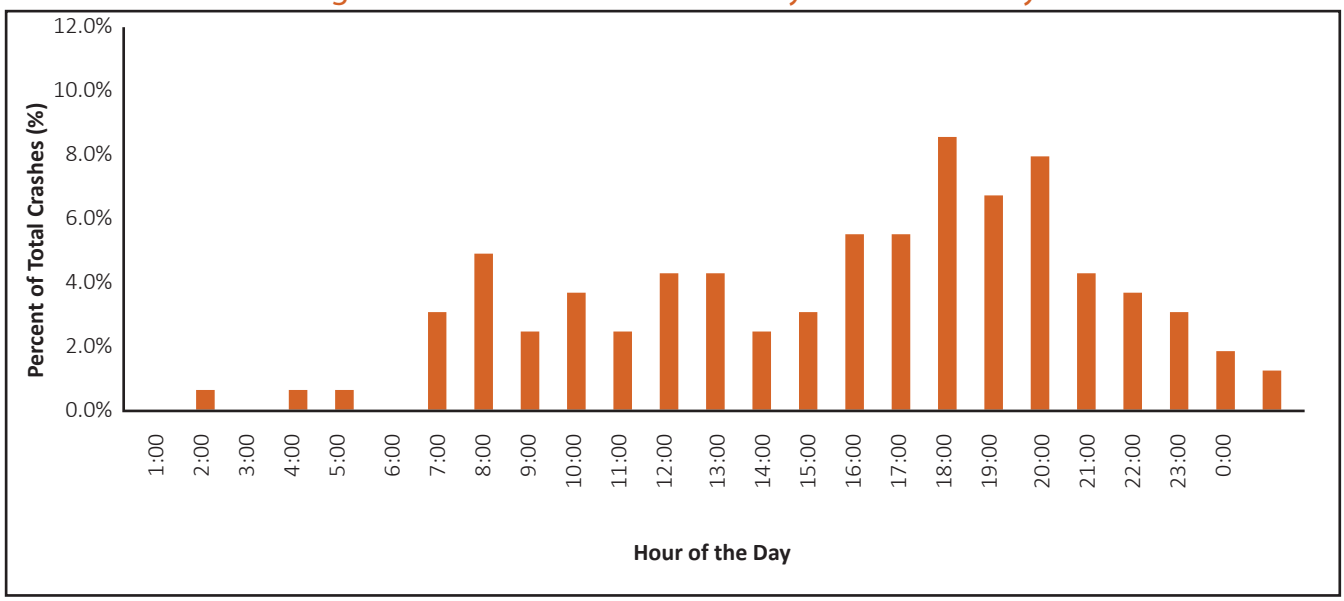


Figure 4-5: Percent Bike Crashes by Hour of the Day



(Dataset info: https://www.arcgis.com/home/item.html?id=801a34b6d3e64786a131d1fa2eca793d)

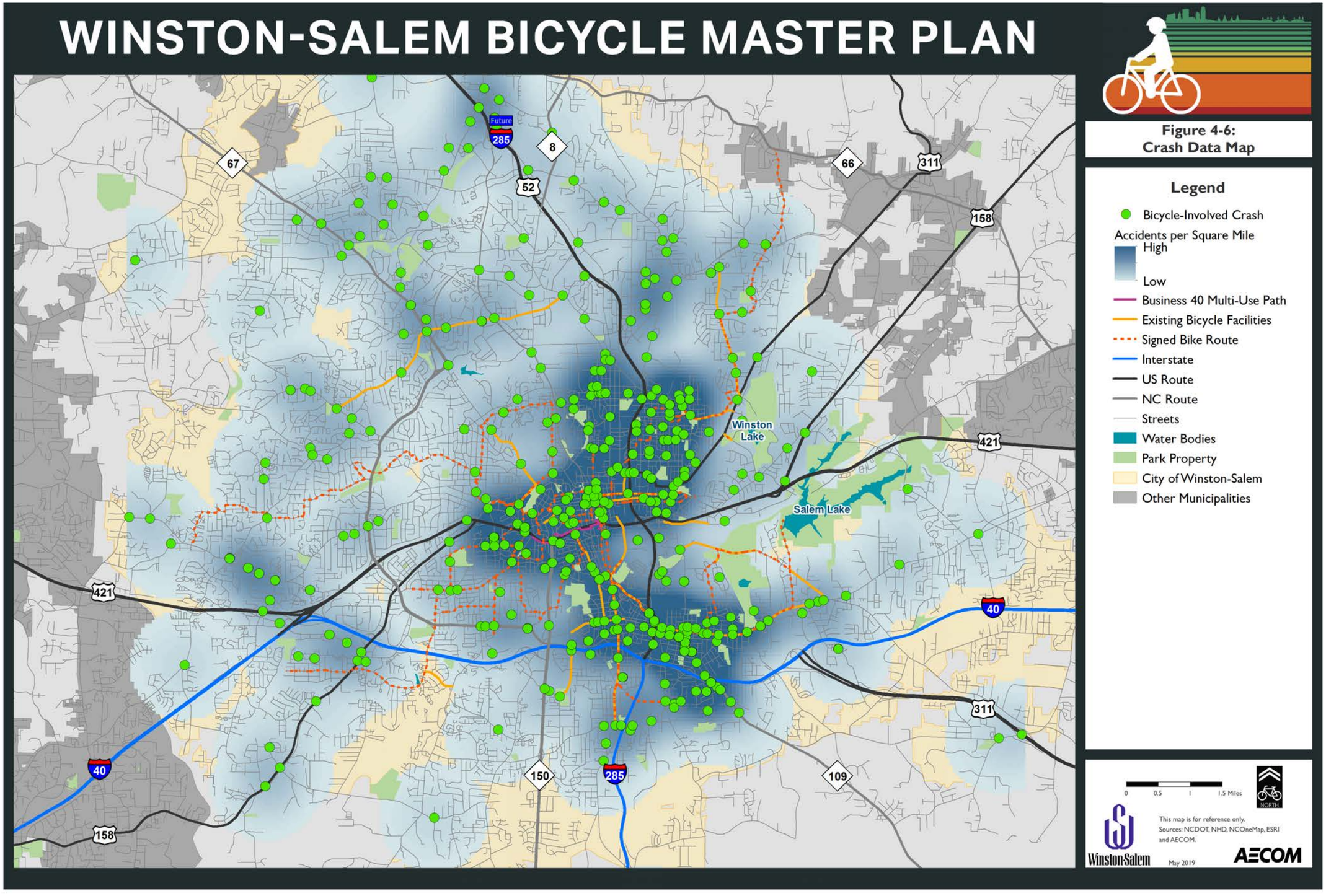
Over half of all reported bike crashes (55.3 percent) occurred in intersections or intersection-related areas. The remaining 44.7 percent of incidents are coded as non-intersection or non-roadway collisions. Figure 4-6 provides a spatial glance of where bicycle crashes have occurred 2002-2018. Although bike crashes occur throughout the city, there are concentrations of crashes along main thoroughfares and in the denser parts of the city.

The NCDOT Bicycle Crash dataset also provides crash type assignment for each conflict. From 2002 to 2018, the most frequently recorded bicycle crash types and their counts include the following:

- Motorist Left Turn – Opposite direction (17 counts)
- Motorist Drive Out – Sign-controlled intersection (13 counts)
- Bicyclist Ride Through – Sign-controlled intersection (8 counts)
- Motorist Drive Out – Commercial driveway / alley (6 counts)
- Motorist Right Turn – Same direction (6 counts)

An analysis of crash data using the most up-to-date data should be an included in any feasibility or engineering study that is conducted on projects that are recommended in this Plan.

Figure 4-6: Crash Data Map



4.3 PUBLIC INPUT

During the planning process, tools were developed to connect with the public, stakeholders and agencies to gather input that would help shape the recommendations of the Master Plan. The planning team provided ample opportunities for input, ideas and concerns, which were carefully reviewed by the city and, to the extent feasible, incorporated into the recommendations. The list below identifies the activities conducted, followed by a description of each. The detailed summaries, comment sheets and sign-in sheets of each meeting can be found in the appendix.

- Steering Committee Coordination
- Public Meetings
- Small Group Meetings
- Outreach at Community Events
- Community Surveys

4.3.1 Steering Committee Coordination

A committee was established at the beginning of the project to provide advice and help guide the project. Members included representatives from the city, National Cycling Center, NCDOT and Forsyth and Davie counties, as shown on Table 4-2.

Three steering committee meetings were held to discuss various project elements, as described below:

- December 13, 2017 – introduced the project and provided an overview of the tasks and milestones, as well as expectations of the committee.
- July 17, 2018 – reviewed draft bicycle facility recommendations that included proposed facility types, as well as existing facilities and currently planned facilities.
- April 1, 2019 – reviewed the draft plan and provided input on proposed projects and other recommendations made in the plan.

Table 4-2: Steering Committee Members

Organization	Contact
National Cycling Center	Michael Hosey
Winston-Salem/Forsyth County Department of Planning and Development Services	Amy Crum
Winston-Salem Recreation and Parks Department	William Royston
Davie County Development and Facilities Services	Amy Litz
Winston-Salem Engineering Department	Andrea Keyser
Winston-Salem Police Department (WSPD)	Sergeant Kevin Bowers
Forsyth County Health Department	Sharon Roberts
NCDOT Division 9	JP Couch, Fredrick Haith
WSDOT	Matthew Burczyk, Jeffrey Fansler, Hank Graham, Toneq' McCullough

The input and suggestions from committee members were incorporated into the planning process and draft recommendations, as feasible.

4.3.2 Public Meetings

Three public meetings were held to gather input and ideas from the public, as shown below.

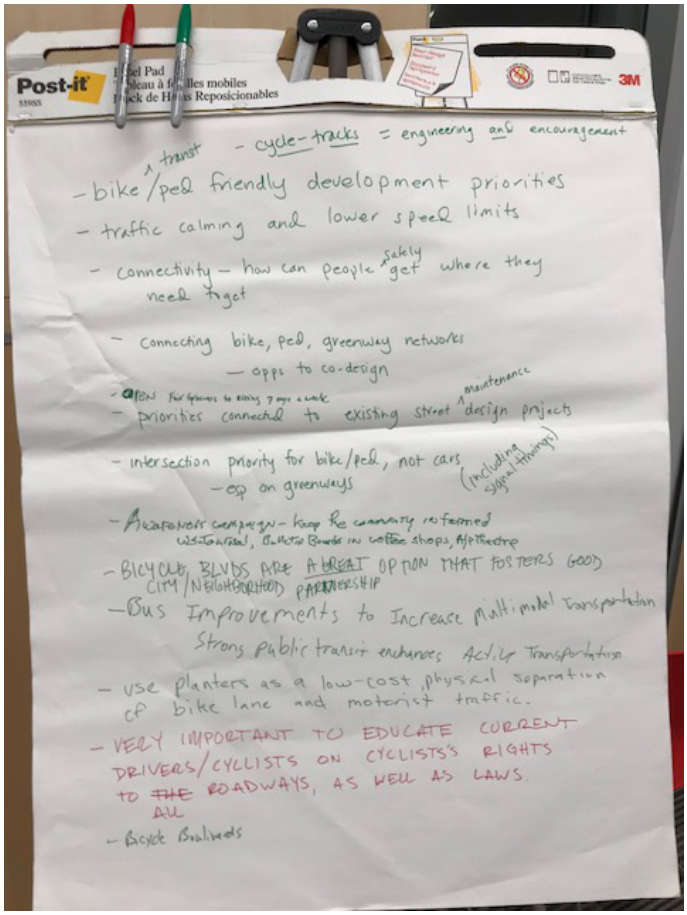
Public Meeting #1 - February 21, 2018

Central Library Auditorium

660 W. Fifth Street

5:30-7:30 p.m.

The purpose of the meeting was to introduce the project, discuss various bike facilities that are being considered and have participants complete a survey. Approximately 75 people attended the meeting, which included a



presentation by the city, followed by opportunities for participants to view exhibit boards, write comments, complete the survey, and talk with staff and team members.

Public Meeting #2 - August 16, 2018

Enterprise Center, 1922 S. MLK, Jr. Drive

5:30-7:30 p.m.

The purpose of the second public meeting was to review the draft bicycle infrastructure recommendations and obtain feedback from participants. Approximately 52 people attended, which began with a presentation by the city at 5:45 p.m. where the proposed bicycle facilities and recommendations were discussed. After the presentation, participants had an opportunity to view exhibits and graphics, mark up maps and talk to staff at four interactive stations.

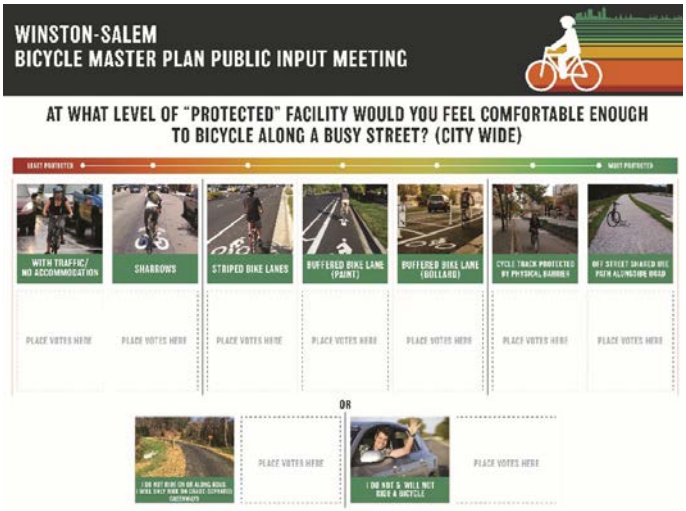
Four interactive stations were provided to engage participants, and included the following:

Station 1- Facility Visual and Description

This station showed pictures of various types of bike facilities, written descriptions and a list of where the facility would be most effective (e.g., low traffic areas, urban setting).

Station 2- Facility Preference and Priority

Participants were given the opportunity to identify bike facilities they would like to see implemented. For example, participants could select their top three to four facilities and then "rank" them in order of preference.



Station 3- Route Feedback

Participants placed post-it notes and/or used markers to write on the proposed bike plan map. Participants could add to a proposed route, draw a new route or extension of route, and/or make comments on the recommendations.

Station 4- Comment Station

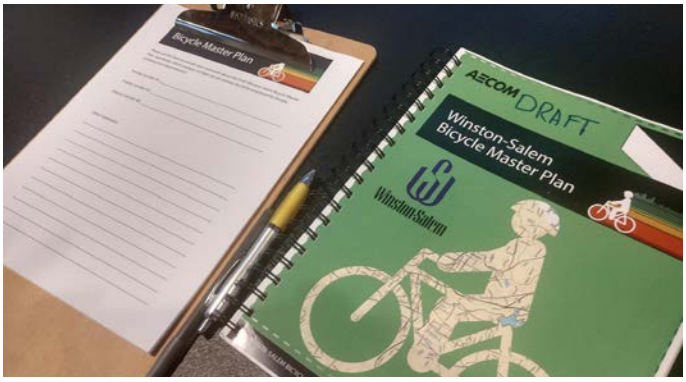
This station provided an opportunity for participants to write comments about the draft master plan.

Public Meeting #3 - April 4, 2019

Salem Lake Marina, 815 Salem Lake Road

5:30-7:30 p.m.

The purpose of the third public meeting was to review the draft Plan and solicit feedback and comments from participants. Approximately 29 people attended the meeting, which began with a presentation by the city at 5:45 p.m. where the project planning process and content of the plan were discussed. After the presentation, participants had an opportunity to view exhibits and graphics about the plan, view the proposed master plan map, view summaries and visualizations from some of the priority routes, and talk to staff and team members.



4.3.3 Small Group Meetings

Small group meetings and personal interviews were also held to extend outreach efforts to parts of the city that had not participated at high levels based on geographic information provided through surveys, on the website, and at public input meetings. This section summarizes the meetings and input received.

A meeting was held with residents of Bon Air, Gilmer, and 28th Avenue on October 15, 2018.The purpose was to engage residents in a discussion of bike and pedestrian safety, whether residents biked for commuting or recreational purposes, and what type of bike facilities would be helpful in their neighborhoods. The following questions were asked to initiate a discussion:

- Do you own a bike?
- Why do you ride a bike?
- Where do you ride?
- Do you ride on the sidewalk or street?
- Do you feel safe riding on the street?
- What would make your bike commute better?
- Are there specific streets or intersections that you feel are unsafe for cyclists?
- Do you ride public transportation? if so, do you take your bike on the bus?
- Are there areas where you would like to see better bike facilities or connections?

However, because most of the residents who attended the meeting did not ride a bike, the conversation was adjusted to focus on their concerns about walking and biking within their neighborhoods. Residents indicated that they would like better sidewalks and perhaps a bike lane along 28th Avenue (note: on-street parking within neighborhoods could make it difficult to add bike lanes) where most people ride.

In addition, three bicycle commuters from underrepresented areas were interviewed to gain specific information and comments on respective routes, areas, and facilities. Comments ranged from providing bike lanes (or other infrastructure) on narrow streets, where currently there is not sufficient space to share a lane with motor vehicles, to being generally happy with current conditions. One suggested that the city evaluate roads to determine which can be reconfigured to eliminate motor vehicle lanes in favor of bike infrastructure, especially on

Table 4-3: Summary of Pop-Up Events

Pop-Up Event	Date	Number of Participants
City of Winston-Salem Creek Week Keynote	March 20, 2018	22
Piedmont Environmental Alliance Earth Day Fair	April 21, 2018	94
Safe Kids Coalition of Northwest Piedmont Bike Safety Day	April 28, 2018	41
Inmar Bike Month Ride	May 2, 2018	25
Temple Emanuel Environmental Movie Event	May 3, 2018	15
Sierra Club Event	May 10, 2018	10
Wake Forest University Baptist Medical Center Employee Wellness Day	May 16, 2018	37
Fairgrounds Farm Market	May 26, 2018	15
Walk & Roll Winston-Salem	May 28, 2018	51
Neighbors for Better Neighborhoods Grand Opening	June 4, 2018	33
East Ward Town Hall Meeting	June 7, 2018	10
Tour To Tanglewood	September 22, 2018	12
Transit Center	November 8, 2018	16
Happy Hill Neighborhood Association Meeting*	N/A	N/A

Note: *Although this group did not want a presentation, city staff provided materials and website details.

narrow roads or roads with narrow lanes.

4.3.4 Pop-Up Events

City staff attended several "pop-up" events, as listed on Table 4-3. At most of the events, tables were set up with maps, surveys and other cycling information. As participants stopped by, staff shared project website information and discussed the challenges cyclists/pedestrians face and reasons why they do or do not choose to ride a bike. This input was included in the development of the Plan, where applicable.

4.3.5 Community Surveys

Two surveys were developed during the course of the project and were distributed via the project website. The first survey gathered information and input about current biking conditions, routes and amenities, as well as safety concerns and future improvements that would provide more convenient and safe bicycle transportation.

The second survey was a follow up to the proposed draft recommendations that were shown at the public meeting in August 2018. Summary results from the surveys are discussed in Section 3.3. Both survey instruments and responses are in Appendix E.

4.4 DESIGN NEEDS OF BICYCLISTS

Bicyclists' skills, confidence, and preferences vary significantly, and designing for their needs and in ways that will encourage bicycling can be challenging. Some bicyclists are comfortable riding anywhere they are legally allowed to operate, including space shared with motorized vehicles. Some bicyclists prefer to use roadways that provide space separated from motorists. Bicyclists can be classified as falling into one of four categories based on confidence and skill levels, including "Strong and the Fearless," "Enthused and the Confident," "Interested but Concerned." The fourth group consists of non-riders, called the "No Way No How" group.

Cyclists who are not confident riders are generally not afraid of other cyclists, or pedestrians, or of injuring themselves in a bicycle-only crash. When they say they are "afraid" it is a fear of people driving automobiles.

The "Strong and the Fearless" generally represent the smallest population of bicycle riders. These are the people who will ride in Winston-Salem regardless of roadway conditions. They are 'bicyclists'; riding is a strong part of their identity and they are generally undeterred by roadway conditions.

The "Enthused and the Confident" bicyclists include those who are comfortable riding on most types of bicycle facilities and on roads without any bicycle facilities. The group includes bicyclists willing to ride on busy roads, navigating traffic, as well as bicyclist who prefer to ride on low-traffic streets and shared-use paths. Experienced bicyclists can include commuters, long distance road bicyclists, racers, and cyclists who regularly participate in organized rides.

The "Interested but Concerned" riders include the majority of the population. These bicyclists typically require a physical network of visible, convenient, and well-designed bicycle facilities. According to the ***2012 American Association of State Highway and Transportation Officials (AASHTO) AASHTO Guide for the Development of Bicycle Facilities***, there are four types of these riders: 1) those who ride frequently for multiple purposes; 2) those who enjoy bicycling occasionally but only ride on paths or low traffic and low speed streets and in favorable conditions; 3) those who ride for recreation; and 4) riders who use the bicycle as a necessary mode of transportation.

The final category, the "no way, no how", group is not interested in bicycling at all, for reasons of topography, inability, or simply a complete lack of interest.

4.5 FACILITY TYPES

Incorporating the varying bicyclist's needs into a bicycle network can be challenging because typically constructing on-road bicycle infrastructure requires an existing roadway network. Aside from greenways, which are typically off-road facilities that follow easements and stream corridors, most bicycle infrastructure will need to be constructed adjacent to, and within the limits of vehicular street right-of-way. AASHTO provides six design options for bicycle facilities.

- Shared lanes
- Marked shared lanes
- Paved shoulders
- Bike lanes (striped and/or protected)
- Bicycle boulevards
- Shared use paths

Corridors can use multiple facility types depending on the appropriateness of the road. The best application of these facilities is dependent on data analysis, engineering judgement and budget constraints. And selection should be based on the following:

- Road function
- Traffic volume
- Speed
- Traffic mix (e.g., truck percentage)
- Expected users
- Road conditions
- Driveways/access points
- Topography
- Existing and proposed adjacent land uses
- Cost

AASHTO provides general considerations for when and where to use the different bikeway types, as shown on Table 4-4.

Table 4-4: General Considerations for Different Bikeway Types

Type of Bikeway	Best Use	Motor Vehicle Design Speed	Traffic Volume	Classification or Intended Use	Other Considerations
Shared lanes (nospecial provisions)	Minor roads with low volumes, where bicyclists can share the road with no special provisions.	Speeds vary based on location (rural or urban).	Generally less than 1,000 vehicles per day.	Rural roads, or neighborhood or local streets.	Can provide an alternative to busier highways or streets. May be circuitous, inconvenient, or discontinuous.
Sharedlanes (wideoutside lanes)	Major roads where bike lanes are not selected due to space constraints or other limitations.	Variable. Use as the speed differential between bicyclist and motorists increases. Generally any road where the design speed is more than 25 miles per hour (mph).	Generally more than 3,000 vehicles per day.	Arterials and collectors intended for major motor vehicle traffic movements.	Explore opportunities to provide marked shared lanes, paved shoulder, or bike lanes for less confident bicyclists.
Marked shared lanes	Space constrained roads with narrow travel lanes, or road segments upon which bike lanes are not selected due to space constraints or other limitations.	Variable. Use where the speed limit is 35 mph or less.	Variable. Useful where there is high turnover in on-street parking to prevent crashes with open car doors.	Collectors or minor arterials.	May be used in conjunction with wide outside lanes. Explore opportunities to provide parallel facilities for less confident bicyclists. Where motor vehicles allowed to park along shared lanes, place markings to reduce potential conflicts with opening car doors.
Paved shoulders	Rural highways that connect town centers and other major attractors.	Variable. Typical posted rural highway speeds (generally 40-55 mph).	Variable.	Rural roadways; inter-city highways.	Provides more shoulder width for roadway stability. Shoulder width should be dependent on characteristics of the adjacent motor vehicle traffic, (i.e., wider shoulders on higher-speed and/or higher-volume roads).
Bike lanes	Major roads that provide direct convenient, quick access to major land uses. Also can be used on collector roads and busy urban streets with slower speeds.	Generally, any road where the design speed is more than 25 mph.	Variable. Speed differential is generally a more important factor in the decision to provide bike lanes than traffic volumes.	Arterials and collectors intended for major motor vehicle traffic movements.	Where motor vehicles are allowed to park adjacent to bike lane, provide o bike lane of sufficient width to reduce probability of conflicts due to opening vehicle doors and objects in the road. Analyze intersections to reduce bicyclist/ motor vehicle conflicts.
Bicycle boulevards	Local roads with low volumes and speeds, offering an alternative to, but running parallel to, major roads. Still should offer convenient access to land use destinations.	Use where the speed differential between motorists and bicyclists is typically 15 mph or less. Generally, posted limits of 25 mph or less.	Generally less than 3,000 vehicles per day.	Residential roadways.	Typically only an option for gridded street networks. Avoid making bicyclists slop frequently. Use signs, diverters, and other treatments so that motor vehicle traffic is not attracted from arterials to bicycle boulevards.
Shared use path; independent right-of-way	Linear corridors in greenways, or along waterways, freeways, active or abandoned rail lines, utility rights-of-way, unused rights-of-way. May be a short connection, such as a connector between two cul-de-sacs, or a longer connection between cities.	N/A	N/A	Provides a separated path for non- motorized users. Intended to supplement o network of on-road bike lanes, shored lanes, bicycle boulevards, and paved shoulders.	Analyze intersections to anticipate and mitigate conflicts between path and roadway users. Design path with all users in mind, wide enough to accommodate expected usage. On-road alternatives may be desired for advanced riders who desire a more direct facility that accommodates higher speeds and minimizes conflicts with intersection and driveway traffic, pedestrians, and young bicyclists.
Shared use path: adjacent to roadways (i.e., sidepath)	Adjacent to roadways with no or very few intersections or driveways. The path is used for a short distance to provide continuity between sections of path on independent rights-of-way.	The adjacent roadway has high-speed motor vehicle traffic such that bicyclists might be discouraged from riding on the roadway.	The adjacent roadway has very high motor vehicle traffic volumes such that bicyclists might be discouraged from riding on the roadway.	Provides a separated path for non-motorized users. Intended to supplement a network of on-road bike lanes, shared lanes, bicycle boulevards, and paved shoulders. Not intended to substitute or replace on-road accommodations for bicyclists, unless bicycle use is prohibited.	Several serious operational issues are associated with this facility type. These include dangerous intersection conditions where motorists don't notice cyclists approaching from the right, or cyclists crossing the intersection at unexpected speeds (relative to pedestrians). Other issues include sidepath width constraints, and limited crossing points of roads.

Consideration and appropriateness of facility types was included as the project team developed the network and high priority projects for the Winston-Salem Bicycle Plan. Specific discussion of the location of facility types is included in the next Section, and typical cross sections for the various bikeway types are included in Appendix B.

4.6 SUMMARY OF NEEDS ANALYSIS

This section identified the location of potential bicyclists and their potential destinations in the city based on a variety of socio-economic and location factors and also provided an analysis of the bicycle crashes in the city. It also summarized the public outreach efforts that were conducted to reach the bicycle community so as to have maximum public input in the Plan. Finally, it identified the types of bicycle facilities that are available to the city to accommodate all levels of comfort and confidence in the bicycling community.

Chapter 5

Bicycle Facility Vision and Recommendations

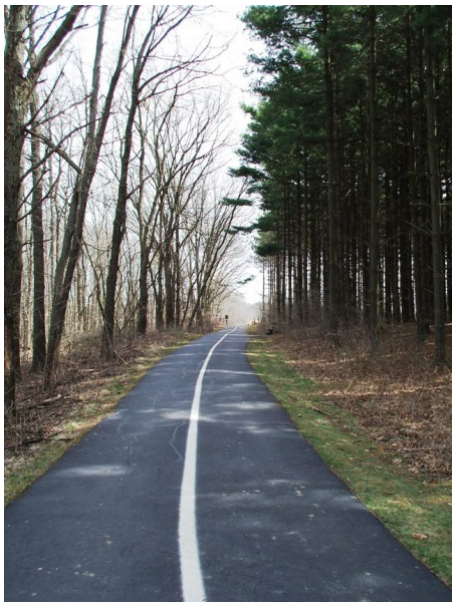
5 Bicycle Facility Vision and Recommendations

5.1 BICYCLE NETWORK

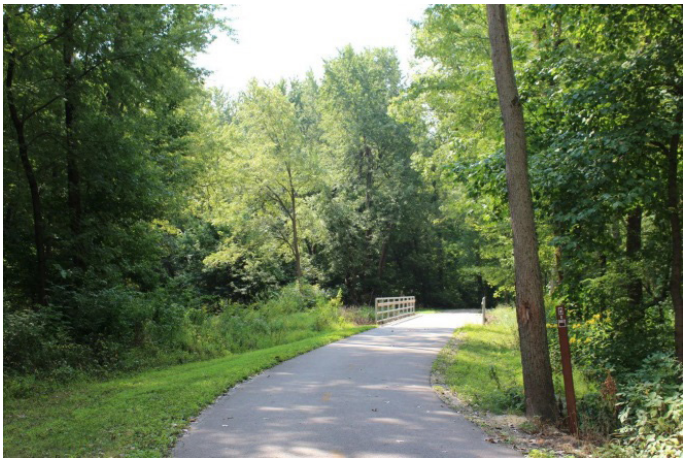
A combined network of bicycle facilities is crucial for creating a bicycle friendly community. While every street will serve as a bicycle facility to some extent, concentrating bicycle trips along specially treated corridors can help to attract new bicyclists and reduce crashes for all modes. The network should be composed of a connected, comprehensive system of paved shoulders, bike lanes, shared lanes, bicycle boulevards, bike routes and shared use paths. In developing the network, the project team relied on the results of the gap analysis and stress level mapping discussed in Section 3, and the latent demand model and public input discussed in Section 4, to identify connections between neighborhoods, shopping, schools, employment centers, and other key destinations.

Based upon public input and technical analysis, the project team outlined recommendations for the type of facility to be constructed. As noted previously, corridors can use multiple facility types depending on the appropriateness of the road. While efforts were made to match the appropriate facility type to the specific conditions of a segment of street, at this stage in the planning process, it is not practical to identify the specific facility for all streets without detailed analysis of each street. Therefore, improvements are placed into four classes described below, along with the associated AASHTO bikeway type discussed in Section 4.5.

Class I – Class I bikeways, also referred to as bike paths or shared-use paths, are facilities with exclusive right of way for bicyclists and pedestrians, away from the roadway and with cross flows by motor traffic minimized. These



Example of a Class I shared-use path



Example of a Class I shared-use path

improvements are similar to shared use paths with independent right-of-way by AASHTO.

Class II – Class II bikeways are referred to by AASHTO as bike lanes and are established along streets typically defined by pavement striping and signage to delineate a portion of a roadway for bicycle travel. Bike lanes are one-way facilities, typically striped adjacent to motor traffic travelling in the same direction. Contraflow bike lanes can be provided on one-way streets for bicyclists travelling in the opposite direction.

Example of a Class II dedicated bike lane

Example of a Class II dedicated bike lane

Class III - Class III bikeways, or bike routes, designate a preferred route for bicyclists on streets shared with motor traffic not served by dedicated bikeways to provide continuity to the bikeway network. Class III improvements can also include Bicycle Boulevards which are shared roadways intended to prioritize bicycle travel for people of all ages and abilities. Bicycle Boulevards are typically sited on streets without large truck or transit vehicles, and where traffic volumes and speeds are already low, or can be further reduced through traffic calming. These improvements include shared lanes and bicycle boulevards

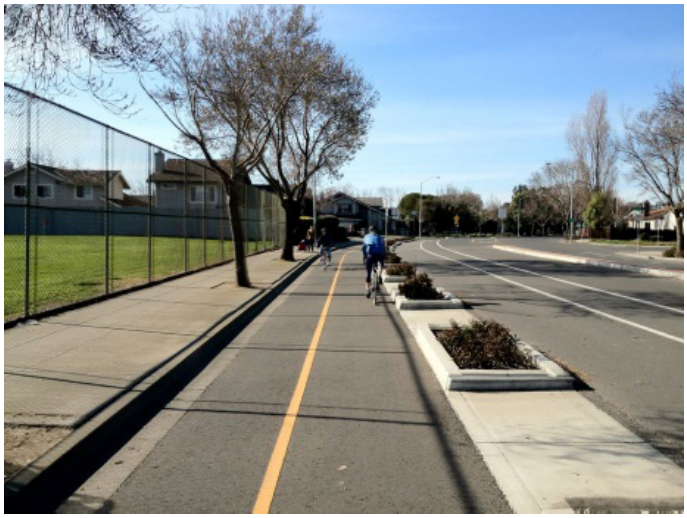
Example of a Class III bicycle boulevard

Example of a Class III shared street

Class IV - A Class IV separated bikeway, often referred to as a cycle track or protected bike lane, is for the exclusive use of bicycles, and is typically physically separated from motor traffic with a vertical feature. A Class IV feature is similar to what AASHTO refers to as a shared use path adjacent to roadways. The separation may include, but is not limited to, grade separation, flexible posts, inflexible barriers, or on-street parking. Separated bikeways can provide for one-way or two-way travel.

The proposed bicycle network of over 400 miles of recommended bicycle facilities is shown in Figure 5-1. The breakdown of recommended improvements by mileage and class is shown in Table 5-1. In addition to the on-

Example of a Class IV protected cycle track



Example of a Class IV protected cycle track

road recommended improvements made in this Plan, the network figure includes existing bicycle facilities and bicycle facilities that are currently under development by the city, as well as existing and some sections of planned greenways. High priority projects are discussed in the next section, and the remaining projects are discussed in Section 5.5.

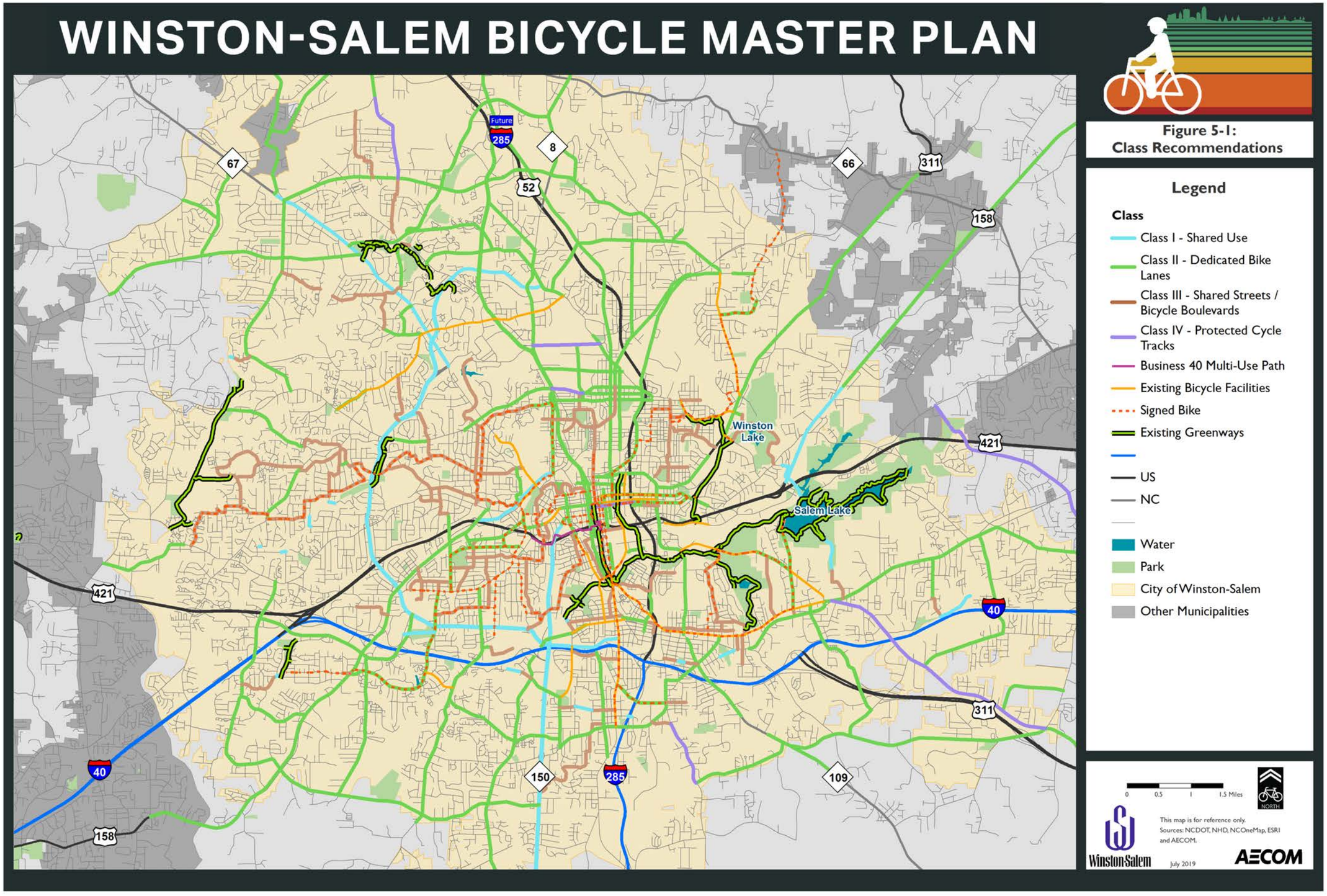
The City of Winston-Salem is committed to implementing projects from this plan and creating a bike-friendly community. The City will work with available resources to pursue priority projects that can be completed through established processes, such as the street resurfacing program and STIP projects.

In addition, on-street bike facilities can be easily implemented in a programmatic fashion through coordination with the city's and NCDOT's street resurfacing programs. Resurfacing represents the opportunity to systematically increase bike facilities across the city with incrementally small or no cost to the city's budget and taxpayers. The city transportation planning staff should serve as a key reviewer of these two annual programs and provide striping recommendations for resurfacing projects based on the recommendations made in this Plan.

Table 5-1: Proposed Bicycle Network by Classification

Class	Miles
Class I – Shared Use Paths	88.5
Class II – Dedicated Bike Lanes	253.6
Class III – Shared Streets / Bicycle Boulevards	54.0
Class IV – Protected Cycle Tracks	18.6
Total	**414.7**

Figure 5-1: Recommended Network by Class



5.2 TYPICAL SECTIONS

The following graphics represent typical sections that would support the proposed bicycle facilities described in this plan. The features illustrated in these sections are not intended to be used as absolute guides for bicycle facilities in Winston-Salem. The typical sections are briefly described below and have been applied to Westside Bike Boulevard, Waughtown Route, and the Downtown Connector later in this chapter. Both typical applications and benefits are provided for each typical section below.

Sharrows:

- Sharrows are typically applied to indicate a shared lane situation where the roadway does not have sufficient width for a dedicated bicycle lane.
- Sharrows are often used to strengthen connections in a bikeway network.
- Sharrows encourage proper cyclist positioning on the road.
- The iconic sharrow marker supports bicycle use on the road.
- Sharrows offer directional and wayfinding guidance.

Two-Way Cycle Track:

- Typically used when streets have parking lanes.
- Used along streets with high bicycle and/or motor vehicle volumes.
- Provides separation from motor vehicles can offer higher levels of security for cyclists.
- Cycle tracks are attractive to a wider spectrum of the public.
- Reduces the risk of "dooring" by a parked car.

Striped Bike Lanes:

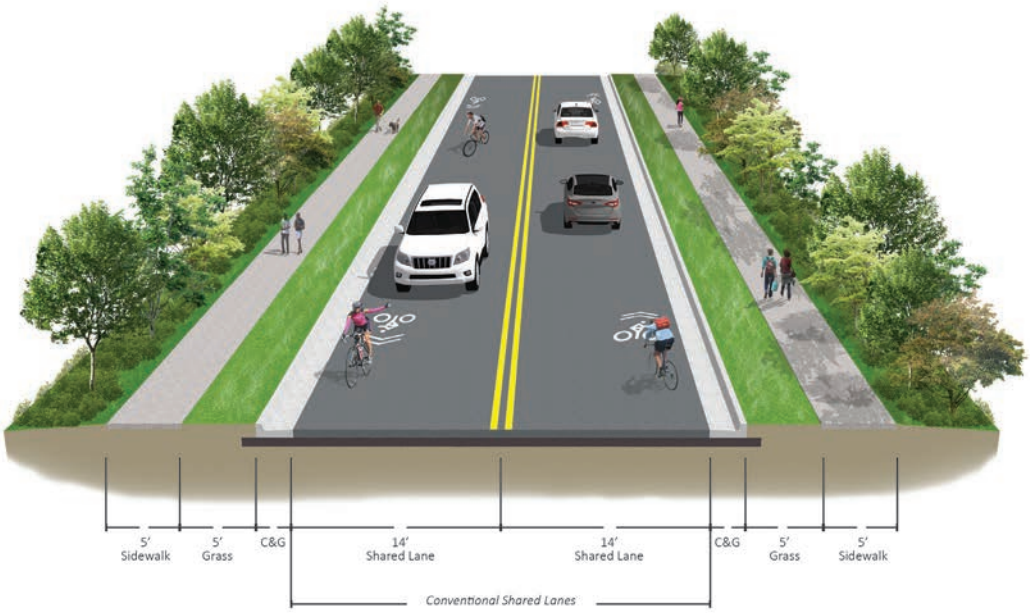
- Most helpful on streets with a posted speed of 25 mph or greater.
- Helpful on streets with high travel volumes, and/or high amounts of motor vehicle traffic.
- Creates separation between motor vehicles and bicycles.
- Provides a visual cue to drivers that cyclists also have a right to the street.
- Increases the total street capacity by allowing non-motor users on the road.

Buffered Bike Lanes (with optional door buffers or paint):

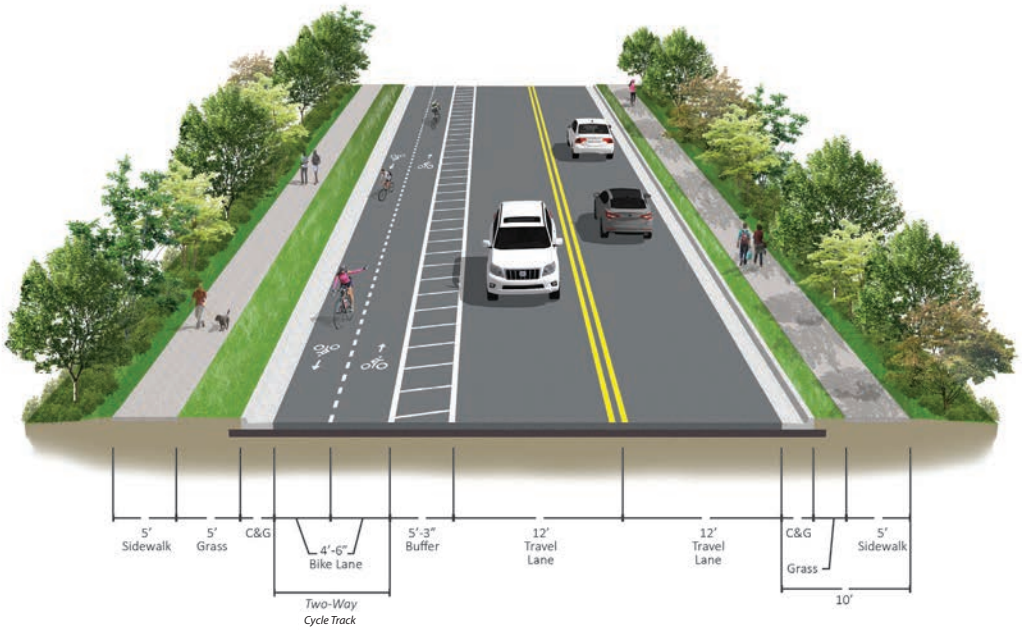
- Can be used anywhere a standard bike lane is being considered.
- Typically used on streets with high travel speeds, high travel volumes, and/or high amounts of motor vehicle traffic.
- Provides greater shy distance and a barrier between cyclists and motor vehicles.
- Cyclists are less likely to ride in the door zone when a buffer is situated between the parked cars and the bike lane.
- A vertical separator provides additional protection to the cyclist.

Conventional Bike Lane with Turn Lane:

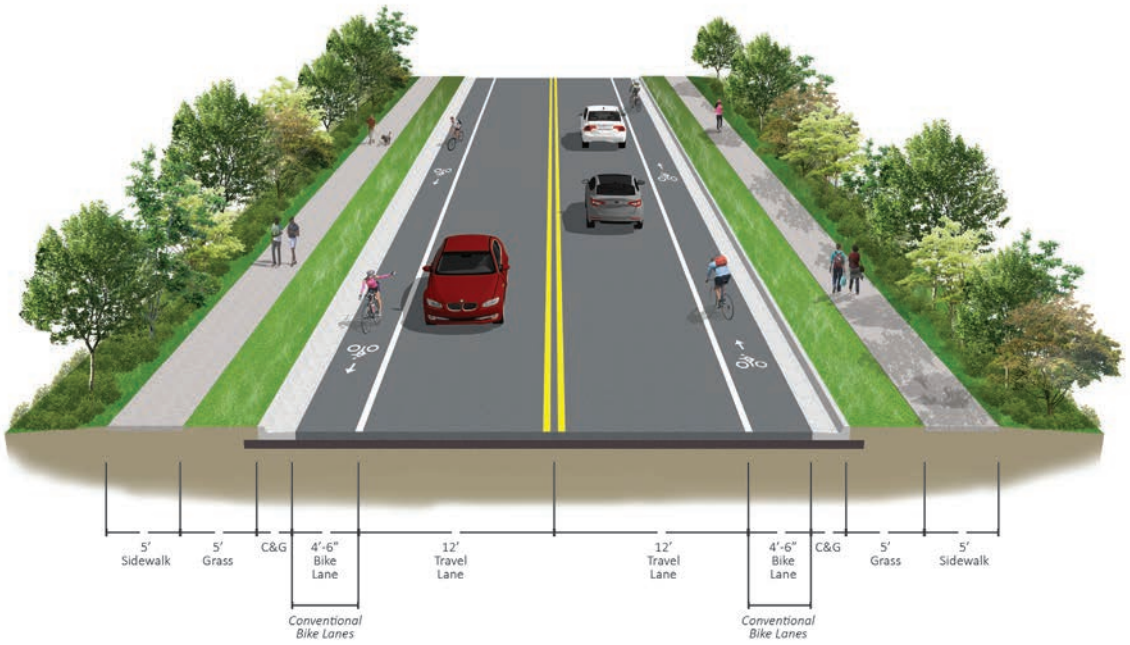
- Striped bicycle lanes can help indicate the intended path for bicyclists.
- Proper markings and signage help to ensure proper positioning of the cyclist and motorist.
- The bicycle lane helps maintain bicyclist comfort.
- Drivers reduce vehicle speeds within the right turn lane.



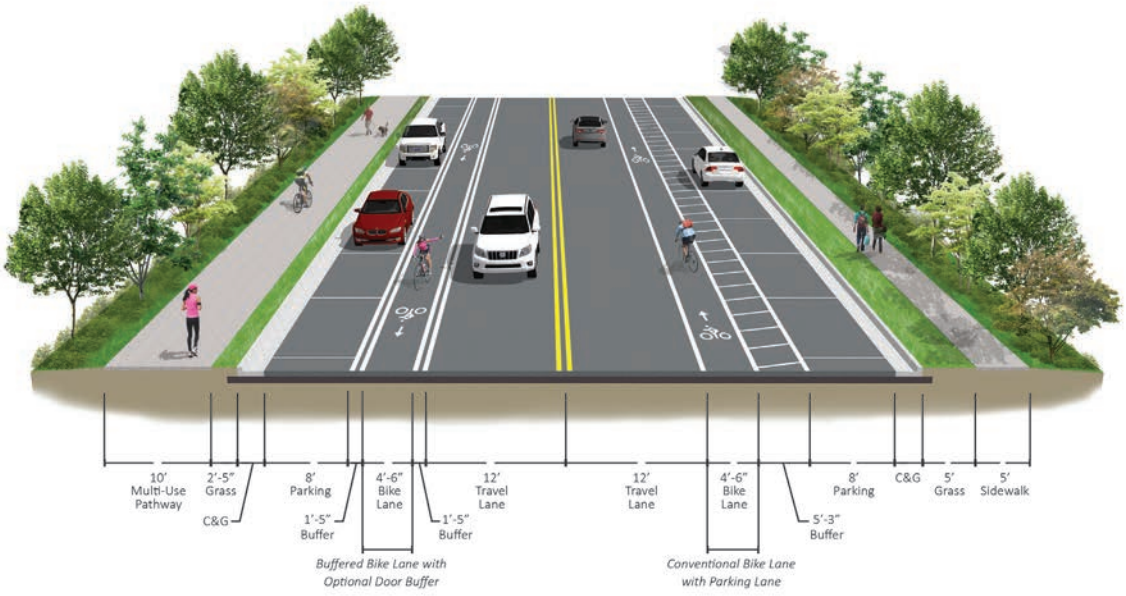
SHARROWS



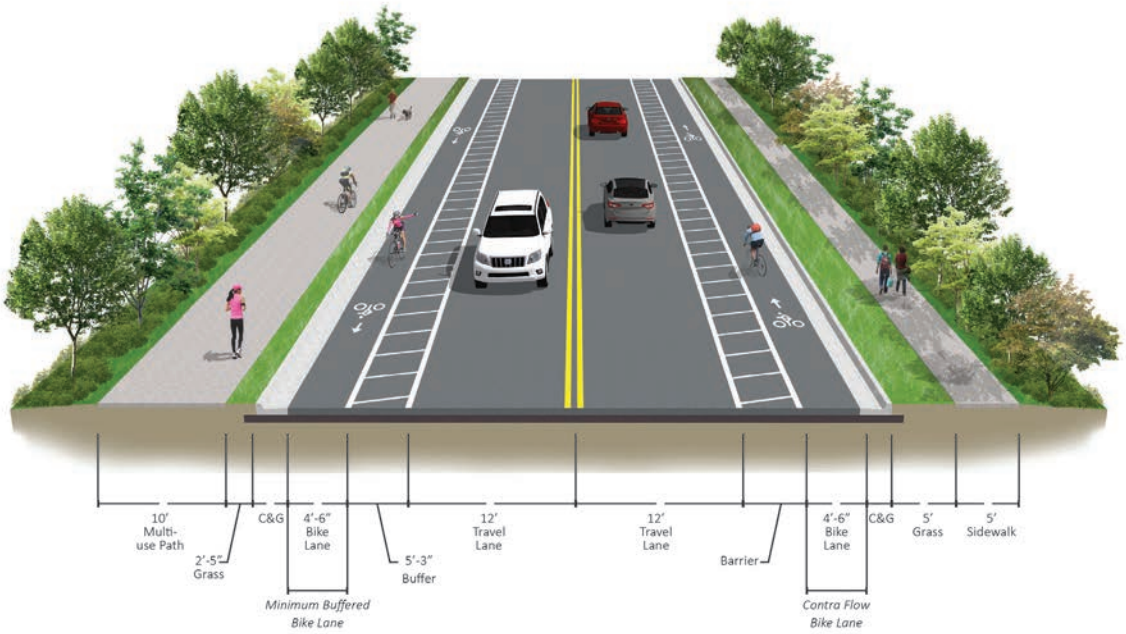
TWO-WAY CYCLE TRACK



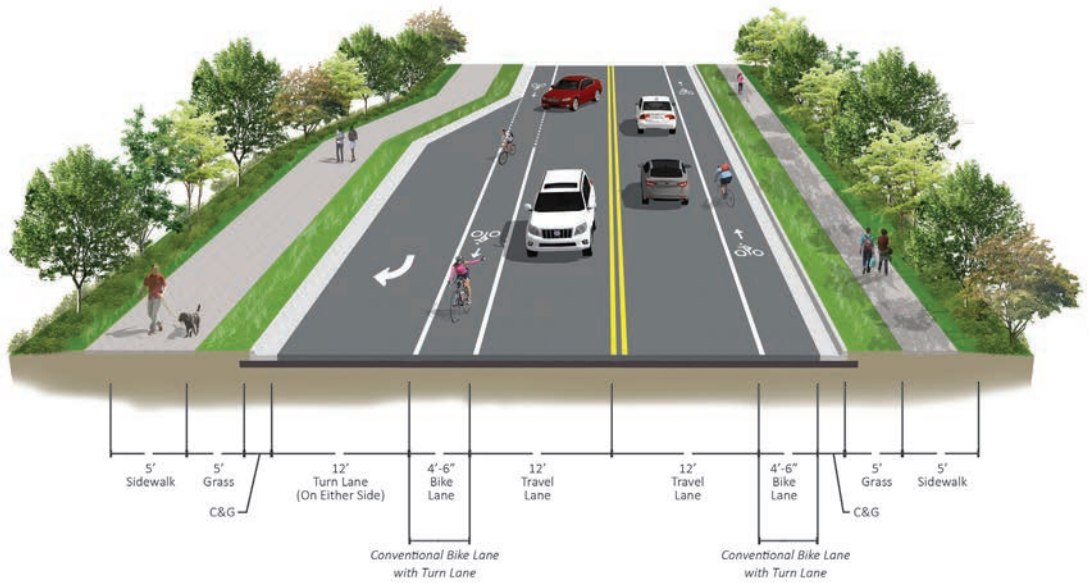
STRIPED BIKE LANES



BUFFERED BIKE LANES WITH OPTIONAL DOOR BUFFERS



BUFFERED BIKE LANES (PAINT)



CONVENTIONAL BIKE LANE WITH TURN LANE

5.3 HIGH PRIORITY PROJECTS

The selection of priority routes for the City of Winston-Salem Bicycle Master Plan are intended to enhance connectivity and safety, and encourage active transportation for both residents and visitors. Seventeen priority route projects have been identified for the Winston-Salem Bicycle Master Plan and are listed below. The prioritization process that helped identify these projects included input from public meetings, surveys, the gap analysis, social equity considerations, and results from the latent demand model. This section outlines each priority route and highlights the following key attributes: total length, key destinations, and bus route connections. Key destinations are categorized and represented by symbols on the maps. The routes are divided into segments and are further evaluated based on recommended cross-section or improvement type, route status, total length, stress level, and social equity connections. The priority routes are listed below in the order of north to south and west to east, and shown on Figure 5-2.

Priority Routes:

- Northside Trace
- Robinhood Road
- Northwest Connector
- Westside Bike Boulevard
- Eastern Trace
- CrossTown Connector
- Lewisville Connector
- Parkland South Connector
- Southern Fiddle
- Bethabara Brightway
- Walktertown Quarry Connector
- Reynolda Link
- Long Branch
- Forsyth Medical
- Forsyth Tech Connector
- Waughtown Route
- Downtown Connector

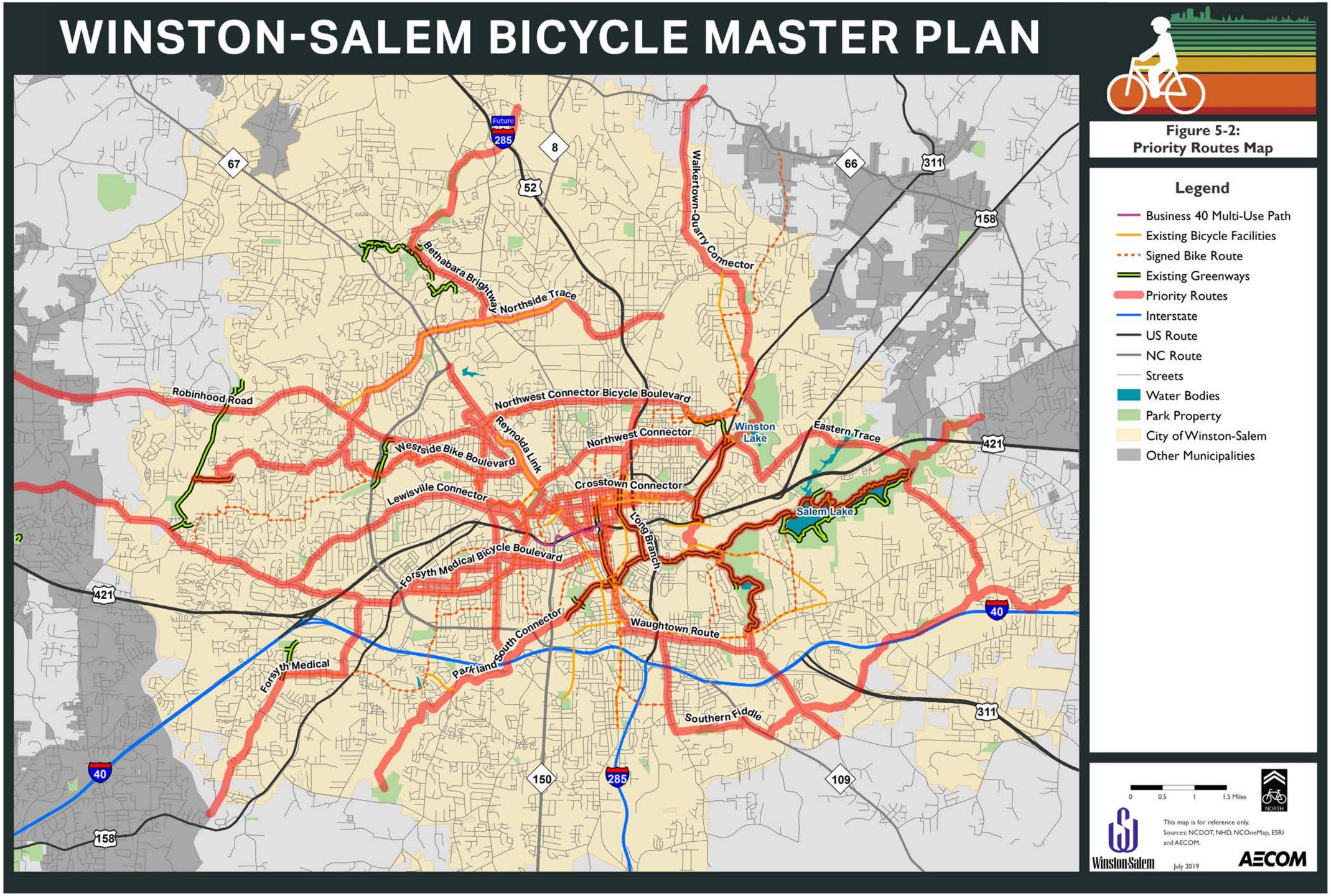
While these routes represent the priorities for the City of Winston-Salem, all streets have the potential to be important bicycle routes and should be evaluated as such as projects impact streets.

Cost estimates for the projects were determined using planning level cost estimates which are based on costs of similar projects in North Carolina. The cost estimates shown are the total costs for the projects, and include preliminary engineering, design and environmental review costs, right-of-way cost, construction cost, construction engineering and inspection costs, oversight costs, and inflation rate. Additional discussion of costs is in Section 7.

A note about Social Equity

It is imperative that social equity be considered during bicycle planning processes. According to the United States Census Bureau, Winston-Salem contains a high number of block groups with households that own zero cars and households that are located in low-income areas. Each route segment was assessed to determine if it ran through spaces classified as either of these social equity areas. If the segment ran through either a block group with zero cars or a block group in poverty, the social equity column received a score of “yes” to signify that the route segment supports social equity connections in the city.

Figure 5-2: Priority Routes



Northside Trace

Legend

- Northside Trace
- Existing Bicycle Facilities
- Existing Greenways
- Parks

Key Destinations

- School
- Park/Recreation/Trail
- Shopping
- Church

5.3.1 Northside Trace

Route Description:

The Northside Trace Route begins on North Liberty Street next to the Liberty and Akron bus stops and ends on North Peace Haven Road where it intersects with Chester Road. The route follows Akron Drive, Indiana Avenue, and Polo Road before turning south onto North Peace Haven Road. The Northside Trace route links to the following routes: Westside Bike Boulevard, Bethabara Brightway, and the Brightway Interim Route. It also will provide additional crosstown mobility and access to shopping in the vicinity of the North Peace Haven and Robinhood Roads. There are also numerous opportunities for connections to bus routes, and to provide additional mobility for low and moderate income residents of the city. While there are bicycle facilities along the majority of Polo Road for the length of this route including bicycle lanes and shared lane markings, this project will upgrade the facilities to more formal, separated facilities (Table 5-2).

Total Length: 6.6miles (56 percent complete)

Total Cost: $2,903,900

Key Destinations:

1. Hanes Hosiery Park
2. Wake Forest Connector Greenway (proposed)
3. Polo Park
4. Speas Elementary
5. Hope Presbyterian Church
6. Harris Teeter
7. Winston-Salem Christian School
8. Spry Soccer Stadium
9. College Park Baptist Church
10. Polo Park Community Center
11. Peace Haven Baptist Church

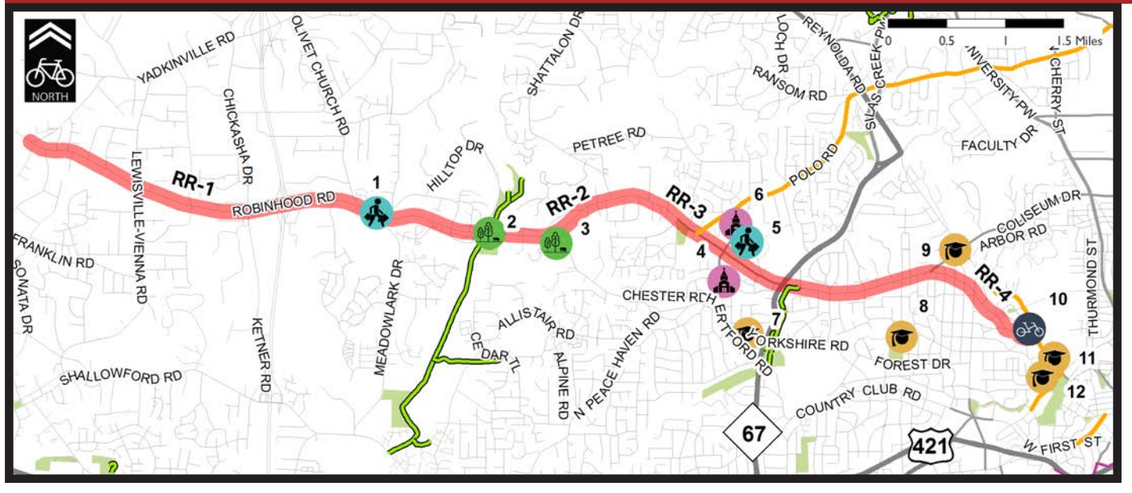
Bus Route Connections:

- Route 87
- Route 88
- Route 89
- Route 90
- Route 91
- Route 109

Table 5-2: Northside Trace

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
NT-1	Akron Drive from North Liberty Street to Indiana Avenue	Class II – Dedicated Bike Lanes	No	1.1 miles	High	Yes	$1,136,600	Improve intersection safety for bicyclists and pedestrians at Akron Drive. Coordinate with NCDOT on upgrading streetscape with roadway improvements. Consider Class I multi-use sidepath project with bridge replacements. Fewer driveways, lack of sidewalks and appearance of goat paths on the south side between Indiana Ave and N Liberty Street make this a potential sidepath candidate.
NT-2	Indiana Avenue from Akron Drive to Polo Road	Class II – Dedicated Bike Lanes	No	0.8 miles	Very High	Yes	$795,900	Reduce road from 5-lanes to 3-lanes with buffered bike lanes.
NT-3	Polo Road from Indiana Avenue to Brookwood Drive	Class II – Dedicated Bike Lanes	Yes	1 mile	High	Yes	N/A	
NT-4	Polo Road from Brookwood Drive to North Peace Haven Road	Class II – Dedicated Bike Lanes	Yes	2.7 miles	High	Yes	N/A	Review turning movement counts on Polo Road to determine opportunities to reconfigure lanes and add bicycle facilities between Sunnyknoll Court and Ransom Road. Upgrade Polo Road to complete street including dedicated bicycle facilities with roadway improvements. Include upgrades for pedestrians and transit.
NT-5	North Peace Haven Road from Polo Road to Chester Road	Class II – Dedicated Bike Lanes	No	1 mile	High	No	$971,400	Review turning movement data on N Peace Haven Road to determine trade-offs between bike lane, through lanes and continuous center turn lane between Polo Road and Chester Road. Include improvements for bicycling at all intersections with restriping. Review intersection at Robinhood Road for improvements to bicycling and walking, including refuge islands, bicycle boxes, two stage turn queue boxes and bicycle actuation. Upgrade North Peace Haven Road to complete street including dedicated bicycle facilities with roadway improvements.

Robinhood Road



Legend

- Robinhood Road
- Existing Bicycle Facilities
- Existing Greenways
- Parks

Key Destinations

- Bike Shop
- School
- Park/Recreation/Trail
- Shopping
- Church

5.3.2 Robinhood Road

Route Description:

The Robinhood Road route would provide east-west connectivity for neighborhoods and key destinations on the northwest side of downtown. The route will begin at the intersection of Robinhood Road and Yadkinville Road and follow Robinhood Road east to Reynolda Road and the Proposed Peters Creek Greenway. The Robinhood Road route links to the following additional routes: Northside Trace, Reynolda Link and the Reynolda Link Bicycle Boulevard (Table 5-3).

Total Length: 9.3 miles (0 percent complete)

Total Cost: $8,794,500

Key Destinations:

1. Jefferson Elementary School
2. Mount Tabor High School
3. Sherwood Forest Elementary School
4. Muddy Creek Greenway
5. Silas Creek Trail Greenway
6. Cedar Trail Greenway Connector
7. Peters Creek Greenway (proposed)
8. The Village at Robinhood
9. Harris Teeter
10. Peace Haven Baptist Church
11. Winton-Salem Children's Center
12. Mock Orange Bikes

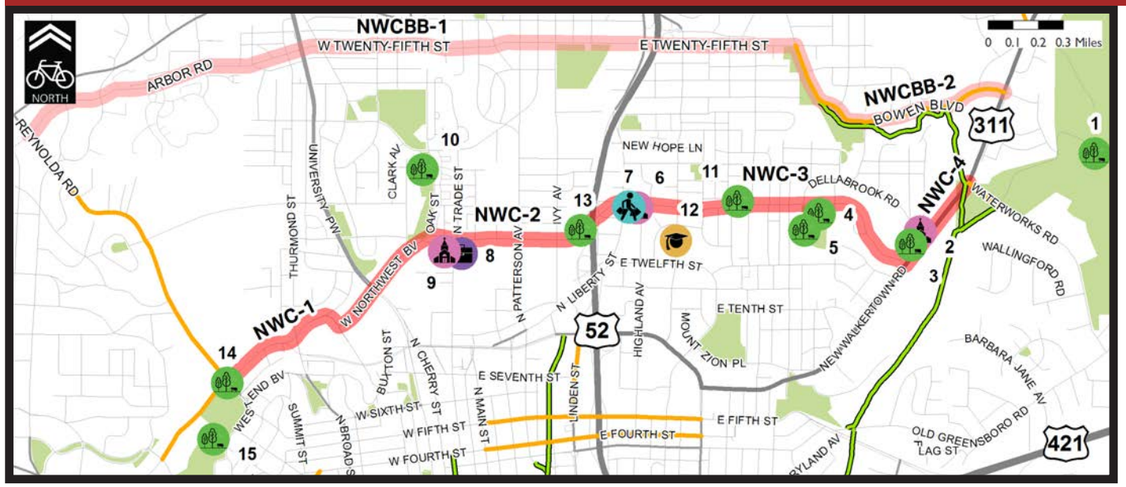
Bus Route Connections:

- Route 99
- Route 109

Table 5-3: Robinhood Road

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
RR-1	Robinhood Road from Yadkinville Road to Milhaven Road	Class II – Dedicated Bike Lanes	No	2.5 miles	High	No	$3,989,500	Improve intersection of Meadowlark Drive and Robinhood Road for bicyclists and pedestrians, including median refuge island. Add sidewalk connections with redevelopment.
RR-2	Robinhood Road from Milhaven Road to Shattalon Drive	Class II – Dedicated Bike Lanes	No	0.2 miles	Very High	No	$728,300	
RR-3	Robinhood Road from Shattalon Drive to Coliseum Drive	Class II – Dedicated Bike Lanes	No	1.2 miles	High	No	$2,884,700	Improve intersection of N Peace Haven Road and Robinhood Road to improve safety for bicyclists and pedestrians including refuge islands, bicycle boxes, two stage turn queue boxes. and bicycle actuation. Coordinate with NCDOT on upgrading streetscape on Robinhood Road with roadway and future NC 67 bridge improvements. A Class I Sidepath may also be considered for this corridor.
RR-4	Robinhood Road from Coliseum Drive to Reynolda Road	Class II – Dedicated Bike Lanes	No	1.5 miles	Low	No	$1,192,000	Stripe bicycle facilities on Robinhood Road.

Northwest Connector



Legend

- Northwest Connector
- Northwest Connector Bicycle Boulevard
- Existing Bicycle Facilities
- Existing Greenways
- Parks

Key Destinations

- School
- Work/Business
- Park/Recreation/Trail
- Shopping
- Church

5.3.3 Northwest Connector

Route Description:

The Northwest Connector would provide east-west crosstown connectivity and allow neighborhoods on the northwest side of downtown to bicycle to Winston Lake Park. The route begins at Hanes Park on Reynolda Road and heads west on W Northwest Boulevard before continuing west on Northwest Boulevard and 14th Street. At New Walkertown Road, the route may either provide a new connection to the Virginia K. Newell/Ann Massey Trail Greenway, or follow New Walkertown Road north to connect with it at Winston Lake Park. The Northwest Connector route connects to both the Long Branch and Eastern Trace routes. It will also provide connections to proposed greenways and numerous transit routes. In addition, it will pass through areas where there are high concentrations of vehicleless households, providing additional mobility opportunities to residents.

The Northwest Connector route will also include a parallel bicycle boulevard that would begin at the intersection of Reynolda Road and Arbor Road Northwest and head west, using Twenty-Fifth Street to Bowen Boulevard where it joins existing facilities to reach New Walkertown Road. The bicycle boulevard option allows less confident riders an option to travel across the northwestern edge of downtown using low-volume, low stress roads (Table 4-4).

Total Length: 7.7miles (0 percent complete)

Total Cost: $834,700

Key Destinations:

1. Winston Lake Park
2. Saint Paul United Methodist Church
3. Delta Arts Center
4. 14th Street Community Center
5. 14th Street Park
6. Mt. Calvary Holy Church
7. Medicap Pharmacy
8. The Salvation Army
9. Union Baptist Church
10. Gateway Commons Park
11. Harambee Park
12. Ephesus Junior Academy
13. Piedmont Triad Research Park Trail
14. Peters Creek Trail (proposed)
15. Hanes Park

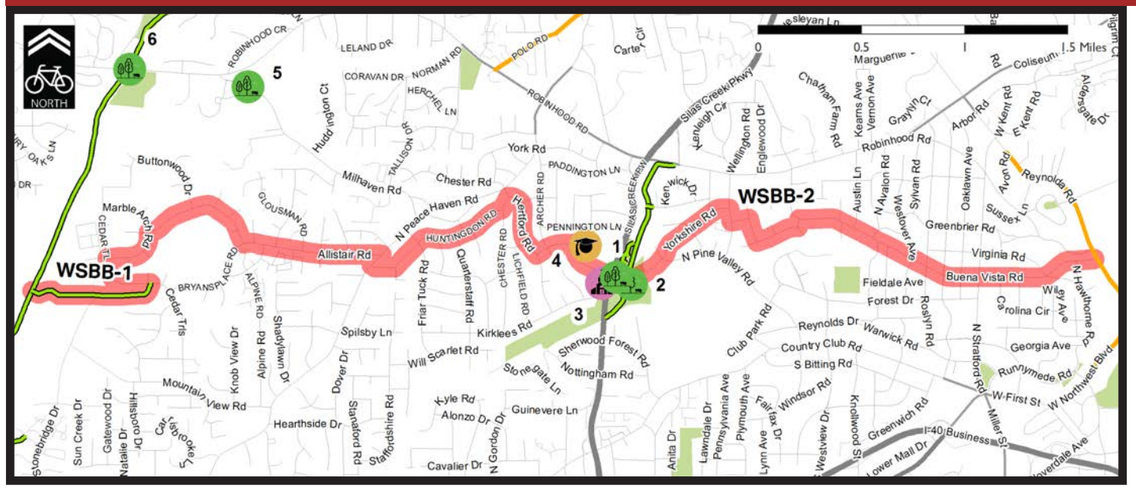
Bus Route Connections:

- Route 87
- Route 88
- Route 90
- Route 92
- Route 96
- Route 98
- Route 106
- Route 109

Table 5-4: Northwest Connector

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
NWC-1	W Northwest Blvd from Reynolda Road to N Trade Street	Class II – Dedicated Bike Lanes	No	1.2 miles	Low/ Moderate	Yes	N/A	Coordinate with NCDOT to improve alignment of off-ramp of John Gold Memorial Expressway at E 25th Street with future bridge replacement or ramp alignment opportunities.
NWC-2	W Northwest Blvd from N trade Street to Old NW Blvd	Class II – Dedicated Bike Lanes	No	0.6 miles	Moderate	Yes	N/A	
NWC-3	E Fourteenth Street from Old NW Blvd to New Walkertown Road	Class II – Dedicated Bike Lanes	No	1.4 miles	High	Yes	N/A	Review turning movement data and speeds on E Fourteenth Street. Opportunity to restripe from sharrows to bicycle lanes as traffic calming measure and to improve bicycling connection. Add bicycle facilities at intersection of E Fourteenth Street NE and US 311/New Walkertown Avenue.
NWC-4	New Walkertown Road from E Fourteenth Street to Waterworks Road	Class IV – Protected Cycle Tracks	No	0.4 miles	Very High	Yes	$382,500	Improve intersection pavement marking, signage and connection to Brushy Fork Greenway at Waterworks Road. Install refuge island.
NWCBB-1	Arbor Road, and West and East Twenty Fifth Streets from Reynolda Road to Bowen Boulevard	Class III – Bicycle Boulevard	No	3.1 miles	Low/ Moderate	Yes	$340,500	Bicycle boulevard improvements. Stripe crosswalk and convert John Gold Memorial Expressway off-ramp yield control to stop control at E 25th Street.
NWCBB-2	Bowen Boulevard from East Twenty Fifth Street to New Walkertown Avenue	Class III – Bicycle Boulevard	Yes	1.0 miles	Moderate	Yes	$111,700	

Westside Bike Boulevard



Legend

- Westside Bike Boulevard
- Existing Bicycle Facilities
- Existing Greenways
- Parks

Key Destinations

- School
- Park/Recreation/Trail
- Church

5.3.4 Westside Bike Boulevard

Route Description:

The Westside Bike Boulevard will connect Reynolda Road west to the Muddy Creek Greenway through several neighborhoods using bicycle boulevard-type improvements and an existing greenway connection. The route begins on Buena Vista Road at the proposed Peters Creek Greenway near Reynolda Road and travels west through the Buena Vista neighborhood. The route crosses Silas Creek Parkway on Yorkshire Road continuing west through the Sherwood Forest neighborhood on neighborhood streets. The Westside Bike Boulevard connects to the Muddy Creek Greenway using the Greenway connection at Cedar Trail (Table 5-5).

Total Length: 6.8miles (11 percent complete)

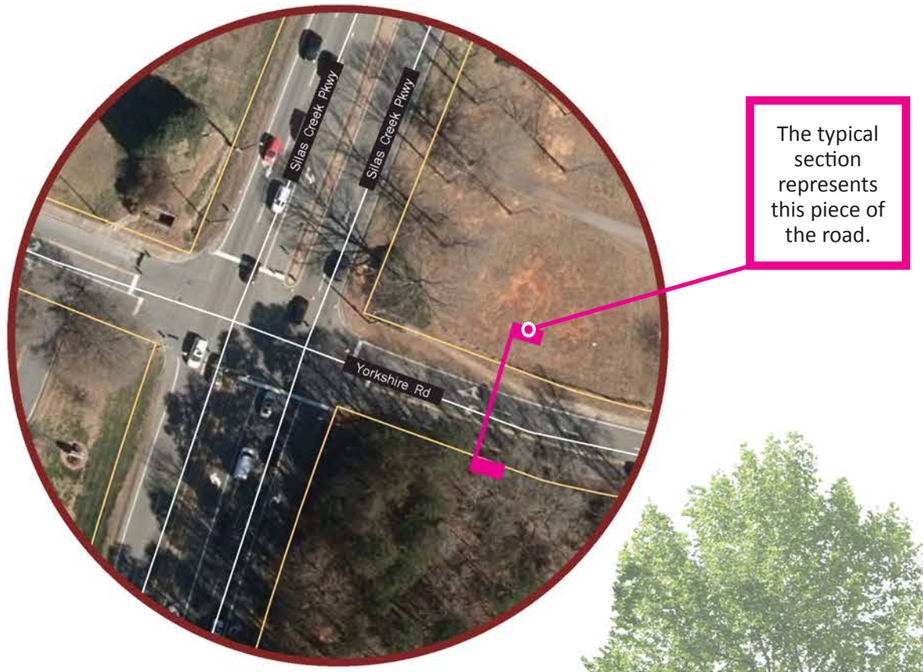
Total Cost: $1,027,900

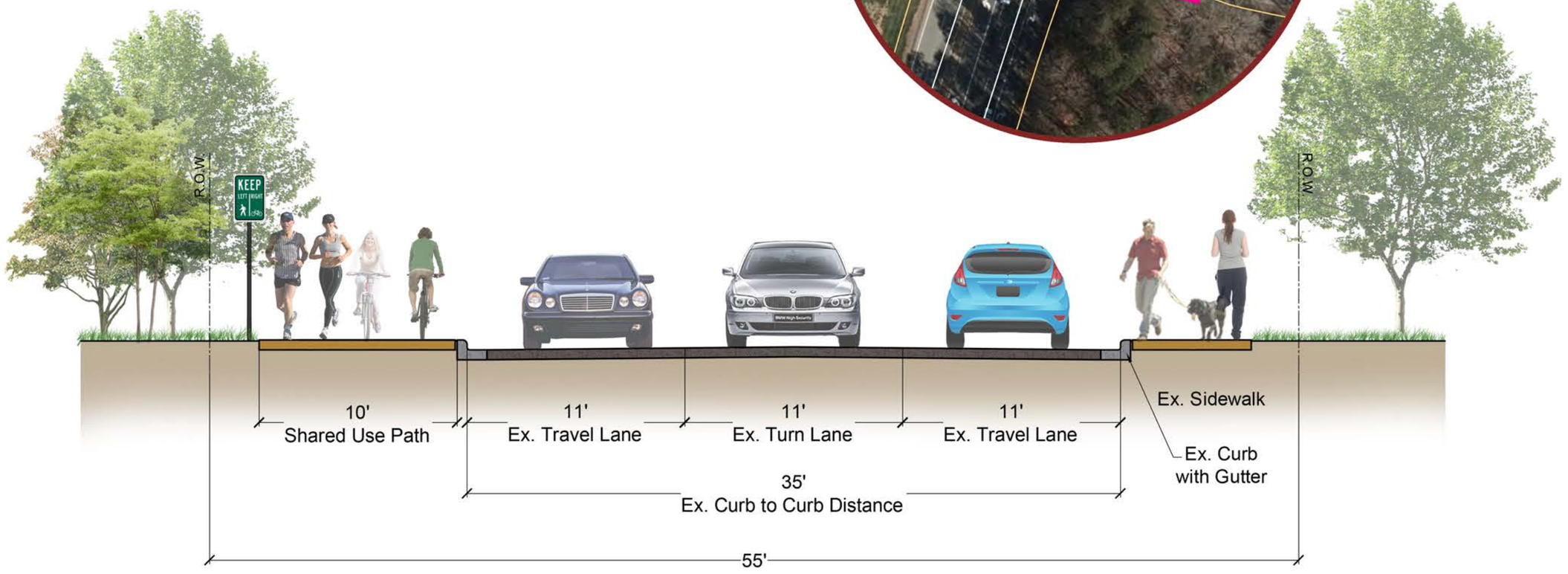
Key Destinations:

1. Silas Creek Trail (proposed)
2. Shaffner Park
3. Parkway Presbyterian Church
4. Sherwood Forest Elementary
5. Cedar Trail Greenway Connector
6. Muddy Creek Greenway

Bus Route Connections: Route 99

WINSTON SALEM BICYCLE MASTER PLAN
Winston Salem, North Carolina



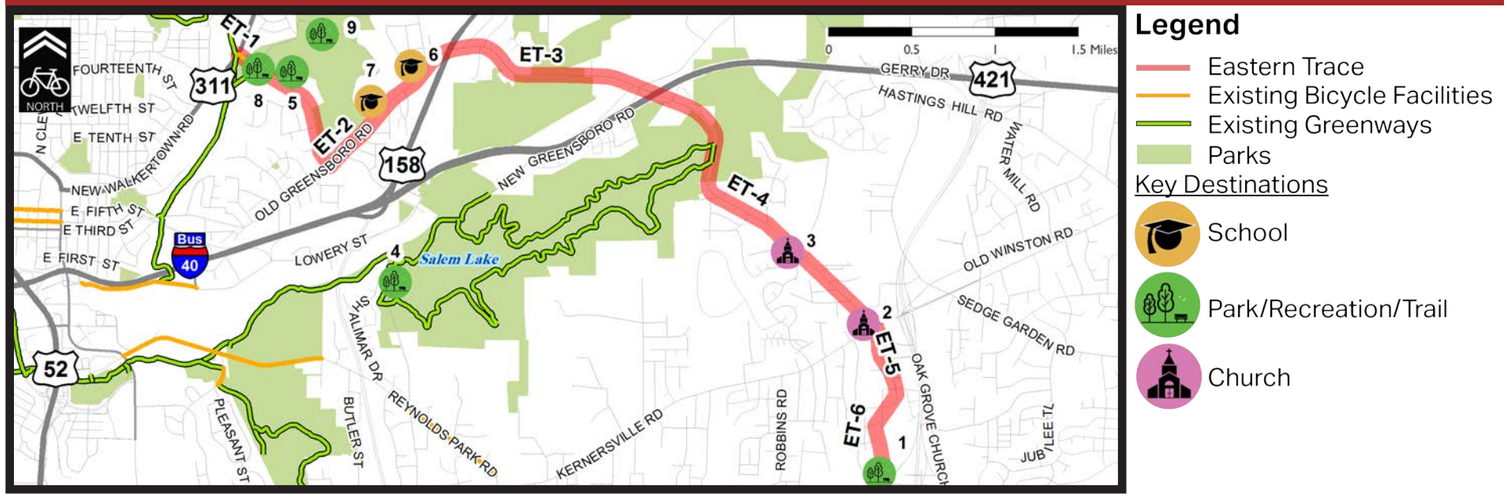


Westside Park Boulevard - Class I (**Shared Use Path**)

Table 5-5: Westside Bike Boulevard

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
WSBB-1	Cedar Creek Greenway from Muddy Creek Trail Greenway to Cedar Trail	Class I – Shared Use Paths	Yes	0.6 miles	Low	No	$436,300	Add signage and marking at Cedar Creek Greenway entrance on Cedar Trail. Formalize Cedar Trail Greenway access and ensure Americans with Disability Acts compliance
WSBB-2	Neighborhood streets in Sherwood Forest Neighborhood and Buena Vista Neighborhood to Reynolda Road (and proposed Muddy Creek Greenway Trail)	Class III – Bicycle Boulevard	No	6.2 miles	Low	No	$674,200	Bicycle boulevard improvements. Improve intersection for turning bicyclists and crossing for pedestrians at N Peace Haven Road and Allstair Road. Improve intersection at Marian Lane. Add sidewalks on N Side of N Peace Haven Road between Allstair Road and Marian Lane. Stripe crosswalks for all intersection legs. Add curb ramps and receiving ramps. Assess safety and accessibility of pedestrian underpass at Yorkshire Rd and Silas Creek Parkway. Improve intersection for bicyclists and pedestrians, including median refuge islands and bicycle actuation. Add Class II facilities at intersections. Additional Class I sidepath on north side of Yorkshire Road between Sherwood Forest Elementary School and Shaffner Park, through intersection.

Eastern Trace



Legend

- Eastern Trace
- Existing Bicycle Facilities
- Existing Greenways
- Parks

Key Destinations

- School
- Park/Recreation/Trail
- Church

5.3.5 Eastern Trace

Route Description:

The Eastern Trace Route will provide connections between neighborhoods and community resources on the eastern side of Winston-Salem, and could, in conjunction with the Northwest Connector, provide nearly 10 miles of connected bicycle facilities. The route begins at Winston Lake Park on New Walkertown Road, and travel east on Waterworks Road to Old Greensboro Road. It will travel north and east along Old Greensboro Road before turning south on to Linville Road and ending in the neighborhood along Motsinger Drive. From there, the project may provide a future connection to the proposed Fiddlers Creek Greenway. The Eastern Trace route connects to the following routes: Southern Fiddle, Parkland South Connector, Interim Route, and Walkertown Quarry Connector. In addition to connecting both current and proposed greenways such as the Virginia K. Newell/ Ann Massey Trail and the Salem Lake Trail, the Eastern Trace Route will connect numerous neighborhoods and other community resources (Table 5-6).

Total Length: 6.3 miles (30 percent complete)

Total Cost: $4,049,900

Key Destinations:

1. Fiddlers Creek Greenway
2. Sedge Garden Baptist Church
3. Linville Forest Church
4. Salem Lake Park
5. YMCA
6. Petree Elementary
7. Atkins Academic and Technology High
8. Bushy Fork Creek Trail
9. Winston Lake Park

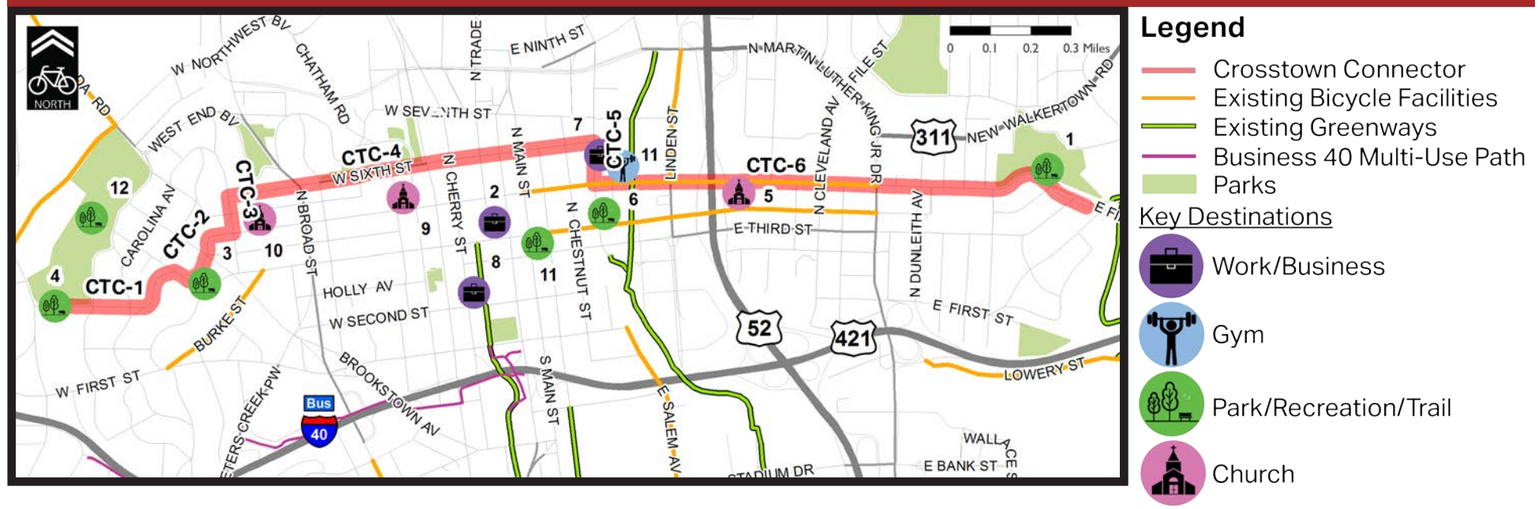
Bus Route Connections:

- Route 94
- Route 96

Table 5-6: Eastern Trace

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
ET-1	Waterworks Road from Walkertown Road to Old Greensboro Road	Class II – Dedicated Bike Lanes	No	0.9 miles	High	Yes	$798,000	Review turning movement data to determine trade-offs between bike lane and having continuous center turn lane on Waterworks Road. Opportunity to restripe from sharrows to bicycle lanes as traffic calming measure and to improve bicycling connection. Add intersection improvements for bicyclists at Waterworks Road and Old Greensboro Road.
ET-2	Old Greensboro Road from Waterworks Road to Reidsville Road	Class II – Dedicated Bike Lanes	Yes	1 mile	Moderate	No	N/A	
ET-3	Old Greensboro Road from Reidsville Road to I-40 Interchange	Class II – Dedicated Bike Lanes	No	1.3 miles	Very High	No	$883,400	Add dedicated bicycle facilities on Old Greensboro Road with roadway improvements.
ET-4	Linville Road from I-40 Interchange to Kernersville Road	Class II – Dedicated Bike Lanes	No	2.1 miles	Very High	No	$1,983,100	Add dedicated bicycle facilities on E Linville Road with roadway improvements; Add Class I sidepath between Salem Lake Greenway and future Fiddlers Creek Greenway.
ET-5	Motsinger Drive from Kernersville Road to Fiddlers Creek Greenway (proposed)	Class III – Shared Street	No	0.5 miles	Low	No	$47,200	Add advance signage and marking at Salem Creek Greenway entrances on Linville Road.
ET-6	Future Greenway Connection from Motsinger Road to Fiddlers Creek Greenway	Greenway	No	0.3 miles	Low	No	$338,200	Connection to Motsinger Drive constructed with Fiddlers Creek Greenway.

CrossTown Connector



Legend

- Crosstown Connector
- Existing Bicycle Facilities
- Existing Greenways
- Business 40 Multi-Use Path
- Parks

Key Destinations

- Work/Business
- Gym
- Park/Recreation/Trail
- Church

5.3.6 CrossTown Connector

Route Description:

The CrossTown Connector begins on Glade Street at N Hawthorne Road before turning on Clover Street briefly to access W Fifth Street before heading north on Summit Street NW to Sixth Street. The route passes through the entirety of downtown on Sixth Street to Vine Street, where it ends at the Innovation Quarter. The CrossTown Connector links to the following routes: Long Branch, Walkertown Quarry Connector, Waughtown, and Reynolda Link, as well as the Downtown Connector. The route provides additional connectivity for bicyclists through downtown as well as provides additional crosstown connectivity to several existing and proposed greenways and bicycle facilities. The CrossTown Connector provides access to jobs, the Innovation Quarter, transit routes and neighborhoods (Table 5-7).

Total Length: 2.7miles (20 percent complete)

Total Cost: $2,514,800

Key Destinations:

1. Skyland Park
2. Transportation Center Bay A-4
3. Grace Court Park
4. Peters Creek Trail (proposed)
5. United Metropolitan Missionary
6. Bailey Park
7. Innovation Quarter
8. Winston-Salem Post Office
9. First Baptist Church
10. Augsburg Lutheran Church
11. YMCA
12. Hanes Park

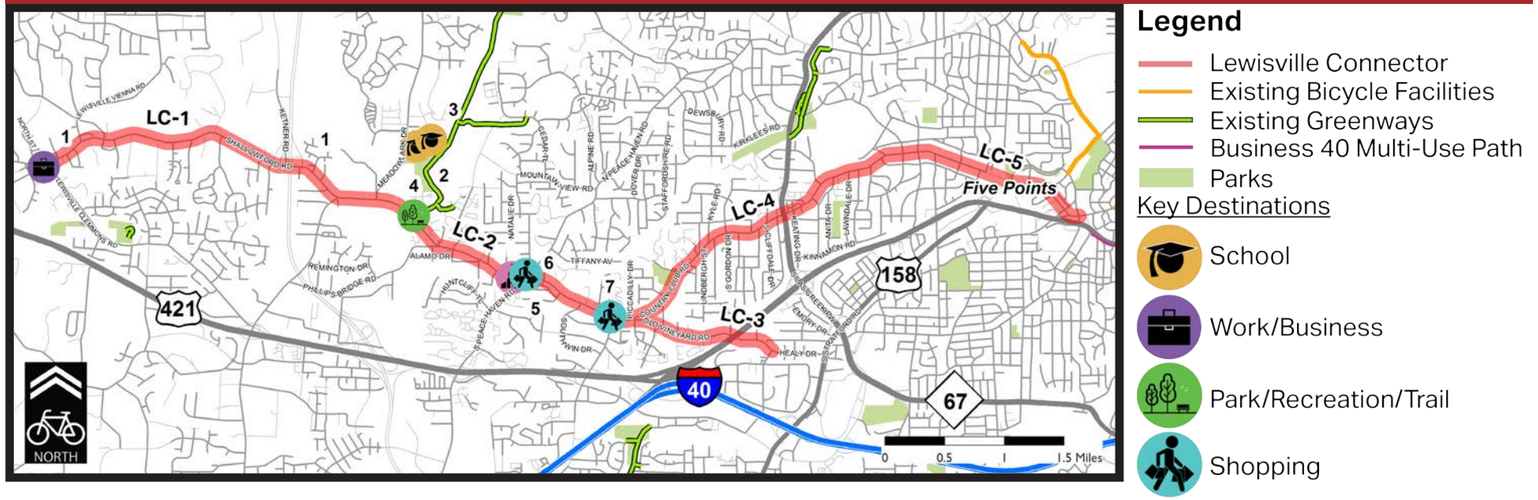
Bus Route Connections:

- Route 80
- Route 84
- Route 86
- Route 87
- Route 91
- Route 94

Table 5-7: CrossTown Connector

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
CTC-1	Glade Street/ Clover Street from N Hawthorne Road to W. Fifth St	Class II – Dedicated Bike Lanes	No	0.4 miles	Moderate	Yes	$405,300	Topography; Install uphill climbing lane. Install signage and marking.
CTC-2	W Fifth Street from Clover Street to Summit Street NW	Class II – Dedicated Bike Lanes	No	0.9 miles	Moderate	Yes	$1,045,800	Topography; Install contraflow uphill climbing lane. Install signage and marking.
CTC-3	Summit Street NW from Fifth Street to Sixth Street	Class II – Dedicated Bike Lanes	No	0.1 miles	N/A	Yes	$143,100	
CTC-4	W Sixth Street from Summit Street NW to Patterson Street	Class II – Dedicated Bike Lanes	No	1.0 miles	High/ Moderate	Yes	$1,131,400	Coordinate with Downtown Connectors.
CTC-5	Patterson Street from Sixth Street to Fifth Street	Class II – Dedicated Bike Lanes	No	0.1 miles	High	Yes	$144,320	
CTC-6	Fifth Street from Patterson Avenue to Brushy Fork Creek Trail Greenway	Class II – Dedicated Bike Lanes	No	1.25 miles	High/ Moderate	Yes	$1,453,600	

Lewisville Connector



Legend

- Lewisville Connector
- Existing Bicycle Facilities
- Existing Greenways
- Business 40 Multi-Use Path
- Parks

Key Destinations

- School
- Work/Business
- Park/Recreation/Trail
- Shopping

5.3.7 Lewisville Connector

Route Description:

The Lewisville Connector uses Shallowford Road, Country Club Road and Old Vineyard Road to connect Lewisville and Winston-Salem, including the Muddy Creek Greenway and shopping areas along Country Club Road. The Lewisville Connector uses roads the make up one of the most popular recreation routes to cross western Forsyth County and into Yadkin County. Meadowlark Middle and Elementary schools and Jefferson Elementary School is a short ride north on the Muddy Creek Greenway. A connection can be made to the Forsyth Medical Center via the Forsyth Medical route. Shopping areas along Hanes Mall Boulevard can also be accessed from the Lewisville Connector via the Forsyth Medical route. The Lewisville Connector will provide additional access to the Muddy Creek Trail Greenway and several other proposed greenway projects, as well as several transit routes (Table 5-8).

Total Length: 4.5 miles (0 percent complete)

Total Cost: $10,502,900

Key Destinations:

1. Lewisville
2. Meadowlark Middle School
3. Meadowlark Elementary School
4. Muddy Creek Greenway
5. Calvary Baptist Church and Day School
6. Peace Haven Road / Country Club Road commercial area
7. Jonestown Road / Country Club Road commercial area

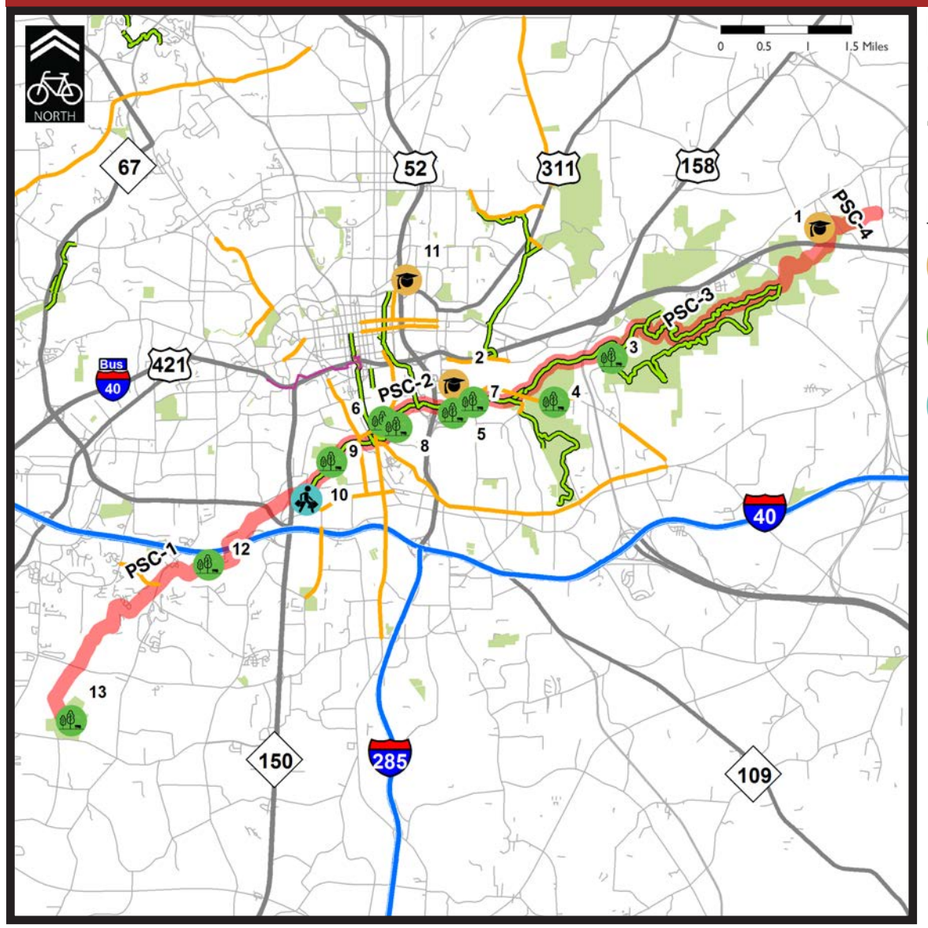
Bus Route Connections:

- Route 81
- Route 95
- Route 102

Table 5-8: Lewisville Connector

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
LC-1	Shallowford Road from Lewisville-Clemmons Road to Ketner Road	Class II – Dedicated Bike Lanes	No	0.7 miles	High	No	$1,956,300	Add dedicated bicycle facilities on Shallowford Road with roadway improvements.
LC-2	Country Club Road from Ketner Road to Old Vineyard Road	Class II – Dedicated Bike Lanes	No	2.7 miles	High	No	$3,029,000	Add dedicated bicycle facilities and improve pedestrian conditions on Shallowford Road and Old Country Club Road with roadway improvements. High crash corridor.
LC-3	Old Vineyard Road from Country Club Road to Healy Drive	Class II – Dedicated Bike Lanes	No	1.1 miles	Low	Yes	$1,129,100	Opportunity to restripe with bicycle lanes and narrow lanes as traffic calming measure and to improve bicycling connection. Add bicycle and pedestrian accommodations with future I-40 bridge replacement.
LC-4	Country Club Road from Old Vineyard Road to First Street	Class II – Dedicated Bike Lanes	No	2.8 miles	High	Yes	$2,714,845	Improve bicycling conditions and safety at highway ramps, stripe shoulder across bridge to fill sidewalk gap in interim. Topography; Install uphill climbing lane. Install signage and marking.
LC-5	First Street from Country Club Road to Hawthorne Road	Class II – Dedicated Bike Lanes	No	1.6 miles	High/ Moderate	Yes	$1,673,634	Review traffic volumes and turning movements and assess opportunities for intersection redesign at Hawthorn and First Street to include improvements for bicycling and walking. Study alternative intersection designs for five points (Country Club Road, S Stratford Road, W 1st Street and Miller Street) with options to include bicycle and pedestrian accommodations on all approaches for making connections to Northside Trace, Lewisville Connector, and Forsyth Tech Connector. Add bicycle and pedestrian accommodations with future Norfolk Southern bridge replacement; consider opportunity for future connection to potential rail trail at this location with design.

Parkland South Connector



Legend

- Parkland South Connector
- Existing Bicycle Facilities
- Existing Greenways
- Business 40 Multi-Use Path
- Parks

Key Destinations

- School
- Park/Recreation/Trail
- Shopping

Key Destinations:

1. East Forsyth High School
2. Winston-Salem State University
3. Salem Lake Park
4. Reynolds Park
5. Civitan Park
6. Central Park
7. Salem Creek Greenway
8. Happy Hill Park
9. Washington Park
10. Marketplace Mall
11. Winston-Salem Career Center
12. Salem Creek Trail (proposed)
13. Hobby Park

5.3.8 Parkland South Connector

Route Description:

The Parkland South Connector will be the longest priority route, reaching 14.2 miles, and connects six bus routes as it travels southwest to northeast through the city. This route will start at Hobby Park and end one mile northeast of Salem Lake. The Parkland South Connector utilizes the existing Salem Creek Greenway and adds an additional 6.7 miles of access to the current segment. This route consists of only greenways and has no on-road segments other than road crossings. As part of this route, an elevated bridge over the existing low water bridge just to the north of the Reynolds Park Golf Course should be constructed. The Parkland South Connector route connects various neighborhoods throughout the corridor and extends access to the current Salem Creek Greenway and Salem Lake. Links can also be made to the following routes: Long Branch, Interim, Eastern Trace, Walkertown Quarry Connector, and the Waughtown Route (Table 5-9).

Total Length: 14.2 miles (53 percent complete)

Total Cost: $3,533,300

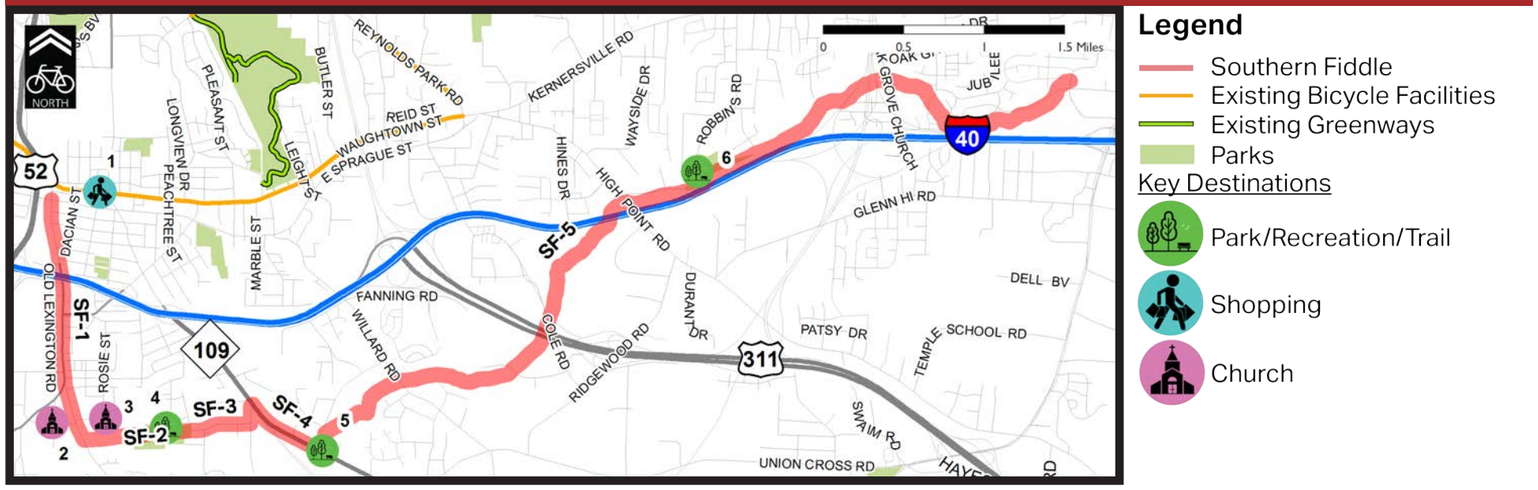
Bus Route Connections:

- Route 80
- Route 83
- Route 85
- Route 86
- Route 100
- Route 104

Table 5-9: Parkland South Connector

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
PSC-1	Proposed Salem Creek Trail from Hobby Park to Existing Salem Creek Trail off Peters Creek Parkway	Class I – Shared Use Paths	No	3.4 miles	Low	Yes	$2,530,000	Greenway with desired connections to Clemmonsville Rd, Hobby Park, Luzelle Dr, Ebert/Ardmore Rd, Forsyth Tech/Miller St, and existing Salem Creek Greenway at Washington Park
PSC-2	Salem Creek Greenway from Peters Creek Parkway to Salem Lake Greenway	Class I – Shared Use Paths	Yes	1.5 miles	Low	Yes	N/A	
PSC-3	Salem Lake Greenway from Salem Creek Greenway to Proposed Piedmont Regional Trail at Linville Road	Class I – Shared Use Paths	Yes	7.5 miles	Low	Yes	N/A	
PSC-4	Proposed Piedmont Regional Trail from Linville Road to Doe Run Drive	Class I – Shared Use Paths	No	1.8 miles	Low	No	$1,036,300	Greenway with desired connections to existing Salem Creek Greenway at Linville Rd, East Forsyth High School, Hastings Hill Rd, and Doe Run Ln.

Southern Fiddle



Legend

- Southern Fiddle
- Existing Bicycle Facilities
- Existing Greenways
- Parks

Key Destinations

- Park/Recreation/Trail
- Shopping
- Church

5.3.9 Southern Fiddle

Route Description:

The Southern Fiddle Route provides connections between neighborhoods and community resources on the eastern side of Winston-Salem that do not have current access to bus routes. The route begins on Old Lexington Road at Sprague Street, and, using a new greenway connection through the Konnoak Elementary School, travels east to Main Street. The route then turns south and travels along Clemmonsville Road to cross I-285. The Southern Fiddle Route then uses a new greenway connection that will connect to the proposed Fiddlers Greenway via Thomasville Road. Southern Fiddle connects to Eastern Trace and the Walkertown Quarry Connector. In addition to connecting multiple parks, such as Easton, Sedge Garden, Parkland, and West Clemmonsville Road, this route will also connect many churches and a few neighborhoods, specifically on the eastern side of Winston-Salem (Table 5-10).

Total Length: 10.1 miles (0 percent complete)

Total Cost: $6,594,100

Key Destinations:

1. Waughtown Street Commercial Area
2. Antioch Baptist Church
3. Saint Peter's Church
4. Easton Park
5. Fiddlers Creek Greenway (proposed)
6. Sedge Garden Park/ Community Center

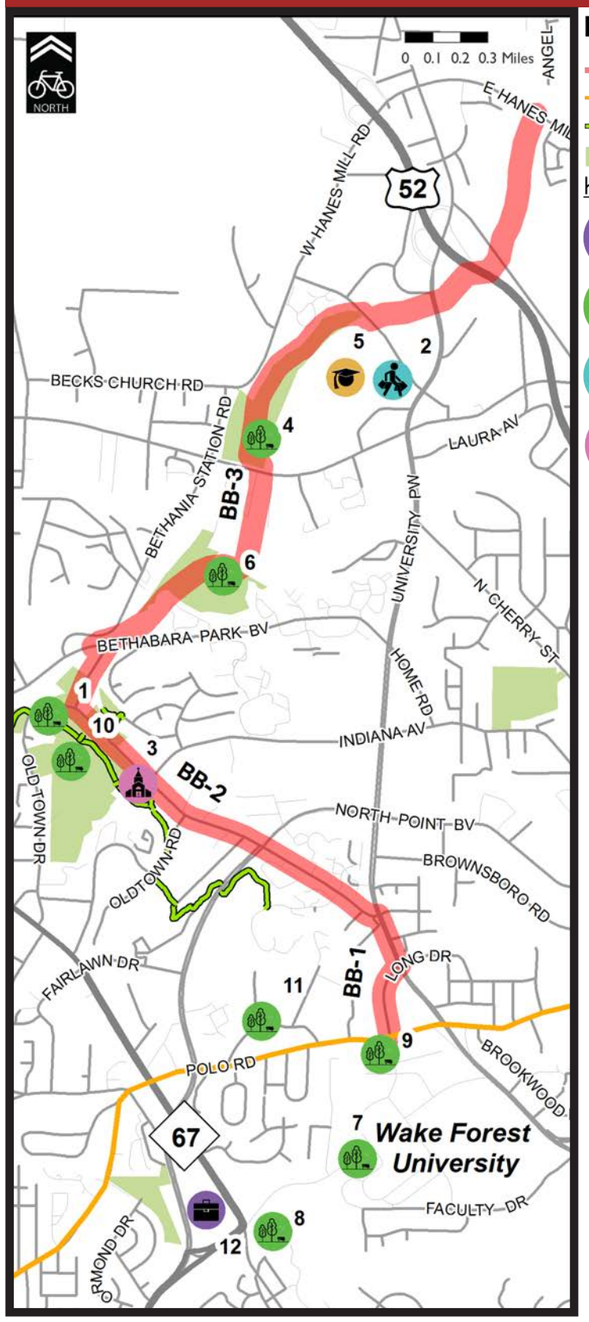
Bus Route Connections:

- Route 101
- Route 104
- Route 108

Table 5-10: Southern Fiddle

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
SF-1	Old Lexington Road from Sprague Street to RK Hash Boulevard	Class IV – Protected Cycle Tracks	No	1.4 miles	High/Very High	Yes	$1,310,100	
SF-2	Greenway connection from RK Hash Boulevard to Brookview Road	Class I – Shared Use Paths	No	0.5 miles	Low	Yes	$477,100	
SF-3	Brookview Road, Cash Drive and Baden Road from greenway connection to Thomasville Road	Class III – Bicycle Boulevard	No	0.4 miles	Low	Yes	$53,300	Bicycle boulevard Improvements.
SF-4	Thomasville Road from Baden Road to proposed Fiddlers Trail Greenway	Class II – Dedicated Bike Lanes	No	0.5 miles	Moderate	Yes	$476,400	Add advance signage and marking at Fiddler Creek Greenway and safety improvements for crossing Thomasville Road to access greenway.
SF-5	Proposed Fiddlers Trail Greenway from Thomasville Road to Pecan Lane	Class I – Shared Use Paths	No	5.4 miles	Low	Yes	$4,277,200	Greenway with connections to Thomasville Road, Willard Road, Cole Road, High Point Road, Sedge Garden Park/Neighborhood Center, Smith Farm Elementary School and Pecan Lane.

Bethabara Brightway



Legend

- Bethabara Brightway
- Existing Bicycle Facilities
- Existing Greenways
- Parks

Key Destinations

- Work/Business
- Park/Recreation/Trail
- Shopping
- Church

Key Destinations:

1. Mill Creek Trail
2. Aldi grocery store
3. Bethabara Moravian Church
4. Sara Lee Soccer Complex
5. North Forsyth High School
6. Hine Park
7. Davis Field
8. Waterfall Field
9. Spry Soccer Stadium
10. Historic Bethabara Park
11. Wake Forest Connector Greenway (proposed)
12. Reynolda Business Center

5.3.10 Bethabara Brightway

Route Description:

The Bethabara Brightway uses an existing trail and proposed improvements on Betharbara Road, as well as proposed greenways, to provide a connection between Wake Forest University and residential and commercial areas on Hanes Mill Road. The route begins at Polo Road and heads north, using existing trails on Long Drive and University Parkway. The route turns northwest on Betharbara Road, using proposed Class IV improvements and connects to the proposed Mill Creek Trail Greenway. Users may use the greenway to go north to East Hanes Mill Road near Brassfield Drive. This route links to both the Northside Terrace and Brightway Interim Routes. In addition to providing access to retail and employment centers, the Bethabara Brightway will connect several transit lines and provide additional mobility and access for low-income minority neighborhoods in northern Winston-Salem (Table 5-11).

Total Length: 6.5 miles (8 percent complete)

Total Cost: $1,593,050

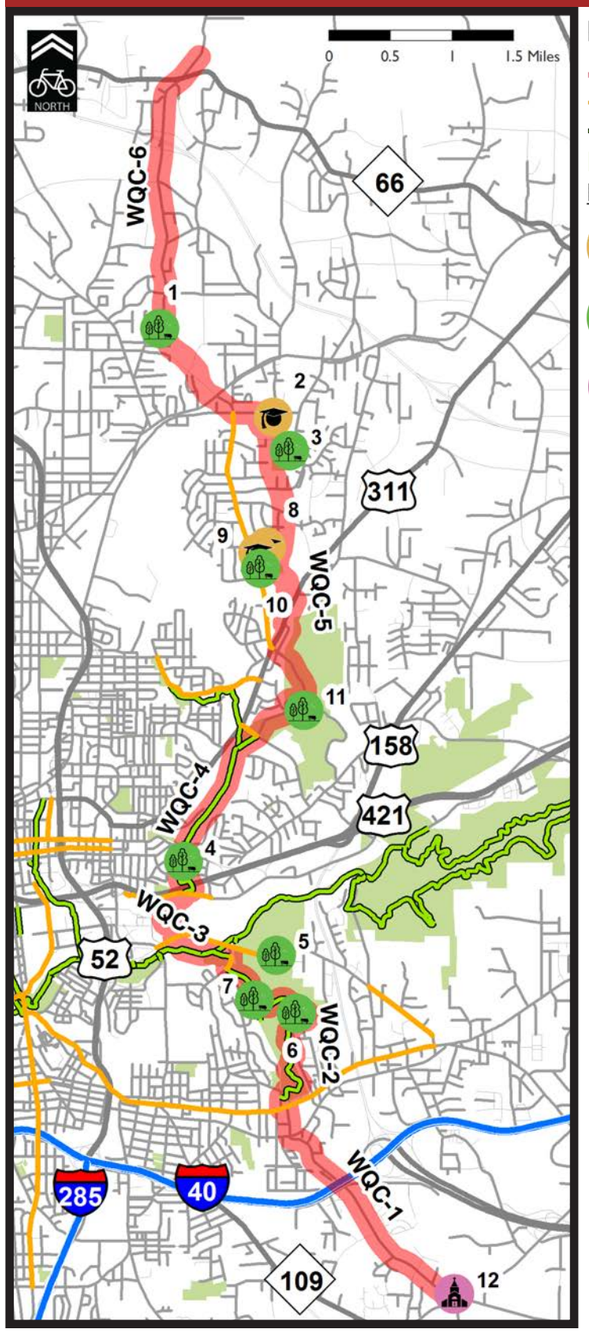
Bus Route Connections:

- Route 87
- Route 97
- Route 109

Table 5-11: Bethabara Brightway

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
BB-1	Long Drive and University Parkway from Polo Road to Bethabara Road	Class IV – Protected Cycle Tracks	Yes	0.5 miles	Low	Yes	N/A	Class I sidepath between existing sidepath at Tucker Forest Roadand Unversity Parkway.
BB-2	Bethabara Road and Bethania Station Road from University Parkway to Bethabara Parkway	Class IV – Protected Cycle Tracks	No	1.6 mile	Low	Yes	$1,197,000	Dedicated bicycling facilities on Bethabara Road and Bethania Station Road at Bethabara Park Boulevard.
BB-3	Mill Creek Trail Greenway	Class I – Shared Use Paths	No	3.9 miles	Low	Yes	$1,989,100	

Walkertown Quarry Connector



Legend

- Walkertown-Quarry Connector
- Existing Bicycle Facilities
- Existing Greenways
- Parks

Key Destinations

- School
- Park/Recreation/Trail
- Church

Key Destinations:

1. Five Mile Branch Trail (proposed)
2. Quality Education Academy
3. Crawford Park
4. Brushy Fork Creek Greenway
5. Reynolds Park
6. Quarry Park Project
7. Waughtown Connector Greenway
8. Jacket Academy at Carver High School
9. Carver High School
10. Hellen Nichols Park
11. Winston Lake Park
12. Christ Wesleyan Church

5.3.11 Walkertown Quarry Connector

Route Description:

The Walkertown Quarry Connector is the second longest priority route at 13.7 miles and will travel north through several existing bike facilities and parks, such as Quarry Park Project, Winston Lake, and Crawford. This route will travel north from Union Cross Road to Waughtown Street and finally along Baux Mountain Road towards Mountain Brook Trail. The following routes connect to the Walkertown Quarry Connector: Southern Fiddle, Parkland South Connector, and Eastern Trace. Most segments will travel through areas that are classified as a social equity connection area (Table 5-12).

Total Length: 13.7 miles (30 percent complete)

Total Cost: $5,196,800

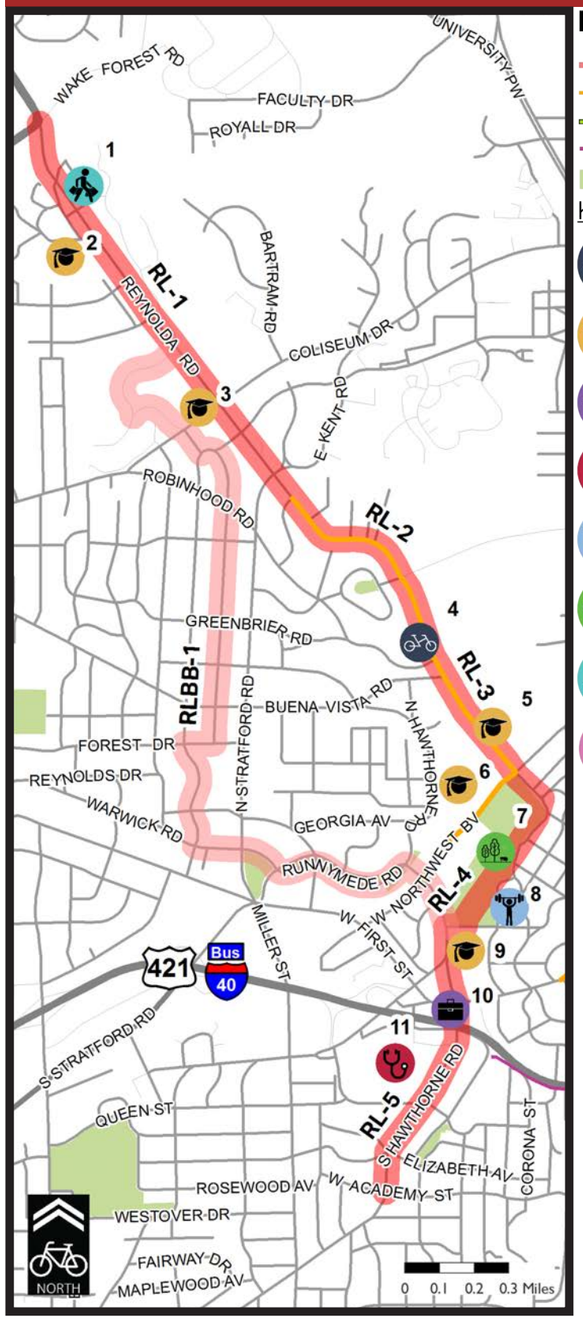
Bus Route Connections:

- Route 94
- Route 96
- Route 101
- Route 105
- Route 101

Table 5-12: Walkertown Quarry Connector

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
WQC-1	Willard Road/ Brindle Street from Union Cross Road to Waughtown Connector Greenway at Marble Street	Class III	No	2.4 miles	High	Yes	$254,600	Add bicycle boulevard improvements on Willard Road and Brindle Street. Improve intersection of Union Cross Road at Willard Road for bicycling. Add safety improvements for Willard Road crossing of Fiddler's Creek Greenway.
WQC-2	Waughtown Connector Greenwayand Salem Creek Greenway from Marble Street to proposed Brushy Fork Creek Trail Greenway	Class I – Shared Use Paths	Yes	2.4 miles	NA	Yes	N/A	Improve intersection of Brindle Street and Waughtown Street for Bicyclists and add greenway wayfinding connection between Brindle Street and Waughtown Greenway.
WQC-3	Proposed Brushy Fork Creek Trail Greenway from Salem Creek Greenway to Lowery Street	Class I – Shared Use Paths	No	0.6 miles	NA	Yes	$363,200	Connection between Brushy Fork Greenway and Brushy Fork Park.
WQC-4	Virginia K. Newell/Ann Massey Trail from Lowery Street to Waterworks Road	Class I – Shared Use Paths	Yes	1.6 miles	NA	Yes	N/A	
WQC-5	Proposed Brushy Fork Creek Trail and Five Mile Branch Trail from Waterworks Road to Baux Mountain Road	Class I – Shared Use Paths	No	4.3 miles	NA	Yes	$2,576,200	
WQC-6	Baux Mountain Road near Motor Road to Baux Mountain Brook Trail	Class II – Dedicated Bike Lanes	No	2.3 miles	Very High	Yes	$2,002,800	Add dedicated bicycle facilities on Baux Mountain Road with roadway improvements.

Reynolda Link



Legend

- Reynolda Link
- Existing Bicycle Facilities
- Existing Greenways
- Business 40 Multi-Use Path
- Parks

Key Destinations

- Bike Shop
- School
- Work/Business
- Medical/Hospital
- Gym
- Park/Recreation/Trail
- Shopping
- Church

Key Destinations:

1. Reynolda Village
2. Summit School
3. Winston-Salem Children's Center
4. Mock Orange Bikes
5. Kingswood School
6. RJ Reynolds High School
7. Hanes Park
8. William G White Jr. Family YMCA
9. Brunson Elementary School
10. 1st Street Businesses
11. Wake Forest Baptist Medical Center

5.3.12 Reynolda Link

Route Description:

The Reynolda Link starts on South Hawthorne Road at West Academy Street and travels north, turning on Reynolda Road and traveling north to Reynolda Village and to Wake Forest Road.The proposed route provides connections from Wake Forest Baptist Medical Center to the West End Neighborhood and Hanes Park north to Reynolda Village Shops and Restaurants and to Wake Forest University. The Reynolda Link also includes an adjacent bicycle boulevard option to the west for less confident riders that may use neighborhood streets such as Runneymede Road and Arbor Road.

Full implementation of the Reynolda Link could utilize several existing bicycle facilities along Reynolda Road and also provide connections to existing facilities on West Northwest Boulevard, as well as provide connections to transit routes.It will also traverse several neighborhoods that have high rates of low-income populations and households with low or no vehicle ownership, providing additional mobility to residents.

Total Length: 3.9 miles (21 percent complete)

Total Cost: $3,139,360

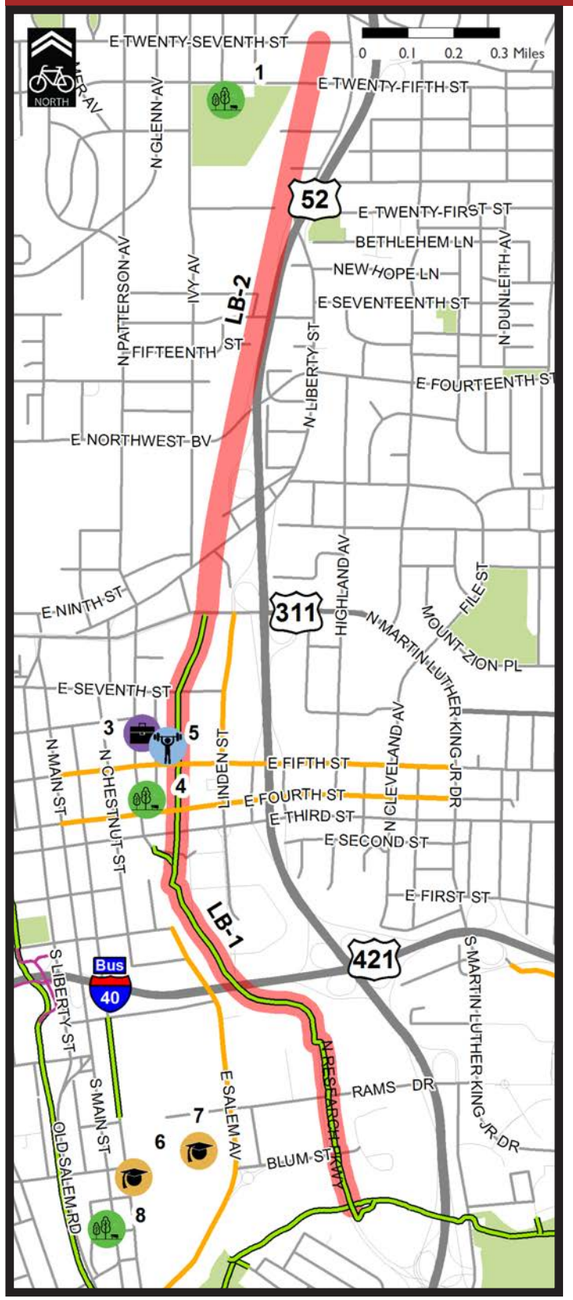
Bus Route Connections:

- Route 80
- Route 88
- Route 95
- Route 109

Table 5-13: Reynolda Link

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
RL-1	Reynolda Road from Wake Forest Road to Stratford Road	Class II – Dedicated Bike Lanes	No	1.1 miles	High	Yes	$1,193,600	Upgrade Reynolda Road to complete street including dedicated bicycle facilities with roadway improvements. Include upgrades for pedestrians and transit.
RL-2	Reynolda Road from Stratford Road to Robinhood Road	Class II – Dedicated Bike Lanes	Yes	0.8 miles	Moderate	Yes	N/A	
RL-3	Reynolda Road from Robinhood Road to the Proposed Peters Creek Greenway Trail	Class II – Dedicated Bike Lanes	No	0.5 miles	High	Yes	$505,800	Review opportunities for lane reallocation with center turn lane and turning movement counts at Reynolda Road and Northwest Boulevard. Seek opportunities to include dedicated bicycle accommodations. Coordinate with Railroad on complete streets retrofit with bridge placement.
RL-4	Proposed Peters Creek Greenway Trail to Hawthorne Road	Class I – Shared Use Paths	No	0.6 miles	N/A	Yes	$278,100	
RL-5	Hawthorne Road NW from Proposed Peters Creek Greenway Trail to W Academy Street	Class IV – Protected Cycle Tracks	No	0.9 miles	Moderate/ High	Yes	$863,760	Review opportunities for lane reallocation with center turn lane and dedicated bicycling facilities along this corridor. Intersection improvements at W 1st Street, Queen Street, and Academy Street.
RLBB-1	Graylyn Court, Oaklawn Avenue, Forest Drive, Georgia Avenue and Runneymede Road	Class III – Bicycle Boulevard	No	2.8 miles	Low	Yes	$298,100	Bicycle boulevard Improvements.

Long Branch



Legend

- Long Branch
- Existing Bicycle Facilities
- Existing Greenways
- Business 40 Multi-Use Path
- Parks

Key Destinations

- School
- Work/Business
- Gym
- Park/Recreation/Trail

Key Destinations:

1. Blum-Blanding Park
2. Downtown Winston-Salem
3. Innovation Quarter
4. Bailey Park
5. Innovation Quarter YMCA
6. Salem College
7. Salem Academy
8. Old Salem

5.3.13 Long Branch

Route Description:

The Long Branch route will complete a greenway connection between Old Salem, Salem College, Salem Academy and downtown, and the Innovation Quarter. Bicyclists can access other parts of downtown via the CrossTown Connector. Connections can be also be made to Winston-Salem State University and Salem Lake via the Salem Creek Greenway and the Parkland South Connector. The Long Branch Route uses the existing Long Branch Trail which parallels Research Parkway and inactive railroad tracks from Salem Creek Greenway north to North Martin Luther King Jr Drive. It also follows the railroad tracks, providing a separate 15-foot mixed use path north from North Martin Luther King Jr Drive to 27th Street. The Long Branch route will provide connections to jobs and workforce training at the Innovation Quarter from neighborhoods to the north, many of which have high rates of poverty and households with low vehicle ownership rates (Table 5-14).

Total Length: 2.7 miles (56 percent complete)

Total Cost: $935,900

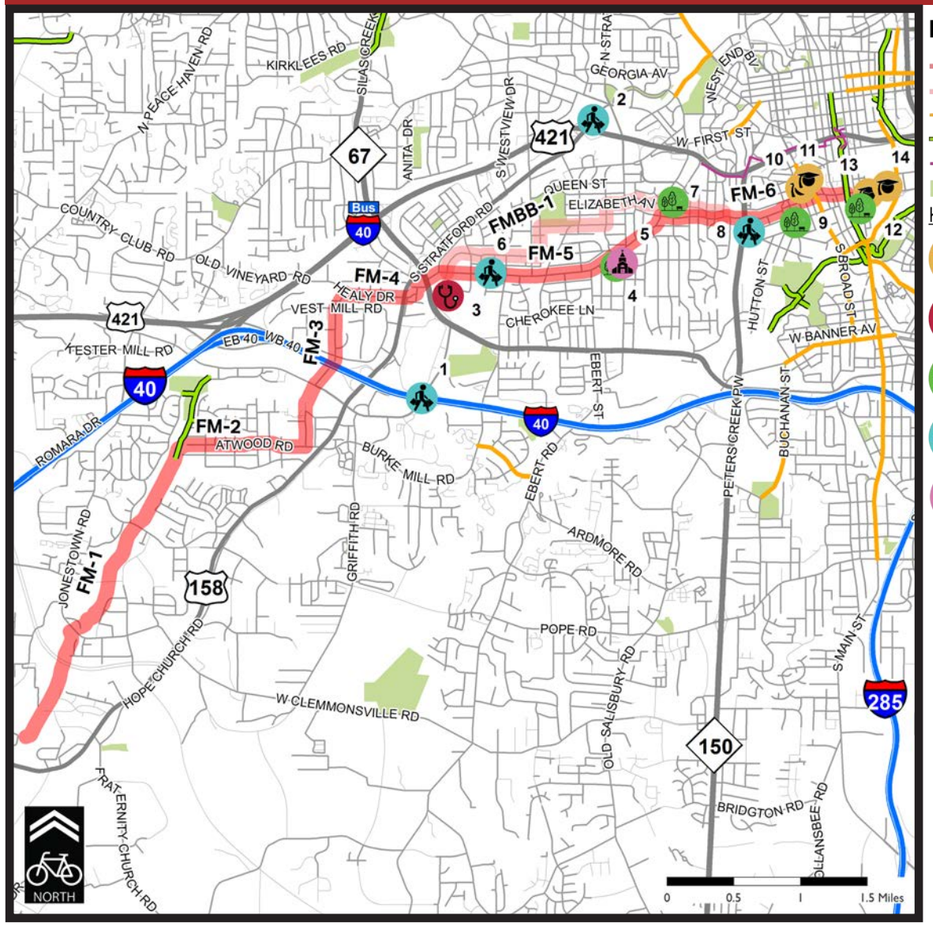
Bus Route Connections:

- Route 87
- Route 100

Table 5-14: Long Branch

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
LB-1	Salem Creek Trail to Martin Luther King Junior Drive	Class I – Shared Use Paths	Yes	1.5	Low	Yes	N/A	
LB-2	Martin Luther King Junior Drive to East 27th Street	Class I – Shared Use Paths	No	1.2	Low	Yes	$935,900	Intersection improvements at N Martin Luther King Jr Boulevard. Greenway with desired connections to E 15th Street, Northwest Boulevard, Blum Blanding Park/25th Street and 27th Street.

Forsyth Medical



Legend

- Forsyth Medical
- Forsyth Medical Bicycle Boulevard
- Existing Bicycle Facilities
- Existing Greenways
- Business 40 Multi-Use Path
- Parks

Key Destinations

- School
- Medical/Hospital
- Park/Recreation/Trail
- Shopping
- Church

5.3.14 Forsyth Medical

Route Description:

The Forsyth Medical Route will connect neighborhoods in southwest Winston-Salem to a major shopping destination, the Forsyth Medical Center and downtown Winston-Salem using proposed greenways and surface streets. The route begins at South Stratford Road and heads north on the proposed Little Creek Trail. At Atwood Road, the route uses neighborhood streets to connect to the Westgate Shopping Center. It continues north on Westgate Center Drive and Ashleybrook Lane, before turning onto Healy Drive. From Healy Drive, the route connects to South Hawthorne Road and travel north and east, using Academy Street and eventually terminating at the Strollway. The Forsyth Medical Route connects to the following high priority projects: the Reynolda Link, the Forsyth Tech Connector, the Reynolda Link, and Waughtown.

The Forsyth Medical Route also includes an adjacent bicycle boulevard option to the north of South Hawthorn Road for less confident riders that may use low volume and low stress neighborhood streets such as Maplewood Avenue, Westover Street and Elizabeth Avenue.

The project will connect neighborhoods to the shopping centers around Hanes Mall Boulevard as well as to Hanes Mall. In addition there are a number of medical offices in the vicinity of Ashleybrook Lane and South Hawthorne Road that the Forsyth Medical Route will connect. Finally, the route connects many employment centers and households with short commute distances, particularly in the eastern end near downtown (Table 5-15).

Total Length: 8.8 miles (0 percent complete)

Total Cost: $6,052,700

Key Destinations:

1. Hanes Mall Boulevard commercial area
2. Stratford Road commercial area
3. Forsyth Medical Center
4. Ardmore Park
5. Redeemer Presbyterian Church and School
6. Hawthorne Road commercial area
7. Lockland Park
8. Peters Creek Parkway commercial area
9. Granville Park
10. Piedmont International University
11. Salem Baptist Christian School
12. Old Salem
13. Salem College
14. Salem Academy

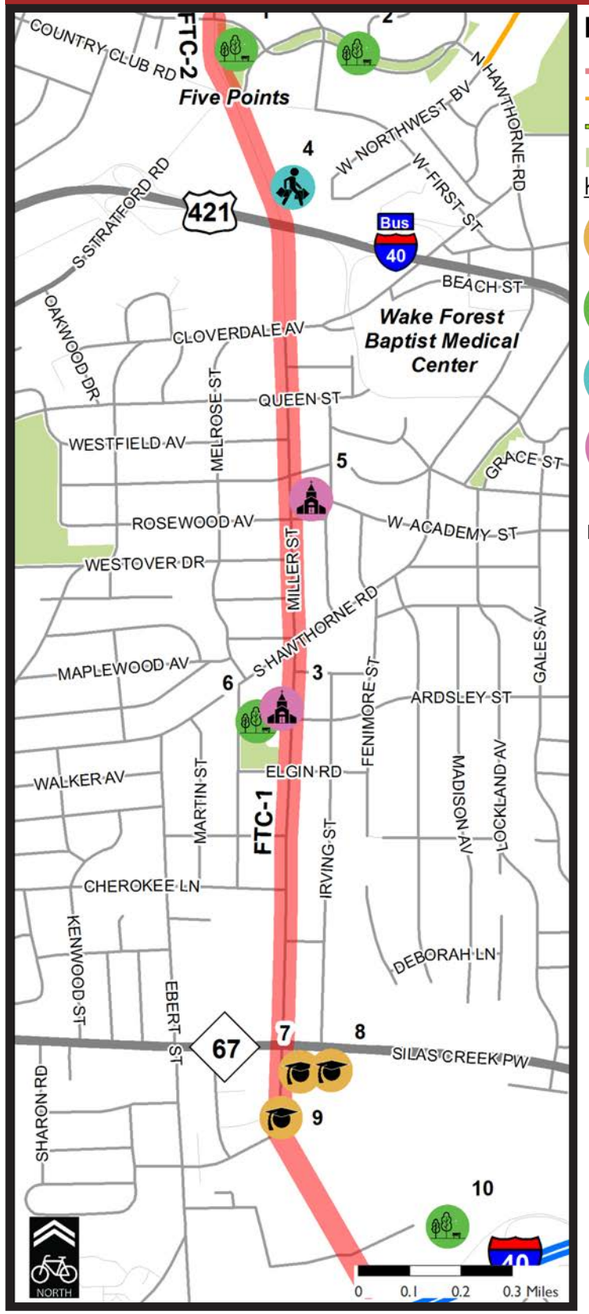
Bus Route Connections:

- Route 80
- Route 81
- Route 102
- Route 103
- Route 107

Table 5-15: Forsyth Medical

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
FM-1	Proposed Little Creek Trail Greenway from South Stratford Road to Atwood Road	Class I – Shared Use Paths	No	2.2 miles	Low	No	$1,733,700	
FM-2	Atwood Acres Neighborhood Roads (Atwood Road and Eddystone Lane	Class III – Bicycle Boulevard	No	1.3 miles	Low	No	$54,400	Bicycle boulevard Improvements on Atwood Road and Eddystone Lane.
FM-3	Westgate Center Drive/ Ashleybrook Lane from Hanes Mall Boulevard to Healy Drive	Class II – Dedicated Bike Lanes	No	1 mile	High	Yes	$790,500	Crossing improvements at Hanes Mall Boulevard and Westgate Center Drive, including median refuge islands, crosswalks and signals, and improvements for transit access. Bicycling connection between Eddystone Lane and Hanes Mall Boulevard through shopping center requires coordination with private property or redevelopment.
FM-4	Healy Drive from Ashleybrook Lane to South Hawthorne Road	Class II – Dedicated Bike Lanes	No	0.9 miles	Moderate	Yes	$578,900	Dedicated bicycling facilities on Healy Drive from Ashleybrook Lane to S Hawthorne Road. Multi-use path connection between Healy Drive and Norvant Health Forsyth Medical Center. Crossing of Silas Creek Parkway to S Hawthorne Road. Requires private property coordination to achieve connectivity goals.
FM-5	South Hawthorne Road from Silas Creek Parkway to Academy Street	Class II – Dedicated Bike Lanes	No	1.9 miles	Moderate /High	No	$2,452,300	Dedicated bicycle facilities on S Hawthorne Road between Silas Creek Parkway and Academy Street.
FM-6	Academy Street from South Hawthorne Rd to the Strollway	Class III – Shared Street	No	1.5 miles	Moderate	Yes	$157,700	Intersection improvements at W Academy Street and Peters Creek Parkway for through-bicyclists including Type II lane markings and bicycle signal actuation.
FMBB-1	Neighborhood Streets (Maplewood Ave, Belview St, Westover Dr, Melrose St, Elizabeth Ave, and Duke St)	Class III – Bicycle Boulevard	No	2.6 miles	Low	No	$285,200	Bicycle boulevard improvements on Maplewood Avenue, Belview Street, Westover Drive, Melrose Street, Elizabeth Avenue, and Duke Street

Forsyth Tech Connector



Legend

- Forsyth Tech Connector
- Existing Bicycle Facilities
- Existing Greenways
- Parks

Key Destinations

- School
- Park/Recreation/Trail
- Shopping
- Church

Key Destinations:

1. Stratford Road Park
2. Runnymede Park
3. Redeemer School
4. Whole Foods Market
5. Ardmore Baptist Church
6. Ardmore Park
7. Early College of Forsyth County
8. Middle College of Forsyth County
9. Career Center
10. Salem Creek Greenway

5.3.15 Forsyth Tech Connector

Route Description:

The Forsyth Tech Connector connects the campus of Forsyth Tech north through the Ardmore neighborhood to the Five Points area of Winston-Salem using Miller Street. The route may also be extended south through the Forsyth Tech campus to connect to the future Salem Creek Greenway. There are several commercial areas along the proposed route, and a short connection to Wake Forest Baptist Medical Center is possible. The route provides a bicycle connection from Forsyth Tech to a job center in the vicinity of Five Points, as well as additional community facilities in an area with a high number of households with low vehicle ownership rates and short commutes. This project also connects existing bicycle facilities on North Stratford Road and South Hawthorne Road, as well as provides several transit connections (Table 5-16).

Total Length: 2.7 miles (0 percent complete)

Total Cost: $2,248,400

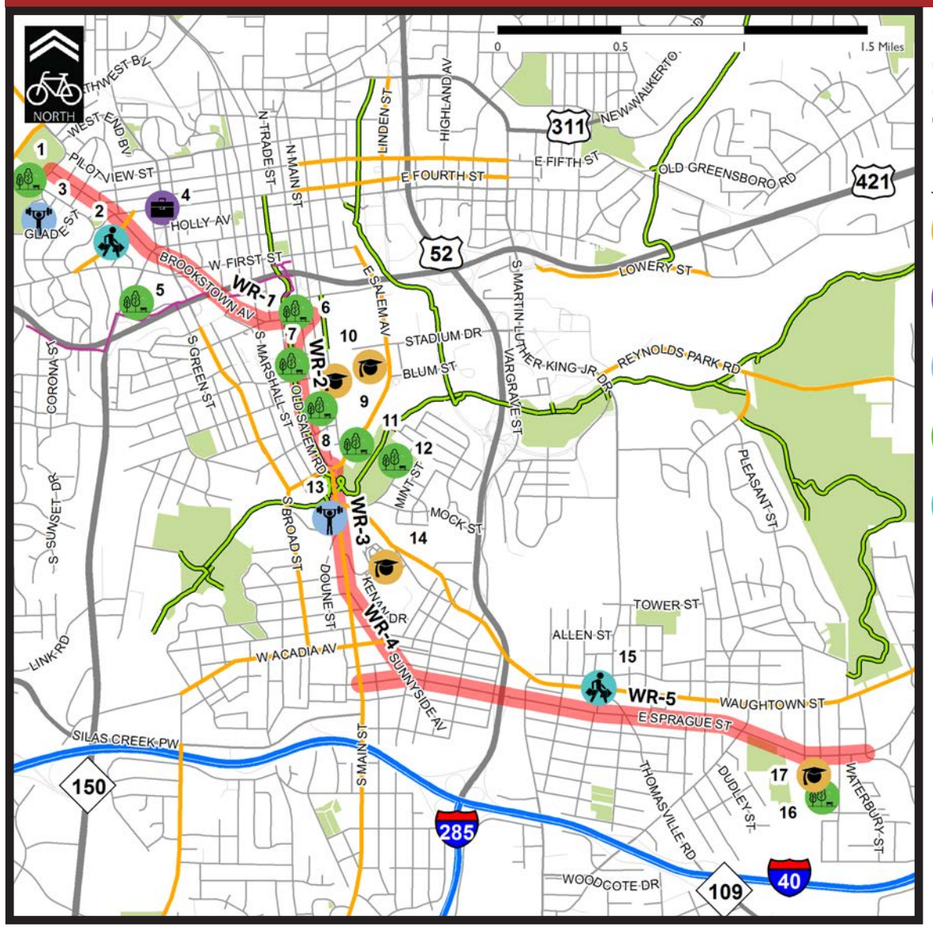
Bus Route Connections:

- Route 84
- Route 85
- Route 95
- Route 100
- Route 107

Table 5-16: Forsyth Tech Connector

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
FTC-1	Miller Street from the Forsyth Tech campus north to the Five Points Intersection	Class IV – Protected Cycle Tracks	No	2.5 miles	Moderate-High	Yes	$2,248,400	Restriping opportunities on Miller Street between future Salem Creek Greenway and Five Points intersection.
FTC-2	Stratford Road from Five Points Intersection north to Runnymede Road	Class II – Dedicated Bike Lanes	Yes	0.2 miles	Moderate	Yes	N/A	Bicycle facilities on Stratford Road between Five Points and Warwick Rd. Coordinate with Five Points Intersection Improvement (LC-5).

Waughtown Route



Legend

- Waughtown Route
- Existing Bicycle Facilities
- Existing Greenways
- Parks

Key Destinations

- School
- Work/Business
- Gym
- Park/Recreation/Trail
- Shopping

5.3.16 Waughtown Route

Route Description:

The Waughtown Route provides crosstown access to a number of destinations using Brookstown Avenue, The Strollway, South Main Street and East Sprague Street.The Waughtown Route connects the West End neighborhood and western downtown to Old Salem, the School of the Arts, and the Waughtown neighborhood. Connections can be made to other parts of downtown via the CrossTown Connector. The CrossTown Connector or the Reynolda Link also connect to the Hawthorne Route and Wake Forest Baptist Medical Center. Winston-Salem State University, Salem Lake, and Washington Park can be accessed via the Parkland South Connector. The Waughtown Route will be next to, and pass through, many low-income and minority neighborhoods, and will provide additional access to jobs and commercial areas. It will also provide connectivity to, and between, several existing and proposed greenways, including the Salem Creek Greenway (Table 5-17).

Total Length: 5.1 miles (10 percent complete)

Total Cost: $4,152,100

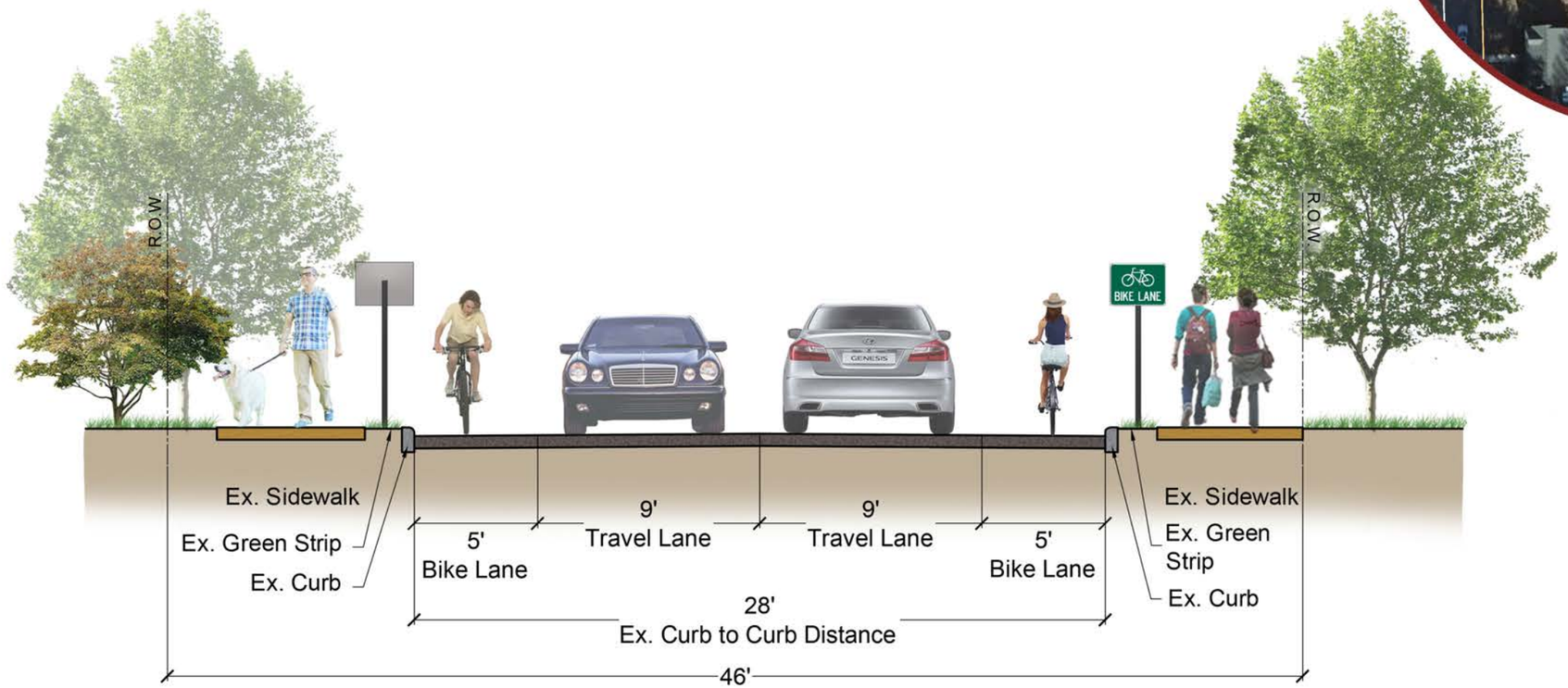
Bus Route Connections:

- Route 83
- Route 86
- Route 104
- Route 107

Key Destinations:

1. Hanes Park
2. West End / Burke Street commercial area
3. William G. White Jr. Family YMCA
4. Downtown Winston-Salem
5. BB&T Ballpark
6. Kaleideum Downtown Children's Museum
7. The Strollway
8. Old Salem
9. Salem College
10. Salem Academy
11. Central Park
12. Happy Hill Park
13. YWCA
14. UNC School of the Arts
15. Waughtown Street commercial area
16. Sprague Street Park
17. Hanes Magnet School
18. Winston-Salem Career Center
19. Salem Creek Trail (proposed)
20. Hobby Park

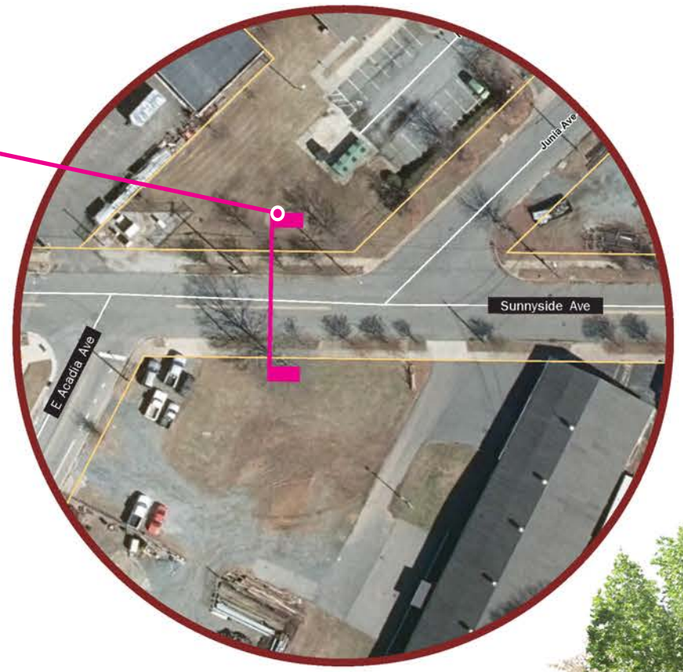
WINSTON SALEM BICYCLE MASTER PLAN
Winston Salem, North Carolina

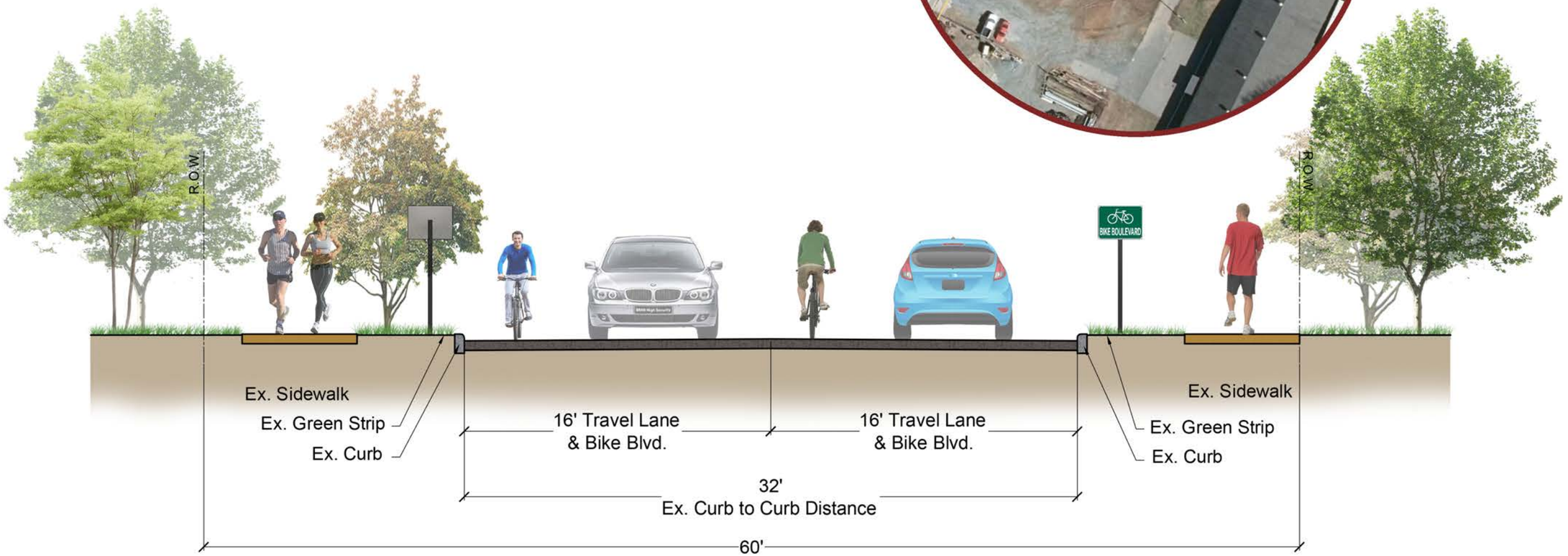


Waughtown Connector - Class II (**Dedicated Bike Lanes**)

WINSTON SALEM BICYCLE MASTER PLAN
Winston Salem, North Carolina

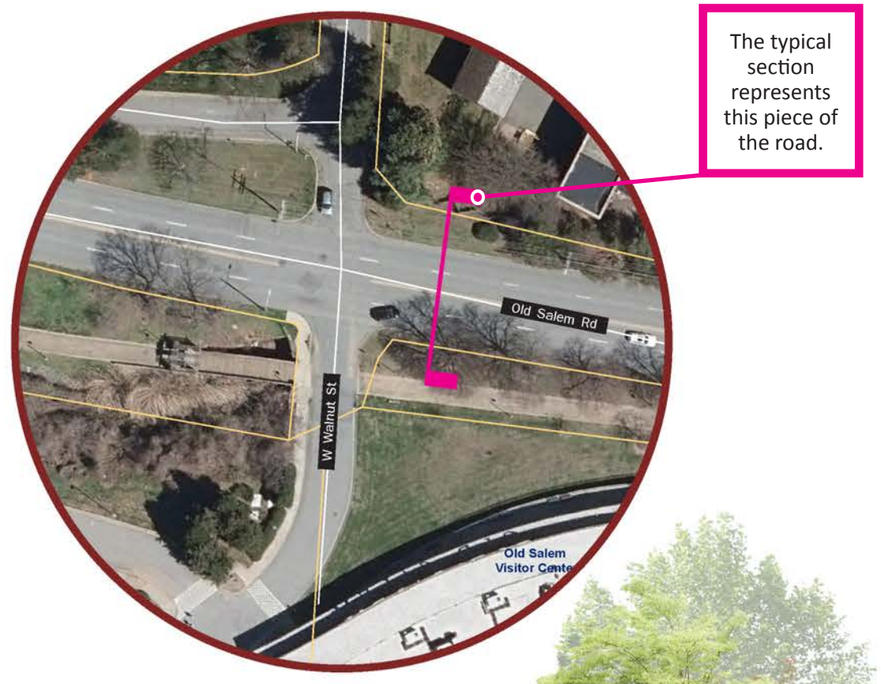
The typical section represents this piece of the road.

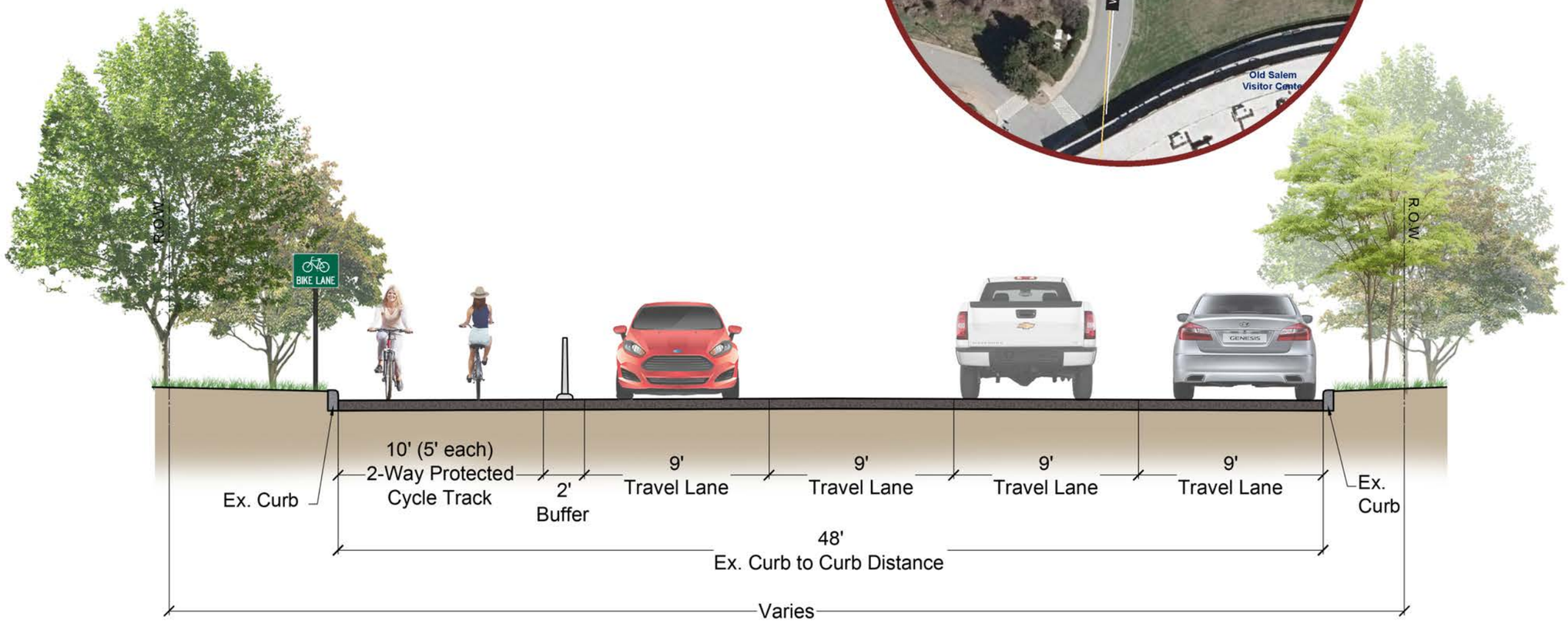




Waughtown Connector - Class III (**Bike Boulevard**)

WINSTON SALEM BICYCLE MASTER PLAN
Winston Salem, North Carolina



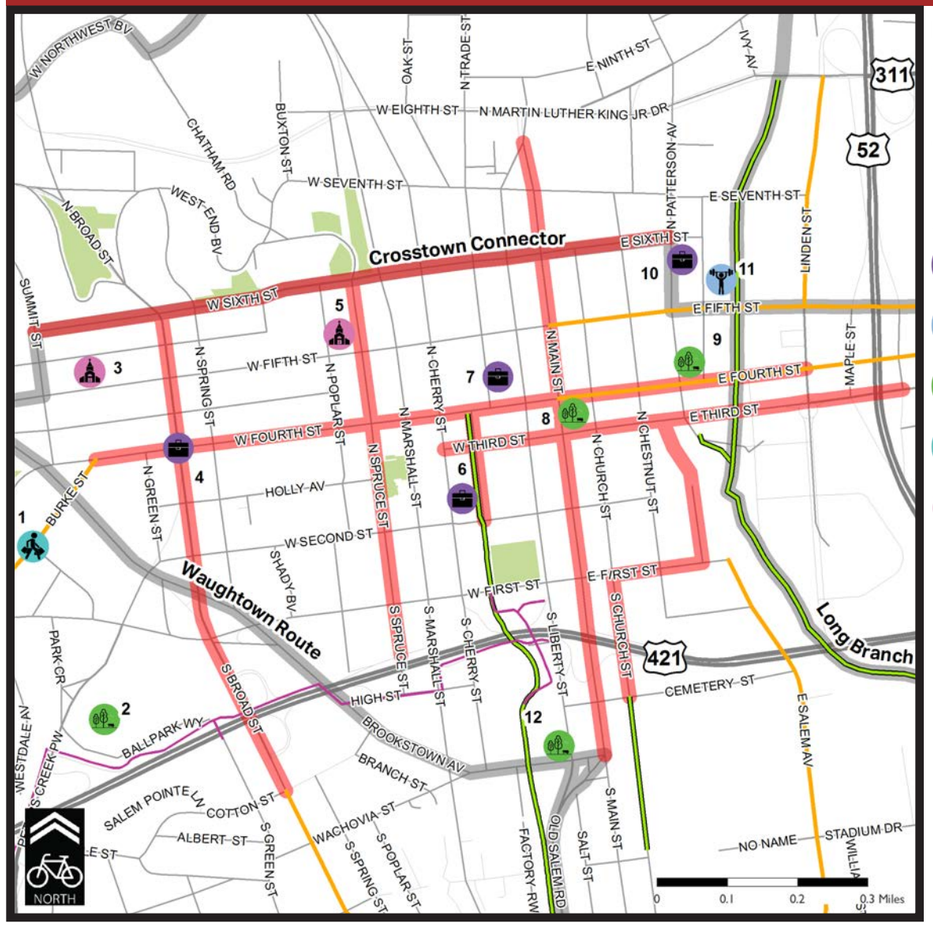


Waughtown Connector - Class IV (**Protected Cycle Tracks**)

Table 5-17: Waughtown Route

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
WR-1	Brookstown Avenue from West End Boulevard to Old Salem Road	Class II – Dedicated Bike Lanes	No	1.2 miles	Low-Moderate	Yes	$1,159,200	Review corridor for short-term restriping opportunities. Dedicated bicycle facilities on Brookstowne Avenue. Implementation in key areas to occur with redevelopment and streetscape projects.
WR-2	Old Salem Road from Brookstown Avenue to S Main Street	Class IV – Protected Cycle Tracks	No	0.8 miles	High	Yes	$585,400	Review opportunities for lane reallocation between Brookstown Avenue and S Main Street on Old Salem Road. Traffic volumes 3,200- 5,600.
WR-3	South Main Street from Old Salem Road to Sunnyside Avenue	Class II – Dedicated Bike Lanes	Yes	0.5 miles	Moderate-High	Yes	N/A	
WR-4	Sunnyside Avenue from South Main Street to Sprague Street	Class III – Bicycle Boulevard	No	0.4 miles	Low	Yes	$65,800	Bicycle boulevard improvements on Sunnyside Avenue. Improve intersection of S Main Street and E Sprague Street at Sunnyside Avenue for turning bicyclists.
WR-5	Sprague Street from South Main Street to Brindle Street	Class IV – Protected Cycle Tracks	No	2.1 miles	Moderate	Yes	$2,341,700	Install separated bikeway on E Sprague Street with special considerations for type and placement due to interchange ramps at John Gold Memorial Expressway. Intersection safety and bicycling improvements for turning bicyclists at Sprague Street, Old Lexington Road (SF-1), and Willard Rd (WQC-1)

Downtown Connector



Legend

- Downtown Connector
- Other Priority Routes
- Existing Bicycle Facilities
- Existing Greenways
- Business 40 Multi-Use Path
- Parks

Key Destinations

- Work/Business
- Gym
- Park/Recreation/Trail
- Shopping
- Church

5.3.17 Downtown Connector

In addition to the priority recommendations identified above, a Downtown Connectivity route was identified to provide a series of connections between existing bicycle facilities and the priority routes. It would also provide additional mobility for bicyclists in the downtown area. Several streets have been identified as east-west connectors, including the following:

- Third Street from North Cherry Street to Research Parkway would provide a downtown connection to the Long Branch Greenway.
- Fourth Street from Burke Street to Research Parkway will provide connections from existing facilities on Burke Street, east to the Strollway and Long Branch Route.
- Sixth Street from Summit Street to Patterson Avenue will provide an east-west connection to an existing bicycle facility on Trade Street.

The north-south connections utilize the following routes:

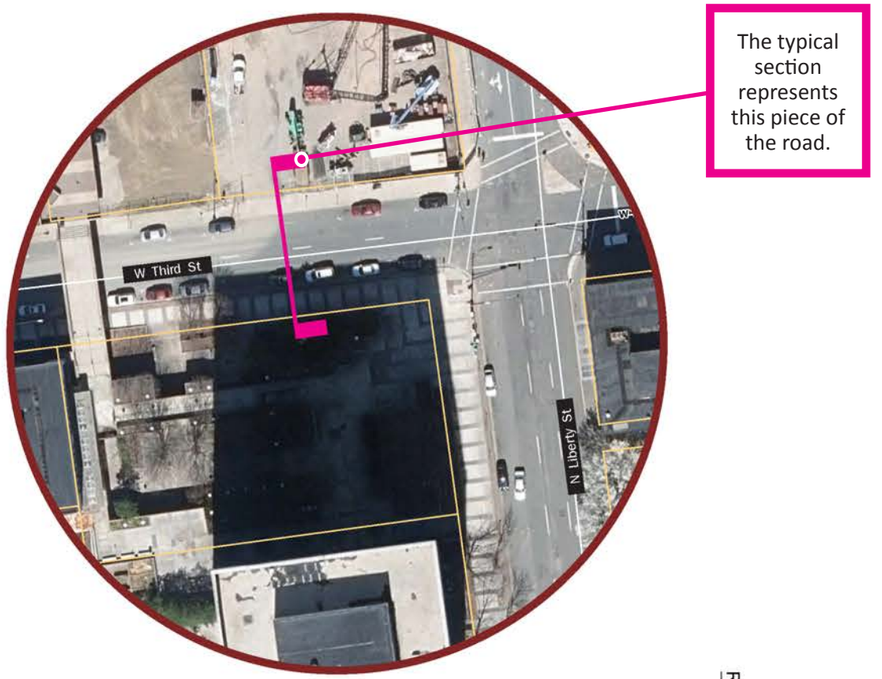
- Broad Street from Cotton Street north to Sixth Street will connect the Waughtown Route to the CrossTown Connector, as well as provide a connection to the Business 40 Multi-Use Path
- Spruce Street from the location of the former bridge over Business 40 north to Sixth Street.
- Town Run Lane, from Second Street to Fourth Street, providing connections from the Strollway to 4th Street businesses.
- Main Street from Brookstown Avenue north to Martin Luther King Jr. Drive.
- Church Street, East First Street and Patterson Avenue from Cemetery Street where the Gods Acre Trail ends, north to East Third Street.

Improvements would be based on design guidelines developed in the Streetscape Master Plan and Design Standards currently being developed. However, Third Street, Sixth Street, Main Street, and Broad Street could likely accommodate Class IV facilities, and Fourth Street, Spruce Street, and Town Run Lane would likely be Class III facilities. In addition, green wave signal coordination on Fourth Street should be included in any facility constructed along the street. Green wave signal timing allows stoplights to be coordinated to allow a bicyclist traveling at 12 miles per hour (mph) to avoid having to stop at every light in a series of lights, which is currently the case. This not only makes biking easier, but reduces the chances that bike riders will endanger themselves by going through red lights. The signal timing can also benefit vehicular drivers as the drivers who are traveling at 25 mph will also encounter green lights.

Key Destinations:

1. West End/Burke St Commercial Area
2. BB&T Ballpark
3. Augsburg Lutheran Church
4. Downtown Winston-Salem
5. First Baptist Church
6. Winston-Salem Post Office
7. Clark Campbell Transportation Center
8. YMCA of Northwest NC
9. Bailey Park
10. Innovation Quarter
11. Innovation Quarter YMCA
12. Kaleideum Downtown Children's Museum

WINSTON SALEM BICYCLE MASTER PLAN
Winston Salem, North Carolina



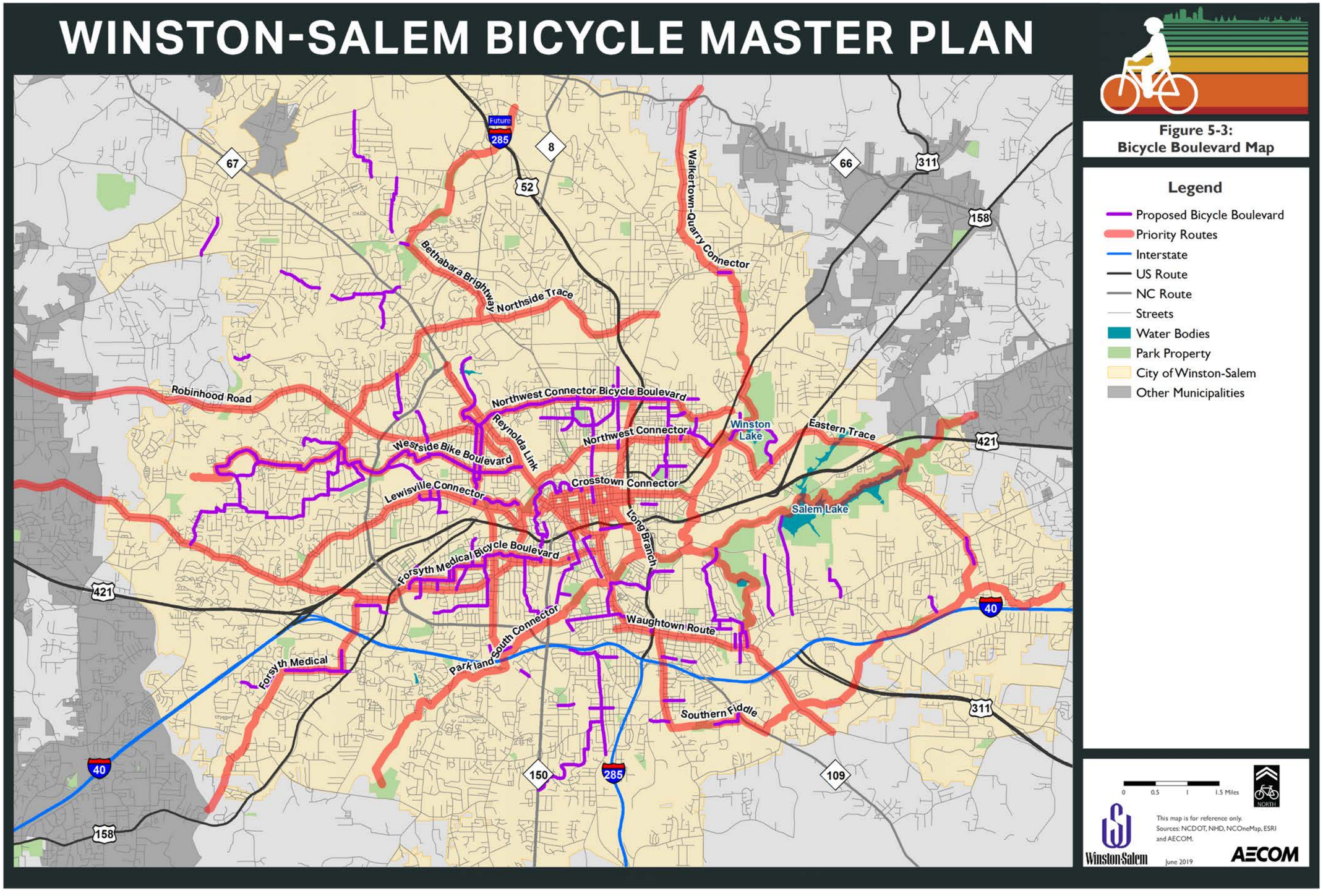
Downtown Connector - Class IV (**Protected Cycle Tracks**)

5.4 BICYCLE BOULEVARD NETWORK

A bicycle boulevard is a neighborhood street or a connected series of neighborhood streets modified to encourage bicycle travel, while discouraging through travel for motor vehicles. Bicycle boulevards are usually located on streets that are already favorable for bicycle travel due to their low traffic volumes, low posted speed limits, and wide lane widths. Improvements often include traffic calming measures such as neighborhood traffic circles, as well as intersection improvements ranging from bicycle-sensitive loop detectors to median refuges. Traffic diverters are often placed at intersections in order to limit through travel for motor vehicles, while still allowing for through travel for bicyclists. In locations where neighborhood street segments do not connect, paths may be used to connect dead-end streets. Although motor vehicle through traffic is discouraged, local access is maintained, and bicyclists continue to share the roadway with motor vehicles. Many local streets already have the characteristics necessary to be used as a bicycle boulevard and at a minimum may only require wayfinding signage and shared-lane markings where appropriate.

A number of potential bicycle boulevards were identified in neighborhoods throughout the City of Winston-Salem. These bicycle boulevards provide connections to key destinations and give bicyclists an opportunity to travel between areas of the city while avoiding heavily trafficked streets. Several planned priority bicycle routes incorporate bicycle boulevards for portions of their length. Bicycle boulevards also provide critical linkages between the priority bicycle routes and are an integral part of the city's planned bicycle network. Proposed bicycle boulevards along with the city's priority route network are shown in Figure 5-3.

Figure 5-3: Bicycle Boulevards



5.5 COST ESTIMATES

Costs for bicycle and pedestrian infrastructure projects were estimated primarily using NCDOT's Bicycle and Pedestrian Facility Construction Cost Estimator Tool. The NCDOT tool was released in fall 2016 to improve the accuracy of bicycle and pedestrian cost estimates. The tool establishes a common estimation methodology and derives average costs from more than 80 bicycle and pedestrian projects across the state. The costs include preliminary engineering, high-level right-of-way costs, engineering and inspection, and construction. Estimates do not include the costs of complementary site amenities such as trash receptacles, restroom facilities, benches, landscaping, water fountains, etc. To account for uncertainty at this stage in the planning process, the costs for each project are reported within a range that includes a 10th percentile and 90th percentile and average costs. The average cost was reported for the priority projects. To account for and take into consideration inflation factors, the tool allows the user to input an expected construction year, which will automatically increase the costs by 3.5 percent per year. The 3.5 percent is based on the average annual consumer price index increase between 1990 and 2012.The costs developed for this Plan were based on the construction year of 2020.

The estimated costs are approximate and are subject to change based on the current price of materials and labor. They are dependent on the actual conditions which will be determined during the planning and engineering phase. The estimates provided are intended to serve as a relative guide for a rough order of cost magnitude.

5.6 OTHER ROUTES

In addition to the priority routes, other streets within the city were evaluated for bicycle facilities based on their ability to provide network connectivity, as well as connections to community features and other destinations in the city. As noted earlier, all streets within the city have the potential to be important bicycle routes and should be evaluated as such as other city and state projects impact streets. The following table identifies streets where improvements are recommended as well as the type of facility recommended (Table 5-18).

Table 5-18: Other Routes

Road Name	Type of Improvement
1st Street (West)	Class II – Dedicated Bike Lanes
20th Street	Class III – Shared Street/ Bicycle Boulevard
23rd Street (Northeast)	Class III – Shared Street/ Bicycle Boulevard
25th Street	Class II – Dedicated Bike Lanes
25th Street	Class III – Shared Street/ Bicycle Boulevard
27th Street	Class IV – Protected Cycle Tracks
30th Street	Class II – Dedicated Bike Lanes
3rd Street (East)	Class IV – Protected Cycle Tracks
4th Street (NW)	Class II – Dedicated Bike Lanes
Arbor Road	Class III – Shared Street/ Bicycle Boulevard
Archer Road	Class III – Shared Street/ Bicycle Boulevard
Ardmore Road	Class II – Dedicated Bike Lanes
Argonne Blvd	Class III – Shared Street/ Bicycle Boulevard
Ashley Glenn Drive	Class III – Shared Street/ Bicycle Boulevard
Ashley School Circle	Class III – Shared Street/ Bicycle Boulevard
Attucks Street	Class III – Shared Street/ Bicycle Boulevard
Atwood Road	Class III – Shared Street/ Bicycle Boulevard
Aureole Street	Class III – Shared Street/ Bicycle Boulevard
Balsom Road	Class II – Dedicated Bike Lanes

Road Name	Type of Improvement
Baux Mountain Road	Class II – Dedicated Bike Lanes
Bethabara Park Blvd	Class II – Dedicated Bike Lanes
Bethabara Road	Class III – Shared Street/ Bicycle Boulevard
Bethania Road	Class II – Dedicated Bike Lanes
Bethania Rural Hall Road	Class II – Dedicated Bike Lanes
Bethania Station Road	Class II – Dedicated Bike Lanes
Bethania-Tobaccoville Road	Class II – Dedicated Bike Lanes
Bethesda Court	Class III – Shared Street/ Bicycle Boulevard
Bethesda Road	Class III – Shared Street/ Bicycle Boulevard
Bitting Road	Class III – Shared Street/ Bicycle Boulevard
Blum Street	Class II – Dedicated Bike Lanes
Bolton Street	Class II – Dedicated Bike Lanes
Bolton Street	Class III – Shared Street/ Bicycle Boulevard
Brewer Road	Class II – Dedicated Bike Lanes
Brewer Road	Class III – Shared Street/ Bicycle Boulevard
Briarcliff Road	Class III – Shared Street/ Bicycle Boulevard
Bright Oak Avenue	Class III – Shared Street/ Bicycle Boulevard
Broad Street	Class II – Dedicated Bike Lanes
Bryansplace Road	Class III – Shared Street/ Bicycle Boulevard
Buckingham Road	Class III – Shared Street/ Bicycle Boulevard
Buena Vista Road	Class III – Shared Street/ Bicycle Boulevard
Burke Mill Road	Class II – Dedicated Bike Lanes
Butler Street	Class III – Shared Street/ Bicycle Boulevard
Butterfield Drive	Class II – Dedicated Bike Lanes
Canary Trail	Class III – Shared Street/ Bicycle Boulevard
Carver School Road	Class II – Dedicated Bike Lanes
Cassell Street	Class II – Dedicated Bike Lanes
Cassell Street	Class III – Shared Street/ Bicycle Boulevard
Cedar Trail	Class III – Shared Street/ Bicycle Boulevard
Cemetery Street	Class III – Shared Street/ Bicycle Boulevard
Cheltonham Drive	Class III – Shared Street/ Bicycle Boulevard
Cherokee Lane	Class III – Shared Street/ Bicycle Boulevard
Cherry Street	Class II – Dedicated Bike Lanes
Cherry Street (North)	Class II – Dedicated Bike Lanes
Cherry Street (South)	Class II – Dedicated Bike Lanes
Chester Road	Class III – Shared Street/ Bicycle Boulevard
Church Street (North)	Class II – Dedicated Bike Lanes
Church Street (South)	Class II – Dedicated Bike Lanes
Clemmonsville Road	Class II – Dedicated Bike Lanes

Road Name	Type of Improvement
Cloverdale Avenue	Class II – Dedicated Bike Lanes
Cobblestone Road	Class III – Shared Street/ Bicycle Boulevard
Cole Road	Class II – Dedicated Bike Lanes
Coliseum Drive	Class II – Dedicated Bike Lanes
Crafton Street	Class III – Shared Street/ Bicycle Boulevard
Crawford Pl	Class III – Shared Street/ Bicycle Boulevard
Deacon Blvd	Class II – Dedicated Bike Lanes
Dellabrook Road	Class III – Shared Street/ Bicycle Boulevard
Duke Street	Class III – Shared Street/ Bicycle Boulevard
Dustin Street	Class III – Shared Street/ Bicycle Boulevard
Ebert Road	Class II – Dedicated Bike Lanes
Ebert Street	Class II – Dedicated Bike Lanes
Elizabeth Avenue	Class III – Shared Street/ Bicycle Boulevard
Fairlawn Drive NW	Class II – Dedicated Bike Lanes
5th Street (East)	Class II – Dedicated Bike Lanes
4th Street	Class III – Shared Street/ Bicycle Boulevard
Foxcroft Drive	Class III – Shared Street/ Bicycle Boulevard
Gatewood Drive	Class III – Shared Street/ Bicycle Boulevard
Geneva Road	Class II – Dedicated Bike Lanes
Germanton Road	Class II – Dedicated Bike Lanes
Glade Street	Class II – Dedicated Bike Lanes
Glenn Avenue	Class II – Dedicated Bike Lanes
Glenn Avenue	Class III – Shared Street/ Bicycle Boulevard
Glenn High Road	Class II – Dedicated Bike Lanes
Grandview Club Road	Class II – Dedicated Bike Lanes
Griffith Road	Class II – Dedicated Bike Lanes
Haled Street	Class II – Dedicated Bike Lanes
Hanes Mall Blvd	Class II – Dedicated Bike Lanes
Harson Street (West)	Class III – Shared Street/ Bicycle Boulevard
Hastings Hill Road	Class III – Shared Street/ Bicycle Boulevard
Hastings Hill Road	Class IV – Protected Cycle Tracks
Hawthorne Road	Class III – Shared Street/ Bicycle Boulevard
Hawthorne Road (North)	Class II – Dedicated Bike Lanes
Hearthside Drive	Class III – Shared Street/ Bicycle Boulevard
High Point Road	Class II – Dedicated Bike Lanes
High Point Road	Class IV – Protected Cycle Tracks
Home Road	Class II – Dedicated Bike Lanes
Hutton Street	Class III – Shared Street/ Bicycle Boulevard
Indiana Avenue	Class II – Dedicated Bike Lanes

Road Name	Type of Improvement
Ivy Avenue	Class II – Dedicated Bike Lanes
Jackson Avenue (North)	Class III – Shared Street/ Bicycle Boulevard
Jonestown Road	Class II – Dedicated Bike Lanes
Kernersville Road	Class II – Dedicated Bike Lanes
Kirklees Road	Class III – Shared Street/ Bicycle Boulevard
Knollwood Street	Class II – Dedicated Bike Lanes
Konnoak Drive	Class II – Dedicated Bike Lanes
Lake View Blvd	Class III – Shared Street/ Bicycle Boulevard
Lansing Drive	Class II – Dedicated Bike Lanes
Liberty Hall Circle	Class III – Shared Street/ Bicycle Boulevard
Liberty Street (North)	Class II – Dedicated Bike Lanes
Link Road	Class III – Shared Street/ Bicycle Boulevard
Loch Drive	Class III – Shared Street/ Bicycle Boulevard
Lockland Avenue	Class III – Shared Street/ Bicycle Boulevard
Main Street	Class II – Dedicated Bike Lanes
Marble Street	Class III – Shared Street/ Bicycle Boulevard
Marshall Street (North)	Class II – Dedicated Bike Lanes
Marshall Street (South)	Class II – Dedicated Bike Lanes
Martin Luther King Drive	Class II – Dedicated Bike Lanes
Martin Luther King Jr Drive	Class II – Dedicated Bike Lanes
Medical Center Blvd	Class II – Dedicated Bike Lanes
Melrose Street	Class III – Shared Street/ Bicycle Boulevard
Memorial Industrial School Road	Class II – Dedicated Bike Lanes
Merrimont Drive Nw	Class III – Shared Street/ Bicycle Boulevard
Milhaven Road	Class II – Dedicated Bike Lanes
Mock Street	Class III – Shared Street/ Bicycle Boulevard
Mockingbird Lane	Class III – Shared Street/ Bicycle Boulevard
Motor Road	Class II – Dedicated Bike Lanes
Mountain View Road	Class III – Shared Street/ Bicycle Boulevard
Murray Road	Class II – Dedicated Bike Lanes
Murray Road	Class III – Shared Street/ Bicycle Boulevard
Murray Road	Class IV – Protected Cycle Tracks
New Walkertown Road	Class II – Dedicated Bike Lanes
Nicholson Road	Class III – Shared Street/ Bicycle Boulevard
North Chestnut Street	Class II – Dedicated Bike Lanes
North Point Blvd	Class I – Shared Use Paths
Oak Grove Church Road	Class II – Dedicated Bike Lanes
Oak Summit Road	Class II – Dedicated Bike Lanes
Oakwood Drive	Class II – Dedicated Bike Lanes
Ogburn Avenue	Class II – Dedicated Bike Lanes

Road Name	Type of Improvement
Old Lexington Road	Class IV – Protected Cycle Tracks
Old Pfafftown Road	Class III – Shared Street/ Bicycle Boulevard
Old Rural Hall Road	Class II – Dedicated Bike Lanes
Old Salisbury Road	Class II – Dedicated Bike Lanes
Old Towne Drive	Class II – Dedicated Bike Lanes
Overlook Drive	Class II – Dedicated Bike Lanes
Palmer Lane	Class III – Shared Street/ Bicycle Boulevard
Park Blvd	Class III – Shared Street/ Bicycle Boulevard
Partridge Lane	Class III – Shared Street/ Bicycle Boulevard
Patterson Avenue	Class II – Dedicated Bike Lanes
Patterson Avenue (North)	Class II – Dedicated Bike Lanes
Peace Haven Road	Class II – Dedicated Bike Lanes
Peace Haven Road (North)	Class II – Dedicated Bike Lanes
Peachtree Street	Class III – Shared Street/ Bicycle Boulevard
Peters Creek Pkwy	Class I – Shared Use Paths
Phillips Bridge Road	Class II – Dedicated Bike Lanes
Pine Valley Road	Class III – Shared Street/ Bicycle Boulevard
Pinewood Drive	Class III – Shared Street/ Bicycle Boulevard
Polo Road	Class II – Dedicated Bike Lanes
Proposed Greenway Connection	Class I – Shared Use Paths
Proposed off-street connection	Class I – Shared Use Paths
Proposed Path Along Railroad and Shopping Center	Class I – Shared Use Paths
Proposed Tunnel or Bridge to Connect Sides of John Gold Memorial Expressway that Cuts Rhyne Avenue in Half	Class I – Shared Use Paths
Quarterstaff Road	Class III – Shared Street/ Bicycle Boulevard
Queen Street	Class II – Dedicated Bike Lanes
Ransom Road	Class II – Dedicated Bike Lanes
Reidsville Road	Class I – Shared Use Paths
Reidsville Road	Class II – Dedicated Bike Lanes
Reynolda Road	Class I – Shared Use Paths
Reynolds Blvd	Class IV – Protected Cycle Tracks
Reynolds Drive	Class III – Shared Street/ Bicycle Boulevard
Reynolds Park Road	Class II – Dedicated Bike Lanes
Ridgewood Road	Class II – Dedicated Bike Lanes
Robbins Drive	Class II – Dedicated Bike Lanes
Robinhood Road	Class II – Dedicated Bike Lanes
Salem Lake Road	Class II – Dedicated Bike Lanes
Salisbury Ridge Road	Class II – Dedicated Bike Lanes
Saxon Lane	Class II – Dedicated Bike Lanes
2nd Street (East)	Class II – Dedicated Bike Lanes

Road Name	Type of Improvement
2nd Street (East)	Class III – Shared Street/ Bicycle Boulevard
2nd Street (West)	Class II – Dedicated Bike Lanes
Sedge Garden Road	Class II – Dedicated Bike Lanes
7th Street (East)	Class II – Dedicated Bike Lanes
7th Street (West)	Class II – Dedicated Bike Lanes
Shattalon Drive	Class II – Dedicated Bike Lanes
Shorefair Drive	Class II – Dedicated Bike Lanes
Silas Creek Pkwy	Class I – Shared Use Paths
6th Street	Class II – Dedicated Bike Lanes
Somerset Drive	Class II – Dedicated Bike Lanes
Southpark Blvd	Class II – Dedicated Bike Lanes
Sprague Road (East)	Class II – Dedicated Bike Lanes
Stafford Village Blvd	Class II – Dedicated Bike Lanes
Staffordshire Road	Class III – Shared Street/ Bicycle Boulevard
Stanleyville Drive	Class II – Dedicated Bike Lanes
Stone Crossing Drive	Class III – Shared Street/ Bicycle Boulevard
Stonebridge Drive	Class III – Shared Street/ Bicycle Boulevard
Stratford Road (South)	Class II – Dedicated Bike Lanes
Summerfield Lane	Class III – Shared Street/ Bicycle Boulevard
Tallison Drive	Class III – Shared Street/ Bicycle Boulevard
Tangle Lane	Class III – Shared Street/ Bicycle Boulevard
Teague Road	Class II – Dedicated Bike Lanes
Temple School Road	Class II – Dedicated Bike Lanes
3rd Street (East)	Class II – Dedicated Bike Lanes
3rd Street (West)	Class II – Dedicated Bike Lanes
Thomasville Road	Class II – Dedicated Bike Lanes
Thurmond Street	Class II – Dedicated Bike Lanes
Trade Street	Class III – Shared Street/ Bicycle Boulevard
Tryon Street	Class III – Shared Street/ Bicycle Boulevard
28th Street (West)	Class II – Dedicated Bike Lanes
28th Street (East)	Class II – Dedicated Bike Lanes
27th Street (East)	Class II – Dedicated Bike Lanes
27th Street (West)	Class II – Dedicated Bike Lanes
Union Cross Road	Class II – Dedicated Bike Lanes
University Pkwy	Class II – Dedicated Bike Lanes
Vargrave Street	Class II – Dedicated Bike Lanes
Vest Mill Road	Class III – Shared Street/ Bicycle Boulevard
Warwick Road	Class III – Shared Street/ Bicycle Boulevard
Washington Park Lane	Class III – Shared Street/ Bicycle Boulevard
Weatherwood Court	Class III – Shared Street/ Bicycle Boulevard

Road Name	Type of Improvement
Weatherwood Lane	Class III – Shared Street/ Bicycle Boulevard
West Clemmonsville Road	Class II – Dedicated Bike Lanes
West End Blvd	Class II – Dedicated Bike Lanes
West End Blvd	Class III – Shared Street/ Bicycle Boulevard
West Hanes Mill Road	Class II – Dedicated Bike Lanes
Westview Drive	Class III – Shared Street/ Bicycle Boulevard
Whittier Road	Class II – Dedicated Bike Lanes
Will Scarlet Road	Class III – Shared Street/ Bicycle Boulevard
Winston Lake Road	Class III – Shared Street/ Bicycle Boulevard
Winston Park Drive	Class III – Shared Street/ Bicycle Boulevard
Yadkinville Road	Class II – Dedicated Bike Lanes

5.7 INTERSECTION IMPROVEMENTS

In addition to the corridor and street improvements identified in previous sections, intersections within the city were studied to determine which intersections could be enhanced to improve bicycle and pedestrian safety. While all of the corridor improvements would improve safety at intersections for non-motorized users, the following intersections fall outside of these corridors, and should be addressed separately. The intersections were identified through the analysis of crash data.

- Twenty Seventh and Twenty Eighth Streets and the intersections of Greenway, Gilmer and Bon Air Avenues: these three consecutive intersections along 27th Street and 28th Streets are one-way pairs heading east and west and provide access to neighborhoods and to Greenway Park. Twenty Seventh Street is going downhill in this area, and vehicles travel at rates higher than the posted speeds. There have been several bicycle crashes in this area, including crashes involving teenage bicyclists.
- Martin Luther King Drive and Cleveland Avenue/ File Street: These two intersections are located in the vicinity of the Sunrise Towers, operated by the Winston-Salem Housing Authority. Several bicycle crashes have occurred in this area.
- Broad Street and Salem Avenue: This is a three-way intersection with businesses on two of the corners. There are Class II – Bicycle Lanes on Broad Street, however multiple bicycle crashes have occurred at this intersection.
- Hanes Mall Boulevard and South Strafford Road: This intersection sits in the vicinity of several regional shopping centers. Hanes Mall Boulevard and Strafford Road are both high volume streets with seven to eight lanes each and no pedestrian or bicycle accommodations. Crossing the intersection is made more complicated by the presence of railroad tracks on the east side of the intersection.

5.8 SUMMARY OF BICYCLE FACILITY VISION AND RECOMMENDATIONS

A total of 17 priority projects were identified in the overall network of recommendations based on their ability to connect populations to work, schools, shopping, and other key destinations. They would also build upon proposed and existing bicycle facilities and greenways in the city. In addition, a network of bicycle boulevards was identified that would provide connections within neighborhoods and to the priority routes. Cost estimates associated with the facilities were included in the discussion.


BIKE ROUTE

Chapter 6

Innovative Programmatic, Institutional, and Support Infrastructure Recommendations

6 Innovative Programmatic, Institutional and Support Infrastructure Recommendations

6.1 PROGRAMMING HISTORY

In addition to physical improvements to its road and trail systems, the City of Winston-Salem recognizes the need for programming to make cycling a safe and attractive transportation option for its residents and visitors. The city has a strong tradition of providing programs in a number of key categories and those programs need to continue to evolve with the demand for cycling improvements in the community.

- Education
- Encouragement
- Evaluation
- Enforcement

6.1.1 Education

For years, the city has created and distributed education materials and delivered programming aimed at cyclists, motorists, and all other residents regarding the rights and responsibilities of all roadway users with the goal of creating an environment that encourages cycling.

Safe Routes to School Program

The City of Winston-Salem has had a strong Safe Routes to School (SRTS) program for over a decade with numerous facets designed to encourage more cycling and walking trips to schools throughout the community. Nationwide, in 1969, 48 percent of children 5 to 14 years of age usually walked or bicycled to school compared to 13 percent in 2009. Parents identified the following as the top barriers preventing children from walking or cycling to school.

1. Distance to school
2. Traffic-related danger
3. Weather
4. Crime danger
5. Opposing school policy

There have been numerous efforts within the city's SRTS program to encourage more cycling to schools and other destinations.

Safe Routes to School Bicycle Education Program

In 2011, using a federal SRTS non-infrastructure competitive grant, the city purchased a fleet of 25 bicycles and a trailer to begin a bicycle education program in local elementary schools. The city worked with Winston-Salem / Forsyth County Schools (WSFCS) to incorporate the Bike Smarts education program into the school system's

Physical Education curriculum and coordinated with the school district's Health and Physical Education Program Manager to have nearly all elementary and middle school Physical Education teachers receive training on how to conduct the Bike Smarts program using the fleet of bicycle and associated equipment. To date, the program has served over 6,000 students and was expanded in 2018 to leverage partnerships with other agencies. The Safe Kids Coalition of the Northwest Piedmont has joined the Winston-Salem SRTS program and provided additional training and hundreds of helmets to students who have completed the Bike Smarts program. The Safe Kids Coalition of the Northwest Piedmont is led by Wake Forest Baptist Medical Center and provides dedicated staff, operational support, and other resources to assist in helping keep kids safe. Based on the needs of the community, the coalition implements evidence-based programs, such as car-seat checkups, safety workshops, and sports clinics that help parents and caregivers prevent childhood injuries. The city has also partnered with the National Cycling Center (NCC) to manage the Bike Smarts program, bringing additional enthusiasm and experience to the program to ensure its viability for years to come. The NCC is in the process of becoming the country's premier training destination for elite cyclists, providing athletes access to leading-edge sports medicine research and currently acts as a community resource for cycling-related fitness, activity, education, and advocacy.

SRTS Committee and WSFCS Coordination

The WSUAMPO also created a Safe Routes to School Committee comprised of parents and staff from WSFCS, the Winston-Salem Police Department, Forsyth County Health Department, NCDOT, local municipalities, and the WSUAMPO. The SRTS Committee meets regularly to discuss policies and practices that encourage walking and cycling to school and recommends methods through which improvements could be made. The committee has led to increased coordination between the City of Winston-Salem and the Winston-Salem / Forsyth County School District, which has taken an active lead in identifying schools with high potential and needs for improving rates of cycling and walking by students.

"Let's Go Cycling and Walking" Newsletter

For several years, the City of Winston-Salem and WSUAMPO published an online newsletter to keep residents informed of events and projects. The quarterly newsletter provided information about upcoming events and activities to encourage greater participation in cycling and walking activities and provided project updates related to greenway, cycling, and walking infrastructure improvements.

AUGUST 2013

LET'S GO!

WINSTON-SALEM'S ACTIVE TRANSPORTATION NEWSLETTER

CYCLING AND WALKING

Cycling Sunday Fun Day returns on September 15

Fall will be here before we know it. That means it's time for another Cycling Sunday combined with Sunday Fun Day on September 15 from 3:30 to 6:00 PM. Once again the two events take place around the Southeast Gateway on Salem Avenue. Segments of Marshall, West, and Spring Streets, along with parts of Salem Avenue will be closed to motor vehicles so that cyclists, skaters, and scooters can take to the streets without worrying about traffic. Helmets are required.

The health department is planning more Fun Day events along the Salem Creek Greenway—no bikes required for that. And everyone is encouraged to explore the greenway by foot or bike. The 5-mile Salem Creek Greenway connects Marketplace Mall with Salem Lake so there's lots of different scenery to enjoy.

Registration for the two events and free parking are at the Gateway Family Medicine building at 390 Salem Avenue. Take Broad Street to Salem Avenue to access parking since much of Salem Avenue will be blocked off for the event.

The elementary school with the most representation that day will win $400 in PE equipment for their school. So invite all the students you know to come. Play different games, learn about your health, and support your local elementary school, all at the same time.

Printed Materials and Videos

In coordination with the city's Marketing and Communications Department, WSDOT has also created a series of printed and video educational materials for distribution through a variety of outlets. Video public service announcements about sharing the road properly and printed materials covering an array of topics from walking, cycling, and driving tips to wallet cards with bicycle-related ordinances to printed maps of recommended bicycle routes have all been created and distributed to the public. The Winston-Salem Urban Area Bicycle Map was developed in conjunction with the analysis of roadways as part of the 2010 Bicycle Master Plan and uses a suitability factor for all roads besides residential streets. Similarly, the Winston-Salem Trail Guide was updated in 2018 to include recent construction and provides information about all trails and greenways in Winston-Salem.

Let's work together to make Winston-Salem safe for everyone!

BIKE SMART

1. Bicycles are vehicles and must obey the same traffic laws as motorists.
2. Bicyclists should ride predictably with the flow of traffic, signaling turns and lane changes.
3. Bike helmets are required by North Carolina law for bicyclists under age 16, even on sidewalks and public trails.
4. The City of Winston-Salem is adding bike lanes and shared lane markings to make bicyclists more visible.
5. Be visible by wearing bright, reflective clothing and using strong lights at night.
6. When your bike is parked outside, always secure it with a strong lock.
7. Be courteous to other roadway users and always yield to pedestrians.

WAY TO GO!
WINSTON-SALEM
BICYCLE & PEDESTRIAN PROGRAM
WWW.BIKE.CITYOFWS.ORG

Produced by City of Winston-Salem Transportation Department

¡Trabajemos para que Winston-Salem sea segura para todos!

PEDALEAR INTELIGEN-TEMENTE

1. Las bicicletas son vehículos y deben obedecer las mismas leyes de tránsito que los automovilistas.
2. Los ciclistas deben manejar de manera predecible siguiendo el flujo vehicular y haciendo señales antes de doblar o cambiar de carril.
3. Los cascos para los ciclistas son obligatorios de acuerdo con lo requerido por las leyes de Carolina del Norte incluso cuando transitan por la escarpa o en parques públicos.
4. El ayuntamiento de Winston-Salem está añadiendo rutas exclusivas para ciclistas y las está marcando adecuadamente para hacerlas más visibles.
5. Hágase visible usando ropa de colores vivos o fosforescentes y utilizando luces intensas por las noches.
6. Cuando estacione su bicicleta en la calle, siempre asegúrela con un candado fuerte.
7. Sea cortés con las otras personas que usan la carretera o las aceras y siempre ceda el paso al peatón.

WAY TO GO!
WINSTON-SALEM
BICYCLE & PEDESTRIAN PROGRAM
WWW.BIKE.CITYOFWS.ORG

Producido por el Departamento de Transporto de la cuidad de Winston-Salem.

Let's work together to make Winston-Salem safe for everyone!

WALK SMART

1. Where sidewalks are available, use them, as required by North Carolina law.
2. If there is no sidewalk, walk or run facing traffic so you can see approaching motorists.
3. For children walking to school, use the route and crosswalks recommended by your school. If there is a crossing guard, always obey the guard and cross at that location.
4. Be visible with colorful or reflective clothing and use a flashlight at night.
5. Obey pedestrian Walk/Don't Walk signals where they are available. At some intersections you may need to push a button to activate the pedestrian signal.
6. If there is no pedestrian signal, cross when the traffic signal is green in the direction you are traveling, but be sure to watch for turning vehicles.
7. Always look both ways before crossing a street and keep looking as you cross.
8. People in motorized and manual wheelchairs are pedestrians.

WAY TO GO!
WINSTON-SALEM
BICYCLE & PEDESTRIAN PROGRAM
WWW.BIKE.CITYOFWS.ORG

Produced by City of Winston-Salem Transportation Department

¡Trabajemos para que Winston-Salem sea segura para todos!

CAMINAR INTELIGEN-TEMENTE

1. Camine sobre las aceras, siempre que existan, como lo establece la ley de Carolina del Norte.
2. Si no hay aceras, camine o, si está haciendo ejercicio, corra de frente al tráfico para ver venir a los carros.
3. Para los niños que caminan a la escuela, use la ruta recomendada por el colegio mismo. Si hay un policía o guardia dirigiendo el tráfico, siempre siga sus indicaciones y cruce donde él lo indique.
4. Por las noches, hágase visible con un ropa de colores vivos o fosforescente y use siempre una linterna.
5. Obedezca las señales para los peatones siempre que estén visibles. En algunas intersecciones, es posible que necesite apretar un botón para activar el semáforo para peatones.
6. Si no hay semáforos peatonales, cruce la calle cuando la luz del semáforo convencional cambie a verde siempre que esté en la misma dirección en la que usted camina. Vea a los lados para cuidarse de vehículos que doblan.
7. Siempre vea ambos lados antes de cruzar la calle y manténgase vigilante mientras está cruzando.
8. Recuerde que la gente en sillas de ruedas manuales o motorizadas son peatones.

WAY TO GO!
WINSTON-SALEM
BICYCLE & PEDESTRIAN PROGRAM
WWW.BIKE.CITYOFWS.ORG

Producido por el Departamento de Transporto de la cuidad de Winston-Salem.

DO YOUR PART TO MAKE WINSTON-SALEM SAFE!

1. Residents and property owners in Winston-Salem are responsible for keeping sidewalks across their property clean and clear of debris and snow.
2. Place your trash bin or yard cart where it will not block the sidewalk or bike lane. If you must place your trash bin or yard cart on the sidewalk, please remove it as soon as possible after it's emptied.
3. Keep shrubbery and low-hanging limbs trimmed away from the sidewalk.
4. Select plantings that will not grow onto the sidewalk or will not attract bees that could sting passersby.
5. Obey Winston-Salem's leash law and keep your pets restrained for their own safety as well as that of people passing your property on foot or on bicycle.
6. Watch for bicyclists and pedestrians when entering or exiting your driveway and yield to them.
7. If you park your vehicle on the street, look for bicyclists before opening your car door.
8. Always park your vehicle so it does not block any part of the sidewalk.

WAY TO GO!
WINSTON-SALEM
BICYCLE & PEDESTRIAN PROGRAM
WWW.BIKE.CITYOFWS.ORG

Produced by City of Winston-Salem Transportation Department

HAZ TU PARTE PARA QUE WINSTON-SALEM SEA UNA CIUDAD SEGURA.

1. Los inquilinos y propietarios de casas y edificios, son los responsables de mantener las aceras alrededor de la propiedad limpias y sin rastros de basura, desperdicios o nieve.
2. Ponga su bote de basura o el receptáculo para productos reciclables donde no se conviertan en un obstáculo que bloqueen la acera o el carril para bicicletas. Si, por alguna razón, tiene que ponerlos en la acera, por favor muévalo de ahí tan pronto le sea posible después de haber sido vaciado.
3. Mantenga bien cortados los arbustos y las ramas que cuelgan bajo para mantener despejada la acera.
4. Selecciones las variedades de plantas que no crecerán sobre la acera y que no atraerán abejas e insectos que puedan picar a los transeúntes.
5. Obedezca las leyes que regulan el pasear a las mascotas en Winston-Salem y manténgalas con una correa o restringidas por su propio bien, así como por la seguridad de ciclistas y peatones.
6. Manténgase vigilante de ciclistas o peatones que estén usando la acera mientras usted saca el carro de su cochera y siempre cédales el paso.
7. Si usted se estaciona en la calle, cerciórese que no haya ciclistas antes de abrir la puerta.
8. Siempre estacione su vehículo de manera que evite bloquear cualquier parte de la acera.

WAY TO GO!
WINSTON-SALEM
BICYCLE & PEDESTRIAN PROGRAM
WWW.BIKE.CITYOFWS.ORG

Producido por el Departamento de Transporto de la cuidad de Winston-Salem.

Let's work together to make Winston-Salem safe for everyone!

DRIVE SMART

1. Watch for bicyclists and pedestrians at all times. Bicycles are vehicles, so bicyclists are permitted to take the entire lane where necessary for safety.
2. Look out for children and slow down, especially in school zones and neighborhoods, as children can unexpectedly dart into the street.
3. Look behind you for bicyclists before opening your car door.
4. Yield to pedestrians in crosswalks, at intersections, and when entering or exiting a driveway or alley.
5. Check your right-hand mirror for bicyclists before turning right, especially where you can turn right on red.
6. Pass bicyclists with care. Treat bicyclists as you would a slow-moving car–don't tailgate, and do wait until you can safely pass the bicyclist. Reduce speed when passing bicyclists and allow at least 5 feet of passing space. Check over your shoulder after passing a bicyclist before moving right.
7. Bicyclists know you're there so, please, no horns.
8. Above all, don't drive distracted or after consuming alcohol or other drugs.

WAY TO GO!
WINSTON-SALEM
BICYCLE & PEDESTRIAN PROGRAM
WWW.BIKE.CITYOFWS.ORG

Produced by City of Winston-Salem Transportation Department

¡Trabajemos para que Winston-Salem sea segura para todos!

MANEJE INTELIGEN-TEMENTE

1. Esté siempre al pendiente de ciclistas y motociclistas. Las bicicletas son vehículos así que a los ciclistas se les permite tomar todo el carril si lo consideran necesario para su seguridad.
2. Esté siempre al pendiente de niños y disminuya la velocidad, especialmente en zonas escolares y adentro de los vecindarios, ya que los menores pueden cruzar la calle intempestivamente.
3. Mire hacia atrás antes de abrir la puerta del carro para cerciorarse de que no vienen ciclistas.
4. Ceda el paso a los transeúntes en pasos peatonales, intersecciones y cuando esté entrando o saliendo de su cochera o de un callejón sin salida.
5. Siempre mire el espejo de la derecha para cerciorarse de que no vienen ciclistas, especialmente si va a doblar a este lado si lo hace cuando el semáforo está en rojo.
6. Rebase a los ciclistas con precaución. Hágalo de la misma manera en que rebasaría a un carro que se mueve a baja velocidad; evite pegarse demasiado a la parte trasera de la bicicleta y espere hasta que sea evidente que la puede rebasar con seguridad. Reduzca su velocidad cuando pase a un ciclista y permita que haya un espacio de por lo menos cinco pies entre usted y la bicicleta. Después de haber rebasado, mire sobre su hombro antes de moverse nuevamente a la derecha.
7. Los ciclistas ya saben que usted está detrás así que evite usar la bocina.
8. Por sobre todo, jamás maneje distraído o después de haber consumido alcohol o drogas.

WAY TO GO!
WINSTON-SALEM
BICYCLE & PEDESTRIAN PROGRAM
WWW.BIKE.CITYOFWS.ORG

Producido por el Departamento de Transporto de la cuidad de Winston-Salem.

WALKING & CYCLING SAFELY IN WINSTON-SALEM

Creating a Safer Community

As interest in good health and physical fitness grows, more people of all ages are walking and bicycling in Winston-Salem. In addition, our community's Safe Routes to School Program is working to make it safer for more children to bike and walk to school and teaching children safe walking and biking skills.

for everyone

1. Residents and property owners in Winston-Salem are responsible for keeping sidewalks across their property clean and clear of debris and snow.
2. Place your trash bin or yard cart where it will not block the sidewalk or bike lane. If you must place your trash bin or yard cart on the sidewalk, please remove it as soon as possible after it's emptied.
3. Keep shrubbery and low-hanging limbs trimmed away from the sidewalk.
4. Select plantings that will not grow onto the sidewalk or will not attract bees that could sting passersby.
5. Obey Winston-Salem's leash law and keep your pets restrained for their own safety as well as that of people passing your property on foot or on bicycle.
6. Watch for bicyclists and pedestrians when entering or exiting your driveway and yield to them.
7. If you park your vehicle on the street, look for bicyclists before opening your car door.
8. Always park your vehicle so it does not block any part of the sidewalk.

WAY TO GO!
WINSTON-SALEM
BICYCLE & PEDESTRIAN PROGRAM

Produced by the
City of Winston-Salem Department of Transportation
and the Winston-Salem Police Department
www.DOT.cityofws.org

We all can do our part to keep ourselves and other people safe!

WINSTON-SALEM BIKE LAWS

In addition to state laws, the City of Winston-Salem has specific bicycle laws:

1. A bicycle should carry only the number of people for which it was designed.
2. Bicyclists should ride no more than two abreast.
3. When bicyclists are riding on a sidewalk, the bicyclist must yield to pedestrians and give an audible warning to the pedestrian.
4. Bicyclists are not allowed on sidewalks in these locations:
   - Central business district—the area bounded by 8th Street, US 52, Business 40, and Broad Street
   - Sunset Drive from First Street to Glade Street.
   - Liberty Street from 14th Street to 17th Street.
5. A bicyclist should not travel at a greater speed than is reasonable for the circumstances and conditions.
6. Bicyclists should not carry packages or items that prevent them from keeping at least one hand on the handlebars.
7. Bicycles should be parked in a way that does not obstruct pedestrian traffic.
8. All bicycles should have working, functional, adequate brakes.

10 SAFETY TIPS

1. Gain motorists' respect by riding courteously and responsibly.
2. Follow all applicable rules of the road, including stop signs.
3. Pass other vehicles only on the left unless a marked bike lane allows you to pass safely on the right.
4. Always be conscious of your surroundings, particularly if you're riding alone and check ahead to anticipate changing situations.
5. Bicyclists can be difficult for motorists to see at dawn and dusk so take special care at these times.
6. If safety dictates it, take the full lane.
7. Always signal your intention to turn or change lanes, so motorists can react properly. And be sure to check behind you for other vehicles.
8. Always maneuver so you cross railroad tracks at a right angle.
9. In a group, ride no more than two abreast and, where possible, move to single file when other vehicles are passing.
10. Always make safety your byword, regardless of who has the legal right-of-way.

NC STATE LAW: A BICYCLE IS A VEHICLE

- Ride in same direction as motor vehicle traffic
- Stop at stop signs and red lights
- Ride as close to the right- hand edge of the lane as practicable, except when making left turns or avoiding hazards.
- Always yield to pedestrians.
- Bicyclists under age 16 are required to wear helmets.
- For riding after dusk, equip your bicycle with a front lamp visible from 300 feet and a rear red light or reflector visible from 200 feet.
- Yield to vehicles and pedestrians when entering the main road from a side street, driveway or building entrance.

BICYCLIST RIGHTS IN NC

In North Carolina, bicyclists have the same rights as motor vehicle drivers. Bicyclists are allowed to take the full lane when it's necessary for safety or to avoid hazards in the road. Bicyclists are allowed to use all roadways except fully-controlled access highways such as interstates.

Remember that motorists are more likely to see you and treat you with respect if you behave like a vehicle operator and communicate your intentions.

City of Winston-Salem Employee Driver Education

As part of earning a license to drive city vehicles, city employees undergo regular driver training and certification. In 2014, WSDOT staff partnered with the city's Risk Management Department, which oversees driver licensing, to incorporate bicycle and pedestrian awareness education into the education and testing process. The City of Winston-Salem is a major employer whose employees generate a lot of traffic during the day during the course of normal operations. To date, nearly 1,000 city employee drivers have been trained and are better equipped to understand the safety issues associated with sharing the roads with cyclists and pedestrians.

6.1.2 Encouragement

Branding

In 2012, the city rolled out a branding initiative titled "Way to Go Winston-Salem" to help create an identity for the bicycle and pedestrian initiatives underway. This logo and theme was applied to all mailings, flyers, printed materials, and electronic media to create a brand that residents and visitors would recognize as part of the city's effort to encourage cycling and walking. Informing residents of activities and efforts was a vital effort in the early stages of the city's bicycle and pedestrian program, but the need for such branding has not diminished and residents need to be reminded of the efforts to make the city bike friendly and the opportunities they have for getting involved in that effort.

WAY TO GO!
WINSTON-SALEM
BICYCLE & PEDESTRIAN PROGRAM

Walk/Bike to School Day

For years the city has also promoted and assisted with bike and walk to school day events as part of International Walk/Bike to School Day. The city worked with parents and school staff to plan, promote, and carry out the events.

Open Streets Winston-Salem

In 2009, Winston-Salem was the first city in North Carolina to hold regular Open Streets events to encourage people to bike, walk, skate, and play in the streets and the program continues to this day, though in a modified form. Open Streets have become very common across the world over the past two decades as cities temporarily close some of their streets to motor vehicles in order to provide a safe, car-free environment for residents to ride bikes, walk, skate, and participate in various activities. Since 2009, the City of Winston-Salem has conducted its Open Streets events in four separate locations from downtown to the Old Salem area to Research Parkway and now in the vicinity of Bailey Park. Along with the changes in venue has come a name change evolving from Cycling Sundays to Walk & Roll Winston-Salem. Numerous agencies from the region assist with preparations for the events, including the Forsyth County Department of Public Health, Active Routes to School program, Winston-Salem Forsyth County Schools, local healthcare providers, the City of Winston-Salem, Wake Forest Innovation Quarter, and the National Cycling Center. Since 2017, Walk & Roll Winston-Salem has been incorporated into the Winston-Salem Cycling Classic on Memorial Day weekend.

Bike Month

The City of Winston-Salem has been involved in promoting cycling through a series of annual events associated with National Bike Month celebrations in May. Each year, the City of Winston-Salem creates a calendar of events to encourage cycling, including organized rides, movies, promotional events, lectures, classes, and social events. In 2018, the National Cycling Center assumed the responsibility of planning and hosting events to celebrate National Bike Month, drawing on synergy from the Winston-Salem Cycling Classic over Memorial Day Weekend to cap the month-long celebration.

Bicycle Light Distribution

In partnership with the Active Routes to School program and the Winston-Salem Police Department, the City of Winston-Salem developed a bicycle light distribution and education program to promote greater use of bicycle lights at night. The Active Routes to School program has donated nearly 300 sets of bicycle lights for the Winston-Salem Police Department to distribute to cyclists riding at night without them. Cyclists are required by law to have functional front and rear lights to improve their visibility, but instead of issuing citations for improper lighting, the Winston-Salem Police Department provided and installed lights for cyclists in violation. The program has led to greater awareness of bicycle-related laws and improved compliance with those laws.

Active Routes to School is a North Carolina Safe Routes to School Project supported by a partnership between the NCDOT and the North Carolina Division of Public Health. Through this project there are ten Active Routes to School project coordinators working across North Carolina to make it easier for elementary and middle school students to safely walk and bike to school. The project coordinators

Bike Month in Winston-Salem MAY 2016

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 1-4 PM, Walk & Roll Winston-Salem 10:30 AM, Clip In & Ride (30 miles) 11 AM, Community Bike Ride (10 miles)	2 Clemmons Bicycle Mountain Bike Ride	3 6 PM, Piedmont Flyers bike ride from Lewisville Square Herbalife Team MS Criterium Series	4 Clemmons Bicycle Wednesday Road Ride National Bike to School Day TRIAD AIR AWARENESS WEEK	5 Forsyth County Employees Bike Ride	6 Piedmont Flyers bike ride from Lewisville Square	7 9 AM – noon, Bike to Cobblestone Farmers Market
8 3 PM, Community Bike Ride	9 Clemmons Bicycle Mountain Bike Ride	10 6 PM, Piedmont Flyers bike ride from Lewisville Square Dixie Classic Criterium Series BIKE TO WORK WEEK	11 6 PM, Clemmons Bicycle Wednesday Road Ride	12 6 PM, Piedmont Flyers bike ride from Lewisville Square	13 Sherwood Forest Elementary School Bike to School Day	14
15 3 PM, Community Bike Ride	16 Clemmons Bicycle Mountain Bike Ride	17 6:30 PM, Free Bike Movie @ a/perture – "Wadjda" 6 PM, Piedmont Flyers bike ride from Lewisville Square Herbalife Team MS Criterium Series	18 1 PM, Innovation Quarter Bike Ride 6 PM, Clemmons Bicycle Wednesday Road Ride 6:30 PM, Ride of Silence	19 6 PM, Piedmont Flyers bike ride from Lewisville Square	20	21 2-4 PM, Clemmons Pedal & Metal Event
22 36 North Triathlon 3 PM, Community Bike Ride	23 Clemmons Bicycle Mountain Bike Ride	24 6 PM, Piedmont Flyers bike ride from Lewisville Square Dixie Classic Criterium Series	25 6 PM, Clemmons Bicycle Wednesday Road Ride	26 6 PM, Piedmont Flyers bike ride from Lewisville Square 6:30 PM, Free Bike Movie @ a/perture	27 Volkswagen USA Cycling Professional Road Race & Time Trial National Championships	28 Volkswagen USA Cycling Professional Road Race & Time Trial National Championships
			May 24 – 28 Volkswagen USA Cycling Road National Championships			
29 3 PM, Community Bike Ride	30 MEMORIAL DAY UCI Professional Road Races (men & women)	31 6 PM, Piedmont Flyers bike ride from Lewisville Square	For more information go to cityofws.org/bikemonth			
May 29 – 30 W-S Cycling Classic						

work with partners in their communities to increase the following:

- One-time awareness events about the importance of Safe Routes to School.
- The number of ongoing programs that encourage walking and biking to or at school.
- The number of trainings on how to implement Safe Routes to School-related activities.
- The number of policies that support walking and biking to or at school.
- The number of safety features near schools.

In addition to working directly with schools, the project coordinators work within communities to identify opportunities for shared use of facilities and Complete Streets to improve access to physical activity.

Bike Share

Launched in May 2017, the bike share program in Winston-Salem has provided transportation and recreation opportunities for thousands of residents and visitors. The NCC serves as the lead agency for planning and implementation of the bike share program with the City of Winston-Salem and numerous private sponsors providing the financial and institutional support to keep the program operating. The program launched with 50 bicycles spread across eight stations and has since increased to 11 stations. The dock-based Zagster bike share model was launched in Winston-Salem just as dockless bike share operations materialized throughout the country, demonstrating the ever-changing landscape of bike share and shared micromobility systems, generally. The National Cycling Center's Zagster bike share system has been incredibly valuable in Winston-Salem, which has not seen the introduction of a dockless system or the financial commitment for another approach. The Zagster system, specifically, has been an asset for Winston-Salem, as the semi-permanent nature of the stations has allowed for experimentation in docking station locations and arrangements, allowing the city and NCC to learn a great deal about successful bike share operations.

Evaluation

In 2013, City of Winston-Salem staff partnered with a local team at the Center for Design Innovation to design and fabricate a series of bicycle counters using Arduino boards and rubber air hoses. A team of programmers, builders, and researchers designed the counters and then trained less experienced members of the team on the actual construction, including soldering, assembly, and testing. The counters were deployed a number of times to collect data and perfect the product. In the spring of 2014, City of Winston-Salem staff presented the project at a professional conference and, as a result, connected with NCDOT as they were developing their pilot bicycle and pedestrian counting program. By the summer of 2014, the City of Winston-Salem had been selected to be a part of the pilot project and by the fall of that year four sets of commercial counting equipment had been installed, including locations on 4th Street, West End Boulevard, the Strollway, and the Salem Lake Trail. The equipment has been counting continuously for nearly four years, providing baseline count data for the city to use and expand upon as funding becomes available.

Enforcement

To date, targeted bicycle and pedestrian enforcement initiatives have been limited to two key areas with much room for expansion. The initial effort begun in 2015 focused on pedestrian safety in the downtown area where count data showed more than 1.3 million walking trips on 4th Street alone. The campaign focused on curbing dangerous driving and involved an educational period with numerous media efforts and the distribution of printed materials. The education period was followed by a targeted enforcement campaign in which drivers who failed to yield to pedestrians in crosswalks were issued warnings and then citations. The campaign was successful and can serve as a model for similar bicycle safety campaigns. More recently the City of Winston-Salem has developed an education and enforcement campaign to reduce the frequency of bicycle lane parking violations. Informational flyers with references to state and local statutes related to the issue are being distributed in areas where there have been reports of automobiles parked in bicycle lanes. The education campaign will be followed by an enforcement campaign to further discourage the practice of blocking bicycle lanes.

6.2 PROGRAMMING RECOMMENDATIONS

While the City of Winston-Salem has been successful in creating programs in the categories of education, encouragement, evaluation, and enforcement, there are numerous needs and opportunities to expand the reach of the current efforts.

6.2.1 Education Recommendations

The City of Winston-Salem will continue its work to enable people to make effective choices and to travel safely. Education efforts could, at a minimum, cover topics such as how to ride a bike, what signs and signals mean, and the rules of the road. It is also important to provide information about how transportation networks function, and how transportation is connected to other issues such as energy use, climate change, personal and public health, and the livability of a community.

Drivers

While driver education is fundamentally critical to the safety of cyclists, most driver education programs in the United States are inadequate when it comes to teaching people to operate motor vehicles safely around people walking or bicycling. This is a national problem that is difficult for any single municipality to address, as driver education falls under state jurisdiction. Enhanced motorist education that teaches how to look for and interact with bicyclists could be part of the driver education curriculum. The City of Winston-Salem, however, could continue outreach and education campaigns to reach as many drivers as possible. Share the road campaigns and efforts to discourage bike lane parking are a good first step, though more comprehensive approaches, such as Watch for Me NC and Vision Zero, are vital to ensuring that all efforts are working in concert to achieve the greatest results.

Cyclists

When people bicycle, they also need to know the traffic laws and develop good bicycling skills. The City of Winston-Salem provides resources towards that end, for both children and adults. In addition to creating outreach and educational materials geared towards bicycling, though, the city could collaborate with local agencies to provide free workshops and skill-building sessions for the public and for city employees. The city also needs to continue and expand efforts to educate cyclists about how to travel safely around motor vehicles and how to be mindful and careful around people walking.

Mapping

In addition to existing printed bicycle maps, the City of Winston-Salem could consider digital mapping options, including interactive route selection tools. The difficulty in creating a static bicycle map is that there are too many variables to account for depending on the experience, skill, and preferences of the cyclist using the map. Some cyclists prefer low-speed, low-volume streets at the expense of riding a longer distance or through varying terrain. Other cyclists may prefer the shortest, quickest route possible, regardless of traffic conditions. It is impossible to adequately convey all of that information on a static map, so the City of Winston-Salem could consider an interactive online bicycle mapping tool that provides cyclists with information tailored to their specific needs. The Montgomery County, Maryland Bicycle Stress Map is a particularly useful tool for cyclists to be able to select routes based on their preferred criteria. http://www.mcatlas.org/bikestress/.

6.2.2 Other Engagement

Community Events

There are many opportunities for reaching the public in Winston-Salem at city events and events sponsored by other agencies. City staff can attend these events to engage the community and make people aware of the efforts underway to make Winston-Salem a bike friendly community by handing out information, asking for feedback, and distributing items, such as bike lights and bells. Efforts could be made to continue attending established events and identify events throughout the community, particularly in underserved areas.

Broadening Community Engagement

Expanding interest in cycling for transportation has been difficult in Winston-Salem, as people cite numerous reasons for not cycling regularly, including, among others, traffic safety, terrain, and personal safety. While infrastructure improvements can address some of those concerns, the City of Winston-Salem and other agencies interested in increasing the use of bicycles must engage residents. Particular emphasis could be placed on conducting significant bicycle and public health related outreach to traditionally underrepresented populations, (i.e., groups who are not seen in the bicycling community at levels equal to their presence in the broader community). This includes some racial and ethnic groups, as well as women, older individuals, and immigrant communities.

Bicycle Education Workshops

The City of Winston-Salem, in conjunction with partner agencies and bike shops, could further engage residents with free and regular bicycle education classes. The classes and workshops have been held sporadically in the past, but a regular schedule of diverse topics could attract a larger audience. Workshops could include "urban cycling basics," "women-powered cycling," and "bike maintenance basics." In addition, the city could partner with the National Cycling Center to teach people how to use the Zagster Bike Share program to boost participation in the program.

Safe Routes to School

While the City of Winston-Salem has expanded the coalition of partners involved in providing SRTS programming and planning, it still has a vital role to play in educating school district administration and staff in creating walkable school zones. City staff could continue to work with district staff to identify schools that could most benefit from improvements in cycling and walking infrastructure to encourage greater use of those transportation options. School officials understand best the issues facing students and families trying to bike and walk to school and city staff can learn a great deal from those representatives and translate the concerns into policies and infrastructure projects to improve conditions.

Cycling and Walking Audits

The City of Winston-Salem has conducted numerous walking audits with neighborhood groups and elected officials to identify and address safety concerns on city streets and sidewalks resulting in actual changes, including sidewalk construction and park access improvements. Walking audits provide residents, planners, engineers, and elected officials a forum in which each can learn about the issues affecting walking in the community and how those issues can be addressed. The walking audit concept could be expanded to include cycling audits. Like walking, cycling requires firsthand experience to truly appreciate the issues that affect cycling as a form of transportation, from interactions with drivers to the use of bicycle lanes and shared lanes. Conducting audits with advocates, planners, engineers, residents, and elected officials would be beneficial and could to additional emphasis to implement recommendations from this Plan. While the audits provide a forum for residents to advocate for improved cycling conditions, they also provide education for planners, engineers, and elected officials who otherwise may have been unaware of the issues.

Social Media Outreach

While the City of Winston-Salem has long used social media and the city website to share information about safety campaigns, planning efforts, and projects to improve cycling infrastructure, it has been sporadic and limited in impact. The city could develop a plan for a consistent and reliable social media presence so people will trust those sources for the latest information on cycling projects and events.

6.2.3 Encouragement Recommendations

Transportation Demand Management

Transportation Demand Management (TDM) is a program of information, encouragement, and incentives provided by local or regional organizations to help people know about and use all their transportation options to optimize all modes in the system – and to counterbalance the incentives to drive that are so prevalent in subsidies of parking and roads. These are both traditional and innovative technology-based services to help people use transit, ridesharing, walking, biking, and telework. The Business 40 project in Winston-Salem and the associated closure of the highway prompted need for TDM measures

that may not have existed before. However, as Winston-Salem continues to grow, traffic volumes will continue to increase requiring significant costs to expand highways or creative thinking to reallocate resources and encourage transportation options. The City of Winston-Salem could consider a Trip Reduction Ordinance requiring employers of a certain size to reduce the single occupancy vehicle commute rate of their employees.

TDM Benefits:

Mobility: Encourages a reduction in SOV rates, which can help reduce congestion and vehicle miles traveled (VMT).

Accessibility: Increases awareness of and promotes the use of travel options such as transit, carpooling, and non-motorized modes.

Environmental: Reduces the emission of criteria air pollutants and greenhouse gases that are harmful to the environment and human health by encouraging shifts to more sustainable transportation modes.

Quality of Life: Promotes the use of active transportation modes which can increase physicalactivity and enhance health and quality of life.

There are numerous TDM strategy options available depending on available funding, staffing, and political will.

- Dedicated bus lanes
- Protected bike lanes
- Dynamic pricing for on-street parking
- Lowering or eliminating off-street parking minimums for new developments
- Congestion pricing
- Monetary incentives to switch modes
- Carsharing
- Bikesharing
- Employee transit benefits and subsidies
- Employer-organized and hosted vanpools and carpools
- Priority parking for carpools
- Employer assisted housing
- Showers, changing rooms, and secure bike parking to help employees bike to work
- Eliminating or reducing free parking
- Flexible work schedules
- Telework

Coordination with Community Partner Agencies

The City of Winston-Salem has dedicated much effort to establishing and maintaining relationships with many different agencies in the community with similar missions to promote bicycling, including, but not limited to, the National Cycling Center, the Forsyth County Department of Public Health, the Wake Forest School of Medicine, local advocacy organizations, and the Winston-Salem Cycling Classic. These agencies have assumed responsibilities for bicycle education and encouragement programs and that type of collaboration could be encouraged to maximize productivity. Additional partner agencies, with whom relationships could be established and/or maintained, include the following.

- Winston-Salem Chamber of Commerce
- Visit Winston-Salem
- Downtown Winston-Salem Partnership
- National Cycling Center
- Winston-Salem Cycling Classic
- Wake Forest Innovation Quarter
- Advocacy Groups
- Adaptables
- Forsyth County Department of Public Health
- Forsyth County Office of Environmental Assistance and Protection
- Wake Forest School of Medicine
- Winston-Salem Transit Authority
- Piedmont Authority for Regional Transportation
- NCDOT
- WSUAMPO
- Piedmont Triad Regional Council

6.2.4 Evaluation Recommendations

Bicycle and Pedestrian Count Program Expansion

While the bicycle and pedestrian count program in Winston-Salem has been successful, the value of the data could be enhanced by expanding the program to new locations using new equipment. It is impossible to install permanent counters at every possible location of value throughout the community, but one of the goals of the NCDOT pilot bicycle and pedestrian count program is to provide counting factors generated from permanent sites that can be applied to temporary count sites to infer Average Annual Daily Bicycle Trips. For certain high-traffic infrastructure sites, such as greenways and well-established on-street bicycle routes, it is advisable to install permanent counters, but for other areas, temporary counters will suffice and provide valuable data. Making the data available to the public is also a key to ensure that the public sees a benefit to the investments being made in bicycle and pedestrian infrastructure. To create a robust bicycle and pedestrian counting program, the City of Winston-Salem could consider the following improvements and practices.

- Annual public reports of bicycle and pedestrian data for count site locations to be distributed via city website and public media outlets.
- Installation of permanent bicycle and pedestrian counting equipment on all remaining greenways.
- Inclusion of permanent bicycle and pedestrian counting equipment in the designs for all future greenways for installation during the construction of each greenways or renovation.
- Deployment of four portable bicycle and pedestrian counters to count bicycle traffic on streets and greenway segments not represented via the permanent count sites.
- Installation of a bicycle and pedestrian count display board on a high-volume trail segment to demonstrate to cyclists, pedestrians, and motorists the volume of people using that trail for transportation and recreation. Possible sites include the following:
  - Future Business 40 Multi-Use Path
  - Long Branch Trail
  - Salem Creek Greenway
  - Strollway
- Purchase Strava Metro Data, or a comparable product, to capture anonymized data for cycling trips to supplement the data gathered via permanent and portable counters that the city owns and maintains.
- Perform manual bicycle counts on trails and bicycle routes to generate demographic data, providing context for automatic counter data.

Bicycle Crash Analysis

The City of Winston-Salem could enhance the current bicycle crash analysis efforts and begin a regular bicycle crash analysis program to monitor bicycle crashes and examine underlying causes of the crashes. With a relatively limited number of bicycle crashes, WSDOT could work with the Winston-Salem Police Department to ensure that bicycle crashes are being reported properly and analyzed to determine the factors leading to the crashes. In addition to collecting analyzing bicycle crash data, the city could collect data on near misses and cyclist interactions with aggressive drivers to provide a fuller picture of the threats to safe, comfortable cycling.

Pre and Post Project Evaluations

As the City of Winston-Salem continues to advance bicycle infrastructure projects, it could begin a program to evaluate traffic speeds and volumes of all modes prior to project completion and after project completion. As the bicycle and pedestrian count program can provide a broad picture of the changes in cycling and walking over time, traffic studies tied to specific projects can provide a snapshot of the effects of those projects and demonstrate the impact they have had on the transportation system. At a minimum, the city could evaluate the number of cyclists traveling through a corridor before and after infrastructure projects and perform traffic studies to determine the impact to the volumes and speeds of motor vehicle traffic. Projects that increase the number of cyclists on the road, while reducing motor vehicle speeds and volumes would be the models of success.

6.2.5 Enforcement Recommendations

The WSDOT could continue to partner with the Winston-Salem Police Department to execute targeted bicycle and pedestrian enforcement initiatives. The campaigns could focus on curbing dangerous driving and include an educational period with numerous media efforts and the distribution of printed materials. The education period could be followed by a targeted enforcement campaign in which drivers who fail to share the road appropriately or yield to pedestrians in crosswalks are issued warnings and then citations.

6.3 INSTITUTIONAL RECOMMENDATIONS

While the recommended programs in the previous section

would enhance the city's current programming efforts, there are numerous institutional efforts necessary for establishing cycling as a fully integrated transportation mode in Winston-Salem. These recommendations include the establishment of new committees, policies, organizational structures, and ordinances that will have contribute to long term improvements to cycling in the community.

6.3.1 Bicycle and Pedestrian Advisory Committee

The city could support the formation of a Bicycle and Pedestrian Advisory Committee (BPAC) that will provide input to the City of Winston-Salem City Council. Other major cities in North Carolina have some form of a Bicycle and Pedestrian Advisory Committee to recommend actions to the City Council regarding development and transportation projects and their possible impact to cycling and walking as modes of transportation. While the WSUAMPO has a bicycle and pedestrian subcommittee, it does not replace the need for a comparable organization at the local level. The WSUAMPO's Bicycle and Pedestrian Subcommittee serves as final layer of review for projects being considered by the WSUAMPO to receive funding. The BPAC would provide a formal platform for citizen involvement in bicycle and pedestrian aspects of numerous projects and would provide a level of involvement in bicycle and pedestrian planning that currently does not exist. Public involvement is a fundamental aspect of all planning efforts of WSDOT and WSUAMPO and the development of a local BPAC would align perfectly with that priority.

6.3.2 Complete Streets Policy

The city could begin the process of adopting a complete streets policy. Complete Streets are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. The WSUAMPO adopted a complete streets resolution in 2012, the primary impact of which has been to increase the competitiveness through the project evaluation process of projects that reflect multimodal goals. The city, however, could adopt a complete streets policy to ensure that transportation projects address the needs of all roadway users. In recent years, the city has worked diligently to incorporate bicycle, pedestrian, and transit infrastructure in roadway projects, but a formal policy with associated changes in engineering standards would ensure accounting for cyclists and pedestrians in all future projects.

6.3.3 Vision Zero

Vision Zero is a multi-national road traffic safety project that aims to achieve a highway system with no fatalities or serious injuries involving road traffic. The city could consider the launch of a Vision Zero campaign in coordination among all necessary city and outside agencies. While the City of Winston-Salem has experimented with efforts designed to reduce the frequency and severity of crashes, there has not been a focused, cooperative effort to do so, as is the case with Vision Zero campaigns. Local education and enforcement efforts, combined with traffic calming projects and the use of new design standards for roads are the components of a Vision Zero campaign, but they have not been implemented to the degree necessary to see fundamental changes in traffic safety in Winston-Salem. A Vision Zero campaign endorsed at the highest level of city government could be an effective means to assemble the staffing, financial, and political resources necessary to combine and enhance existing efforts to significantly improve roadway safety for everyone.

6.3.4 Unified Development Ordinance Updates

The city could also begin to update the Unified Development Ordinance (UDO) to improve bicycle infrastructure. In 2015, the City County Planning Board for Winston-Salem and Forsyth County adopted changes to the Unified Development Ordinance (UDO) to require bicycle parking at most new developments within the city, representing a significant step in the process of creating a bicycle friendly community. Requirements, such as those represented in the UDO, provide a long-term, consistent improvement to the infrastructure that supports more cycling in the community. Now that a basic bicycle parking requirement has been adopted in the UDO, attention can shift to making the next step to further improve the cycling environment. The following are possible approaches and additions to the UDO:

1. Credits or requirements for high-security parking, including bicycle lockers and cages, so cyclists can be confident they will not experience theft of their vehicles.

2. Credits or requirements for showers and lockers in buildings to allow cyclists to keep clothing onsite and freshen up after commuting.

3. Credits or requirements for the construction of bicycle and pedestrian paths in new developments.

4. Credits for contributing to the expansion of the existing bicycle share program.

6.3.5 Coordination with Winston-Salem/Forsyth County Schools for Safe Routes to School Campaigns

Continued expansion of the SRTS program within the WSFCS. For several years, the City of Winston-Salem has worked with WSFCS to transfer the primary responsibility for SRTS planning and programming from the city to the school district. This is a crucial step in the evolution of the local SRTS program in that in order to achieve significant results, buy-in is needed within the school district from school board members to district level administration to principals and teachers in each school. WSFCS and the City of Winston-Salem can then focus their energy on issues that need to be addressed by the city, such construction of sidewalks, trails, and safe intersections. The City of Winston-Salem could continue to support the SRTS program and continue to work with WSFCS to make the program sustainable within the school district.

6.3.6 Livable Streets Division

The city could form a Livable Streets Division within the City of Winston-Salem DOT. The proposed Livable Streets Division would provide a comprehensive vision for implementing projects focused on creating safe and inviting streets and sidewalks for all who walk and use a bicycle. This would include enhancements to the bicycle and pedestrian environment and taking a proactive approach to traffic calming and roadway redesigns that promote bicycle and pedestrian safety. A Livable Streets Division would provide attractive, safe streets and sidewalks, making walking and biking the most attractive options for most non-transit travel. The Livable Streets Division would oversee the development and delivery of projects and programs supporting a proposed Vision Zero campaign with the goal of ending traffic fatalities. Livable Streets staff would also coordinate among other agencies, such as Public Health, Police, Public Works, and Planning to advance the Vision Zero campaign.

6.4 SUPPORT INFRASTRUCTURE RECOMMENDATIONS

Another crucial component to creating a bicycle friendly community includes the expansion of the support infrastructure environment. While other sections of this Plan address linear infrastructure improvements, including bicycle lanes, cycle tracks, and trails, there are also other infrastructure needs, such as bicycle parking and bicycle share that are critical to attracting more residents and visitors to cycling for transportation.

6.4.1 Bicycle Parking

In 2013, the City of Winston-Salem used federal transportation funds to purchase and install approximately 200 bicycle racks, primarily in the downtown area and in 2015 the Unified Development Ordinance was amended to require bicycle parking with new developments, but bicycle parking needs remain. As downtown Winston-Salem has continued to grow, there are unmet bicycle parking needs in areas where previously none existed. To address the new bicycle parking needs and to address future needs, bicycle parking could be installed on every block at a rate of two bicycle racks per block face for every block in the downtown area. In addition to providing bicycle parking in the downtown area, the city could also install bicycle parking at all transit hubs, parks, greenway

trailheads, and other municipal and social services offices. All uses combined will require the purchase and installation of approximately 300 bicycle racks.

In addition to standard bicycle racks, high security bicycle lockers could be installed at the following locations to promote the use the bicycles to these destinations by providing long-term bicycle parking solutions. In addition to installing bicycle lockers, the city could consider installing wayfinding and instructional information to promote the use of the lockers. The following locations are likely to generate the highest level of interest and can be used as a pilot project to study the potential demand for high security bicycle parking in other locations.

- Transit Center
- Twin City Quarter
- Wake Forest Innovation Quarter
- Union Station

In addition to a proactive bicycle parking initiative, the city could begin a bicycle parking request program to account

for new requests that emerge throughout the city. The city could maintain a supply of bicycle racks to respond to requests as they arise using a set of previously-developed criteria to determine eligible and priority areas. The criteria will include the following:

- Land uses, locations, and quantities as identified in the Unified Development Ordinance for bicycle parking
- Located within the public right-of-way
- Existing hardscape mounting surface
- Sidewalks that are at least 7 feet wide or where the presence of a bicycle rack does not decrease the useable sidewalk below 4 feet

6.4.2 Bike Share Program Investment

The National Cycling Center launched its Zagster Bike Share program in May 2017 with its own resources and through the contributions of private sponsors with the City of Winston-Salem contributing by planning and preparing bike share station sites. While this approach has made the bike share program possible, a public investment from the City of Winston-Salem would allow for the expansion of the program where it currently does not exist. An annual public investment of $50,000 would provide for a significant expansion of the program, while still only accounting for a fraction of the total program cost. That investment from the city could also be used to expand the fleet to include electric assist bicycles, which in a hilly community like Winston-Salem could dramatically boost user participation in the program. An annual bike share program pass in Winston-Salem costs users just $30, which is 1/3 to 1/4 the annual fee for bike share programs in most other communities. Possible expansion locations include the following:

- Transit centers, hubs, and Park-and-Rides
- Public library branches
- City parks with greenway trailheads
- Community centers
- Low and moderate income neighborhoods
- Medical centers

Bike share benefits:

- Makes bicycles available to those who do not own one
- Eliminates worry about bicycle theft and the hassles of bicycle maintenance and repair
- Provides bicycles for those who do not have bike storage at their home or office
- Enables transit users a first and last mile transportation option
- Offers an inexpensive option, with minimal capital investment

6.4.3 Public Bicycle Repair Stands Program

In 2017, local residents worked with the Enterprise Center to apply for a grant and install the first public bicycle repair stand in the City of Winston-Salem. The city soon followed with the installation of a public bicycle repair stand along the Salem Lake Trail. The repair stands are extremely valuable to cyclists who may need to perform minor adjustment or inflate their tires and they demonstrate a high level of support for cycling. The purchase and installation of 10 public bicycle repair stands throughout the community is recommended. Possible locations include the following:

- Transit Center
- Transit Hubs and Park and Rides
- Greenway Trailheads
- Parks
- Innovation Quarter
- Union Station

6.4.4 Inductive Loop Tuning

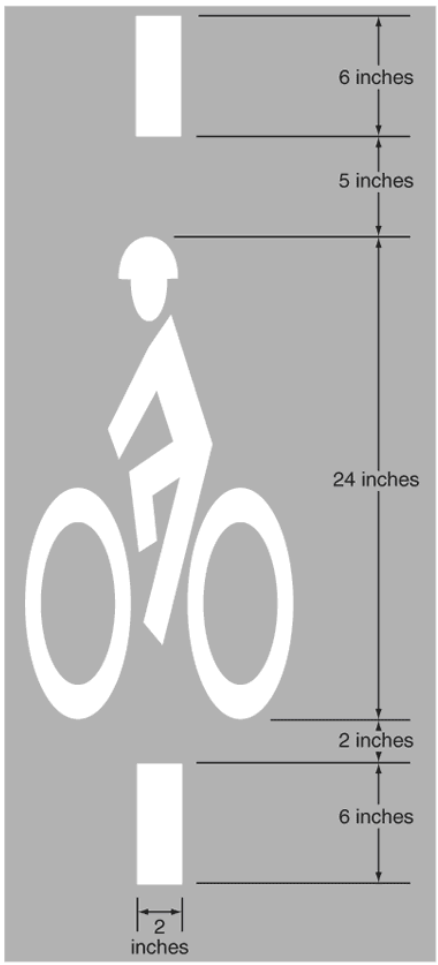
Many traffic signals in the city are activated via inductive wire loops buried in the pavement. As vehicles with significant amounts of metal pass over the inductive loops, they break a magnetic field sending a signal to the traffic control cabinet to activate the traffic signal. In 2017, the City of Winston-Salem finished construction of its first bicycle-specific inductive loop as part of a bicycle lane installation project. The bicycle lane on Polo Road continues

uninterrupted to the intersection with Cherry Street and the inductive loop is needed to activate the traffic signal in the event there are no other vehicles at the intersection. The loop was designed and tuned to detect bicycles, but there are hundreds of other inductive loops throughout the city in travel lanes that, while not specifically designed for bicycles, can be tuned to recognize bicycles. While video, push-button, and microwave detection and signal activation may be better solutions for bicycle detection in some cases, the ubiquity of inductive loops provides a significant opportunity to improve the roads for cycling with minimal cost. The city could perform a survey of inductive traffic signal loops and tune them as necessary to recognize bicycles to the extent possible without causing them to be so sensitive as to recognize motor vehicles in adjacent travel lanes. Surveys and associated inductive loop tuning could be prioritized on the following basis:

1. Streets with bicycle lanes
2. Streets included in signed bicycle routes
3. Streets with shared lane markings
4. Streets with planned bicycle infrastructure
5. Remaining streets with significant bicycle traffic generators

Inductive loops that are tuned and tested to accommodate bicycles could be treated with an appropriate pavement marking and associated sign as advised in the Manual on Uniform Traffic Control Devices.

Figure 9C-7. Bicycle Detector Pavement Marking



6.4.5 Public Transit

Most transit trips begin and/or end with a walk, bike ride, or scooter ride and combining cycling and transit increases the utility of both modes. Linking bicycles with transit will minimize barriers, such as long distances, poor weather conditions, poor bicycle access, and unforeseen circumstances. Transit agencies throughout the country have made significant investments to integrate cycling and transit, including adding bicycle racks on buses and trains, installing secure bicycle parking options and transit stations, integrating bike share programs with transit, and installing other bicycle-friendly features to serve transit riders. The Winston-Salem Transit Authority and the Piedmont Authority for Regional Transportation provide transit services for the Winston-Salem area and both provide bicycle racks on their vehicles to accommodate cyclists. The City of Winston-Salem could work to ensure that all transit centers, hubs, park and ride lots, and other transit facilities are served with secure bicycle parking, including bicycle racks and lockers and that bike share stations are positioned strategically to best serve transit riders.

Winston-Salem Transit Authority

14,602 bike loadings

January 1, 2017 – December 31, 2017

6.4.6 Old Salem Zone

The Old Salem area is a completely unique place. Not only is Salem the origin of Winston-Salem (1766), but because of the restoration work of Old Salem, Inc. the area may also be thought of as a large park. Much of the historic area is focused on the work of Old Salem Museums and Gardens, which annually hosts more than 325,000 visitors, who experience the area predominantly on foot. In addition, the history and attractions extend beyond the museum to the surrounding areas, which include a mix of uses, including museums, parks, libraries, churches, graveyards, restaurants, farm markets, retail, offices, hotels, colleges, downtown Winston-Salem, and residential neighborhoods. Connecting many of these amenities are strong cycling and walking ties, including infrastructure, such as the Salem

Creek Greenway, the Strollway, a network of bicycle and pedestrian friendly streets, and the future Multi-Use Path along Business 40. In consideration of the existing land uses and infrastructure and potential for increasing cycling and walking trips in the area, the City of Winston-Salem, in Conjunction with Old Salem Museums and Gardens and the Historic Resource Commission, could designate a Bicycle and Pedestrian Priority Zone in the area to heighten the visibility and accessibility of the cultural, historic, and natural resources via active transportation options. Features of the Old Salem Bicycle and Pedestrian Priority Zone could include the following features:

- Designation of an area bounded by Broad Street, Business 40, and Salem Avenue to serve as the Old Salem Bicycle and Pedestrian Priority Zone
- Reduction in vehicular speed limits with the Zone to 15 or 20 miles per hour to support the comfort and safety of cyclists and pedestrians
- Provision of signage and traffic control devices, including crosswalks, within the Zone to notify drivers and promote compliance
- Provision of bicycle share stations in the vicinity of Old Salem Museums and Gardens, Visit Winston-Salem, hotels, and greenways

6.5 SUMMARY OF BICYCLE FACILITY VISION AND RECOMMENDATIONS

This section makes recommendations as to how to programmatically make Winston-Salem a safer bicycling community by addressing the remaining Es – Education, Encouragement, Evaluation and Enforcement. Recommended educational programs include programs that target both cyclists and drivers. Encouragement programs focus on community partnerships and transportation demand strategies. Evaluation programs allow the city to monitor the improvement in the bicycle conditions of the city, and enforcement would help keep bicyclists safe.

This section also provides recommendations for the institutional efforts necessary to establish cycling as a fully integrated transportation mode in Winston-Salem. The recommendations include the establishment of new committees – such as a bicycle and pedestrian committee – policies, organizational structures, and ordinances that will contribute to long term improvements to cycling in the community.

This section also details recommendations to create a bicycle-friendly community which includes providing infrastructure beyond the linear recommendations made in Section 5, such as bicycle parking and bicycle share, that are critical to attracting more residents and visitors to cycling for transportation.

Chapter 7

Implementation, Phasing, and Funding

7 Implementation, Phasing, and Funding

7.1 OVERVIEW

The infrastructure and programmatic recommendations in the previous chapters provide strategies for making Winston-Salem more bicycle-friendly. The purpose of this chapter is to provide guidance for establishing policy, obtaining funding, implementing programs and building out the bicycle network.

7.2 KEY ACTION STEPS

Project Delivery Process

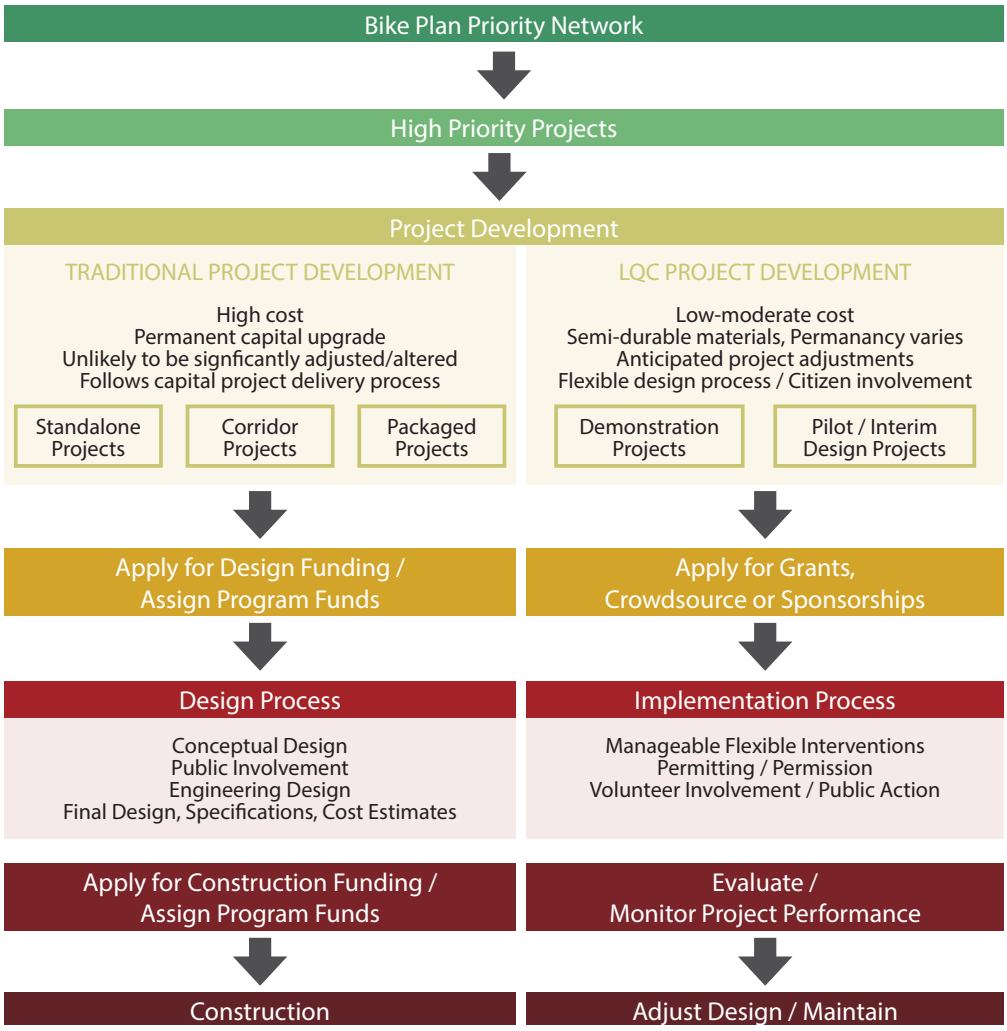
There are two main types of project delivery to implement the facilities proposed in this Plan. The "traditional project development" results in long-term capital improvements that is unlikely to be significantly altered or adjusted once installed. The process from concept to design to construction can take many years to develop, sometimes delayed by political obstacles, neighborhood concerns, or public opposition to streets balanced for more users. As an alternative, "lighter, quicker, cheaper" (LQC) project development provides a placemaking strategy that empowers communities to create the change they want to see in their neighborhoods using which can eventually result in permanent change. Improvements can be made quickly and less expensively, ideas can be tested, and adjustments are expected as a part of the process. While small LQC projects can have large local impacts, care should be taken to determine whether a long-term capital project is more appropriate due to connectivity or other safety issues that may be present. The two delivery methods can also be intertwined, with concepts development in the traditional methods spurring demonstration/pilot projects as proofs-of concept, and LQC projects being memorialized as permanent projects (Figure 7-1).

In addition, on-street bike facilities can be easily implemented in a programmatic fashion through coordination with the city's and NCDOT's street resurfacing programs. Resurfacing represent the opportunity to systematically increase bike facilities across the city with incrementally small or no cost to the city's budget and taxpayers. The city transportation planning staff should serve as a key reviewer of these two annual programs and provide striping recommendations for resurfacing projects based on the recommendations made in this Plan.

7.3 PERFORMANCE MEASURES

As Winston-Salem plans, funds, and implements projects, they are seeking methods to aid in objectively planning and prioritizing their investments. In a constrained funding environment, it is critical to be able to identify the projects and investments that will provide the highest level of benefit. Transportation performance measures are

Figure 7-1: Project Delivery Process



suggested here to track progress, develop effective solutions to needs, and prioritize needs and investments. It is recommended that progress on performance be provided in an annual report to city council.

Crash Reduction – The number of bicycle/pedestrian fatalities is up nationwide and exceeds general increase in traffic fatalities. According to the crash data, the 10 most dangerous states for bicycling are in the south and North Carolina is included at #9. ***(See the League of American Bicyclists 2018 Benchmarking Report ((https://bikeleague.org/benchmarking-report)) for more information)*** Traffic deaths are preventable. Many cities are looking at changing the mindset around fatalities with a goal of zero roadway deaths. As of 2018, five communities including Asheville, Charlotte, Durham, Greensboro and Greenville are developing Vision Zero programs. ***(See NC Vision Zero*** (https://ncvisionzero.org/))

Baseline: According to the most recent reports from the Winston-Salem Police Department, there were 64 total crashes involving bicycles from 1/1/2016 through 12/31/2018.

Goal:

Monitor the bicycle crash data with a goal of reducing both the frequency and severity of crashes. In alignment with the statewide Vision Zero goals set in 2017, Winston-Salem should aim to reduce roadway fatalities by 50 percent within 15 years, with the eventual goal of eliminating these deaths completely.

Miles of Bicycle Facilities - "Miles of bicycle facilities" is a simple measure describing the total mileage of the network within a specified geography. Reporting miles added annually allows for tracking progress over time. In conjunction with Powell Bill inventories, the city should continue to track miles of existing greenway, and bicycle infrastructure and update this information on an annual basis. Many agencies typically see large increases in the early years of network development and monitoring as the "low hanging fruit" are addressed; however, as networks become more complete the large gains in mileage tend to level out. Once this occurs the emphasis is then generally placed on key barriers and linkages that unlock the potential of the larger network.

Baseline: Currently, there are 25 miles of bicycle facilities within the city.

Goal:
100 percent increase in overall bike infrastructure mileage over first 5-year period. Additional 50 percent increase over second 5-year period. Additional 25 percent over third 5-year period.

Project Completion – Transportation staff should track and report the overall completion of the Priority Projects as the Priority Bicycle Corridors are built out. This metric can be used to fill crucial gaps and meet unaddressed needs for bicyclists. All intersection improvements and wayfinding recommendations must be implemented for a project to achieve completion. Projects that primarily fall under long-term implementation should initiate feasibility and program funds for design in the near term.

Baseline: Percent completion has been calculated for each priority corridor and can be found in High Priority Projects section in Chapter 5 of the Plan.

Goal:
Staff should calculate percent completion of each corridor as new projects come online. Increase percentage completion for each of the priority corridors in the first year. By the end of the 5-year period, complete half of 3 priority corridors. Document difficulties in achieving 50 percent completion at the end of the 5-year period.

Bicycling Commute to Work Modeshare – Commute to work data is a regular annual product of the American Community Survey. Estimates are published to reflect the commuting characteristics of workers in a community over the age of 16 years. Over the past 10 years, bicycling to work modeshare has remained relatively stagnant and there have been no major commute changes for any modes, although the number of individuals working from home has increased by a few percent and carpooling has decreased slightly. Bicycling to work numbers are expected to increase and the gender gap between male and female bicyclists should close as the network expands and other recommendations in the Plan are achieved.

Baseline: Male (0.3 percent) | Female (0.1 percent) | Overall (0.2 percent) 2017 ACS Data | Journey to Work, Bicycling

Goal:
The city should continue to monitor ACS data and document percent increase in bicycling share of total commute trips with a goal of 1 percent. The city should focus specifically on increasing female bicycle mode share.

Non-Motorized Counts - Counting volumes of non-motorized transportation users offers useful information on performance, especially where commute to work data may fall short of capturing non-work trips. These counts are a better gauge of walking and bicycling usage trends than journey to work data since it includes people who are not traveling solely for work purposes on weekdays. This information can also be used to determine environment, health, and economic implications of a project. There are several location counts from which annual bicycle counts for cycling and walking in Winston-Salem can be obtained (Table 7-1). Though counts are highly seasonal in nature, and weather dependent, continuous counts provide a good source for looking at change over time.

Baseline: Use Annual Average Daily Bicycle Traffic (AADBT) and Annual Average Daily Pedestrian Traffic (AADPT) data to calculate 3-year averages.

Goal:
Achieve an upward trend over three-year averages calculated from the AADBT and AADPT. (Document equipment malfunctions and note other data errors.)

Table 7-1: Baseline

Current Location	AADBT 2015	AADPT 2015	AADBT 2016	AADPT 2016	AADBT 2017	AADPT 2017
4th Street Downtown	78	4,288	93	3,599	64	3,744
West End Boulevard	31	331	27	419	26	349
Salem Lake Greenway	168	377	171	391	160	395
Strollway	15	238	16	335	16	282

Source: Winston-Salem Bicycle and Pedestrian Count Data (2015 – 2017)

12 Month Bicycle Counts

Baseline: 4th St Count Station (23,489) | W End Blvd Count Station (9,307) | Salem Lake Greenway Count Station (56,539) 2017 North Carolina Non-Motorized Volume Data Program | Continuous Count Station Overview and Data Summary

Goal:

Continue to monitor count data and document change over time, especially as new low-stress network linkages and greenway facilities come online. Add permanent counters in construction of all new greenways and purchase three sets of portable bike/ped counters within two years for rotation across various sites.

7.4 KEY PARTNERS IN IMPLEMENTATION

To realize the vision and goals of the Winston-Salem Bicycle Master Plan, the city will need to put its plans into action. The best success will be realized through collaboration with regional and state agencies, the private sector and non-profit organizations. These include business owners, developers, NCDOT, environmental agencies, community-based organizations. Finally, find ways to harness energy and accommodate citizen-led initiatives.

City of Winston-Salem Department of Transportation

- Oversee implementation of the Plan and coordinate action steps.
- Take the lead on funding, including any changes to the city budgeting process.
- Coordinate with WSUAMPO to leverage local funding on specific projects.
- Coordinate with NCDOT Division 9 to include bicycle and pedestrian facilities during roadway reconstruction and resurfacing.
- Lead update of development regulations to support bicycle facility development and inclusion of bicycle parking in development projects.
- Monitor and evaluate progress through performance measures.
- Support citizen-led or community-based initiatives and programs, including but not limited to low-cost, temporary changes to the built environment (i.e., Better Blocks, Tactical Urbanism), open streets initiatives, or community events.
- Coordinate selective private sponsorship and/or crowdfunding of Innovative Programs and Bike-Friendly Features.
- Send an official letter to NCDOT Division 9 to request that the Division coordinate with the city on the scheduled maintenance/restriping/resurfacing of state-maintained roadways. This communication will help the city take advantage of opportunities to continue implementing the facility recommendations of the Bicycle Plan.
- Begin to implement the Programmatic Recommendations made in Section 6.

NCDOT – Division of Bicycle and Pedestrian Transportation

- Guidance on bicycle policy and project funding.
- Provide support through department program initiatives: Vision Zero, Watch for Me NC, Complete Streets Trainings, and Let's Go NC.

NCDOT Division 9

- Provide early notification to regional planning organizations (MPOs, Regional Planning Organizations, and Council of Governments and municipalities) of maintenance/restriping/resurfacing schedules. Annual meetings should be held when updated schedules are released to allow for face to face conversation between local staff and NCDOT Division

staff. This information allows the local governments an opportunity to provide input regarding their needs and support for accommodation measures such as restriping to include bicycle lanes and other relevant markings and facility improvements.

- Recognize that projects that involve complete streets elements will inherently "complicate" project development and delivery, as they include balancing a local funding match, may involve more comprehensive public involvement, and also because they may require the balancing of additional trade-offs in design. The NCDOT is currently developing strategies to address challenges in Complete Streets implementation.
- Recognize outdated policies and design standards and allow cross-sections, treatments and intersection design that reflect modern standards for multi-modal and urban projects. FHWA has supported the use of NACTO Urban Street Design Guide and Urban Bikeway Design Guide since 2014 and has since published the Small Town and Rural Multimodal Networks (2016) which expands the use of many design treatments into the rural context.
- Establish relationship between newly formed position of Corridor Engineer and city transportation staff to assist with planning and implementation of projects and safety improvements in the Plan

Private Sector

- Cultivate partnerships in implementation of projects through development of multi-use path connections, street infrastructure adjacent to a project, increased neighborhood connectivity through community design and provision of bicycle parking.
- Actively seek private donations that can support bicycling infrastructure. By providing healthy, affordable, and enjoyable transportation options, high-quality bicycling facilities add significant value to a community.
- Provide selective sponsorship of Innovative Programs and Bike-Friendly features.

WSUAMPO

- Coordinate on leveraging funding opportunities through the Strategic Transportation Investment (STI) process. The STI allows the N.C. Department of Transportation to use its funding more efficiently and effectively to enhance North Carolina's infrastructure while supporting economic growth, job creation, and a higher quality of life.
- Incorporate Bicycle Plan projects into Long Range Transportation Plans.
- Coordinate process to revise/simplify the application for Surface Transportation Block Grant Directly Attributable (STBGDA) and Transportation Alternatives Program-Directly Attributable (TAPDA) Funding.

City Recreation and Parks Department /Planning Department/Engineering Department/Winston-Salem Department of Transportation

- Develop new and use existing segments of greenway for cross-city commuting and errand-based trips.
- Prioritize and leverage additional funding for key pieces of greenway that enhance or support the on-road bicycling facilities.
- Enhance or build greenway segments in Winston-Salem parks to ensure these connections to and within the overall network.
- Provide support infrastructure such as restrooms and water bottle refilling stations in key locations and supplement with appropriate wayfinding for greenway users.
- Partner with Winston-Salem parks programming for bicycle education programming at community centers and events
- Increase resources for maintenance of trails and upgrades of deficient trail segments

Citizens, Business Owners, and Community Based Organizations and Advocacy Groups

- Solicit feedback at public involvement opportunities, route to elected officials and decision-makers to show organization or business support bicycling improvements for the community, and if applicable, apply for funding for community-based initiatives.
- Develop allies in implementation of the Plan:
  - Piedmont Land Conservancy
  - Winston-Salem Chamber of Commerce
  - Bicycle advocacy organizations
  - Local bicycle shops
  - Police Department
  - Forsyth County Health Department

- Visit Winston-Salem

Regional Partners

Continue to support coordination, and outreach from the following:

- Piedmont Triad Regional Council
- Adjacent municipalities: City of High Point, City of Greensboro, Forsyth County, Davie County, Davidson County, Stokes Coutny, Yadkin County, Town of Bethania, Town of Kernersville, Town of Lewisville, Town of Rural Hall, Town of Walkertown, and the Village of Clemmons
- Local colleges and universities: Forsyth Technical Community College, North Carolina School of the Arts, Piedmont International University, Salem College, Wake Forest University, Winston - Salem State University
- Forsyth County Parks and Recreation Department

Consultants Hired by the City

Assist with project development, and provide planning, design, and construction services.

7.5 PHASING

The following tables provide guidance on moving the plan's projects and policies forward with next steps and potential funding options. The projects are broken up into categories for short-, mid-, and long-term implementation. Projects are generally listed by type so they may be packaged for funding and implementation (e.g., bicycle boulevards, intersection safety, corridor).

Short Term Implementation Projects represent projects that can be easily implemented with the approval of the plan, or shortly thereafter. They include small capital improvement projects with some engineering that may be implemented through existing levels of funding. They may also include projects that have a significant impact on safety or where planning work is needed to start to determine next steps. This list may also include projects that can be constructed as LQC demonstration/pilot projects.

Mid-Term Implementation Projects require more design work and coordination with other agencies/departments. They may also be more costly so require more lead time to program funding, coordinate planning and design.

Long-Term Implementation Projects require significant design work and depend on strategic planning amongst city staff, project approval by outside agencies and significant legwork to identify and secure funding.

No projects should be considered static in their implementation timeframe as coordination with state agencies, private developers, or departments may dictate a faster or slower schedule.

7.6 FUNDING STRATEGIES AND MATRIX

The following matrix identifies potential funding sources for recommended short-term, mid-term, and long-term implementation projects detailed in Chapter 5.

Table 7-2: Funding Strategies (Short Term)

Short Term Implementation Projects				
Segment Label	**Location**	**Project Type**	**Funding Sources**	**Implementation Notes**
NWCBB-1	Various	Bicycle Boulevard Signage and Wayfinding	Capital Improv-ement Plan Funding	Bicycle boulevard improvements.
WSBB-2	Various	Bicycle Boulevard Signage and Wayfinding	CIP Funding	Bicycle boulevard improvements.
SF-3	Varies	Bicycle Boulevard Signage and Wayfinding	CIP Funding	Bicycle boulevard Improvements.
WQC-1	Willard Rd	Bicycle Boulevard Signage and Wayfinding	CIP Funding	Add bicycle boulevard improvements on Willard Road and Brindle Street.
RLBB-1	Varies	Bicycle Boulevard Signage and Wayfinding	CIP Funding	Bicycle boulevard Improvements.
FM-2	Varies	Bicycle Boulevard Signage and Wayfinding	CIP Funding	Bicycle boulevard Improvements on Atwood Road and Eddystone Lane.
FM-BB	Varies	Bicycle Boulevard Signage and Wayfinding	CIP Funding	Bicycle boulevard improvements on Maplewood Avenue, Bellview Street, Westover Drive, Melrose Street, Elizabeth Avenue, and Duke Street
WR-4	Sunnyside Avenue	Bicycle Boulevard Signage and Wayfinding	CIP Funding	Bicycle boulevard improvements on Sunnyside Avenue.
NWC-3	E Fourteenth Street	Corridor Project	CIP Funding	Review turning movement data and speeds on E Fourteenth Street. Opportunity to restripe from sharrows to bicycle lanes as traffic calming measure and to improve bicycling connection.
ET-1	Waterworks Road	Corridor Project	CIP Funding	Review turning movement data to determine trade-offs between bike lane and having continuous center turn lane on Waterworks Road. Opportunity to restripe from sharrows to bicycle lanes as traffic calming measure and to improve bicycling connection.
CTC-1	Glade St/Clover Street	Corridor Project	CIP Funding	Topography; Install uphill climbing lane. Install signage and marking.
CTC-2	W 5th Street	Corridor Project	CIP Funding	Topography; Install contraflow uphill climbing lane. Install signage and marking.
LC-5	First Street	Corridor Project	CIP Funding	Topography; Install uphill climbing lane. Install signage and marking.
BB-2	Bethabara Road	Corridor Project	CIP Funding	Dedicated bicycling facilities on Bethabara Road and Bethania Station Road at Bethabara Park Boulevard.
RL-5	Hawthorne Road	Corridor Project	CIP Funding	Review opportunities for lane reallocation with center turn lane and dedicated bicycling facilites along this corridor.
FTC-1	Miller Street	Corridor Project	CIP Funding	Restriping opportunities on Miller Street between future Salem Creek Greenway and Five Points intersection.
WR-1	Brookstown Avenue	Corridor Project	CIP Funding	Review corridor for short-term restriping opportunities.
WR-2	Old Salem Road	Corridor Project	CIP Funding	Review opportunities for lane reallocation between Brookstowne Avenue and S Main Streeton Old Salem Road. Traffic volumes between 3,200- 5,600.
NT-4	Polo Road	Improvement Study	CIP Funding, WS MPO Funding	Review turning movement counts on Polo Road to determine opportunities to reconfigure lanes and add bicycle facilities between Sunnyknoll Court and Ransom Road.
CTC-4	W 6th Street	Improvement Study	CIP Funding, WS MPO Funding	Coordinate with Downtown Connectors (DC).
LC-5	First Street	Improvement Study	CIP Funding, WS MPO Funding	Review traffic volumes and turning movements and assess opportunities for intersection redesign at Hawthorn and 1st Street to include improvements for bicycling and walking.
LC-5	First Street	Improvement Study	CIP Funding, WS MPO Funding	Study alternative intersection designs for five points (Country Club Road, S Stratford Road, W 1st Streetand Miller Street) with options to include bicycle and pedestrian accommodations on all approaches for making connections to Northside Trace, Lewisville Connector, and Forsyth Tech Connector.
DC	Varies- Downtown Connectors	Improvement Study	CIP, WS MPO Funding	Conduct improvement study on Class IV Downtown Connectors (6th Street, Spring Street, 2nd Street, Main, Liberty and 1st Street) and CTC-3(5th Street) to determine facility types for bicycling connectivity through downtown. Study should assess facility types, intersection configurations, opportunities and tradeoffs.

NWC-3		Intersection Safety	CIP Funding	Add bicycle facilities at intersection of E 14th Street NE and US 311/New Walkertown Avenue.
WSBB-1	Cedar Trail Greenway	Intersection Safety	CIP Funding	Add signage and marking at Cedar Creek Greenway entrance on Cedar Trail. Formalize Cedar Trail Greenway access and ensure Americans with Disability Acts compliance
ET-5	E Linville Road	Intersection Safety	CIP Funding	Add advance signage and marking at Salem Creek Greenway entrances on Linville Road.
CTC-2	W 5th Street	Intersection Safety	CIP Funding	Improve intersection at Brookstowne Avenue and W 5th Street, including bicycle boxes for turns from Waughtown Route (WR-1).
CTC-6	W 5th Street	Intersection Safety	CIP Funding	Intersection improvement at E 5th Street and N Cameron Avenue.
WQC-2	Waughtown Connector Greenway	Intersection Safety	CIP Funding	Improve intersection of Brindle Street and Waughtown Street for Bicyclists and add greenway wayfinding connection between Brindle Street and Waughtown Greenway.
RL-5	Hawthorne Road	Intersection Safety	CIP Funding	Intersection improvements at W 1st Street, Queen Street, and Academy Street.
WR-2	Old Salem Road	Intersection Safety	CIP Funding	Review turning movements and opportunities for bicycle facilities such as two-stage turn queue boxes and bicycle boxes at intersections with Brookstowne Avenue and S Main Street with implementation of Downtown Connectors.
WR-4	Sunnyside Avenue	Intersection Safety	CIP Funding	Improve intersection of S Main Street and E Sprague Street at Sunnyside Avenue for turning bicyclists.
WQC-3	Brushy Fork Creek Trail	Multi-Use Path Connection Project	Parks grants, CIP Funding	Connection between Brushy Fork Greenway and Brushy Fork Park.
LB-2	Long Branch Trail	Intersection Safety	Parks grants, CIP Funding	Intersection improvements at N Martin Luther King Jr Boulevard.
LC-5	First Street	Bridge Project	NCDOT Funding, CIP Funding	Add bicycle and pedestrian accommodations with future Norfolk Southern bridge replacement; consider opportunity for future connection to potential rail trail at this location with design.
NT-2	Indiana Avenue	Corridor Project	NCDOT Funding, CIP Funding	Reduce road from 5-lanes to 3-lanes with buffered bike lanes.
RR-4	Robinhood Road	Corridor Project	NCDOT Funding, CIP Funding	Stripe bicycle facilities on Robinhood Road.
BB-1	University Parkway	Corridor Project	NCDOT Funding, CIP Funding	Class I sidepath between existing sidepath at Tucker Forest Road and University Parkway.
RR-1	Robinhood Road	Intersection Safety	NCDOT Funding, Highway Safety Improvement Funding, CIP Funding	Improve intersection pavement marking, signage on Robinhood Road at intersection with Muddy Creek Greenway. Install refuge island on Robinhood Road between Jefferson School Lane and greenway access.
NWCBB-1	E 25th Street	Intersection Safety	NCDOT Funding, HSIP, CIP Funding	Stripe crosswalk and convert John Gold Memorial Expressway off-ramp yield control to stop control at E 25th Street.
NT-4	Polo Road	Improvement Study	NCDOT Funding, HSIP, Winston-Salem MPO Funding, CIP Funding	Review turning movement data to determine trade-offs between bike lane, through lanes and center turn lane between Brookwood Drive and N Peacehaven Road. Include improvements for bicycling at all intersections with restriping. Review intersection at Reynolda Road for improvements to bicycling and walking, including refuge islands, bicycle boxes, two stage turn queue boxes and bicycle actuation.
NT-1	Akron Drive	Intersection Safety	NCDOT Funding, HSIP, CIP Funding	Improve intersection safety for bicyclists and pedestrians at Akron Drive.
RR-1	Robinhood Road	Intersection Safety	NCDOT Funding, HSIP, CIP Funding	Improve intersection of Meadowlark Drive and Robinhood Road for bicyclists and pedestrians, including median refuge island. Add sidewalk connections with redevelopment.
RR-3	Robinhood Road	Intersection Safety	NCDOT Funding, HSIP, CIP Funding	Improve intersection of N Peace Haven Road and Robinhood Road to improve safety for bicyclists and pedestrians including refuge islands, bicycle boxes, two stage turn queue boxes, and bicycle actuation.
NWC-4	New Walkertown Road/ US Highway 311	Intersection Safety	NCDOT Funding, HSIP, CIP Funding	Improve intersection pavement marking, signage and connection to Brushy Fork Greenway at Waterworks Road. Install refuge island.
LC-4	Country Club Road	Intersection Safety	NCDOT Funding, HSIP, CIP Funding	Improve bicycling conditions and safety at highway ramps, stripe shoulder across bridge to fill sidewalk gap in interim.
FM-3	Westgate Center Road	Intersection Safety	NCDOT Funding, HSIP, Winston-SalemMPO, CIP Funding	Crossing improvements at Hanes Mall Boulevard and Westgate Center Drive, including median refuge islands, crosswalks and signals, and improvements for transit access.
FM-6	Academy Street	Intersection Safety	NCDOT Funding, HSIP, CIP Funding	Intersection improvements at W Academy Street and Peters Creek Parkway for through-bicyclists including Type II lane markings and bicycle signal actuation.

Table 7-3: Funding Strategies (Mid-Term)

Mid-Term Implementation Projects				
Segment Label	**Location**	**Project Type**	**Funding Sources**	**Implementation Notes**
NT-5	North Peace Haven Road	Corridor Project	CIP Funding	Review turning movement data on N Peace Haven Road to determine trade-offs between bike lane, through lanes and continuous center turn lane between Polo Road and Chester Road.
ET-5	E Linville Road	Corridor Project	CIP Funding	Add dedicated bicycle facilities on E Linville Road with roadway improvements; Add Class I sidepath between Salem Lake Greenway and future Fiddlers Creek Greenway.
LC-3	Old Vineyard Road	Corridor Project	CIP Funding	Opportunity to restripe with bicycle lanes and narrow lanes as traffic calming measure and to improve bicycling connection.
NT-4	Polo Road	Corridor Project	CIP Funding, WS MPO	Upgrade Polo Road to complete street including dedicated bicycle facilities with roadway improvements. Include upgrades for pedestrians and transit.
RL-1	Reynolda Road	Corridor Project	CIP Funding, WS MPO	Upgrade Reynolda Road to complete street including dedicated bicycle facilities with roadway improvements. Include upgrades for pedestrians and transit.
RL-3	Reynolda Road	Corridor Project	CIP Funding	Review opportunities for lane reallocation with center turn lane and turning movement counts at Reynolda Road and Northwest Boulevard. Seek opportunities to Include dedicated bicycle accommodations.
FTC-2	Stratford Road	Corridor Project	CIP Funding	Bicycle facilities on Stratford Road between Five Points and Warwick Rd. Coordinate with Five Points Intersection Improvement (LC-5).
FM-4	Healy Drive	Corridor Project	CIP Funding	Dedicated bicycling facilities on Healy Drive from Ashleybrook Lane to S Hawthorne Road.
FM-5	South Hawthorne Road	Corridor Project	CIP Funding	Dedicated bicycle facilities on S Hawthorne Road between Silas Creek Parkway and Academy Street.
WR-5	Sprague Street	Corridor Project	CIP Funding	Install separated bikeway on E Sprague Street with special considerations for type and placement due to interchange ramps at John Gold Memorial Expressway.
NT-5	North Peace Haven Road	Intersection Safety	CIP Funding	Include improvements for bicycling at all intersections with restriping. Review intersection at Robinhood Road for improvements to bicycling and walking, including refuge islands, bicycle boxes, two stage turn queue boxes and bicycle actuation.
WSBB-2	N Peace Haven Road	Intersection Safety	CIP Funding	Improve intersection for turning bicyclists and crossing for pedestrians at N Peace Haven Road and Allstair Road. Improve intersection at Marian Lane. Add sidewalks on N Side of N Peace Haven Road between Allstair Road and Marian Lane. Stripe crosswalks for all intersection legs. Add curb ramps and receiving ramps.
WSBB-2	Silas Creek Parkway	Intersection Safety	NCDOT Funding, HSIP, CIP Funding	Assess safety and accessibility of pedestrian underpass at Yorkshire Rd and Silas Creek Parkway. Improve intersection for bicyclists and pedestrians, including median refuge islands and bicycle actuation. Add Class II facilities at intersections.
WSBB-2	Yorkshire Road	Intersection Safety	CIP Funding	Additional Class I sidepath on north side of Yorkshire Road between Sherwood Forest Elementary School and Shaffner Park, through intersection.
ET-1	Waterworks Road	Intersection Safety	CIP Funding	Add intersection improvements for bicyclists at Waterworks Road and Old Greensboro Road.
WQC-1	Willard Road	Intersection Safety	CIP Funding	Improve intersection of Union Cross Road at Willard Road for bicycling. Add safety improvements for Willard Road crossing of Fiddler's Creek Greenway.
WR-5	Sprague Street	Intersection Safety	CIP Funding	Intersection safety and bicycling improvements for turning bicyclists at Sprague Street, Old Lexington Road (SF-1), and Willard Rd (WQC-1)

Table 7-4: Funding Strategies (Long Term)

Long Term Implementation Projects				
Segment Label	**Location**	**Project Type**	**Funding Sources**	**Implementation Notes**
NT-5	North Peace Haven Road	Corridor Project	CIP Funding	Upgrade North Peace Haven Road to complete street including dedicated bicycle facilities with roadway improvements.
SF-4	Thomasville Road	Intersection Safety	NCDOT Funding, CIP Funding	Add advance signage and marking at Fiddler Creek Greenway and safety improvements for crossing Thomasville Road to access greenway.
ET-6	Motsinger Drive	Multi-Use Path Connection Project	Parks grants, CIP Funding	Connection to Motsinger Drive constructed with Fiddlers Creek Greenway.
WR-1	Brookstown Avenue	Corridor Project	CIP Funding,Private	Dedicated bicycle facilities on Brookstowne Avenue. Implementation in key areas to occur with redevelopment and streetscape projects.
FM-3	Westgate Center Road and Ashleybrook Lane	Multi-Use Path Connection Project	CIP Funding, WS-MPO	Bicycling connection between Eddystone Lane and Hanes Mall Boulevard through shopping center requires coordination with private property or redevelopment. A Tier 1 facility is ultimately recommended.
FM-4	Healy Drive	Multi-Use Path Connection Project	NCDOT Funding, HSIP, WS MPO Funding, CIP Funding	Tier 1 multi-use path connection between Healy Drive and Norvant Health Forsyth Medical Center. Crossing of Silas Creek Parkway to S Hawthorne Road. Requires private property coordination to achieve connectivity goals.
CTC-6	W 5th Street	Multi-Use Path Connection Project	Parks grants, CIP Funding	Connection to Brushy Fork Greenway through Skyland Park between N Cameron Avenue and Old Greensboro Road.
RL-3	Reynolda Road	Bridge Project	CIP Funding, Winston-Salem MPO	Coordinate with Railroad on complete streets retrofit with bridge placement.
NT-1	Akron Drive	Corridor Project	NCDOT Funding, CIP Funding	Coordinate with NCDOT on upgrading streetscape with roadway improvements. Consider Class I multi-use sidepath project with bridge replacements. Fewer driveways, lack of sidewalks and appearance of goat paths on the south side between Indiana Ave and N Liberty Street make this a potential sidepath candidate.
RR-3	Robinhood Road	Corridor Project	NCDOT Funding, CIP Funding	Coordinate with NCDOT on upgrading streetscape on Robinhood Road with roadway and future NC 67 bridge improvements. A Class I Sidepath may also be considered for this corridor.
ET-3	Old Greensboro Road	Corridor Project	NCDOT Funding, CIP Funding	Add dedicated bicycle facilities on Old Greensboro Road with roadway improvements.
LC-1	Shallowford Road	Corridor Project	NCDOT Funding, CIP Funding	Add dedicated bicycle facilities on Shallowford Road with roadway improvements.
LC-2	Shallowford/Country Club Road	Corridor Project	NCDOT Funding, CIP Funding	Add dedicated bicycle facilities and improve pedestrian conditions on Shallowford Road and Old Country Club Road with roadway improvements. High crash corridor.
LC-3	Old Vineyard Road	Corridor Project	NCDOT Funding, CIP Funding	Add bicycle and pedestrian accommodations with future I-40 bridge replacement.
WQC-6	Baux Mountain Road	Corridor Project	NCDOT Funding, CIP Funding	Add dedicated bicycle facilities on Baux Mountain Road with roadway improvements.
NWCBB-1	E 25th Street	Intersection Safety	NCDOT Funding, CIP Funding	Coordinate with NCDOT to improve alignment of off-ramp of John Gold Memorial Expressway at E 25th Street with future bridge replacement or ramp alignment opportunities.
SF-5	Fiddlers Creek Greenway	Multi-Use Path Connection Project	Parks grants, CIP Funding	Greenway with connections to Thomasville Road, Willard Road, Cole Road, High Point Road, Sedge Garden Park/Neighborhood Center, Smith Farm Elementary School and Pecan Lane.
LB-2	Long Branch Trail	Multi-Use Path	Parks grants, CIP Funding	Greenway with desired connections to E 15th Street, Northwest Boulevard, Blum Blanding Park/25th Street and 27th Street.

Facility Maintenance

Equally critical, and perhaps more challenging, will be meeting the need for recurring sources of expanded revenue to implement infrastructure projects. Even small amounts of local funding are very useful and beneficial when matched with outside sources. Process revisions are also important to overall funding strategies. The following recommendations are the outcome of a thorough review of Winston-Salem's potential bicycle and pedestrian funding mechanisms, a review of best practices, and comparisons with peers. The following paragraphs indicate where a potential change or initiative can be made according to the priorities of the city and/or MPO:

City Budget

Within the Winston-Salem budget, a strategic focus area has been created around Quality Transportation to 'Expand Bike/Sidewalk/Greenway Network.' It is recommended that Winston-Salem consider creating a specific annual budget item to support stated objectives to set aside funds for improving bicycle facilities and increasing multi-modal transportation connectivity, especially for improvements such as signage and wayfinding and improvements on local roadways.

Transportation Alternatives Program (TAP) and STBGDA Application (see Appendix)

TAP is the single largest federal source of funding for walking and bicycling projects. It is recommended that WSUAMPO revise the application for TAP and FHWA's Surface Transportation Program Directly Attributed Funding to simplify the application process and make it clear how submitted bicycle and pedestrian projects are scored and compete against other types of projects. This will help provide the data for a more transparency project selection process. The Call for Projects application used by the MPO in 2018 is included in the Appendix.

Highway Safety Improvement Program

Reviewing data on HSIP submissions dating back to 2010, segments and intersections have been submitted on the roadway side on an annual basis, however no locations in Forsyth County have been submitted as "Potentially Hazardous Bicycle and Pedestrian Intersection Locations." These projects can be developed into highway safety improvements that result in curb ramps, sidewalk, signal upgrades and new intersection alignments.

Project Packaging

Recently, the City of Raleigh received a $1.1 million dollar grant from the federal Congestion Mitigation and Air Quality Improvement (CMAQ) program and used it construct a package of 27 miles of marked, on-road bicycle facilities.

BUILD Grant

The City of Hickory was recently awarded a project from the USDOT. The $17 million-dollar grant was given to develop an approximately 1.7-mile bicycle and pedestrian trail and a bridge over US 321 and construct a 1.2-mile complete streetscape loop in downtown Hickory that will add designated space for bicycles and pedestrians. Similar projects could be packaged in Winston-Salem to compete for a future grant.

7.7 FACILITY MAINTENANCE

Both off-street and on-street bikeways require regular maintenance. Bicycles are more susceptible than motor vehicles to roadway irregularities such as potholes, broken glass, and loose gravel.

- To prevent obstacles and maintain the travel way, program bikeway streets regularly into the sweeping schedule, ensure leaves are collected in a timely manner, perform tree trimming where needed, and educate residents to manage their trash and recycling receptacles outside of the travel lane.
- Promote online reporting of bikeway issues. Track response to and actions on maintenance issues reported on bikeways through SeeClickFix and Winston-Salem's CityLink program.
- Undertake routine striping, signage replacement, pavement surface, and signal detection maintenance.

Construction activities present additional maintenance requirements. Construction affects bicyclists through increased roadway wear due to heavy vehicle traffic and increased debris such as sand and gravel from construction equipment. Construction activities may also hinder bicyclists if bikeways are closed or obstructed due to road maintenance, landscaping or other construction activities. Special accommodations or alternate routes should be made for bikeways to maintain cyclist's safety and comfort through construction zones.

Review accommodations for bicyclists at intersections to ensure bicyclists safety.

- Review traffic signal timing on bikeways and establish adequate clearance times.
- Establish bicycle actuation.

7.8 SUMMARY OF IMPLEMENTATION, PHASING, AND FUNDING

The projects, programs and policies in this chapter are laid out as a roadmap. Implementation of these strategies is intended over the next 10 to 15 years as not all improvements can be made quickly. It will take years of slow and steady incremental projects, identifying "low hanging fruit," programming projects, and prioritizing and re-prioritizing projects as the city accomplishes it's goals. Included are performance measures and benchmarks for tracking progress. Bicycle boulevards and projects that require striping only to complete are great "low hanging fruit." Ensure that projects are opportunistically pursued with roadway resurfacing and intersection improvements. It's sometimes preferable and ultimately beneficial to ensure the intersection functions well for bicyclists, pedestrian and motor vehicles as this is where the majority of conflict points exist. In many cases, intersections can be improved before bicycle facilities are even present and can benefit the safety of pedestrians as well. Strategically pursue high-priority projects and programs with local funding and grant funding. Packaging projects in a logical manner can also keep costs low as small projects can be expensive to mobilize. Look at opportunities associated with new development and ensure that policies are in place that create the kind of communities that reflect the strategies in the plan, especially in areas that are prime for development or those that may redevelop in the future. Also, processes should be reviewed regularly to ensure that all modes are considered fairly. Consider maintenance in issue reporting, budgeting as well as during construction. Finally, foster good relationships between all partners to bring the plan to fruition.

Chapter 8
Appendices

8 Appendices

A. WINSTON-SALEM BICYCLE MAPS

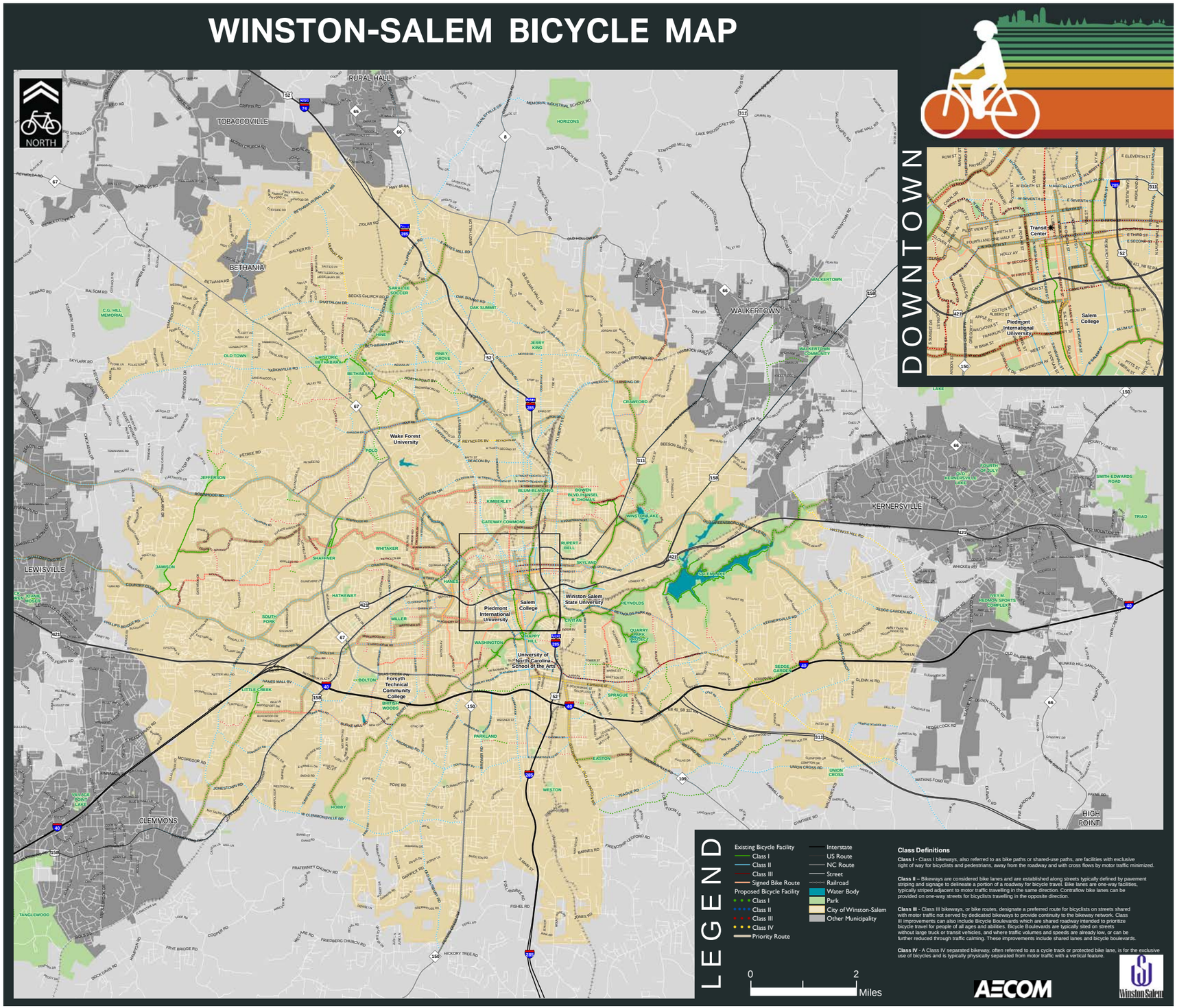
B. DESIGN STANDARDS AND TYPICAL SECTIONS

C. FUNDING RESOURCES

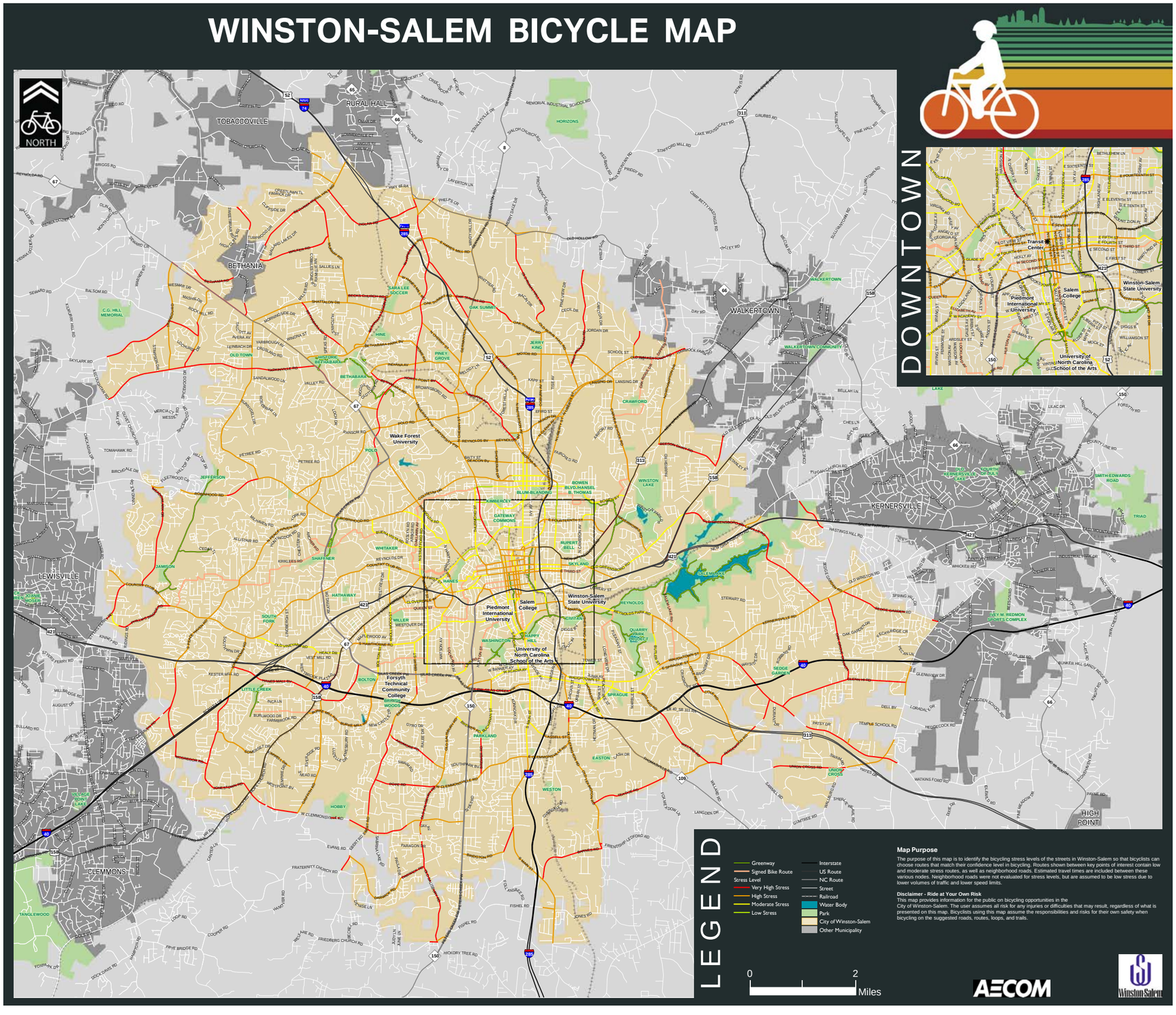
D. PUBLIC INVOLVEMENT MATERIALS

E. SURVEY RESPONSES

WINSTON-SALEM BICYCLE MAP



WINSTON-SALEM BICYCLE MAP

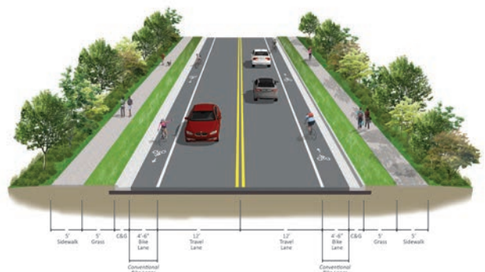


B. Design Standards and Typical Sections

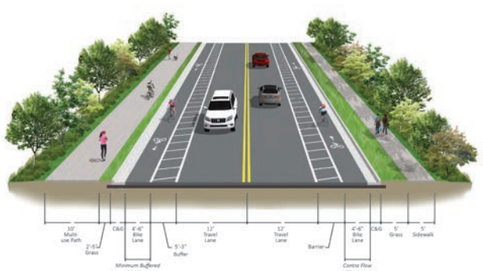
WINSTON-SALEM
BICYCLE MASTER PLAN PUBLIC INPUT MEETING

ROAD SECTIONS WITH BICYCLE ACCOMODATIONS

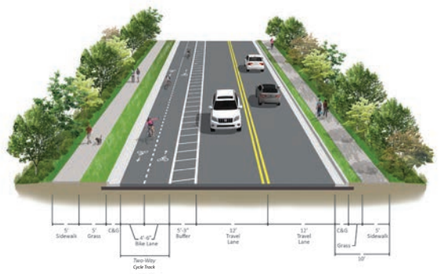
SHARROWS



STRIPED BIKE LANES

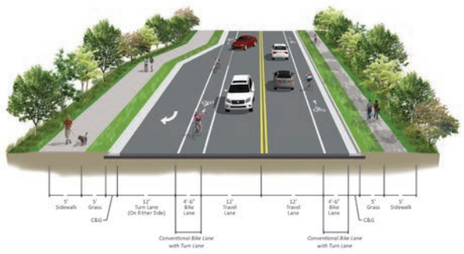


BUFFERED BIKE LANES (PAINT)



TWO-WAY CYCLE TRACK

BUFFERED BIKE LANES WITH OPTIONAL DOOR BUFFERS



CONVENTIONAL BIKE LANE WITH TURN LANE

AUGUST 16, 2018

ENTERPRISE CENTER • 1922 SOUTH MARTIN LUTHER KING, JR. DRIVE • WINSTON-SALEM, NC

C. FUNDING RESOURCES

8.1 LOCAL FUNDING

City Budget

Currently, most counties and towns do not have an annual budget line item specifically for bicycle improvements, due to in part the role NCDOT plays on many of the roadways in the region that are in the most need for bicycle-related improvements. Such improvements are typically rolled into overall transportation or public works budgets. Winston-Salem does not currently have a line-item for multi-modal improvements.

Capital Improvement Program (CIP) budget/funding: The city's CIP is a 5-year financial plan for its major infrastructure needs, establishing priorities and potential funding sources. The CIP is approved annually as part of the city's budget and allocates tax revenues to, amongst other things, traffic calming, traffic safety, street resurfacing and greenway projects.

Bonds: Municipal bonds are financial bonds issued by the city to fund numerous projects, typically by tax increases outlined in a referendum voted on by residents. For example, Winston-Salem residents approved a $122M general obligation bond in 2018 which included street resurfacing, 2-way street conversions, streetscape, bike/ped, and greenway projects.

Municipal Services District: The Municipal Service District Act allows North Carolina municipalities to establish special taxing districts to fund a variety of services and functions. When a city establishes a special taxing district for the purpose of financing downtown revitalization projects, it is commonly referred to as a Business Improvement District or BID. The downtown Winston-Salem Business Improvement District (DWSBID) comprises a 60-block area in Winston-Salem's core Central Business District and was created for the purpose of financing downtown revitalization projects. While capital projects could fall within the purview of downtown revitalization, it is not currently in the scope of services.

Developer requirements and exactions: Local jurisdictions can update the local land use and development ordinances to require that bicycle facilities, sidewalks and greenway segments are built as part of new developments of certain size and type. As a best practice, the requirement for bicycle facilities in the land use and development ordinances is linked to a specific adopted planning document which indicates where bicycle facilities would be required. The requirement for on-road bicycle facilities is frequently linked to specific street types (e.g., bicycle lanes could be required for collector streets but not for alleys).

Private/public partnerships: It may be advantageous at times for the city to enter into agreements with developers

to accept payments-in-lieu to help fund larger projects in the future, or to provide developers funding to build more than they are required. These types of case-by-case agreements help complete key connections or incentivize future developments.

Tax Increment Financing (TIF) District: TIF districts are established to fund projects within the district and repay those costs through the incremental increase in tax revenues resulting from redevelopment. TIF districts can be formally established by the city or "synthetically" administered by monitoring and accounting for the increases in city financial records. Winston-Salem does not have any existing TIF Districts.

8.2 STATE AND FEDERAL FUNDING

The state and federal funding opportunities listed below are subject to changes in administration. It is recommended that the status and availability of any federal funding listed here is confirmed through the provided links[1] or other appropriate channels, particularly:

NCDOT State Transportation Improvement Program (STIP) funding: Based on current prioritization formulas, state funding specifically for non-motorized transportation is limited to 4 percent of STIP budget and is a competitive process, 2 percent at the statewide level and 2 percent at local level split between the 14 NCDOT divisions. All projects not funded specifically as roadway or non-motorized also compete for an additional 6 percent of the total budget. While there is stiff competition for ped/bike projects statewide, the city has had success in getting bike/ped projects into the STIP. Bicycle and pedestrian projects require a 20 percent local funding commitment to be submitted into the state's biennial prioritization process.

MPO Planning Funds: These transportation planning funds require a 20 percent local match that are allocated through the Unified Planning Work Program (UPWP). These reimbursable funds cannot be used for full preliminary engineering of infrastructure projects, though can provide for early technical findings as part of a feasibility study.

Surface Transportation Block Grants (STBG): STBG grants provides states with flexible funds which may be used for a variety of highway, road, bridge, transit, and non-motorized transportation projects. A wide variety of improvements are eligible, including bicycle projects, multi-use paths, sidewalks, crosswalks, pedestrian signals, and other ancillary facilities. STBG funded facilities may be located on local and collector roads which are not part of the Federal-Aid Highway System.

Surface Transportation Block Grant - Directly Attributable (STBG-DA) / Transportation Alternatives Program - Directly Attributable (TAP-DA) Funding: These are formula, urban surface transportation funds that are directly allocated to MPOs through NCDOT per federal transportation legislation. WSUAMPO allocates DA funds for both the highway and non-highway program. The programs provide monetary assistance for construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other nonmotorized 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. Other eligible activities include conversion and use of abandoned railroad corridors for trails for pedestrians, bicyclists, or other nonmotorized transportation users. See the TAP program page for full list of eligible projects. TAP funds are sub-allocated based on population and the remaining funds may be used in any area of the state. In order to allocate available TAP funds, the Federal Highway Administration (FHWA) requires that each MPO adopt a project ranking methodology, specific to TAP, which scores projects based on locally-identified project criteria. This methodology is to be determined by the individual MPO, based on the MPO's funding and planning priorities, and must be reviewed by FHWA.

The amount of TAP funding available to individual MPOs in each fiscal year is determined by two factors: 50 percent of the funding amount is based on the population of the MPO; the other 50 percent of the funding is based on a general apportionment. Nationwide, TA/TAP bicycle and pedestrian surface transportation projects made up approximately 40 percent of TA/TAP obligated funds in 2018.

The WSUAMPO puts out a call for proposals from local governments seeking funding. These proposals are evaluated, ranked, and submitted to the WSUAMPO Transportation Advisory Committee for final approval. In 2018, the total proposed funding allocation by WSUAMPO for TAP projects was $10.8 million, with approximately 55 percent allocated to bicycle, pedestrian, and greenway projects.

Congestion Mitigation/Air Quality Improvement Program (CMAQ): This funding can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Recreation-only facilities generally are not eligible. NCDOT serves as the administrator for this program. A local match is required at the regional and sub-regional level. Forsyth County is listed as a current air quality maintenance and non-attainment area for fund eligibility. Nationwide,

[1] For a list of eligible Pedestrian and Bicycle Funding Opportunities by funding source from FHWA, see the following quick reference: https://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.cfm

CMAQ bicycle and pedestrian surface transportation projects made up approximately 20 percent of CMAQ obligated funds in 2018. NCDOT allocated $1,980,058 to the WSUAMPO for Fiscal Year 2019. The Business-40/US 421 Multi-Use Path (U-2827) is a recent example of the use of CMAQ funds for a bike/ped project.

Highway Safety Improvement Program (HSIP): Eligible projects for this program include bicycle and pedestrian safety improvements, enforcement activities, traffic calming projects, and crossing treatments for non-motorized users in school zones. Depending on the cost and nature of the countermeasures, the investigations may result in requesting division maintenance forces to make adjustments or repairs, developing Spot Safety projects, developing hazard elimination projects, making adjustments to current TIP project plans or utilizing other funding sources to initiate countermeasures.

USDOT's BUILD Grants: This program replaces the former Transportation Investment Generating Economic Recovery Grant Program by USDOT. It provides opportunities for USDOT to invest in roads and other projects that have a significant local or regional impact. For the 2018 round of BUILD Transportation grants, the maximum grant award is $25 million for a single project, and no more than $150 million can be awarded to a single state. There is a $5 million minimum award for projects located in urban areas, and a $1 million minimum for rural projects.

Private and Non-Profit Grant Opportunities: Another method of funding bicycle facilities is to partner with public agencies, private companies and/or non-profit organizations. Most private funding sources offer limited grants and public-private partnerships engender a spirit of cooperation, civic pride and community participation. Details regarding these opportunities may vary and change regularly. People For Bikes has a grant program that typically supports up to $10,000 for projects and programs in the U.S. BikeWalk NC won the maximum award in 2018 for a campaign to strengthen the State's Complete Streets Policy. Most grants are focused on infrastructure projects. The Z. Smith Reynolds Foundation leverages two grants opportunities for short-term funding: Community Progress Fund ($20,000-$30,000 per year for one or two years) and Collaborative Problem Solving ($50,000 to $150,000 a year for up to four years). Criteria and focus areas for each grant differ. Other opportunities include the ***Blue Cross Blue Shield of North Carolina Foundation, the North Carolina Community Foundation, the Bank of America Charitable Foundation and REI Foundation.***

WSUAMPO Call for Projects Application

(Please see following pages)

WINSTON-SALEM URBAN AREA METROPOLITAN PLANNING ORGANIZATION
2018 CALL FOR PROJECTS
PROJECT APPLICATION

Date: _____

Municipality: _____

Submitted by: _____

Title: _____

Project Type:
____ Sidewalk
____ Greenway
____ Small Roadway Project
____ Streetscape Improvements
____ Intersection Improvement
____ Transit
____ Other (Provide Details)

Location of project: _____

Limits of Project: _____

Length of project: _____

Description of Need

_____

_____

_____

_____

_____

_____

_____

_____

Reimbursement

Phases of work requested: ____ Preliminary Engineering
____ Right of Way/Utility Relocation
____ Construction

Is the municipality prepared to pay the required match on the above phases of work? ___

WINSTON-SALEM URBAN AREA METROPOLITAN PLANNING ORGANIZATION
2018 CALL FOR PROJECTS
PROJECT APPLICATION

If yes, provide a Letter of Support for the 20% match.

Cost Estimates

Provide cost estimates (and source) for each phase of work.

Preliminary Engineering _____

Right of Way/Utilities _____

Construction _____

Were realistic quantities and current bid prices used for the construction estimate? _____

Were provisions for construction administration included in the estimate? _____

Schedule

Preliminary Engineering _____

Right of Way/Utilities _____

Construction _____

Is the proposed completion date realistic and obtainable? _____

How was the project schedule determined? _____

Has adequate time been allocated for acquiring right of way? _____

Has adequate time been allocated for relocating utilities? _____

Has adequate time been allocated for the process of soliciting and securing a private engineering firm to assist with design of the project? _____

Has adequate time been allocated for the process of soliciting and securing a private engineering firm to assist with the administration and inspection of the project? _____

Has adequate time been allocated for application and securing any applicable permits? _____

Has adequate time been allocated for NCDOT to review and approve plans and specifications? _____

Has adequate time been allocated for review and concurrence of bid award? ___

WINSTON-SALEM URBAN AREA METROPOLITAN PLANNING ORGANIZATION
2018 CALL FOR PROJECTS
PROJECT APPLICATION

Right of Way

Will proposed project require acquisition of easements and/or right of way?

_____

If proposed project makes improvements to an existing facility, is the existing right of way sufficient for improvements? _____

Is there sufficient right of way to accommodate relocation of utilities if needed?

_____

To what extent has the availability of right of way been investigated?

Explain in detail:

_____

_____

_____

_____

_____

_____

Is the Municipality aware of the requirements for acquiring and certifying right of way using federal funds? _____

Utilities

What utilities are present on the proposed project site?

____ Gas
____ Water
____ Sewer
____ Power (Aerial and/or Underground)
____ Communications (Aerial and/or Underground)
____ Cable TV
____ Other

WINSTON-SALEM URBAN AREA METROPOLITAN PLANNING ORGANIZATION
2018 CALL FOR PROJECTS
PROJECT APPLICATION

List owners and contacts of all utilities:

_____

_____

_____

_____

Will the proposed project necessitate relocation of any of the above? _____

If so, have estimates been secured from the utility owners? _____

Is the municipality prepared to pay for the utility re-location? _____

Will Public Utility Easements (PUE's) be required? _____

If so, is the municipality prepared to acquire these? _____

To what extent have the potential utility conflicts been investigated? Explain in detail:

_____

_____

_____

_____

_____

Environmental Issues

Are there potential environmental concerns (including but not limited to: historic properties, wetlands, endangered species, flood studies, air and water quality issues) on or near the project site? _____

To what extent have these impacts been investigated? Explain in detail:

_____

_____

_____

_____

WINSTON-SALEM URBAN AREA METROPOLITAN PLANNING ORGANIZATION
2018 CALL FOR PROJECTS
PROJECT APPLICATION

NCDOT

If proposed project is on a NCDOT route, has NCDOT reviewed projects? _____

If so, provide contact person and information: _____

_____

Has an NCDOT encroachment agreement been issued? _____ Applied for? ___

WINSTON-SALEM URBAN AREA METROPOLITAN PLANNING ORGANIZATION
2018 CALL FOR PROJECTS
PROJECT APPLICATION

BICYCLE & PEDESTRIAN PROJECT EVALUATION

Project Name/Route/Title: _____

Project Type: ☐ Bicycle ☐ Pedestrian

Access: *(Within .5 miles of pedestrian facility / within 1.5 miles of bicycle facility)*		
-High-Density Residential Areas (at least 12 units/acre)	4	_____
-Transit Station (Hub or Main Terminal)	4	_____
- Major Employment Center (Activity Centers as defined in Legacy 2030 Update)	4	_____
-School ☐ K-8 ☐ 9-12 ☐ College/University	4	_____
- Cultural Attraction (museum, stadium, theater, etc.)	4	_____
- Park/Playground/Recreation Center	4	_____
- Shopping/Retail & Services	4	_____
- Municipal Site (local, county, state, or federal government office or property, not including council or judicial chambers)	4	_____
MAXIMUM POINTS – 32		Total _____
Constructability:		
ROW Acquired		
50-100%	10	_____
25-50%	5	_____
0-25%	3	_____
Has the project been studied through a preliminary engineering process? ☐ Yes ☐ No	5	_____
Is the project included in an adopted plan? ☐ Yes ☐ No	5	_____
MAXIMUM POINTS – 20		Total _____
Safety:		
Crashes		
5 or more	15	_____
4	12	_____
3	10	_____
2	7	_____
1	5	_____
Posted Speed Limit		
55 and over	15	_____
40 to 50	12	_____
30 to 40	7	_____
25	5	_____
MAXIMUM POINTS – 30		Total _____
Connections: *(Connections to existing or funded Sidewalk/Greenway/Bike/Transit Facilities)*		
3, or more, connections	18	_____
2 connections	12	_____
1 connection	6	_____
MAXIMUM POINTS – 18		Total _____
Total:		
		_____

WINSTON-SALEM URBAN AREA METROPOLITAN PLANNING ORGANIZATION
2018 CALL FOR PROJECTS
PROJECT APPLICATION

Additional Information

Please provide additional information concerning any due diligence the municipality has performed to sustain the viability of the proposed project.

_____
_____
_____
_____
_____
_____
_____
_____
_____

Please provide the following documentation with your application if applicable and available:

- Turning movement counts
- Signal warrant analysis
- Speed or delay studies
- Accident diagrams
- Preliminary/conceptual designs
- Project Map
- Right-of-way identification
- Letter of Support for 20% match
- Cost estimate

*Please submit this form to Kelly Garvin by **January 31, 2018***
Winston-Salem Department of Transportation P.O. Box 2511 Winston-Salem, NC 27102
Tel: 336.747.6881 Fax: 336.748.3370 Email:kellym@cityofws.org

D. PUBLIC INVOLVEMENT MATERIALS

Materials Created for Steering Committee Meetings and Public Meetings

Winston-Salem Bicycle Master Plan Public Input Meeting #1 Sign-In

Name	Address	Telephone	Email
Maria Salazar	626 Hillhaven Dr WS NC	336 464-6510	miaguad1212@gmail.com ~~Miaguad~~
Cody Stevens	320 N Broad St, 27101	301-514-1617	steve49@gmail.com
Paul Moss	270 Carter Circle	716-867-4740	paulmcsi@gmail.com
David Wallace	1514 Overbrook Ave WSNC 27104	336-618-5175	dwallace1@wctriad.rr.com
Judy Hunt	"	336-602-0444	
Linda Pass	2425 Westfield Ave W-S, NC 27103	336-391-3533	Lpass1959@gmail.com
Shawn Byrd	1037 Kingtree Ridg Dr. WS, NC 27127	336 4223811	bgdbws@gmail.com
Chip Rumph	1025N. Cameron Ave W-S	336 703 2178	CNCRumph@gmail.com
David Finn	716 S. Hawthorne WS	336 407 2174	finndt@wfu.edu
Darren Redfield	Peacehaven Rd		darrenmr@cityofws.org
Eva Lively	964 Lytchfield WS- NC 27104		elively@triad.rr.com
Tom Ramirez	411 S Marshall, 401 WS, NC 27101		tomhramirez@gmail.com

Winston-Salem Bicycle Master Plan Public Input Meeting #1 Sign-In

Name	Address	Telephone	Email
Libby Skinner	4134 Mill Creek Rd WS, NC 27106	336-655-3519	skinneej@forsyth.cc
Charles Reeves	6253 Arbor Circle Clemmons NC 27012		charles.reeves@yahoo.com
Michael Robinson	2849 Meadow Ln W-S 27106	336 354-5540	MLRJUDGE@OUTLOOK.com
Katlyn Greene	~~126 Brookstown Ave~~		kugextra@gmail.com
Bruce Hermann	122 Piedmont Ave W-S	336-723-2350	hermannbruce@gmail.com
Laura Phail	2216 Elizabeth Ave W-S	336 816 3174	laurap.kail@gmail
Mike Harris	1241 Kent Place		MFPWHARRIS@GMAIL.COM
Martha Hartley	600 S. Main St	336 721 7307	mahartley@oldsalem.org
David Fain	309 Deerglade Rd. W-S	336-408-0606	
Charlie Wilson	1177 Edgebrook Dr WS 27106		engrCWNC@gmail.com
David Wainwright	632 S Sunset Dr WS 27103		wake.dainwright@gmail.com
Sean Barb	691 Chester Rd W-S	336 971 3941	sean.barb@gmail.com

Winston-Salem Bicycle Master Plan Public Input Meeting #1 Sign-In

Name	Address	Telephone	Email
Maria Salazar	626 Hillhaven Dr WS NC	336 464-6510	miaguad1212@gmail.com ~~Miaguad~~
Cody Stevens	320 N Broad St, 27101	301-514-1617	steve49@gmail.com
Paul Moss	270 Carter Circle	716-867-4740	paulmcsi@gmail.com
David Wallace	1514 Overbrook Ave WSNC 27104	336-618-5175	dwallace1@wctriad.rr.com
Judy Hunt	"	336-602-0444	
Linda Pass	2425 Westfield Ave W-S, NC 27103	336-391-3533	Lpass1959@gmail.com
Shawn Byrd	1037 Kingtree Ridg Dr. WS, NC 27127	336 4223811	bgdbws@gmail.com
Chip Rumph	1025N. Cameron Ave W-S	336 703 2178	CNCRumph@gmail.com
David Finn	716 S. Hawthorne WS	336 407 2174	finndt@wfu.edu
Darren Redfield	Peacehaven Rd		darrenmr@cityofws.org
Eva Lively	964 Lytchfield WS- NC 27104		elively@triad.rr.com
Tom Ramirez	411 S Marshall, 401 WS, NC 27101		tomhramirez@gmail.com

Winston-Salem Bicycle Master Plan Public Input Meeting #1 Sign-In

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Libby Skinner	4134 Mill Creek Rd WS, NC 27106	336-655-3519	skinneej@forsyth.cc
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Michael Robinson	2849 Meadow Ln W-S 27106	336 354-5540	MLRJUDGE@OUTLOOK.com
Katlyn Greene	~~126 Brookstown Ave~~		kugextra@gmail.com
Bruce Hermann	122 Piedmont Ave W-S	336-723-2350	hermannbruce@gmail.com
Laura Phail	2216 Elizabeth Ave W-S	336 816 3174	laurap.kail@gmail
Mike Harris	1241 Kent Place		MFPWHARRIS@GMAIL.COM
Martha Hartley	600 S. Main St	336 721 7307	mahartley@oldsalem.org
David Fain	309 Deerglade Rd. W-S	336-408-0606	
Charlie Wilson	1177 Edgebrook Dr WS 27106		engrCWNC@gmail.com
David Wainwright	632 S Sunset Dr WS 27103		wake.dainwright@gmail.com
Sean Barb	691 Chester Rd W-S	336 971 3941	sean.barb@gmail.com

Winston-Salem Bicycle Master Plan Public Input Meeting #1 Sign-In

Name	Address	Telephone	Email
Richard Rauch	1740 VA RD 27104	336-714-6408	RRAUCH@CRPAN.com
Twin City Hive	301 Brookstown AV Suite 300	336-745-7051	twincityhive@gmail.com

Encouragement – Walk & Roll Winston-Salem


Encouragement – W-S Cycling Classic

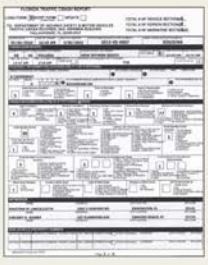
Encouragement – National Cycling Center

Education – Safe Routes to School


Evaluation - Bicycle Counting Program

- *Salem Lake: 60,000 Bicycle Trips Annually*
- *4th Street Downtown: 24,000 Bicycle Trips Annually*


Evaluation – Crash Analysis

WINSTON-SALEM BICYCLE MASTER PLAN



Matthew Burczyk
Bicycle & Pedestrian Coordinator
City of Winston-Salem
336.747.6884
mattbk@cityofws.org

www.wsbikeplan.com

The 6 "E"s

- Engineering
- Encouragement
- Education
- Evaluation
- Enforcement
- Equity

Engineering - On-Street Infrastructure

- 25 Miles Currently
- 35 Miles Total in 2018
- 45 Miles Total in 2019


Engineering - Greenways and Paths

- 27 Miles Currently
- Additional Funded Projects
  - *Brushy Fork Greenway*
  - *Piedmont Regional Greenway*
  - *Salem Creek Greenway Extension*
  - *Business 40 Multi-Use Path*
  - *Lantern Ridge Greenway Connector*
  - *Long Branch Trail*

Engineering - Bicycle Parking

- 300 Bicycle Parking Stalls Downtown and at Schools and Parks
- Development Ordinance Requires Bicycle Parking

Engineering / Encouragement - Bike Share

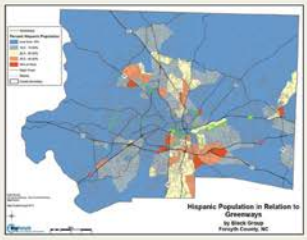
Enforcement

- New State Laws
- Driver/Cyclist Interactions
- Bike Lane Parking


City's Bicycle and Pedestrian Safety Campaign Entering Enforcement Phase

Equity

Address the Unique Needs of Neighborhoods and Individuals through the other "E"s



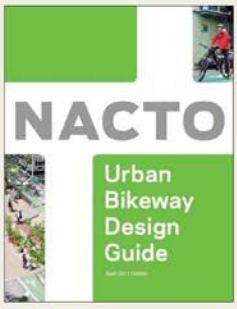
Existing Bicycle Master Plan

- Adopted 2005
- Infrastructure Tools and Recommendations
  - Bike Lanes
  - Edge Lines
  - Signed Routes
  - Paths
  - Shared Lane Markings
  - Wide Outside Lanes

Need for a New Plan

- Community Growth and Change
- Accomplishments
- Bicycle Friendly Community Designation
- Infrastructure Developments

New Tools



Cycle Tracks

Bicycle Signals

Buffered Bicycle Lanes

High Visibility Bicycle Lanes

Advisory Bicycle Lanes

Bicycle Boulevards

Intersection Treatments

- Two-Stage Turn Queue Boxes
- Bike Boxes

Bicycle Master Plan Process

- December 2017 – December 2018
- Public Input
  - *Large public meetings*
  - *Small group meetings*
  - *Special events*
  - *Website – www.wsbikeplan.com*
  - *Direct contact*
- Network Analysis
- Bicycle Facility Recommendations
- Bicycle Parking Analysis
- Programmatic Recommendations
- Bicycle Map Development

Your Vision for Cycling in Winston-Salem

- What should the Bicycle Master Plan accomplish?
- What would encourage you to cycle more?
- What do you like about cycling in Winston-Salem?
- What does Winston-Salem need to become more bicycle friendly?

Questions & Comments

- Maps
- Project Website
- Surveys
- Comment Sheets
- Infrastructure Preference Display
- Discussion with Staff and Other Attendees

WS BMP Public Meeting No. 2 Sign-In Sheets

ID 2	First Name	Last Name	Street Address	City	State	Zip Code	Other	Number in party
1	Melissa	Rosebrock	120 harper Ridge Ct	Clemmons	NC	27012	mmrosebrock@gmail.com	1
2	Keith	Pope	4960 Oak Garden Drive	Winston-Salem	NC	27284	kpope12@netzero.com	1
3	Amy	Easter	3407 Luther Street	Winston-Salem	NC	27127	amy@beersngears.com	1
4	Alex	Boston		Winston-Salem	NC		alexander.m.boston@gmail.com	1
5	Henry	Garrett	743 South Poplar Street	Winston-Salem	NC	27101	hmgarrett@me.com	1
6	Phillip	Craver		Winston-Salem	NC		pcraver@ncdot.gov	1
7	Erik	Olshall	1022 Englewood Drive	Winston-Salem	NC	27106	erik.olshall@gmail.com	1
8	Jeff	Bloomfield		Winston-Salem	NC		jeffbloomfield@gmail.com	1
9	Greg	Errett	4 Park Blvd	Winston-Salem	NC	27127	gerrett@triad.rr.com	1
10	Steve	Zorn		Winston-Salem	NC		srzorn@hotmail.com	1
11	Louise	Allen	3104 Turkey Hill Court	Winston-Salem	NC	27106	allenlouise@gmail.com	1
12	Earl	Taylor		Winston-Salem	NC		lost.in.interior@gmail.com	1
13	Matthew	Hart		Winston-Salem	NC		hartmp@gmail.com	1
14	Caleb	Williams		Winston-Salem	NC			1
15	Sandy	High		Winston-Salem	NC		kandshigh@gmail.com	1
16	Phillip	Summers	2422 Peachtree Street	Winston-Salem	NC	27107	summers.phillip@gmail.com	1
17	Steven	Mierisch	7016 Ashburn Circle	Clemmons	NC	27012	mierischs@juno.com	1
18	James	Rodriguez		Winston-Salem	NC		james.rodriguez@upr.edu jamesrodriguez@epr.edu jamesrodriguez.upa.edu	1
19	Myra	Stafford	PO 2511	Winston-Salem	NC	27101	myras@cityofws.org	1
20	Jane	Doe	123 any street	Winston-Salem	NC		xnxxnxn@whatever	1
21	Earl	Anderson		Winston-Salem	NC			1
22	Daniel	M ntgomery		Winston-Salem	NC			1
23	Delia	Smith	4900 Pinewood	Winston-Salem	NC		deesmith30@gmail.com	1
24	Andy	Meixner	211Gaston Streetr	Winston-Salem	NC	27103		1
25	James	Benckert	4108 Trollet RidgeLane	Winston-Salem	NC	27106	jamesbenckert@gmail.com	1
26	Morgana	Mongrew-Chaffin		Winston-Salem	NC			1
27	Simon	Rice		Winston-Salem	NC			1
28	Steve	Wintes		Winston-Salem	NC			1
29	Greg	Waddell	362 Patterson Ave	Winston-Salem	NC	27101	gregg@cycleyourcity.com	1
30	Nicholos	Salazar	626 Hillside Dr	Winston-Salem	NC	27101		4
31	Michael	Prentice	860 Chatham Road	Winston-Salem	NC	27101	mprent08@gmail.com	1
32	Jacky	Jolley	611 Brae Hill Ct	Winston-Salem	NC	27107		2
33	Marian	Wilson	2501 Warick	Winston-Salem	NC	27104	mwilson27@triad.rr.com	1
34	Sharon	Ralston	105 N Avalon Rd	Winston-Salem	NC	27104	ralstonsharon@gmail.com	1
35	Jake	Easter		Winston-Salem	NC			1
36	Guy	Spihar	170 Maynard Drive	Winston-Salem	NC	27107	gjspiher@gmail.com	1
37	Nathan	Lemans	3341 Hyd Place Circle	Winston-Salem	NC	27103	nathanllemans@gmail.com	1
38	Stephanie	Peerson	1555 Sharon Rd	Winston-Salem	NC	27103	stephaniemckinnon33@gmail.com	1
39	Katie	Burford	684 Old Hollow Road	Winston-Salem	NC	27105	burfordses@yaho.com	4
40	Randall	Rupp	1 Robinhood Road	Winston-Salem	NC	27104	Raupp@gmail.com	1

WS BMP Public Meeting No. 2 Sign-In Sheets

ID 2	First Name	Last Name	Street Address	City	State	Zip Code	Other	Number in party
41	Candi	Pennington	1555 Sharon Road	Winston-Salem	NC	27103	candipennington89@gmail.com	1
42	Jeff	MacIntosh	129 Woodbriar Road	Winston-Salem	NC	27106	jeffm@cityofws.org	1
43	Benjamin	Wilson	817 West End Blvd	Winston-Salem	NC	27101	bwilson8202@triad.rr.com	1
44	Greg	Marino	130 Whitmore Cove Ct	Clemmons	NC	27012	gregmarino.email@gmail.com	1
45	Emily	Lewis	621 Miller St	Winston-Salem	NC	27103	emmy.lewis@gmail.com	1
46	Martha	Hartley	601 S. Main Street	Winston-Salem	NC	27101		1
47	Artie	Sparrow		Winston-Salem	NC			1
48	Elise	Barrella	50 W. 4th St	Winston-Salem	NC	27101		1
49	Cheraton	Love	605 Burke Trail	Thomasville	NC	27360	cheraton.love@gmail.com	1
50	Ben	Stamey	919 Watson Ave	Winston-Salem	NC	27103		1
51	Melicia	Whitt-Gloover		Winston-Salem	NC		mwhittglover@gramercyresearch.com	1
52	Jan	Anderson	1937 Angelo Street	Winston-Salem	NC	27104	1937angelostreet@gmail.com	1

Meeting Purpose:	WS Bike Master Plan Public Meeting
Date/Time:	August 16, 2018 / 5:30 AM - 7:30 PM
Location:	Enterprise Center

SIGN-IN SHEET

PLEASE PRINT

#	NAME	ADDRESS	CITY, ZIP	PHONE	EMAIL
1	Marian Wilson	2501 Warwick Rd	Winston Salem 27104		mwilson27@triad.rr.com
2	Sharon Ralston	105 N. Avalon Rd	Winston Salem 27104		ralstonsharon@gmail.com
3	Jake Foster				
4	Guy Spicher	170 Hoyland Dr	27107		gjspicher@gmail
5	Nathan Lemons	3341 Hyde Place Cir	Winston-Salem 27103		nathanllemons@gmail.com
6	Candi Pennington	1555 Sharon Rd.	W-S 27103		candipennington89@gmail.com
7	Stephanie Pearson	"	"		stephmckinnon33@gmail.com
8	JAN ANDERSON	1937 Angelo St.	Winston Salem 27104		1937Angelo Street@gmail
9	Katie Burford	684 Old Hollow Rd	W-S NC 27105		burfordsec@yahoo.com
10	KENDALL RUPP	1750 ROBINHOOD RD	W-S 27104		KRUPP@GMAIL.COM
11					
12					
13					
14					
15					

Agenda

- Project overview
- Progress to date
- Review station format

2

Project overview

- Existing bicycle plan was adopted in 2005
  - Community growth and change
  - Accomplishments
  - Incorporate current infrastructure standards/best practices

3

What will the bike plan include?

- Engineering
- Encouragement
- Education
- Evaluation
- Enforcement
- Equity

4

Project Updates

- Completed the first round of public engagement
- Completed draft bicycle network analysis
- Developed design standards for bicycle facilities
- Developed draft project recommendations

5

Survey Results

- 161 people took the full online survey
  - All but 22 lived in the City
  - Approximately 60 percent were male
  - Majority (77 percent) were white
  - Income levels varied
- Nearly 90 percent had bicycled in the last 12 months

6

Bicycle Facility Recommendations Planning Process

– Developed a network to connect Winston-Salem taking into account:
  • Existing bicycle and greenway facilities
  • Points of interest/population centers
  • Survey/feedback from public
– Evaluated the existing roadway conditions to make facility type recommendations

7

Bicycle Recommendations

225 roadway segments included in the draft recommendations, of which within the existing right-of-way, we propose:
  • 102 sharrows
  • 30 bicycle boulevards
  • 71 bicycle lanes
  • 41 buffered bicycle lanes
  • 5 Cycle tracks
  • 12 Contra flow

8

Open House

– Five stations to check-out
  1. Bicycle facilities (linear/roadway)
  2. Bicycle facilities (intersection treatments)
  3. Bicycle friendly features
  4. Proposed bicycle network
  5. Comment station

– Project team members will be at each station to help answer questions

9

Meeting wrap-up

– Next public meeting will be scheduled for late fall/early winter
– Draft plan will be presented

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ID	First Name	Last Name	Street Address	City	Zip Code	mail Addres	luded on th	hear about	Other	mber in party
1	Greg	Errett	4 Park Blvd.	Winston-Salem	27127		-1		gerrett@triad.rr.com	1
2	Steve	Zucker	1521 Reynolda Rd.	Winston-Salem	27104		0			1
3	George	Peterson	1454 Capri Rd.	Winston-Salem	27103		-1		george.d.peterson@gmail.com	1
4	Joseph	Fagan	6070 Charlie Rd	Kernersville	27284		-1		goalie1jf@gmail.com	1
5	Carin	Kromm	225 Oakmount Park Court	Kernersville	27284		-1		clkromm@gmail.com	1
6	Gavin	Irby	552 South Westview Drive	Winston-Salem	27103		-1		girby01@gmail.com	1
7	Mark	Caudill	4800 Glouchester Rd.	Winston-Salem	27127		-1		mcaudill336@gmail.com	1
8	Morgana	Chaffin	2233 Rosewood Ave.	Winston-Salem	27103		-1		morganachaffin@gmail.com	1
9	Kathy	Gondring	438 N Avalon Rd.27104	Winston-Salem			-1		ksgondring@gmail.com	1
10	Jacob	Easter	3407 Luther St	Winston-Salem	27127		-1		easter.jake@gmail.com	1
11	Chip	Rumph	1025 Cameron	Winston-Salem	27101		-1		cncrumph@gmail.com	1
12	Martha	Hartley	600 S Main St	Winston-Salem	27101		1			1
13	Chris	Studley	136 Scottridge Dr.	Winston-Salem	27107		1			1
14	Cameron	Sweeney	820 Sylvan	Winston-Salem	27104		-1		camsween86@hotmail.com	1
15	Greg	Mohler	1295 Turkeyhill Rd.	Winston-Salem	27106		-1		gmohler2@gmail.com	1
16	Ms.	Mohler	1295 Turkeyhill Rd	Winston-Salem	27106		1			1
17	Richard	Rauck	1740 Virginia Rd.	Winston-Salem	27104		1		rrauck@ccrpain.com	1
18	Anderson	Cox	817 Gales	Winston-Salem	27103		-1		anderson.o.cox@gmail.com	1
19	Kelley	Montoyan	2208 Briar Glen RD	Winston-Salem	27127		-1		kmancrx@hotmail.com	1
20	Artie	Sparrow	2572 Mount Salem Road	Pfafftown	27040		1			1
21	Christine	Jobsky	3175 Creighton Lane	Winston-Salem	27127		-1		christine.jobsky@yahoo.com	1
22	Amy	Easter	3407 Luther Street	Winston-Salem	27127		-1		amygeaster@gmail.com	1
23	John	France	4460 Oak Ridge Drive	Winston-Salem	27105		-1		elder_jwf@hotmail.com	1
24	Daniel	Montgomery	2233 Rosewood Ave	Winston-Salem	27103		-1		danopato@gmail.com	1
25	Jim	Wade	201 Stanaford Road	Winston-Salem	27104		-1		wadejpm@gmail.com	1
26	Sharon	Brooks	3266 Nottingham Road	Winston-Salem	27104		-1		sharon.brooks10@gmail.com	1
27	Michelle	Soyars	4965 Shady Maple Lane	Winston-Salem	27106		-1		soyarsm@triad.rr.com	1
28	Jeff	Macintosh	129 Woodbriar Road	Winston-Salem	27106		-1		jeffm@cityofws.org	1
29	Katie	Rauck		Winston-Salem			-1		katie.rauck@gmail.com	1

Winston-Salem Bicycle Master Plan

Please use this form to provide your comments about the Draft Winston-Salem Bicycle Master Plan. Specifically, which roadway corridors do you believe should be prioritized for bicycle infrastructure improvements?

Priority Corridor #1: Forsyth Tech Connection

Priority Corridor #2: Waughtown Route

Priority Corridor #3: Cross town connector

Other Comments:

6-E's yeah!

Included in the 2030 Legacy - makes it harder for others to say they didn't know it was planned.

Winston-Salem Bicycle Master Plan

Please use this form to provide your comments about the Draft Winston-Salem Bicycle Master Plan. Specifically, which roadway corridors do you believe should be prioritized for bicycle infrastructure improvements?

Priority Corridor #1: S. Main St / Old Salem / Downtown

Priority Corridor #2:

Priority Corridor #3:

Other Comments:

Support Bicycle-Pedestrian Zone for the Old Salem area.

The citywide network looks great — Thank you for the comprehensive nature of the whole plan.

Winston-Salem Bicycle Master Plan

Please use this form to provide your comments about the Draft Winston-Salem Bicycle Master Plan. Specifically, which roadway corridors do you believe should be prioritized for bicycle infrastructure improvements?

Priority Corridor #1: Salem Lake Greenway

Priority Corridor #2:

Priority Corridor #3:

Other Comments:

Salem Lake Greenway consistent flooding. Modular bridges.

Winston-Salem Bicycle Master Plan

Please use this form to provide your comments about the Draft Winston-Salem Bicycle Master Plan. Specifically, which roadway corridors do you believe should be prioritized for bicycle infrastructure improvements?

Priority Corridor #1:

Priority Corridor #2:

Priority Corridor #3:

Other Comments:

General Concern: Safety along the bicycle paths for older seniors biking alone during the day.

Winston-Salem Bicycle Master Plan

Please use this form to provide your comments about the Draft Winston-Salem Bicycle Master Plan. Specifically, which roadway corridors do you believe should be prioritized for bicycle infrastructure improvements?

Priority Corridor #2: Down Town Connector — more Bikes less car Downtown

Priority Corridor #1: Waughtown Route

Priority Corridor #3: West side

Other Comments:

Class 2 upgrade ~~Ridge~~ Ridgewood from Union Cross to High Point Road

Class 2 Extend Glenn Hi to Union Cross

Should have added Bike lanes to Union Cross

LOWER GRADE than alternate "Back Ways"

Winston-Salem Bicycle Master Plan

Please use this form to provide your comments about the Draft Winston-Salem Bicycle Master Plan. Specifically, which roadway corridors do you believe should be prioritized for bicycle infrastructure improvements?

Priority Corridor #1: Down town Connections

Priority Corridor #2: Forsyth Medical p.139

Priority Corridor #3: Reynolds Link p191

Other Comments:

#1 It would be helpful if the city could improve some of the busier road crossings on cycle routes. For example, on the Yadkin county connector, it is difficult crossing N. Peace Haven Rd ~~[illegible]~~ between Hearthside & Mountain View. No matter which direction a cyclists goes, they must join busy traffic, then try to turn Left to ~~[illegible]~~ continue. It would be better to have a wide sidewalk on one side and a safe crossing to it.

#2 Sharrow markings along signed bike routes would help with following the route, and they are more theft / vandal ~~resistant~~ resistant than signs

#3 Work with NCDOT on proposed State Bike Route 2B, an alternate for existing route 2

Winston-Salem Bicycle Master Plan

Please use this form to provide your comments about the Draft Winston-Salem Bicycle Master Plan. Specifically, which roadway corridors do you believe should be prioritized for bicycle infrastructure improvements?

Priority Corridor #1: Robinhood Rd

Priority Corridor #2: Polo Rd (Northside Trace)

Priority Corridor #3: Long Branch Extension

Other Comments:

Winston-Salem Bicycle Master Plan

Please use this form to provide your comments about the Draft Winston-Salem Bicycle Master Plan. Specifically, which roadway corridors do you believe should be prioritized for bicycle infrastructure improvements?

Priority Corridor #1: Robinhood Rd

Priority Corridor #2: Polo Rd (Northside Trace)

Priority Corridor #3: Bethabara Brightway

Other Comments:

Winston-Salem
Bicycle Master Plan

Please use this form to provide your comments about the Draft Winston-Salem Bicycle Master Plan. Specifically, which roadway corridors do you believe should be prioritized for bicycle infrastructure improvements?

Priority Corridor #1: Reynolda Link

Priority Corridor #2: Westside Bike Blvd

Priority Corridor #3: Down Town Connector

Other Comments:

Other Concern is the proposal of more Bike Friendly Lanes and streets with How Low the Frequency is now w/ street cleaning. How do we handle more Bike Lane when the existing ones aren't maintained & Clean

Winston-Salem
Bicycle Master Plan

Please use this form to provide your comments about the Draft Winston-Salem Bicycle Master Plan. Specifically, which roadway corridors do you believe should be prioritized for bicycle infrastructure improvements?

Priority Corridor #1:

Priority Corridor #2:

Priority Corridor #3:

Other Comments:

Bike lane striping:
- Great to have bicycle marking within wider area.
- Adding the white "stripe" to separate from traffic is a problem for cyclists.
  - traffic does not ever cross into this area
  - debris gets blown into bike lane and collects
  - becomes unsuitable to ride in bike lane
  - cars see cyclists not using dedicated bike lane and become angry

⇒ wider road with bike icon. no stripe.

Project Updates

- Held Public Meeting no. 2 in August
- Launched second online survey: www.wsbikeplan.com
- Addressed comments on the draft bicycle project recommendations
- Created priority routes
- Completed draft bicycle master plan

4

Introductions

- WSDOT
- Consultant team
- Steering committee

2

Public Outreach Summary

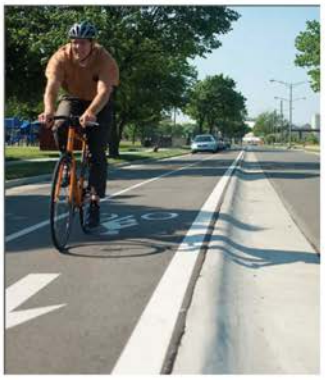
- 52 people attended the second public meeting
  - Learn about different facility types and improvements
  - Able to comment on the draft list of projects
  - Recommend additional facilities/improvements
- 150 people participated in Survey No. 2

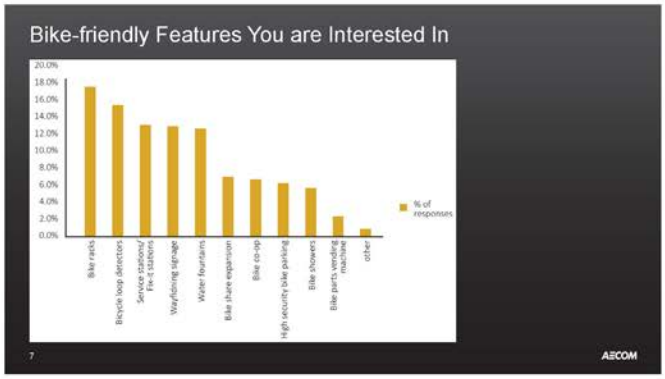
5

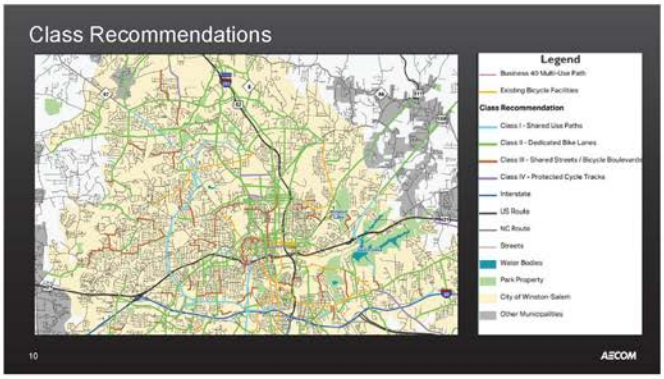
Agenda

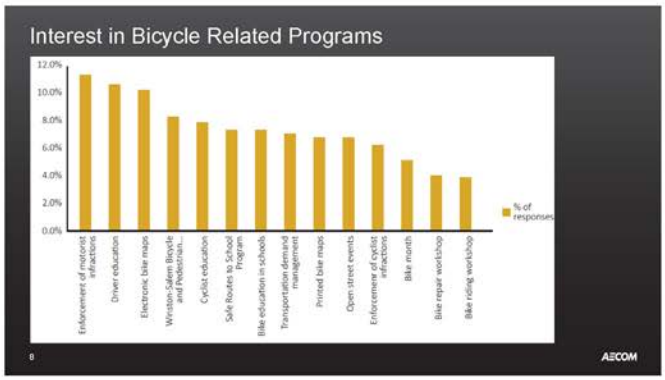
- Project updates
- Summary of public outreach
- Priority routes
- Master Plan overview
- Next steps

3









Priority Routes

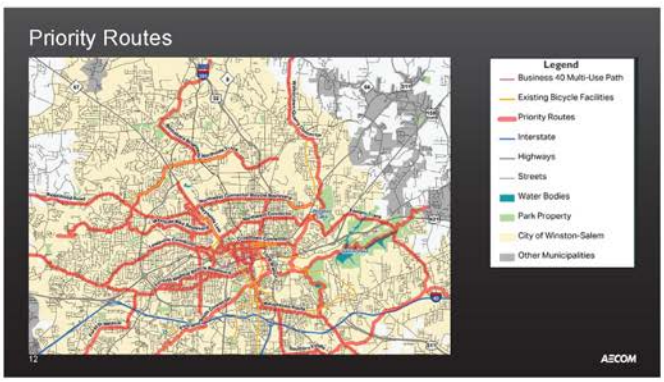
- The selection of priority routes are intended to enhance connectivity and safety, and encourage active transportation.
- Sixteen priority route projects have been identified.
- The prioritization process included input from public meetings, surveys, the gap analysis, social equity considerations, and results from the latent demand model.

11

Bicycle Facility Recommendations

Class	Miles
Class 1 – Shared Use Paths	88.5
Class II – Dedicated Bike Lanes	253.6
Class III – Shared Streets/Bicycle Boulevards	54.0
Class IV – Protected Cycle Tracks	18.6
Total	414.7

9



Waughtown Route

- The Waughtown Route connects the West End neighborhood and western Downtown to Old Salem, the School of the Arts, and the Waughtown neighborhood.
- Length: 5.1 miles (10% complete)
- Cost: $4,152,100

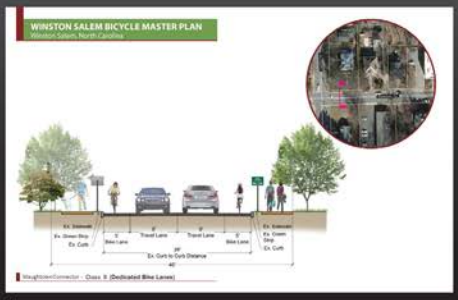
13

Innovative Programmatic Recommendations

- Programming recommendations
- Institutional recommendations
- Support infrastructure

16

Visualization



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Implementation, Phasing, and Funding

- Key action steps
- Performance measures
- Partners in implementation
- Phasing
- Funding strategies
- Facility maintenance

17

Waughtown Route Summary

Map Label	Segment Location	Typical Cross Section or Improvement Type	Existing	Total Length	Stress Level	Social Equity Connections	Cost Estimate	Implementation Notes
WR-1	Brookstown Avenue from West End Boulevard to Old Salem Road	Class II – Dedicated Bike Lanes	No	1.2 miles	Low-Moderate	Yes	$1,159,200	Review corridor for short-term restriping opportunities. Dedicated bicycle facilities on Brookstowne Avenue. Implementation in key areas to occur with redevelopment and streetscape projects.
WR-2	Old Salem Road from Brookstown Avenue to S Main Street	Class IV – Protected Cycle Tracks	No	0.8 miles	High	Yes	$585,400	Review opportunities for lane reallocation between Brookstown Avenue and S Main Street on Old Salem Road. Traffic volumes 3,200–3,600.
WR-3	South Main Street from Old Salem Road to Sunnyside Avenue	Class II – Dedicated Bike Lanes	Yes	0.5 miles	Moderate-High	Yes	N/A	
WR-4	Sunnyside Avenue from South Main Street to Sprague Street	Class III – Bicycle Boulevard	No	0.4 miles	Low	Yes	$65,800	Bicycle boulevard improvements on Sunnyside Avenue. Improve intersection of S Main Street and E Sprague Street at Sunnyside Avenue for turning bicyclists.
WR-5	Sprague Street from South Main Street to Brindle Street	Class IV – Protected Cycle Tracks	No	2.1 miles	Moderate	Yes	$2,541,700	Install separated bikeway on E Sprague Street with special considerations for type and placement due to interchange ramps at John Gold Memorial Expressway. Intersection safety and bicycling improvements for turning bicyclists at Sprague Street, Old Lexington Road (SP-1), and Willard Rd (WQC-1).

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Next Steps

Task	Schedule
Draft Master Plan – Review	April 2019
Incorporate comments, finalize report	May 2019
Council adopt Final Master Plan	June 2019

18 Presentation Title AECOM

Meeting wrap-up

– Questions

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Kory Wilmot
Project Manager
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E. SURVEY RESPONSES

WHAT IS YOUR RACE?		
Response	Number of Respondents	Percentage of Respondents
White or Caucasian	125	77.6%
Black or African American	29	18.0%
Hispanic or Latino	2	1.2%
Asian or Asian American	0	0.0%
American Indian or Alaska Native	1	0.6%
Native Hawaiian	0	0.0%
Another race	4	2.5%
Total	161	100%

WHAT IS YOUR ANNUAL HOUSEHOLD INCOME?		
Response	Number of Respondents	Percentage of Respondents
Under $15,000	20	13.2%
Between $15,000 and $29,999	11	7.2%
Between $30,000 and $49,999	14	9.2%
Between $50,000 and $74,999	26	17.1%
Between $75,000 and $99,999	23	15.1%
Over $99,999	58	38.16%
Total	152	100%

HAVE YOU BICYCLED IN THE LAST TWELVE MONTHS		
FOR FUN, RECREATION, OR COMMUTING?	Number of Respondents	Percentage of Respondents
Yes	141	89.8%
No	16	10.2%
Total	157	100%

ON AVERAGE, HOW OFTEN DO YOU BICYCLE FOR THE FOLLOWING REASONS?						
Option	Daily	At Least Once a Week	At Least Once a Month	At Least Once a Year	Never	No Response
Regular exercise or workout	23	59	27	28	17	2
Commuting to work or school	11	14	8	18	78	17
Shopping	3	8	18	29	78	8
Trips to parks or recreation facilities	6	11	14	23	78	9
Trips to libraries, museums, or similar places	9	22	49	23	42	5
Going to meetings or conducting businesses	5	10	20	21	81	10
Socially	6	8	8	15	99	10
Family outings	11	27	37	30	37	3
Bicycling tours	3	17	38	28	46	14

IF YOU CYCLE TO COMMUTE TO WORK OR RUN ERRANDS, WHAT IS THE APPROXIMATE DISTANCE (TIME) YOU TYPICALLY CYCLE PER USE?		
Response	Number of Respondents	Percentage of Respondents
I do not bicycle	70	48.3%
Less than one mile (five minutes)	8	5.5%
One to five miles (between five and twenty minutes)	44	30.3%
Six to ten miles (between twenty to forty minutes)	12	8.3%
Ten to fifteen miles (between forty to sixty minutes)	7	4.8%
More than fifteen miles (more than one hour)	4	2.8%
Total	145	100.0%

IF YOU CYCLE FOR RECREATION, WHAT IS THE APPROXIMATE DISTANCE (TIME)		
Response	Number of Respondents	Percentage of Respondents
I do not bicycle	26	16.7%
Less than one mile (five minutes)	2	1.3%
One to five miles (between five and twenty minutes)	20	12.8%
Six to ten miles (between twenty to forty minutes)	33	21.2%
Ten to fifteen miles (between forty to sixty minutes)	26	16.7%
More than fifteen miles (more than one hour)	49	31.4%
Total	156	100%

IF YOU MAKE A COMBINED BIKE AND BUS TRIP, WHICH OF THE FOLLOWING DO YOU TYPICALLY USE?		
Response	Number of Respondents	Percentage of Respondents
Bike lockers or bike parking at the bus stop	0	0%
Bus-mounted bike racks	9	5.9%
I take my bike on the bus	0	0%
I do not make combined trips	144	94.1%
Total	153	100%

HOW DO YOU PREFER TO LEARN ABOUT CYCLING OPTIONS AND ROUTES?		
Response	Number of Respondents	Percentage of Respondents
Printed maps	48	13.2%
Online maps (Google, Bing, etc.)	104	28.5%
City of Winston-Salem website	52	14.2%
Route signage	61	16.7%
Advocacy groups	26	7.1%
Smart phone apps	74	20.3%
Total	365	100%

ON AVERAGE, HOW OFTEN DO YOU BICYCLE FOR THE FOLLOWING REASONS?		
Response	Number of Respondents	Percentage of Respondents
No bike lanes	84	15.9%
No bike parking at my destination	37	7.0%
Unsafe physical riding conditions (Potholes, no shoulder, etc.)	88	16.6%
Too much traffic	80	15.1%
Don't feel safe due to criminal activity	12	2.3%
Too much debris in road and/or bike lanes	39	7.4%
Cars go too fast	63	11.9%
Travel difficult with small children	19	3.6%
Too much to carry	11	2.1%
Lack of interest	9	1.7%
Lack of time	35	6.6%
I don't know how to ride a bike	1	0.2%
Lack of wayfinding information	11	2.1%
Inadequate connection to destinations	40	7.6%
Total	529	100%

IF IT WERE SAFE AND CONVENIENT, HOW LIKELY WOULD YOU BE WILLING TO BIKE FOR THE FOLLOWING REASONS?				
Response	Very Unlikely	Unlikely	Likely	Very Unlikely
Regular exercise or workout	11	2	36	107
Commuting to work or school	34	26	34	51
Shopping	32	34	44	39
Routine errands	29	24	54	42
Trips to parks or recreation facilities	17	2	44	92
Going to meetings or conducting businesses	43	47	30	27
Socially	14	8	45	83
Bicycling tours	26	18	49	57

Facility Type	WHAT IS (WOULD BE) YOUR LEVEL OF COMFORT WHILE RIDING ON THE FOLLOWING BIKE FACILITIES?						
	Very Comfortable	Somewhat Comfortable	Uncomfort-able	Unsure	Totals	Percent Very Comfortable	Percent Uncomfortable
Facility Type	Very Comfortable	Somewhat Comfortable	Uncomfort-able	Unsure	Totals	Percent Very Comfortable	Percent Uncomfortable
Well maintained shoulders	50	67	33	7	157	31.85%	21.02%
Sharrows	33	75	40	6	154	21.43%	3.90%
Conventional bike lanes	61	69	23	3	156	39.10%	14.74%
Buffered bike lanes	85	49	16	4	154	55.19%	10.39%
Separated bike lanes	127	24	2	3	156	81.41%	1.28%
Sidepath/ Multi-use path	134	16	2	4	156	85.90%	1.28%
Greenway	136	13	0	4	153	88.89%	0.00%
Well maintained shoulders	50	67	33	7	157	31.85%	21.02%
Sharrows	33	75	40	6	154	21.43%	3.90%
Conventional bike lanes	61	69	23	3	156	39.10%	14.74%
Buffered bike lanes	85	49	16	4	154	55.19%	10.39%
Separated bike lanes	127	24	2	3	156	81.41%	1.28%
Sidepath/ Multi-use path	134	16	2	4	156	85.90%	1.28%
Greenway	136	13	0	4	153	88.89%	0.00%

	RANK THE FOLLOWING IMPROVEMENTS 1 THROUGH 7 IN ORDER OF IMPORTANCE TO YOU OR YOUR HOUSEHOLD (1 BEING MOST IMPORTANT).						
Improvement	1	2	3	4	5	6	7
More bicycle facilities (e.g. bike lanes, greenways)	72	16	19	9	10	8	12
More signed bike routes	10	15	17	20	16	22	48
Improved maintenance of bike lanes, roads and sidewalks	18	33	27	20	20	16	10
Improved visibility (e.g. colored asphalt, sharrows, signage, street lighting)	3	26	26	28	22	29	11
Improved connections between sidewalks, bikeways, and transit	12	19	28	20	29	24	15
Improved intersection accommodations	13	15	16	29	30	25	19
Education/ enforcement for motorists, pedestrians, and bicyclists	24	23	14	20	16	20	30

	RATE YOUR LEVEL OF AGREEMENT WITH THE FOLLOWING STATEMENTS REGARDING CYCLING.				
Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Promotes healthy lifestyles and fitness	9	2	2	17	128
Provides sustainable transportation options	9	2	9	41	96
Creates a sense of community	10	1	15	53	80
Improves mental health and reduce stress	9	2	8	35	104
Promotes tourism to the city	11	4	16	57	71
Helps attract new residents and businesses	12	6	18	50	73
Increases economic development	10	8	27	43	71

Survey 2

TELL US YOUR CONNECTIONS TO WINSTON-SALEM...		
Response	Number of Respondents	Percentage of Respondents
I live in Winston-Salem	0	0%
I work in Winston-Salem	211	83.7%
I am a student in Winston-Salem	17	6.7%
Other	17	6.7%
I am just visiting	7	2.8%
Total	252	100%

WHICH BICYCLE FACILITIES DO YOU FEEL SAFE USING? (SELECT ALL THAT APPLY)		
Response	Number of Responses	% of Responses
Off-Road Mixed Use Path Alongside Road	176	22%
Cycle Track Protected By Physical Barrier	172	21.5%
Buffered Bike Lane (Protected By Physical Barrier such as Bollards)	156	19.5%
Bicycle Boulevard	118	14.75%
Striped Bike Lanes	93	11.625%
Advisory Bike Lanes	50	6.25%
Sharrows	31	3.875%
I do not feel safe using any of these options.	4	0.5%
Totals	800	100%

WHICH BICYCLE FACILITIES DO YOU FEEL THE LEAST SAFE USING? (SELECT ALL THAT APPLY)		
Response	Number of Responses	% of Responses
Sharrows	68	34.9%
Advisory Bike Lanes	46	23.6%
Striped Bike Lanes	39	20.0%
Cycle Track Protected By Physical Barrier	12	6.2%
Buffered Bike Lane (Protected By Physical Barrier such as Bollards)	11	5.6%
Off Street Multi-Use Path Alongside Road	9	4.6%
Bicycle Boulevard	9	4.6%
All of these options feel unsafe to me	1	0.5%
Totals	195	100.00%

WHICH INTERSECTION IMPROVEMENTS DO YOU PREFER? (SELECT ALL THAT APPLY)		
Response	Number of Responses	% of Responses
Intersection Crossing Markings	97	23.0%
Protected Intersections	97	23.0%
Bike Lanes Through Intersections	92	21.8%
Bike Boxes (With or Without Paint)	76	18.0%
Two-Stage Left Turn Box	54	12.8%
I don't like any of these improvements	6	1.4%
Totals	422	100.00%

WHAT BIKE RELATED PROGRAMS WOULD YOU LIKE TO SEE IMPLEMENTED IN OUR COMMUNIVTY? PLEASE CHOOSE UP TO 5.		
Response	Number of Responses	% of Responses
Enforcement of motorist infractions	82	11.0%
Driver Education	77	10.3%
Electronic Bike Maps	74	9.9%
Bicycle and Pedestrian Advisory Committee	60	8.1%
Cyclist Education	57	7.7%
Safe Routes to School Program	53	7.1%
Bike education in schools	53	7.1%
Transportation Demand Management initiatives	51	6.9%
Printed Bike Maps	49	6.6%
Open Street Events	49	6.6%
Enforcement of Cyclist infractions	45	6.0%
Bike Month	37	5.0%
Bike Repair Workshop	29	3.9%
Bike Riding Workshop	28	3.8%
Totals	744	100.0%

WHICH BIKE-FRIENDLY FEATURES WOULD YOU PREFER TO HAVE ACCESS TO?		
Response	Number of Responses	% of Responses
Bike Racks	121	17.5%
Bicycle Loop Detectors	106	15.3%
Service Stations/ Fix-it Stations	90	13.0%
Wayfinding Signage	89	12.9%
Water Fountains	87	12.6%
Bike Share Expansion	48	6.9%
Bike Co-op	46	6.7%
High Security Bike Parking	43	6.2%
Bike Showers	39	5.6%
Bike Parts Vending Machine	16	2.3%
Other	6	0.9%
Totals	691	100.00%

Meeting summaries, sign-in sheets, comment sheets, bi-weekly project status reports, field work inventories, GIS data, PowerPoint presentations, maps, handouts, and photos generated through the planning process (AECOM and Simon Resources)

Winston-Salem

JULY 2019

WINSTON-SALEM BICYCLE MASTER PLAN