

# GIBSONVILLE BIKE PLAN

September 2020

GIBSONVILLE  
BIKE PLAN



# ACKNOWLEDGMENTS

## STEERING COMMITTEE

Jesse Day	Bryan Lopez
Sean Dowell	Brent Mills
Mike Dupree	Ron Parrish
Rob Elliot	James Todd
James Hartman	Shannon O'Toole
BJ Korn	

## STAFF

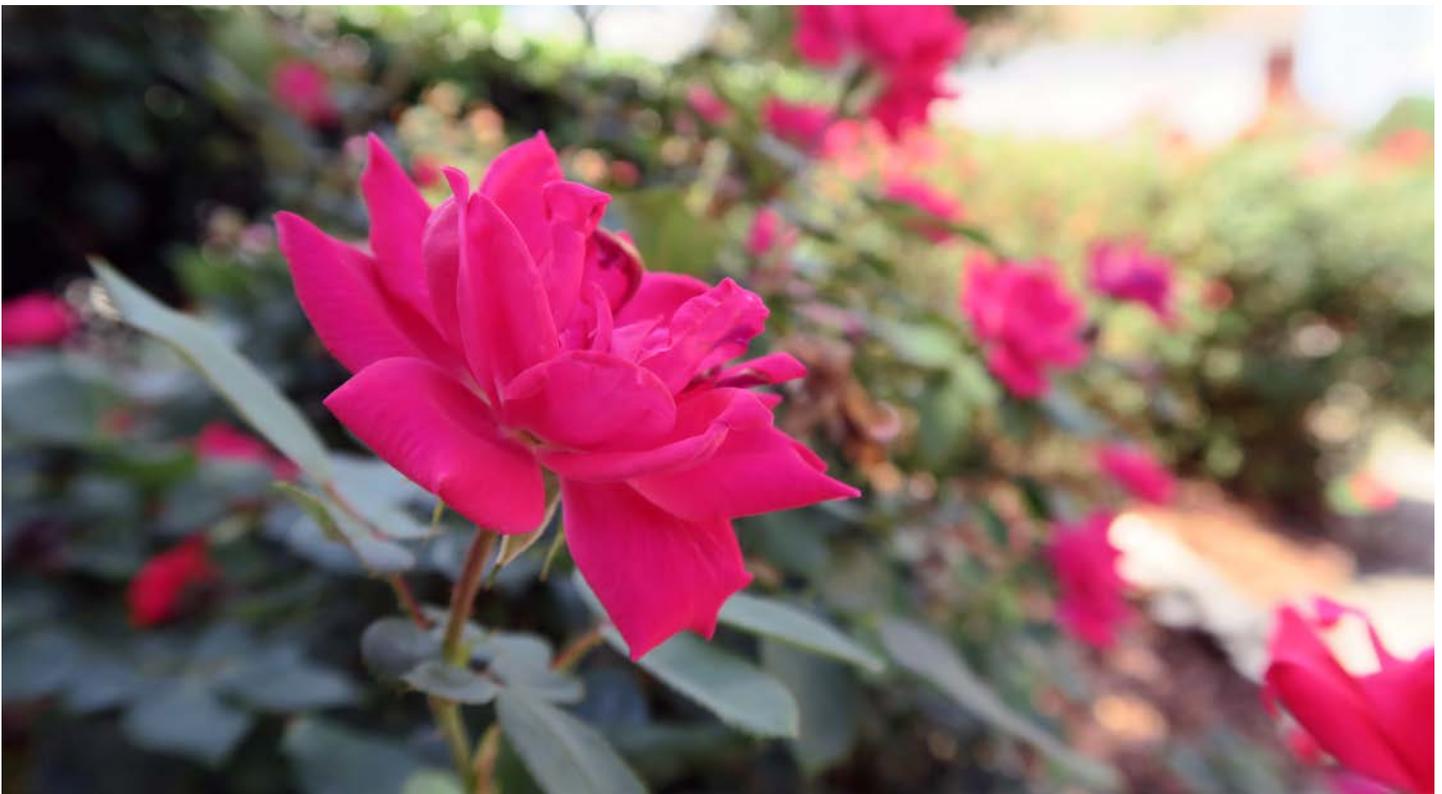
Ben Baxley  
Brandon Parker

## CONSULTANT TEAM

Jared Draper, AICP  
Chris Lambka, PLA  
Ashley Schultz, MPH  
Tom Natwick, P.E.  
Sarah Johnson  
Arthur Cashwell IV

*Information contained in this document is for planning purposes and should not be used for final design of any project. All results, recommendations, concept drawings, cost opinions, and commentary contained herein are based on limited data and information and on existing conditions that are subject to change. Further analysis and engineering design are necessary prior to implementing any of the recommendations contained herein.*

*Geographic and mapping information presented in this document is for informational purposes only, and is not suitable for legal, engineering, or surveying purposes. Mapping products presented herein are based on information collected at the time of preparation. Toole Design Group, LLC makes no warranties, expressed or implied, concerning the accuracy, completeness, or suitability of the underlying source data used in this analysis, or recommendations and conclusions derived therefrom.*



# TABLE OF CONTENTS

## **01** *The Vision*..... 01

Purpose.....	2
Goals.....	3
Measures of Success.....	4
Benefits of a Bikeable Community.....	6
Bicycling in Gibsonville Today.....	9

## **02** *Public Engagement*..... 15

Summary.....	16
Steering Committee.....	17
Open House Meetings.....	18
Online Engagement.....	20

## **03** *Network Development*..... 27

Summary.....	28
Why a Network?.....	29
Layers of Analysis.....	30
A Successful Network.....	39
Gibsonville Bike Plan Network.....	40

## **04** *Implementation Action Plan*..... 45

Summary.....	46
Project Prioritization.....	47
Performance Measures.....	49
Plan Recommendations.....	57
Action Plan.....	80

## **05** *Design Guidance*..... 85

Summary.....	86
Philosophy of Safe Bicycle Facility Design.....	87
Bikeway Facilities.....	92
Intersection Design & Other Crossing Treatments..	114

## **Appendix**

A: Plan Review.....	131
B: Priority Projects.....	137
C: Cost Estimates .....	141

# FIGURES

<b>FIGURE 1.</b>	Existing Bicycle Network in Gibsonville . . . . .	13
<b>FIGURE 2.</b>	Types of Bicyclists in Gibsonville . . . . .	25
<b>FIGURE 3.</b>	Screenshot of Wikimap Feature . . . . .	27
<b>FIGURE 4.</b>	Screenshot of the On-Demand Video . . . . .	28
<b>FIGURE 5.</b>	Public Comment on the WikiMap. . . . .	33
<b>FIGURE 6.</b>	Vulnerable Communities in Gibsonville . . . . .	35
<b>FIGURE 7.</b>	Bicycle- and Pedestrian-related Crashes in Gibsonville . . . . .	37
<b>FIGURE 8.</b>	Bicycle Crash Density in Gibsonville. . . . .	38
<b>FIGURE 9.</b>	Gibsonville Street Characteristics . . . . .	40
<b>FIGURE 10.</b>	The Gibsonville Bike Plan Network. . . . .	42
<b>FIGURE 11.</b>	1/2 Mile Access to the Existing Bike Network . . . . .	43
<b>FIGURE 12.</b>	1/2 Mile Access to the Proposed Bike Network . . . . .	44
<b>FIGURE 13.</b>	Gibsonville Bike Plan Network With Project IDS. . . . .	60
<b>FIGURE 14.</b>	Short-Term Slow Street Concept . . . . .	63
<b>FIGURE 15.</b>	Long-Term Slow Street Concept. . . . .	65
<b>FIGURE 16.</b>	FHWA Separated Bike Lane Guidelines . . . . .	87
<b>FIGURE 17.</b>	Directional SBL with Flex Posts. . . . .	92
<b>FIGURE 18.</b>	Curb-Separated Directional SBL. . . . .	92
<b>FIGURE 19.</b>	Sidewalk-Level SBL . . . . .	93
<b>FIGURE 20.</b>	Street-Level SBL . . . . .	93
<b>FIGURE 21.</b>	Intermediate-Level SBL. . . . .	93
<b>FIGURE 22.</b>	Two-Way Sidewalk-Level SBL . . . . .	94
<b>FIGURE 23.</b>	Two-Way Intermediate-Level SBL . . . . .	95
<b>FIGURE 24.</b>	Two-Way Street-Level SBL . . . . .	95
<b>FIGURE 25.</b>	One-Way Recommended Widths. . . . .	96
<b>FIGURE 26.</b>	Two-Way Recommended Widths . . . . .	96
<b>FIGURE 27.</b>	Raised Island Intermediate-Level SBL. . . . .	97
<b>FIGURE 28.</b>	Raised Island Street-Level SBL . . . . .	97
<b>FIGURE 29.</b>	Raised Island Sidewalk-Level SBL. . . . .	97
<b>FIGURE 30.</b>	Planters . . . . .	98
<b>FIGURE 31.</b>	On-Street Parking . . . . .	98
<b>FIGURE 32.</b>	Flexible Delineator Posts/Rigid Bollards. . . . .	98
<b>FIGURE 33.</b>	Parking Stops . . . . .	98
<b>FIGURE 34.</b>	Buffered Bike Lane . . . . .	99
<b>FIGURE 35.</b>	Buffered Bike Lane with Parking . . . . .	100
<b>FIGURE 36.</b>	Buffered Bike Lane without Parking . . . . .	100
<b>FIGURE 37.</b>	Bike Lane . . . . .	101
<b>FIGURE 38.</b>	Bike Lane without Parking . . . . .	101
<b>FIGURE 39.</b>	Bike Lane with Parking . . . . .	102
<b>FIGURE 40.</b>	Bike Lane with Parking and Door Zone. . . . .	102
<b>FIGURE 41.</b>	Shared Use Path . . . . .	105
<b>FIGURE 42.</b>	Neighborhood Bikeway . . . . .	107
<b>FIGURE 43.</b>	Curb Extensions . . . . .	113
<b>FIGURE 44.</b>	Shared Use Path Street Crossing - A. . . . .	114
<b>FIGURE 45.</b>	Shared Use Path Street Crossing - B. . . . .	114
<b>FIGURE 46.</b>	Bike Lane Street Crossing. . . . .	115
<b>FIGURE 47.</b>	Separated Bike Lane (SBL) Street Crossing. . . . .	115
<b>FIGURE 48.</b>	Protected Intersection . . . . .	116

# FIGURES

<b>FIGURE 49.</b> Raised Intersection . . . . .	118
<b>FIGURE 50.</b> Curb Radii . . . . .	120
<b>FIGURE 51.</b> Truck Aprons . . . . .	122
<b>FIGURE 52.</b> Signal Types . . . . .	123
<b>FIGURE 53.</b> Directional Separated Bike Lane Driveway Crossing . . . . .	124
<b>FIGURE 54.</b> Two-Way Separated Bike Lane Driveway Crossing . . . . .	124
<b>FIGURE 55.</b> Buffered Bike Lane Driveway Crossing -A. . . . .	125
<b>FIGURE 56.</b> Buffered Bike Lane Driveway Crossing - B . . . . .	125
<b>FIGURE 57.</b> Trail or Shared Use Path Driveway Crossing . . . . .	126
<b>FIGURE 58.</b> Trail to Street-Level Bicycle Lane Transition - A . . . . .	127
<b>FIGURE 59.</b> Trail to Street-Level Bicycle Lane Transition - B . . . . .	127
<b>FIGURE 60.</b> Bicycle Parking Recommendations. . . . .	129
<b>FIGURE 61.</b> Priority Levels for Gibsonville Bike Plan Network Projects . . . . .	141

# TABLES

<b>TABLE 1.</b>	Performance Measures and Goals . . . . .	5
<b>TABLE 2.</b>	Plan Review . . . . .	10
<b>TABLE 3.</b>	Criteria for Equity Analysis . . . . .	34
<b>TABLE 4.</b>	Severity for Pedestrian and Bicycle-related Crashes. . . . .	36
<b>TABLE 5.</b>	Prioritization Criteria . . . . .	49
<b>TABLE 6.</b>	Local Ordinance Recommendations. . . . .	69
<b>TABLE 7.</b>	Action Plan . . . . .	79
<b>TABLE 8.</b>	Priority Projects . . . . .	138
<b>TABLE 9.</b>	Probable Cost Assumptions . . . . .	142
<b>TABLE 10.</b>	Slow Streets Probable Cost Summary. . . . .	144
<b>TABLE 11.</b>	Short-Term Slow Streets Probable Cost . . . . .	145
<b>TABLE 12.</b>	Long-Term Slow Streets Probable Cost . . . . .	146
<b>TABLE 13.</b>	Greenway Probable Cost . . . . .	148
<b>TABLE 14.</b>	Shared Use Paved Trail Probable Cost . . . . .	149
<b>TABLE 15.</b>	Shared Use Paved Trail (Constrained) Probable Cost. . . . .	150
<b>TABLE 16.</b>	Directional Separated Bike Lane Probable Cost. . . . .	151
<b>TABLE 17.</b>	Directional Separated Bike Lane (Constrained) Probable Cost . . . . .	152
<b>TABLE 18.</b>	Two-Way Separated Bike Lane Probable Cost . . . . .	153
<b>TABLE 19.</b>	Two-Way Separated Bike Lane (Constrained) Probable Cost. . . . .	154
<b>TABLE 20.</b>	Buffered Bike Lanes Probable Cost . . . . .	155
<b>TABLE 21.</b>	Directional Bike Lanes Probable Cost. . . . .	156
<b>TABLE 22.</b>	Neighborhood Greenway/Bikeway Probable Cost. . . . .	157
<b>TABLE 23.</b>	Traffic Calming Probable Cost . . . . .	158

# IMAGES

<b>IMAGE 1.</b>	A man looks over Gibsonville’s main green. . . . .	6
<b>IMAGE 2.</b>	Kids enjoy Maple View Ice Cream in downtown on a hot day. . . . .	7
<b>IMAGE 3.</b>	Northeast Park is a popular bicycling destination. . . . .	8
<b>IMAGE 4.</b>	Parks and green space are also community destinations. . . . .	8
<b>IMAGE 5.</b>	Downtown Gibsonville is a key community destination. . . . .	8
<b>IMAGE 6.</b>	The existing shared use path on University Drive/ Cook Road. . . . .	9
<b>IMAGE 7.</b>	The trail behind Moricle Park is currently for walking only. . . . .	12
<b>IMAGE 8.</b>	Attendees at the open house meeting. . . . .	18
<b>IMAGE 9.</b>	Community members shop in downtown Gibsonville. . . . .	30
<b>IMAGE 10.</b>	A bikeway network can connect kids to their school. . . . .	31
<b>IMAGE 11.</b>	A bikeway network can connect to local attractions, such as Beth Schmidt Park. . . . .	32
<b>IMAGE 12.</b>	A bikeway network can connect regional destinations, Such As Elon University. . . . .	32
<b>IMAGE 13.</b>	A stop-controlled intersection in Gibsonville. . . . .	39
<b>IMAGE 14.</b>	A signalized intersection in downtown Gibsonville. . . . .	39
<b>IMAGE 15.</b>	Speed limit and travel lanes along Burlington Avenue. . . . .	39
<b>IMAGE 16.</b>	The Guilford-Alamance County Line on Howerton Road. . . . .	48
<b>IMAGE 17.</b>	A gravel road behind Moricle Park. . . . .	51
<b>IMAGE 18.</b>	Bicycles outside Elonbikeshop, the closest bike shop to Gibsonville. . . . .	86
<b>IMAGE 19.</b>	A cyclists rides in a demonstration bike lane. . . . .	103
<b>IMAGE 20.</b>	Kids ride bicycles along a buffered bike lane with curb stops. . . . .	104
<b>IMAGE 21.</b>	Speed Cushion . . . . .	108
<b>IMAGE 22.</b>	Speed Hump. . . . .	108
<b>IMAGE 23.</b>	Raised Crosswalk . . . . .	108
<b>IMAGE 24.</b>	Curb Extension . . . . .	109
<b>IMAGE 25.</b>	Neckdown. . . . .	110
<b>IMAGE 26.</b>	Neighborhood Traffic Circle . . . . .	110
<b>IMAGE 27.</b>	Chicane. . . . .	110
<b>IMAGE 28.</b>	Diagonal Diverter . . . . .	111
<b>IMAGE 29.</b>	Full Traffic Closure. . . . .	112
<b>IMAGE 30.</b>	Partial Traffic Closure - Interim Stop Control . . . . .	112
<b>IMAGE 31.</b>	Partial Traffic Closure - Permanent Signal. . . . .	112

# 01: *The Vision*



# Purpose

Strategically located between Greensboro and Burlington, Gibsonville is a charming community located in North Carolina's Piedmont region. The Town is home to a wide range of residents, including long-time residents and young families. Neighboring Elon University presents opportunity for an influx of college students to live in, work in, or visit Gibsonville. Close proximity to the University and its location between two larger urban centers position the Town to enjoy a variety of visitors and possible new residents. While growth has benefits, Gibsonville strives to maintain the small-town character that makes it such a unique place. Investments in walking and bicycling infrastructure can aid in balancing growth while cultivating community. In 2014, Gibsonville adopted a Comprehensive Pedestrian Plan. This *Gibsonville Bike Plan*—henceforth noted as the Plan—supplements the Pedestrian Plan with bicycle-specific recommendations to encourage bicycling as an activity for people of all ages and abilities.

Currently, most bicycling trips in and around Gibsonville are recreational riders who bicycle throughout the region with a club. This Plan envisions

a future where people can bicycle for a variety of trips, from recreational to utilitarian, and where bicyclists traveling in town or throughout the region experience a pleasant place to rest and refuel.

The Plan identifies clear strategies for increasing safety and connectivity for people that bicycle in and around Gibsonville. In addition, it employs existing conditions analyses in conjunction with community input to propose a strategic network that increases access to key community destinations, as well as encourages bicycling for numerous trip types throughout the community. Network recommendations include a people-focused update to the Town's downtown core that can enhance the experience of people walking, bicycling, wheeling, and driving while prioritizing safety. Prioritization metrics that recommend how the system could be implemented, strategies for moving projects to design and construction, and an action plan to ensure the Plan's overall success are also included. The *Gibsonville Bike Plan* will serve as a resource and guiding document for future implementation of local bicycle projects, programs, and policies that will advance the overall vision.

## Vision Statement

**Gibsonville will strive to establish a community that is safe and accessible for bicyclists of all ages and abilities—children riding to schools, employees commuting to work, and bicycle clubs passing through on recreational rides—while focusing on creating connections to key destinations that better serve the community.**

# Goals

Through identification of strategic goals that reflect the values of the community, the *Gibsonville Bike Plan* illustrates what the Town of Gibsonville hopes to become as it continues to evolve into a more bicycle-friendly community. A steering committee guided the development of the goals of the plan. These goals shaped the Plan's public engagement strategies, network development, and project prioritization.



## Safety

Bicyclists are more likely to use facilities that feel comfortable and safe. The *Gibsonville Bike Plan* emphasizes a network of safe bikeways for all users and provides programs and policies aimed at increasing safety for people on bikes.



## Environmental Sustainability

More people bicycling can result in a healthier community, both in terms of people and the environment. The *Gibsonville Bike Plan* understands the benefits of bicycling to Gibsonville's physical environment and offers programs and policies to encourage bicycling as a method of environmental stewardship.



## Equality

All residents and visitors to Gibsonville should be able to access and enjoy the bicycle network regardless of their individual characteristics. The *Gibsonville Bike Plan* aspires to develop infrastructure, program, and policy recommendations that benefit residents and visitors equally and allow them equal transportation and recreation opportunities.



## Economic Development

A successful bicycle network in Gibsonville will contribute to economic growth of the Town's downtown core, as well as establish Gibsonville as a regional recreation destination. The *Gibsonville Bike Plan* approaches network development from a regional perspective, promoting a network that connects with neighboring communities and draws recreational bicyclists into the downtown core of the Town.



## Connectivity

A well-connected bicycle network offers people multiple ways to get where they need and want to go. The *Gibsonville Bike Plan* envisions a Gibsonville in which residents and visitors can seamlessly get to and from destinations by bicycling. The Plan establishes a connected network of low-stress bicycle facilities that provide linkage to key community destinations, increasing mobility options for people of all ages and abilities.



## More Users

The *Gibsonville Bike Plan* recognizes that more users will be drawn to a comfortable and convenient network of bikeways. This goal addresses the distance and directness, comfort and perception of safety, and convenience and reliability in how users move from place to place. Bikeways that are comfortable and convenient can achieve significant growth in mode share.

# Measures of Success

Measures of success, or performance measures, were identified to evaluate the effectiveness of the Plan over time. Promoting ongoing assessment of the bicycle network, policies, and programs will allow for the Town to highlight and communicate the value of key changes to mobility. In addition, many of the performance measures used to analyze the progress of this Plan can also be used for other planning efforts, such as the 2014 *Gibsonville Comprehensive Pedestrian Plan*, by altering them to include pedestrian infrastructure. Performance measures for the Plan are defined below and described in more detail in **Chapter 4. Table 1** illustrates how each performance measure aligns with the overall Plan goals.



## Access to Community Destinations

The proximity of bicycle infrastructure and services to origins and destinations (e.g., shopping, recreation, entertainment).



## Crashes

The measured number of crashes or rate of crashes (i.e., crashes per volume of users) over a designated period of time, typically separated into modes (i.e., vehicles, pedestrians, bicyclists) and severity (i.e., fatalities, injuries, property damage only).



## Equity

The proportion of communities who are low-income, people with disabilities, older adults, children, and people of color that have access to bicycle infrastructure and services.



## Network Completeness

The portion of the transportation network that is usable for people bicycling, and represents the minimum accommodations needed for a facility to be considered part of the bicycling network.



## Retail Impacts

The commercial impacts (e.g., change in revenue, spending habits) and the ability to access retail establishments by pedestrians and bicyclists as a result of transportation investment.



## User Volume

The number of bicyclists counted in a specified area for a designated period of time.

**TABLE 1: Performance Measures and Goals**

PERFORMANCE MEASURE	ASSOCIATED GOALS					
	SAFETY	ENVIRONMENTAL SUSTAINABILITY	EQUALITY	ECONOMIC DEVELOPMENT	CONNECTIVITY	MORE USERS
Access to Community Destinations	✓	✓	✓	✓	✓	✓
Crashes	✓		✓			
Equity	✓		✓		✓	✓
Network Completeness	✓	✓	✓	✓	✓	✓
Retail Impacts				✓		✓
User Volume	✓				✓	✓

# Benefits of a Bikeable Community

Choosing to bicycle for trips can benefit individual users and local communities alike. The following identifies rationale for supporting bicycling and bicycling infrastructure, even if bicycling for trips or recreation is not routine.

## As a Roadway User: Why support bicycling?

- **Improve and Maintain Health**

The World Health Organization identified that inactivity is one of the leading risk factors around the world.<sup>1</sup> People who use active transportation generally add to their daily activity by adding their travel time, and in some cases, those who commute by bike spend more time exercising in other capacities (like recreation or fitness reasons) than those who do not.<sup>2</sup> In addition, people who bicycle, whether for recreation or transportation, have improved cardiovascular fitness, with a lessened risk of coronary heart disease by nearly 50%.<sup>3</sup> Bicycling is also a low impact activity, meaning it places less stress on joints

than other aerobic activities. Lastly, trails and separated bikeways provide an attractive, safe, and accessible low- or no-cost place to walk, hike, jog, or bicycle. This gives people of all ages an opportunity to incorporate exercise into their daily routines.

- **Save on Travel Costs**

The estimated cost of driving ranges between 47 and 62 cents per mile; the average annual cost of operating an automobile for a year is over \$8,400 per year,<sup>4</sup> which is nearly 15% of the median household income in Gibsonville. Conversely, the cost of operating a bicycle for a year is estimated at only \$308,<sup>5</sup> which consumes less than half a percent of the median household income.<sup>6</sup>

- **Enjoy Communities More**

Research suggests that bicycling improves mood and overall happiness.<sup>7</sup> Allowing people to explore Gibsonville by bicycle allows roadway users to experience their communities in an entirely new way.

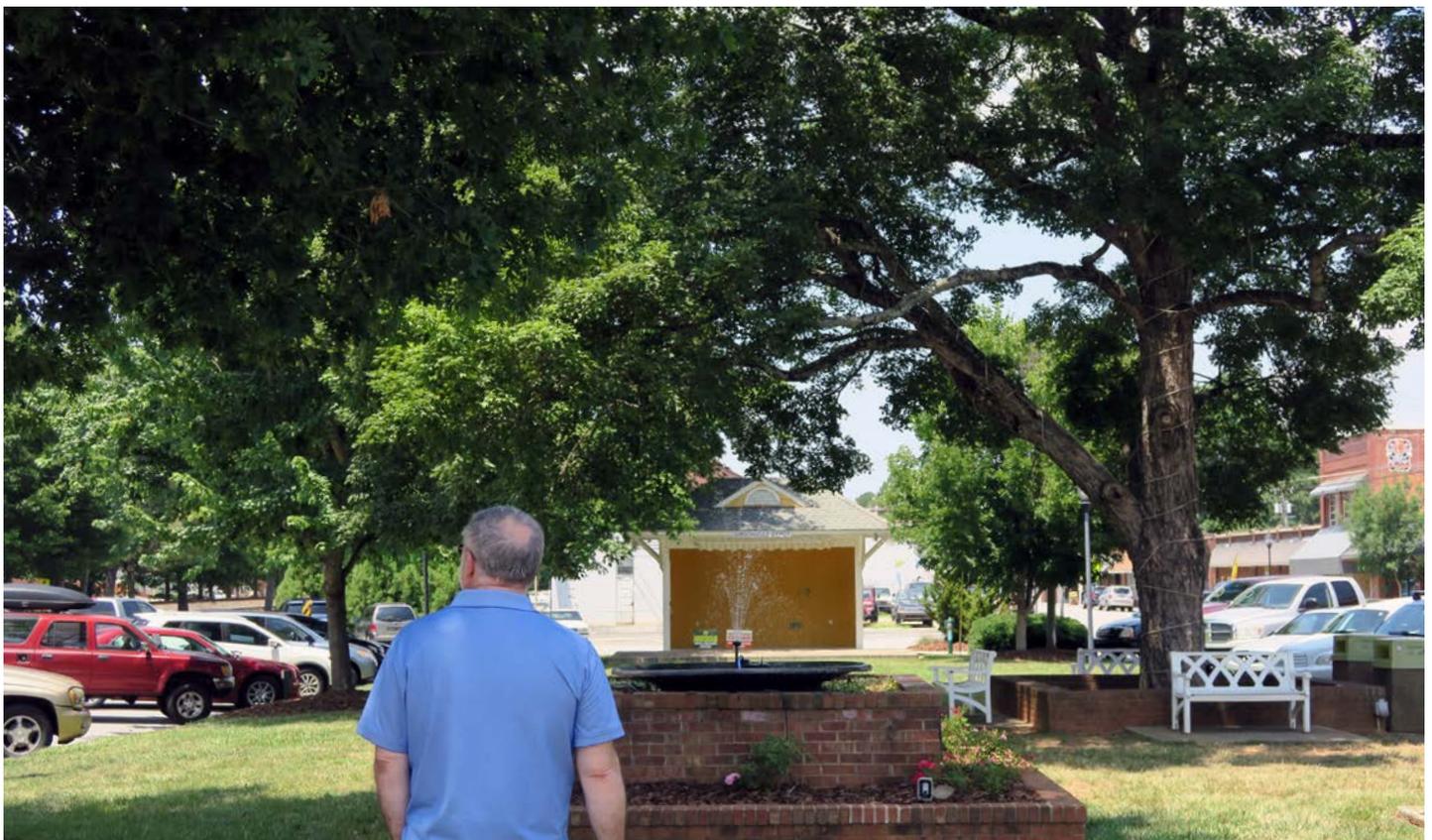


IMAGE 1: A man looks over Gibsonville's main green.



IMAGE 2: Kids enjoy Maple View Ice Cream in downtown on a hot day.

## As a Community: Why invest in bicycling?

- **Encourage Economic Vitality**

There is no question that countless communities across America have experienced significant economic growth as a result of bikeway infrastructure. Bikeable downtowns typically have lively, populated streets and promote commercial exchanges. Having spaces that are enjoyable to bicycle to can encourage more interaction at storefronts and attract more potential buyers.<sup>8</sup> Increasing land values around trails and walkable areas show that people desire to live closer to active transportation and recreation facilities; people, including those that do not bike or walk for trips often, are willing to make investments in places with better transportation choices and robust recreation options. A study of 11 cities around the US found that bicycle projects created 50% more jobs than vehicle-centric roadway projects.<sup>9</sup> In addition, investment in bikeway infrastructure has contributed to the revitalization of communities across the country and contributed millions of dollars in direct economic impact.<sup>10,11</sup>

- **Create Safer Places**

Safety for people on bicycles can be viewed in three ways: in terms of fatalities, crashes, or user comfort. Increased users and well-designed infrastructure can help reduce fatalities and crashes, while also increasing overall bicyclist comfort.<sup>12</sup>

- **Provide Options and Promote Equity**

While some people may choose to bicycle for trips, others cannot afford or do not have access to any other modes of transportation. Over 170 households, or about 5% of the total households, in Gibsonville do not own a personal vehicle.<sup>13</sup> Bicycling provides a cheaper transportation option for people who do not have personal vehicles—if safe, connected infrastructure provides safe routes to destinations.

## As a Community Leader: What will help most?

- **Safe Routes Between Destinations**

Bicyclists are willing to add additional time to their trips—up to 20 minutes—on a less direct route if it means that they can ride on a safer, more comfortable facility.<sup>14</sup> This means that more people may be willing to bicycle to destinations even if it takes them longer than driving, so long as they feel safe during their trips.

- **Prioritizing User Comfort**

People choose to ride bicycles where it is safe and comfortable. Results from community engagement conducted for the *Gibsonville Bike Plan* indicate that people would be more willing to bicycle if infrastructure is complete, safe, and makes them feel comfortable.



IMAGE 3: Parks and green space are also community destinations.



IMAGE 4: Northeast Park is a popular bicycling destination.



IMAGE 5: Downtown Gibsonville is a key community destination.

# Bicycling in Gibsonville Today

Bicycling is a multi-dimensional activity, serving as a recreational and fitness pursuit for some and a transportation mode for others. Choosing to make a trip, regardless of purpose, may feel uncomfortable and dangerous due to a lack of existing infrastructure and connectivity between low-stress routes. Most people will choose not to bike to work, school, or downtown in the absence of a dedicated bicycle facility that is separated from vehicular traffic. A review of previous planning efforts and existing conditions illuminates current assets that need to be leveraged and reveals gaps and/or barriers that should be addressed to provide a more bicycle-friendly environment. The following sections provide an overview of existing conditions in the Town, which were used as a foundation for network development.



**IMAGE 6: The existing shared use path on University Drive/ Cook Road.**

# Plan Review

This Plan leverages the work that has been completed by previous planning efforts within the Town of Gibsonville and Alamance and Guilford counties and desires to build upon these previous endeavors. **Table 2** illustrates how each plan aligns with the performance measures identified by this Plan. A complete review of previous planning documents is provided in **Appendix A**.

**TABLE 2: Plan Review**

PLAN	YEAR	KEY TAKEAWAYS
Gibsonville Comprehensive Pedestrian Plan	2014	<ul style="list-style-type: none"> <li>Residents desire greenway trails and stated that the lack of sidewalks and trails discourages them from walking.</li> <li>Network recommendations of nearly 17 miles of off-street multi-use facilities, including greenways and side paths, were proposed throughout Gibsonville, as well as connecting to regional destinations.</li> <li>No multi-use trail projects were considered high priority.</li> </ul>
Burlington Greenways & Bikeways Plan	2017	<ul style="list-style-type: none"> <li>An overarching theme from public feedback during the planning process was a desire to increase greenway and bikeway connectivity to local destinations, including downtown Gibsonville.</li> <li>Proposes a 1.7-mile long greenway trail, the Springwood-Davidson Greenway, to connect to the existing shared use path from University Drive to Beth Schmidt Park on Gibsonville’s southeastern edge.</li> </ul>
Alamance County Trails Plan	2015	<ul style="list-style-type: none"> <li>Recommends establishing wayfinding and designing trails for people of all ages and abilities.</li> <li>Short-term goals (0-4 years) included aiding in the development of Gibsonville’s Pedestrian Plan.</li> <li>Long-term goals (5-10 years) included updating the County’s Bicycle and Pedestrian Plans.</li> </ul>
Town of Elon Bicycle, Pedestrian and Lighting Plan	2008	<ul style="list-style-type: none"> <li>Long-term vision to connect with Gibsonville and encourage walking, running, and biking throughout the university and in neighboring communities.</li> <li>Providing adequate lighting for bikeway facilities and bike parking areas was recommended.</li> <li>Recommended creating bicycle paths to connect Elon with Burlington and other outlying areas.</li> <li>Recommended providing separated bicycle facilities on major roads.</li> </ul>
Burlington Graham Metropolitan Planning Organization 2040 Transportation Plan Update	2015	<ul style="list-style-type: none"> <li>‘Walking and biking safely’ and ‘building sidewalks, crosswalks, and greenways’ were identified as ‘very important’ by 70% and 95% of respondents respectively.</li> <li>Respondents indicated that most of their trips are between work and home, and they drive their personal vehicle for the majority of the trips they take.</li> <li>The Plan includes one goal targeted towards people walking and biking, “promote development of an integrated bicycle and pedestrian network.”</li> <li>The BGMPO Technical Coordinating Committee highlighted the need for bicycle/pedestrian-related projects that could be tied in with specific TIP projects.</li> </ul>
Alamance County Recreation & Parks Comprehensive Master Plan	2007	<ul style="list-style-type: none"> <li>Creating bicycle routes is highlighted as being an important consideration in developing future parks sites.</li> </ul>

TABLE 2: Plan Review continued

PLAN	YEAR	KEY TAKEAWAYS
Elon University Campus Master Plan Update	2016	<ul style="list-style-type: none"> <li>• Three of the six core strategies can impact people on bicycles: 1) clarify road network, 2) extend network of open space, and 3) strengthen and connect edge neighborhoods.</li> <li>• Recommended a variety of strategies to improve the pedestrian experience on-campus.</li> </ul>
Gibsonville Marketing Analysis	2019	<ul style="list-style-type: none"> <li>• Recommended developing a unified marketing campaign to drive foot traffic and retail sales.</li> <li>• To supplement the campaign, the following strategies were also suggested: wayfinding, place-based marketing, public art, community-informed business recruitment, and small business workshops.</li> </ul>
Gibsonville Land Development Plan (2001-2021)	2001	<p>The Transportation goal centers around maximizing roadway capacity to serve the needs of people driving, walking, and bicycling. While most of the objectives and strategies developed to meet this goal are not mode-specific, there are some that would be relevant for Gibsonville’s Bicycle Plan:</p> <ul style="list-style-type: none"> <li>• Strategy 5.3A-3: Require alternative transportation modes (sidewalks, greenways, bike paths) to be included in all new developments.</li> <li>• Objective 5.3B: Explore regional transportation options that will link Gibsonville to neighboring municipalities and commercial centers.</li> <li>• Objective 5.3D: Maximize the functionality of the Town’s existing road system.</li> </ul>
Downtown Gibsonville Revitalization Commission Report	2005	<p>Recommendations relevant to bicycling in Gibsonville include the following:</p> <ul style="list-style-type: none"> <li>• Build a bike shop.</li> <li>• Establish a yearly bike race or distance running race.</li> <li>• Provide sidewalk or a bike path on Burlington Street to Cook Road, encourage Elon to add sidewalks to Cook Road as well.</li> <li>• NCDOT should make a truck route turning radius analysis to minimize the impact of big (60 foot) trucks driving through downtown. Truck traffic should be discouraged from using downtown, but car traffic should continue to use Main Street.</li> <li>• Have NCDOT install “Truck Route” sign at Burlington and Cook Road, as well as “I40/85” sign pointing to Cook Road. Reroute large trucks off Alamance Road at Cook Road.</li> <li>• Decide which roads leading to town are the “front door” where we make our first impression to visitors.</li> </ul>
Gibsonville Market Analysis and Development Strategies	2019	<p>The Plan’s final recommendations suggested using a variety of strategies to increase market demand, traffic and population in and around downtown. Strategies pertinent to bicycling in Gibsonville include the following:</p> <ul style="list-style-type: none"> <li>• Wayfinding signage – to direct more traffic to the downtown area;</li> <li>• Housing – adding more housing, particularly multifamily and other denser formats; and</li> <li>• Destination Tourism marketing – to increase traffic and the opportunity to capture more consumer expenditures.</li> </ul> <p>In its Downtown Strategy chapter, the Plan emphasizes the needs to leverage the region’s interest in biking and hiking activities with family- and youth-oriented recreation.</p>

## State of Bicycling in Gibsonville

There is little existing bicycle infrastructure within the Town of Gibsonville; the only designated facility for bicyclists is a side path along University Drive/Cook Road. Today, bicyclists in Gibsonville experience:

- No network of bicycle facilities connecting key community destinations;
- Limited accessibility to existing side path;
- An unsafe shared street environment with little traffic calming;
- Unsafe regional connections on streets with high volumes and speeds;
- The need to choose between safe or convenient routes; and
- No amenities (e.g., parking, bike repair stations).

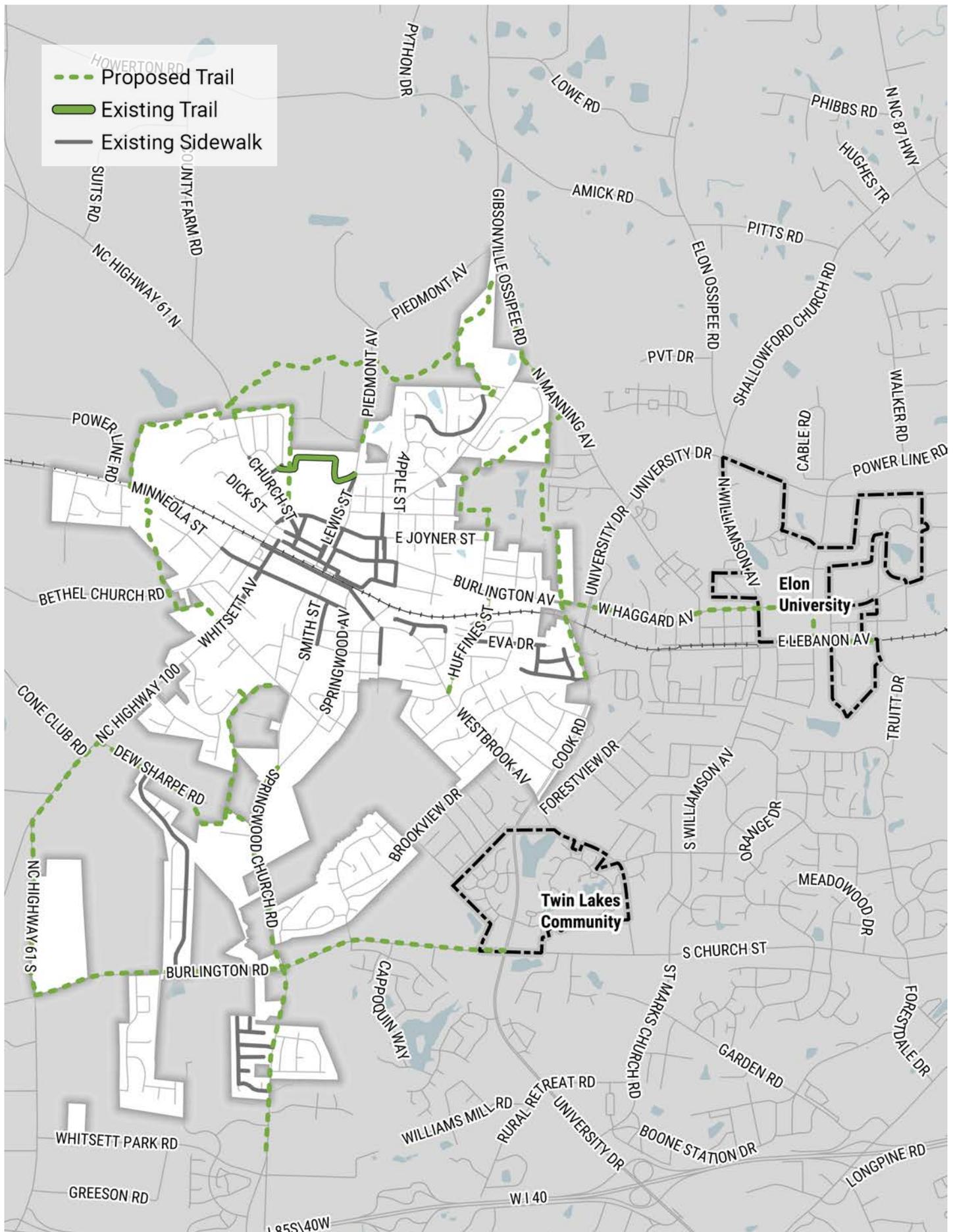
The 2014 *Gibsonville Comprehensive Pedestrian Plan* proposes a network of off-street multi-use facilities, including greenway trails and side paths, that could be used by both pedestrians and bicyclists.

Connections were proposed and emphasized that each corridor and crossing (e.g., waterway, roadway, railroad) should require additional evaluation and feasibility study. While proposed trails are primarily within town limits or the extraterritorial jurisdiction, multi-use trails are also proposed to make regional connections. Side paths are proposed along Burlington Ave/NC 100 to connect the Town to Elon University and along NC 61, NC 100, Burlington Road/US 70, and Springwood Church Road to connect Gibsonville with Burlington. Longer-term connections to Greensboro through multi-use trails or rail-trail projects are also recommended. **Figure 1** illustrates the existing bicycle and pedestrian facilities in and around the Town, as well as proposed greenways and side paths.



IMAGE 7: The trail behind Moricle Park is currently for walking only.

FIGURE 1: Existing Bicycle Network in Gibsonville



## Chapter 1 Sources

1. World Health Organization (2018). "Physical Inactivity."
2. Panik, Morris, Voulgaris (2019). "Does walking and bicycling more mean exercising less? Evidence from the US and the Netherlands."
3. Winzer, E. B., Woitek, F., & Linke, A. (2018). Physical Activity in the Prevention and Treatment of Coronary Artery Disease. *Journal of the American Heart Association*, 7(4), e007725. <https://doi.org/10.1161/JAHA.117.007725>
4. Stepp, E. (2017). "AAA Reveals the True Cost of Operating a Vehicle."
5. League of American Bicyclists. (2013). "The New Majority: Pedalling Towards Equity"
6. American Community Survey (2018). Income in the Past 12 Months (In 2018 Inflation-Adjusted Dollars) 5-Year Estimates.
7. Morris, E. A., & Guerra, E. (2015). "Mood and mode: does how we travel affect how we feel?"
8. Litman, Todd (2018). "Economic Value of Walkability."
9. Garrett-Peltier, H. (2011). "Pedestrian and Bicycle Infrastructure: A National Study of Employment Impacts."
10. Reed, J. (2012). "Greenville Health System Swam Rabbit Trail: Year 2 Findings."
11. Economic Development Studio at Virginia Tech. (2011). "Building Connectivity Through Recreation Trails: A Closer Look at New River State Park and the Virginia Creeper Trail."
12. Jacobsen, P. L. (2003). "Safety in numbers: more walkers and bicyclists, safer walking and bicycling."
13. US Census Bureau. (2017). "Tenure By Vehicles Available."
14. Transportation Research Board, & National Academies of Sciences, Engineering, and Medicine. (2006). "Guidelines for Analysis of Investments in Bicycle Facilities."

# 02: Public Engagement



# Summary

Listening to the public's experiences, needs, and desires laid the foundation for developing recommendations for the *Gibsonville Bike Plan*. In addition to providing valuable input that shaped recommendations, public engagement also influenced strategies for sustaining the Plan's momentum, fostering a more bicycle-friendly community, and increasing the number of users bicycling for recreational and active transportation trips. Public outreach was a central element of the planning process, involving a variety of steering committee meetings, online engagement activities, and an open house meeting.

## *Responding to Unprecedented Events*

During the development of the *Gibsonville Bike Plan*, the COVID-19 pandemic spread rapidly throughout the United States and across the world, initiating an unprecedented halt to public gatherings. This drastic change to daily life transformed the process of developing this plan. All public engagement activities, beginning in April 2020, were held virtually. In addition, Plan recommendations were shared through on-demand video and online survey rather than through attendance at community events.

# Steering Committee

A steering committee was formed to guide the *Gibsonville Bike Plan* process and support the ultimate success of the Plan. The committee was comprised of representatives from a variety of organizations and Town departments who were involved consistently throughout the entire process. Four steering committee meetings were held over the course of the project. Each meeting included a presentation that updated members on the key milestones and upcoming events, along with interactive opportunities for attendees to provide feedback. The following provides an overview of each steering committee meeting:

## November 4, 2019

---

A kickoff meeting provided the committee with information about the project team, the overall Plan approach, and Plan schedule. Participants provided feedback on goals for the plan.

## March 5, 2020

---

The *Gibsonville Bike Plan* brand was revealed to steering committee members along with results from existing conditions analyses. Attendees enjoyed robust discussion around public engagement opportunities and the vision for a successful bicycle network for the Town of Gibsonville.

## June 3, 2020

---

Results from public outreach were reviewed. In addition, a draft bikeway network was presented that highlighted project recommendations. Attendees provided feedback on network recommendations, strategies for implementation, and next steps in the plan making process.

## August 25, 2020

---

Final recommendations were reviewed along with an on-demand video to share these recommendations virtually with the public.

# Open House Meetings

An open house meeting was held to provide information about the Plan, educate on the benefits of bicycling for recreational and active transportation trips, and receive valuable input from Gibsonville residents and visitors. The open house gave the project team the opportunity to actively listen to the key issues or concerns expressed by the public. The following describes the open house event along with themes based upon public input.



IMAGE 8: Attendees at the open house meeting.

## March 5, 2020

Nearly **20** people attended the open house and provided feedback on major destinations, active transportation barriers, facility type preference, and the community's bicycling goals.

Key themes from the open house include:

- Most attendees expressed support of bicycle infrastructure in Gibsonville but feel that the community is not currently "bike-friendly."
- There are two common groups of bicyclists in Gibsonville: 1) highly confident, regular road cyclists, 2) people who are interested but concerned (these folks don't usually ride their bike because they don't feel safe doing so, but they would like to).
- Vehicle speeding a major safety concern.
- Community members value destination-oriented bikeway networks that are safe and accessible.
- Open house attendees noted the need for safe bike parking.
- When asked if they would prefer separated on-street or off-street bicycle facilities, open house attendees were equally split between the two options.

**This page intentionally left blank.**

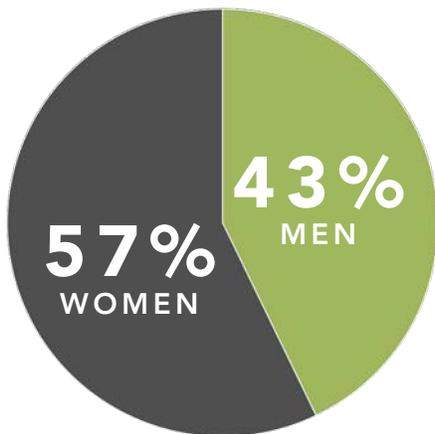
# Online Engagement

## Online Listening Survey

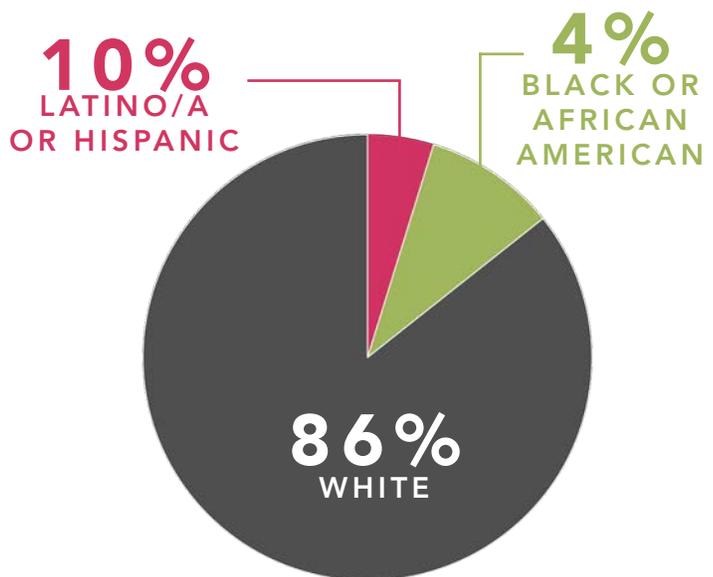
Over **20** survey responses provided initial feedback on the state of bicycling in Gibsonville that informed the network development and implementation strategies. Focus areas for the survey were demographics, user types, and perceptions of bicycling in the community. All responses were critical to shaping the proposed bikeway networks, programs and policies. The survey was available in hardcopy format at the open house meeting, as well as via the project website. Key findings are illustrated on the following pages.

### Demographics

It is important to note that the respondents were not statistically representative of Gibsonville demographics. However, visitors to Gibsonville and residents of surrounding communities who may benefit from additional bicycle infrastructure and bicycle-friendly policies and programs within the Town were also encouraged to complete the survey. The graphics below illustrate survey respondent demographics during the planning process for the *Gibsonville Bike Plan*.

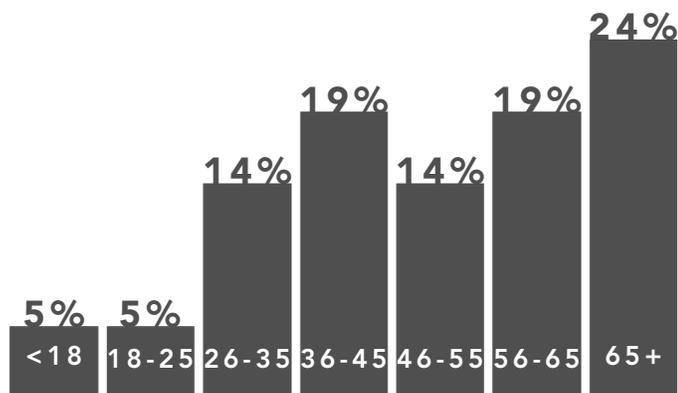


Gender

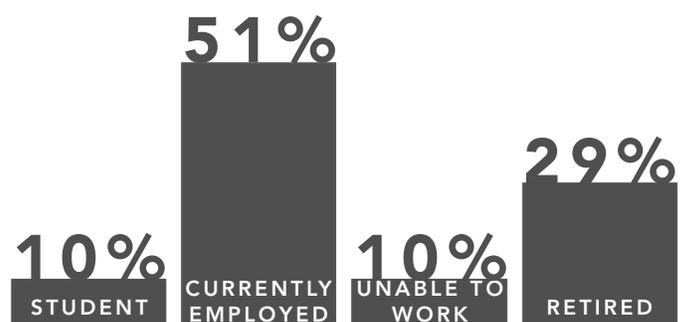


Race/Ethnicity

Age



Employment Status



## Perceptions & Priorities

# 10%

currently bike in/around Gibsonville



The last time survey respondents rode a bicycle was...

**30%** within the past **week**

**15%** within the past **month**

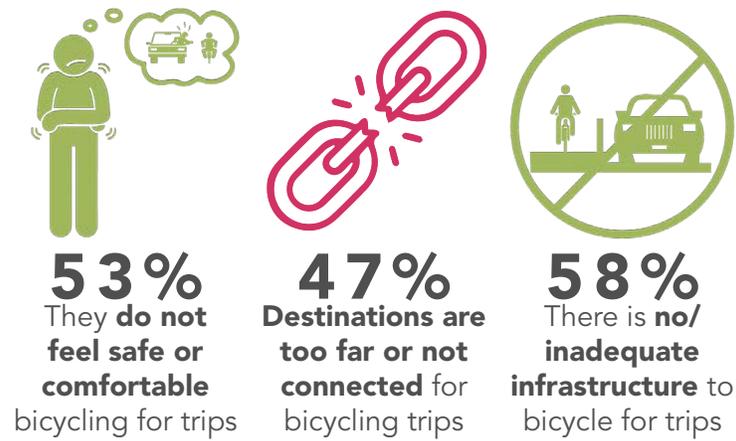
**15%** within the past **year**

**40%** **over a year** ago

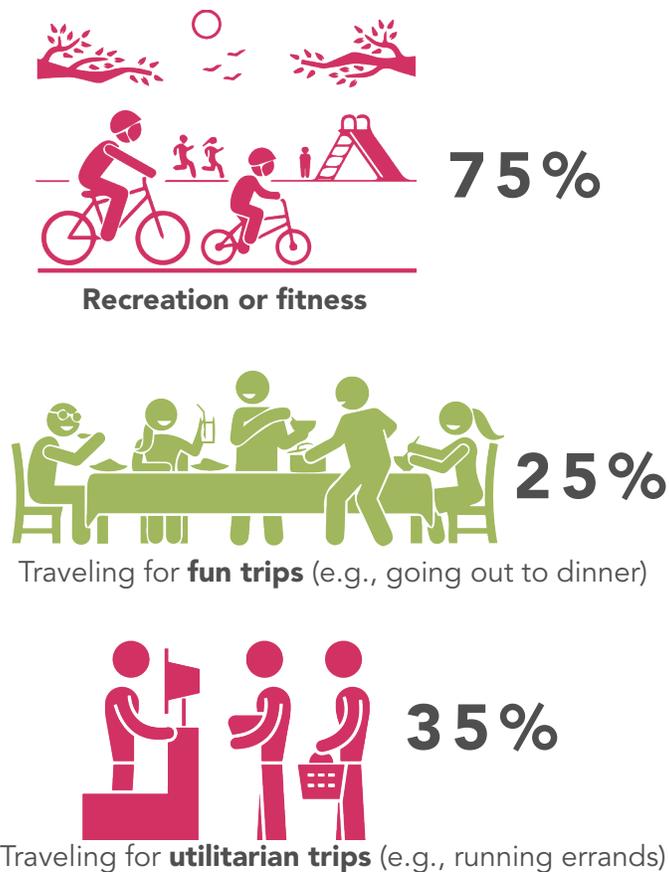


**76%** would like to ride a bicycle  
**more than they do now**

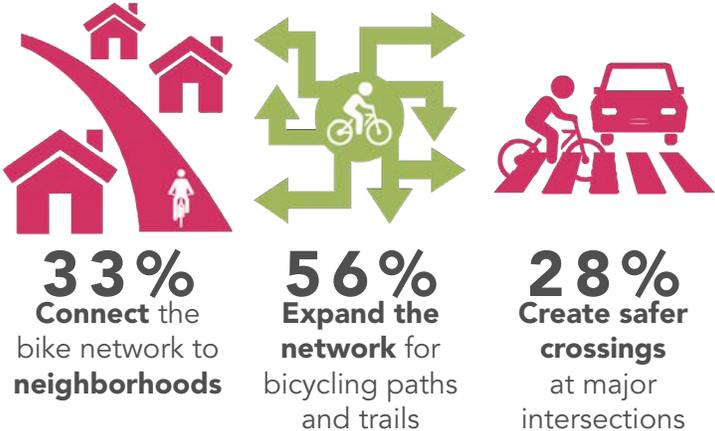
Among those who do not ride a bicycle, the most common reasons provided were...



If a safe, continuous network for bicycling were provided, most survey respondents said they use the network for...



When asked for their highest implementation priority, most survey respondents want to...



This page intentionally left blank.

## Types of Bicyclists in Gibsonville

To better understand the demand for bicycling in Gibsonville, survey respondents were asked to classify themselves into groups based both on their current bicycling behavior and their bicycling comfort level on streets with a variety of characteristics. Results provide insight into who is biking, and their comfort level, so recommended bikeways are tailored to encourage more people to ride.

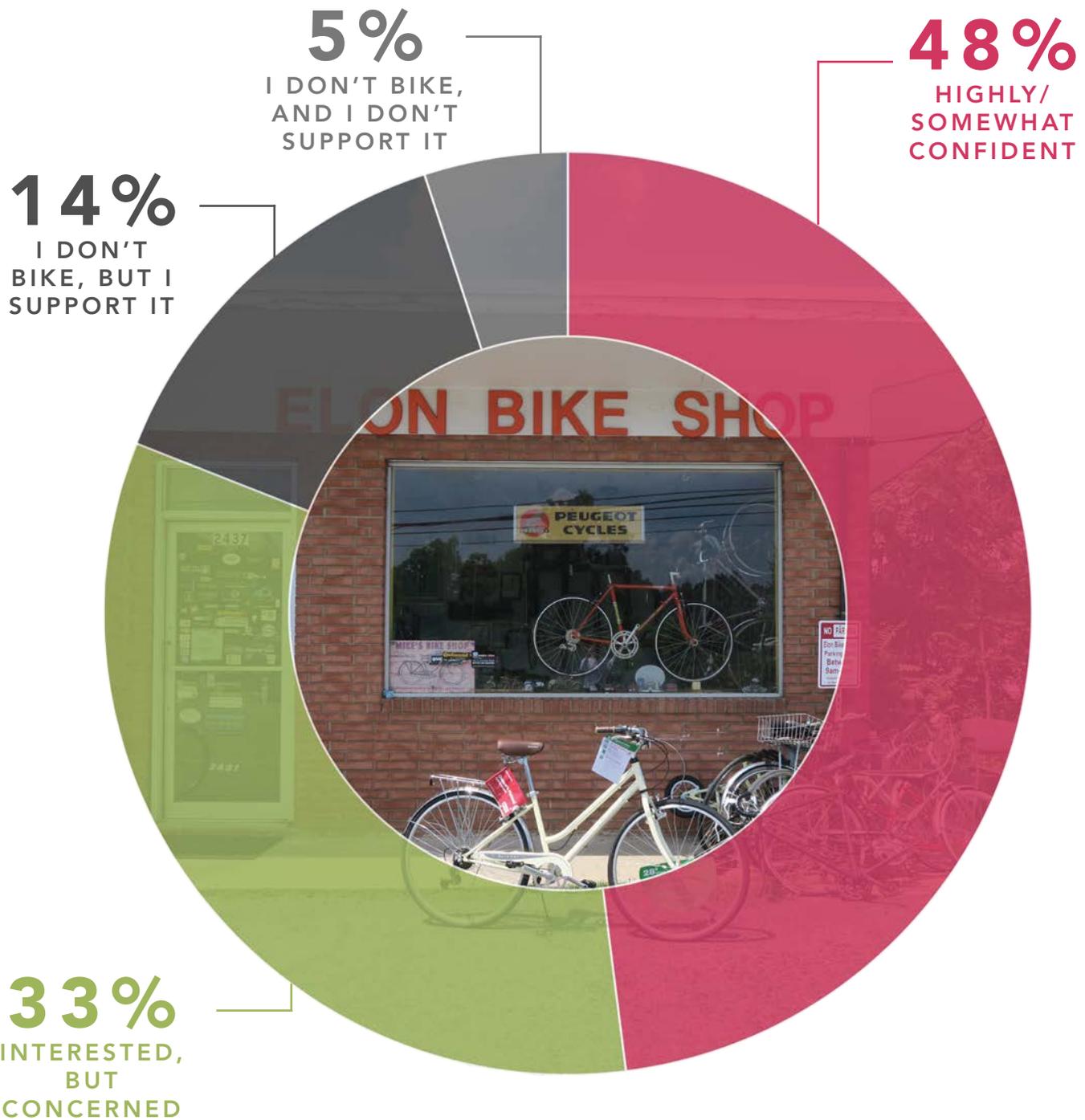


FIGURE 2: Types of Bicyclists in Gibsonville

**48%**



**Highly/Somewhat Confident**

I am willing to ride a bicycle on busy streets. I may prefer to have a designated bicycle facility, but I feel okay riding my bicycle on a street without one. I go for group rides.

**33%**



**Interested, but Concerned**

I enjoy riding my bicycle and am most comfortable when I am bicycling off-street, on a sidepath or greenway. I am less likely to bike if it means I have to share the road with cars.

**14%**



**I don't ride a bicycle, but I support it**

I'm not interested in bicycling myself, but I think it would be great if we had a safer, more comfortable way for people to bike in Gibsonville.

**5%**



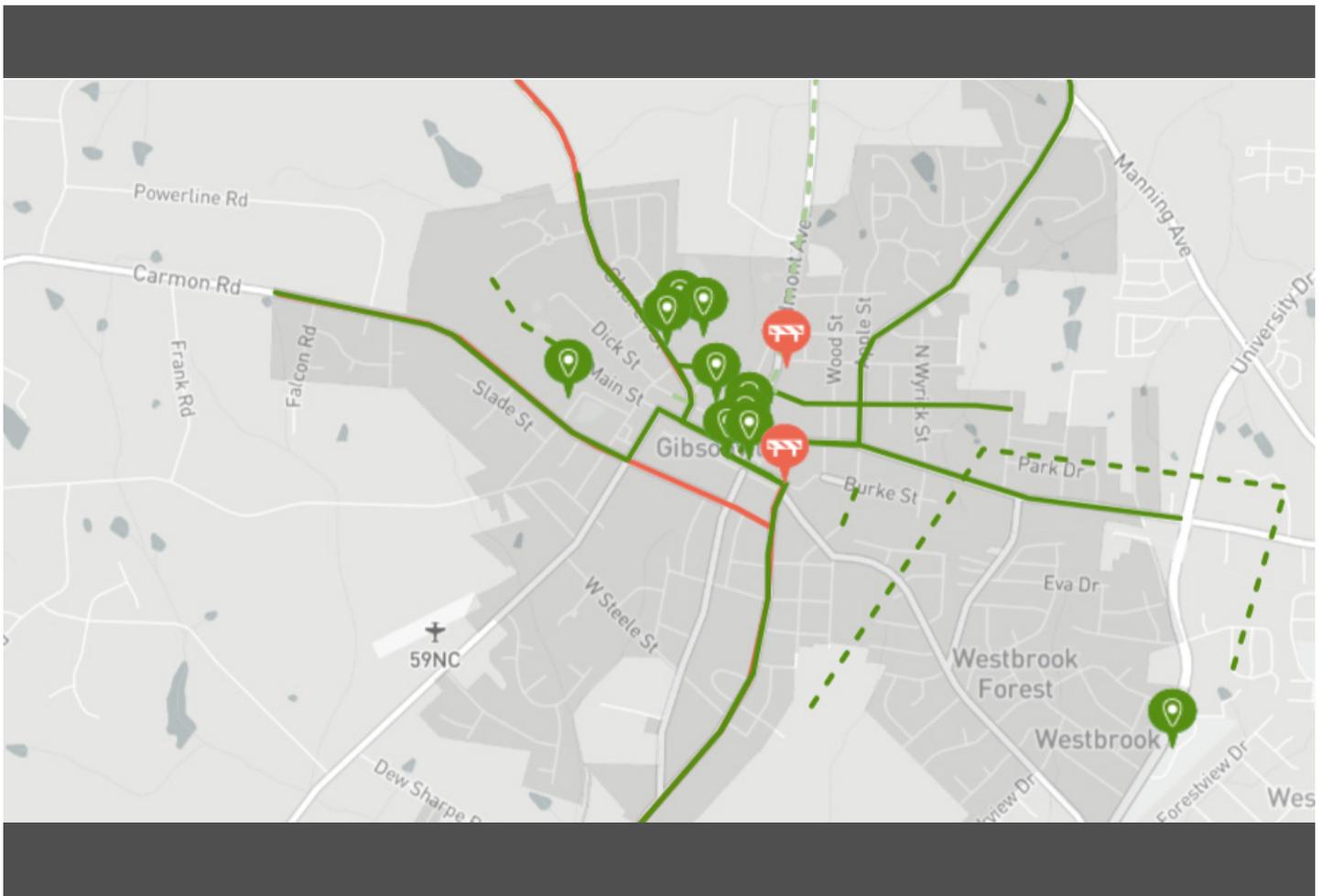
**I don't ride a bicycle, and I don't support it**

I'm not interested in bicycling myself, and I don't think that Gibsonville needs more bicycle infrastructure.

## Interactive Maps

A Wikimap, an online interactive map, provided the public the opportunity to identify desired bicycle connections throughout Gibsonville. The Wikimap allowed users to note preferred routes, destinations, and barriers to bicycling in the community. Results from the Wikimap were included as one of several layers to assess during network development. The proposed network considered the key destinations that users desired to access by bicycling to recommend connections that would increase safety and accessibility for all existing and potential users. Additionally, barriers and problem intersections and roadways identified by the public were reviewed for targeted improvements as part of the overall network, as well as serving as a key consideration for prioritization of projects. **Figure 3** illustrates a screenshot of the online map participants could interact with. Complete results from the Wikimap are provided in **Figure 5**.

Wikimap participants desired ways to bicycle throughout the community more directly, conveniently, and safely. Specific community destinations noted on the Wikimap include the following: downtown Gibsonville, Gibsonville Public Library, Gibsonville Community Center, Beth Schmidt Park, Gibsonville Garden Railroad, Gibsonville Caboose Museum, Elon University and downtown Elon, Springwood Park, and Lowes Foods of Burlington. Wikimap participants also highlighted routes that local bicycle clubs often ride. The intersection of Springwood Avenue with Burke Street and East Railroad Drive was highlighted as a barrier for bicyclists. Roads with no shoulders, many lanes, and blind curves were also identified as key barriers to people bicycling in Gibsonville.



**FIGURE 3: Screenshot of Wikimap Feature**

## On-Demand Video & Recommendations Survey

An on-demand video was created to describe the contents of this Plan and encourage community members to take a survey sharing their thoughts on the proposed recommendations and the overall Plan document. The video was shared at the last steering committee meeting, then disseminated to community members. The recommendations survey provided

Gibsonville residents and visitors the opportunity to react to the Plan and share their thoughts. Only three people responded to the recommendations survey, but the on-demand video was viewed over 50 times as of the writing of this Plan. All survey respondents stated they would support the Town in pursuing the short-term slow streets concept in downtown.

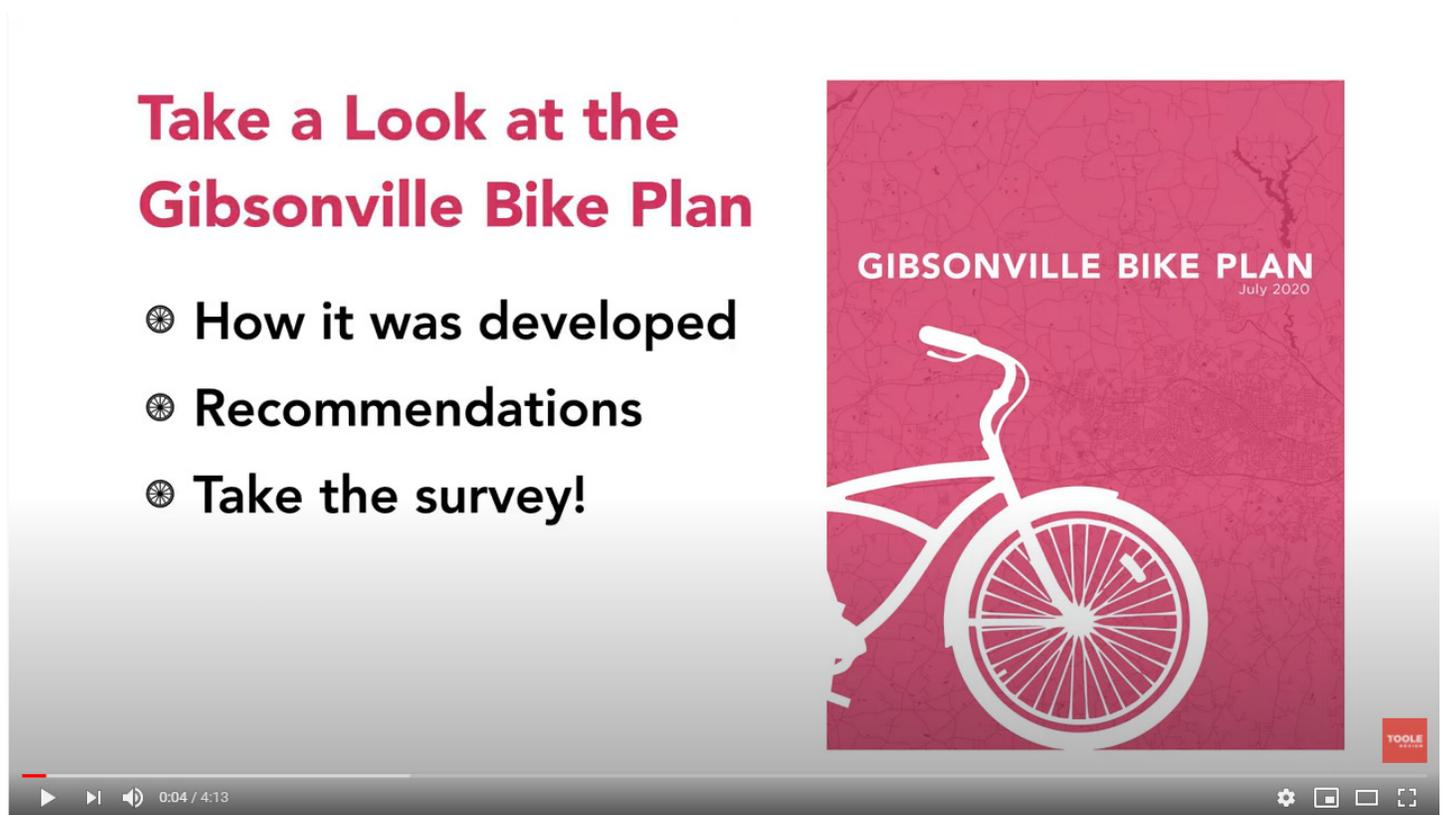


FIGURE 4: Screenshot of the On-Demand Video

# 03: *Network Development*



# Summary

Aligning Plan goals with a strategic bicycle network is a critical component for future mobility and investment choices. This chapter identifies the value of a safe and connected network along with the layers of quantitative and qualitative analyses that were used to craft that network to expand access for Gibsonville residents and visitors.



**IMAGE 9: Community members shop in downtown Gibsonville.**

# Why a Network?

For many people in and around Gibsonville, bicycling is or has the potential to be an important recreational activity that can lead to increased health and quality of life. For other residents, bicycling is a vital mode of transportation. In addition, the region is home to many bicycle enthusiasts keen on identifying new routes and communities to explore. While bicycling isn't necessarily integrated into Gibsonville's culture today, this Plan supports a bicycle-friendly culture and encourages bicycling as a mode of choice within Gibsonville by proposing a bikeway network that connects residents and visitors with the places they need and want to go in a safe and convenient way.

A network of seamlessly connected and continuous bicycle facilities is more powerful for increasing mobility and accessibility than isolated projects that do not link into a larger system. A network or system approach to bicycle infrastructure—rather than a piecemeal approach—is a more strategic investment for the Town of Gibsonville. Ultimately, an implemented network of bikeways serving the entire community will enhance mobility more than a single trail or bike lane alone.



IMAGE 10: A bikeway network can connect kids to their school.

# Layers of Analysis

A variety of distinct analyses were used to create the proposed network:

- Public input,
- Equity,
- Bicycle-related crashes, and
- Street characteristics.

Together, these analyses provided a multifaceted lens through which the proposed network for Gibsonville was crafted and refined. The resulting network emphasizes community priorities by promoting safety and high comfort bikeways that encourage new users and truly enhance transportation and recreation opportunities by connecting people to destinations throughout the Town.

## Public Input

The public's voice helped shape the network of recommended bicycle facilities. Results from the online interactive map (Wikimap) and survey, along with other comments gathered from steering committee meetings and the open house event, were used comparatively with the other analyses to identify key destinations and routes that are important to residents and visitors, as well as real or perceived barriers to bicycling in Gibsonville.

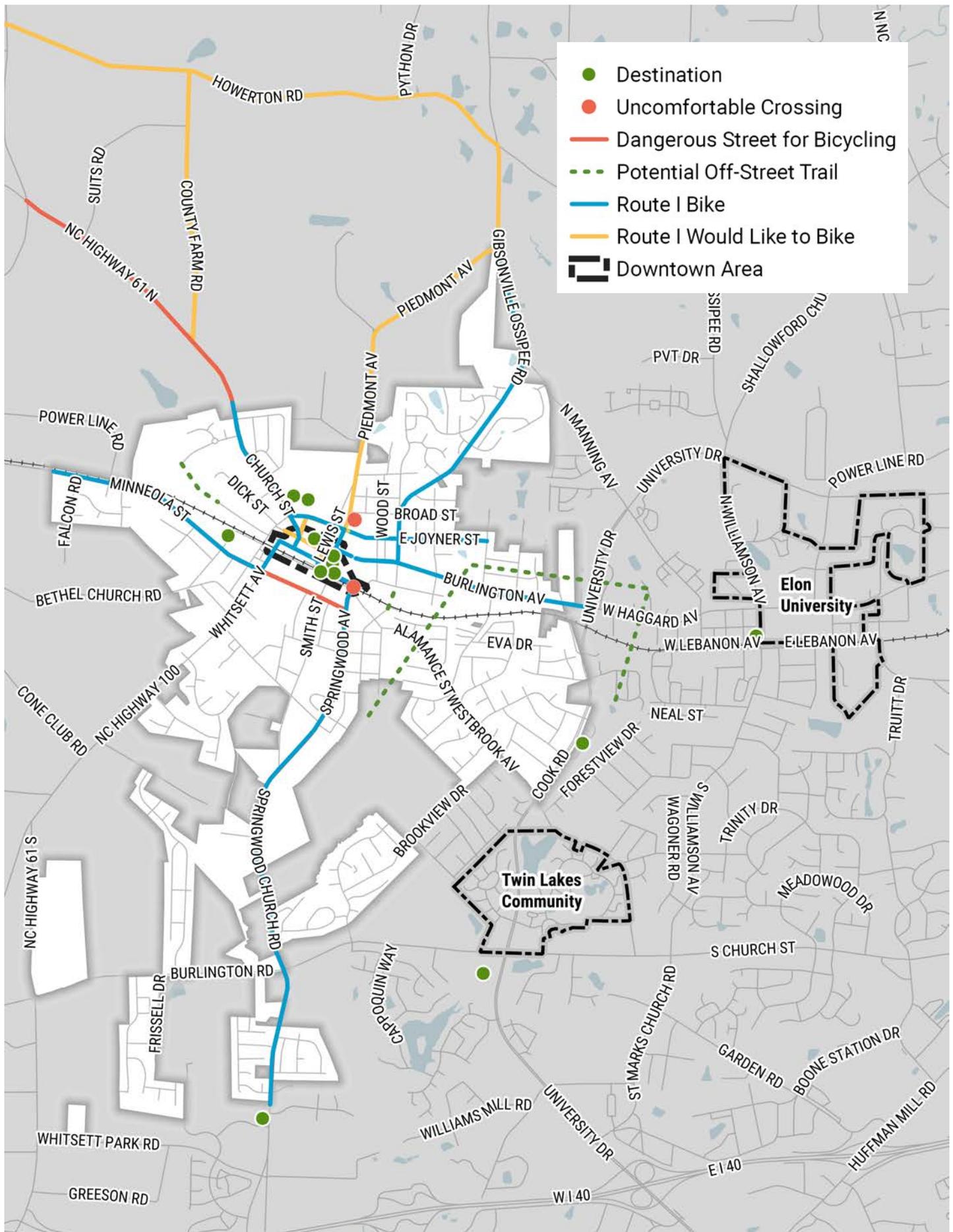


**IMAGE 11: A bikeway network can connect to local attractions, such as Beth Schmidt Park.**



**IMAGE 12: A bikeway network can connect regional destinations, Such As Elon University.**

FIGURE 5: Public Comment on the WikiMap



## Equity

While some people may choose to bicycle for trips, others cannot afford or do not have access to any other modes of transportation. Over 170 households, or about 5% of the total households, in the Town of Gibsonville do not own a personal vehicle.<sup>1</sup> Bicycling provides a more affordable transportation option for people who do not have personal vehicles. In addition to vehicle access, other social factors are important to analyze to ensure that the proposed bicycle network is accessible to those who need it most.

An equity analysis was conducted to identify the areas in Gibsonville with the highest concentration of people in these groups who may benefit more from new bicycle infrastructure. This analysis was conducted using block groups defined by the Census. In **Figure 6**, higher equity priority scores represent locations with greater concentrations of households in poverty, households without a car, and higher percentages of people of color, older adults, and/or children.

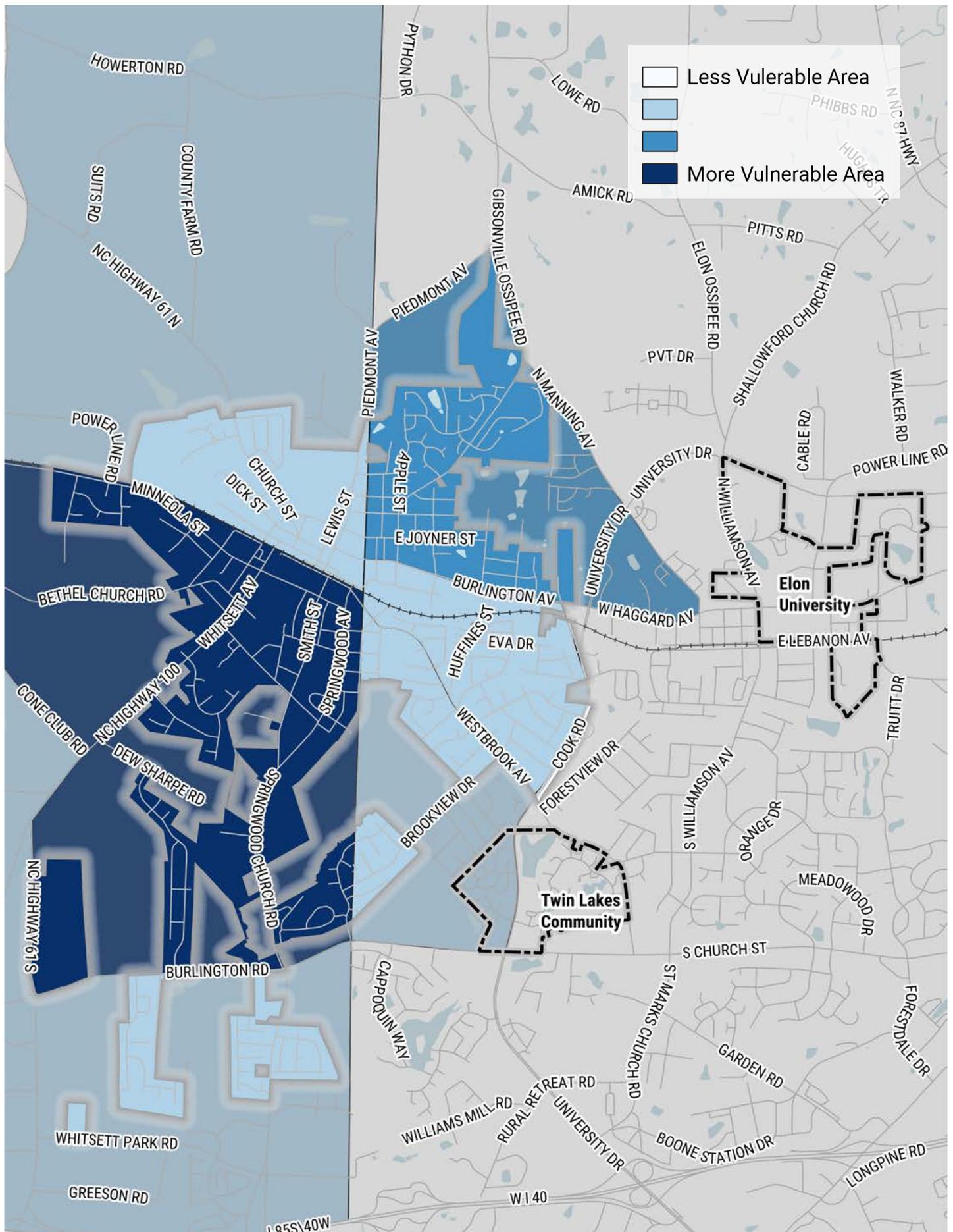
Some groups face greater vulnerabilities and/or disparities in relation to mobility and the transportation system. The more groups a person identifies with, the greater the potential for disparity. These groups include:

- People who don't own cars or do not drive
- Older adults
- Children
- People of color
- People with no- or low-income

**TABLE 3: Criteria for Equity Analysis**

EQUITY CRITERIA	DESCRIPTION
People who don't own cars or do not drive	A safe and accessible bike network can connect people without access to a vehicle with employment and education opportunities, as well as key community destinations. Areas where there are a higher proportion of households without access to personal transportation are given higher priority.
Older adults	The presence of alternative, affordable transportation options reduces isolation and economic hardship and increases quality of life for older adults. <sup>2</sup> Furthermore, across the country older adults comprise the fastest growing group of bicyclists. <sup>3</sup> For the purpose of this analysis, older adults are defined as people aged 65 and older. Areas where there are a higher proportion of households with people 65 and older are given higher priority.
Children	A safe and accessible bicycle network provides children with alternative routes to school or other destinations in Gibsonville. In addition, riding a bicycle benefits youth by providing opportunities for physical activity and to better connect with their surrounding community. <sup>4</sup> For the purpose of this analysis, children are defined as people under the age of 18. Areas where there are a higher proportion of households with people under 18 are given higher priority.
People of color	Communities of color have historically experienced less investment and transportation resources that predominantly white communities. This means residents of these communities often have less options to get where they need to go. For the purpose of this analysis, people of color are defined as people who identify as non-white, one or more race, and/or Hispanic/Latino. Areas with a higher proportion of the population that identifies as a person of color are given higher priority.
People with no- or low-income	The high costs of personal vehicles can trap low-income families in poverty. More affordable transportation options can foster self-sustainability, promote independence, and allow for spending on other household essentials. Areas where there are a higher proportion of households with an annual income below the federal poverty level are given higher priority.

FIGURE 6: Vulnerable Communities in Gibsonville



## Crash Analysis

Available crash data from a twelve-year period (2007-2018) was used to determine if there were any patterns established that may impact safety recommendations for the *Gibsonville Bike Plan*. During this period, five (5) total crashes within the town limits involved people on bicycles. The map below illustrates the specific locations of all bicycle-related crashes within the town limits. Most crashes occurred in or south of the downtown area. With the lack of existing infrastructure for people on bicycles throughout Gibsonville and the higher likelihood of traffic of all modes in the downtown area, it is somewhat unsurprising that the highest density of bicycle-related crashes are occurring predominantly in the commercial core.

Two of the crashes occurred at intersections, two occurred in non-intersection roadway, and another occurred in a parking lot. The intersection of Main and Wharton streets was the site of one of the bicycle-related crashes and the Town has proposed updates for this intersection. In addition, two bicycle-related crashes transpired along Alamance Street, for which future sidewalk has been proposed but not implemented. None of the streets with bicycle-related crashes have been prioritized for bikeway or trail projects in previous planning efforts. Lastly, it is important to highlight the difficulty in assessing the significance of the number of bicycle-related crashes without bicycle count data. Knowing the number of people who regularly travel by bicycle could provide more context to understand the significance of bicycle-related crash statistics.

## Crash Severity

Due to the vulnerability of people on bicycles, crash severity is a key factor to assess. Crash data provides a glimpse of the crash severity for bicycle-related crashes in the study area. The table below and **Figure 7** categorizes crashes for people on bicycles and pedestrians by severity. Pedestrians were included in the table to provide a more comprehensive look at how crashes impact non-motorized street users. Approximately 20% of all bicycle-related crashes were fatal. Combining fatal and serious injury crashes results in 40% of the total crashes for people on bicycles.

## Crash Density

Analyzing specific crash locations provides insight into how crashes are dispersed throughout the town. Higher-density areas of overall crashes and could benefit from specific recommendations to change or upgrade design characteristics to increase safety. **Figure 8** highlights the density of crash throughout Gibsonville. While crashes are limited to a few locations, bicycle-related crashes are more dispersed. However, while not within the town limits, it is important to note the highest density for crashes involving people on bicycles was near Elon University. Three (3) crashes occurred on West Haggard Avenue, the main thoroughfare connecting Elon with Gibsonville. Two of these crashes resulted in minor injuries, while the third was recorded as a possible injury. These bicycle-related crashes are not reflected in **Table 4** based upon their location outside of the Town's jurisdiction.

**TABLE 4: Severity for Pedestrian and Bicycle-related Crashes**

CRASH SEVERITY	PEDESTRIAN CRASHES		BICYCLE CRASHES		TOTAL CRASHES	
	#	%	#	%	#	%
Fatality	0	0%	1	20%	1	8%
Serious Injury	0	0%	1	20%	1	8%
Minor Injury	3	43%	1	20%	4	34%
Possible Injury	3	43%	2	40%	5	42%
Property Damage	1	14%	0	0%	1	8%
<b>TOTAL CRASHES</b>	<b>7</b>	<b>100%</b>	<b>5</b>	<b>100%</b>	<b>12</b>	<b>100%</b>

FIGURE 7: Bicycle- and Pedestrian-related Crashes in Gibsonville

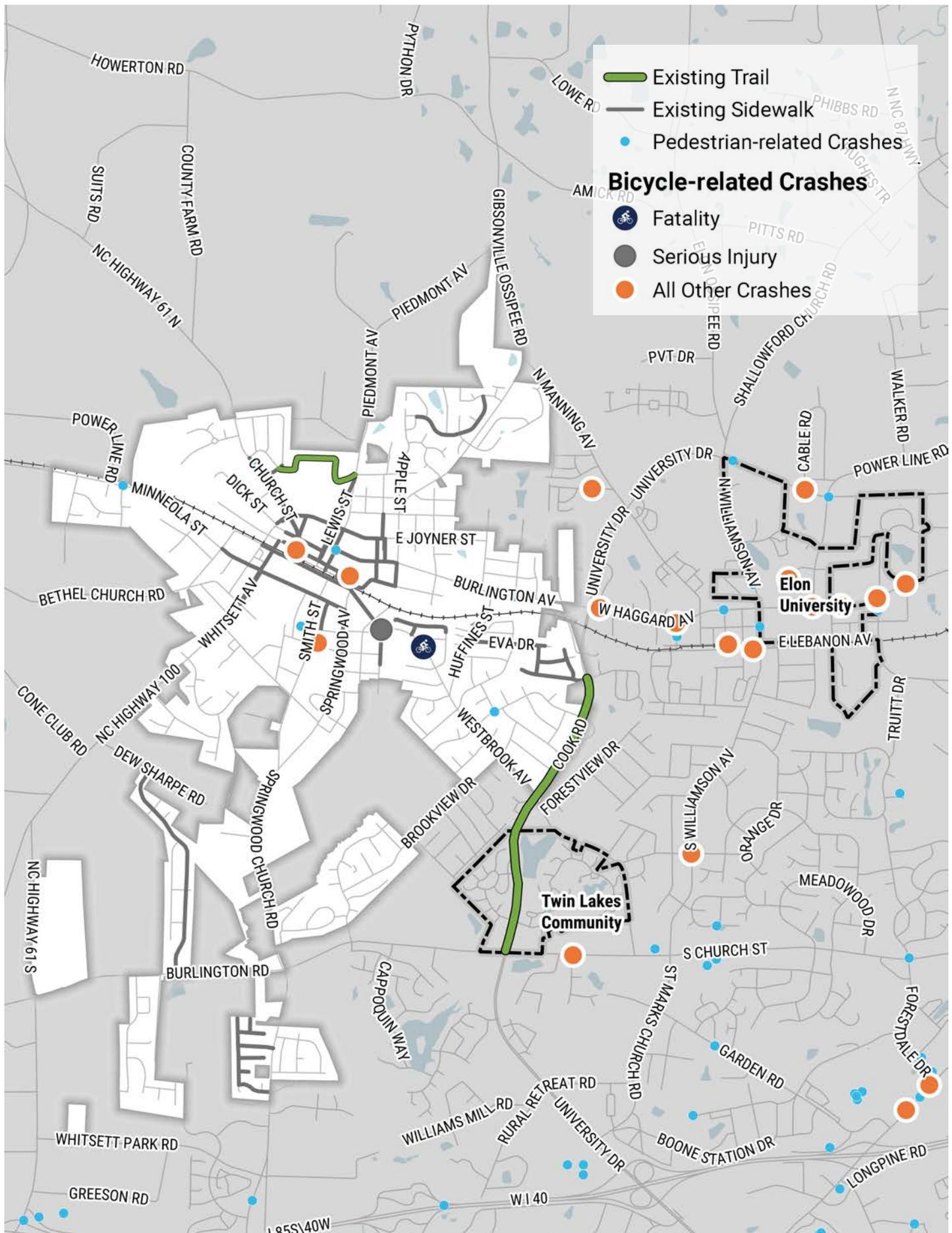
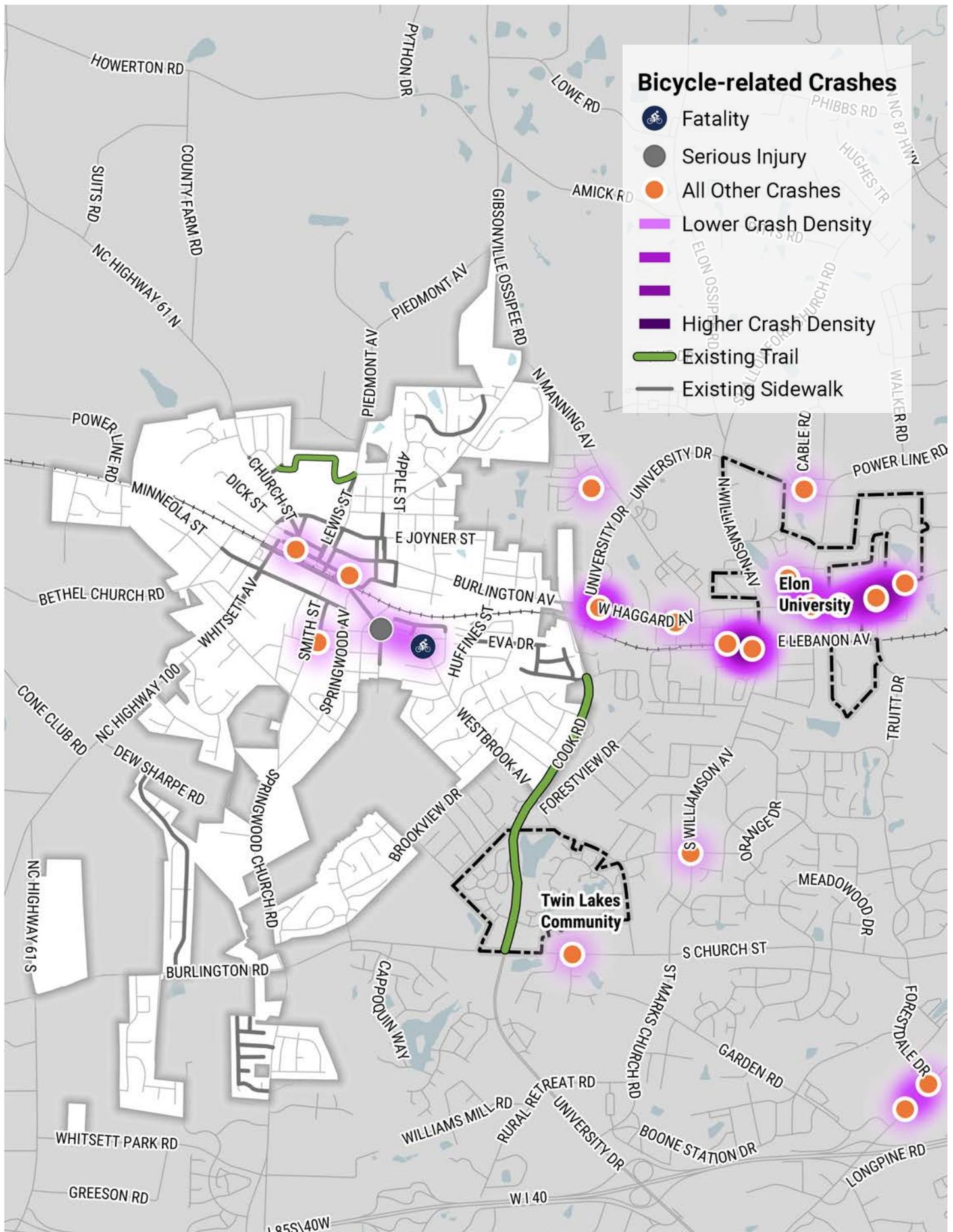


FIGURE 8: Bicycle Crash Density in Gibsonville



## Street Characteristics

Street characteristics, such as speed, traffic volume, number of lanes, and intersection type, greatly contribute to the overall experience of bicycling along a given roadway. Higher speed streets with more travel lanes and greater traffic volumes necessitate more separation for a bikeway to maintain or increase user comfort and accommodate bicyclists of all ages and abilities. Similarly, uncontrolled intersections can introduce uncertainty for all roadway users, particularly when limited sight lines or challenging topography is introduced. Evaluating existing street characteristics established a baseline for bikeway recommendations. Street characteristics noted in the analysis will assist with the selection of bikeway types that align with the goals of this Plan. The following map (**Figure 9**) identifies various street characteristics that could contribute to bicyclist discomfort for all streets within the Town of Gibsonville, including: speed limits, lack of stop control presence at intersections, and presence of traffic calming features.



**IMAGE 13:** A stop-controlled intersection in Gibsonville.

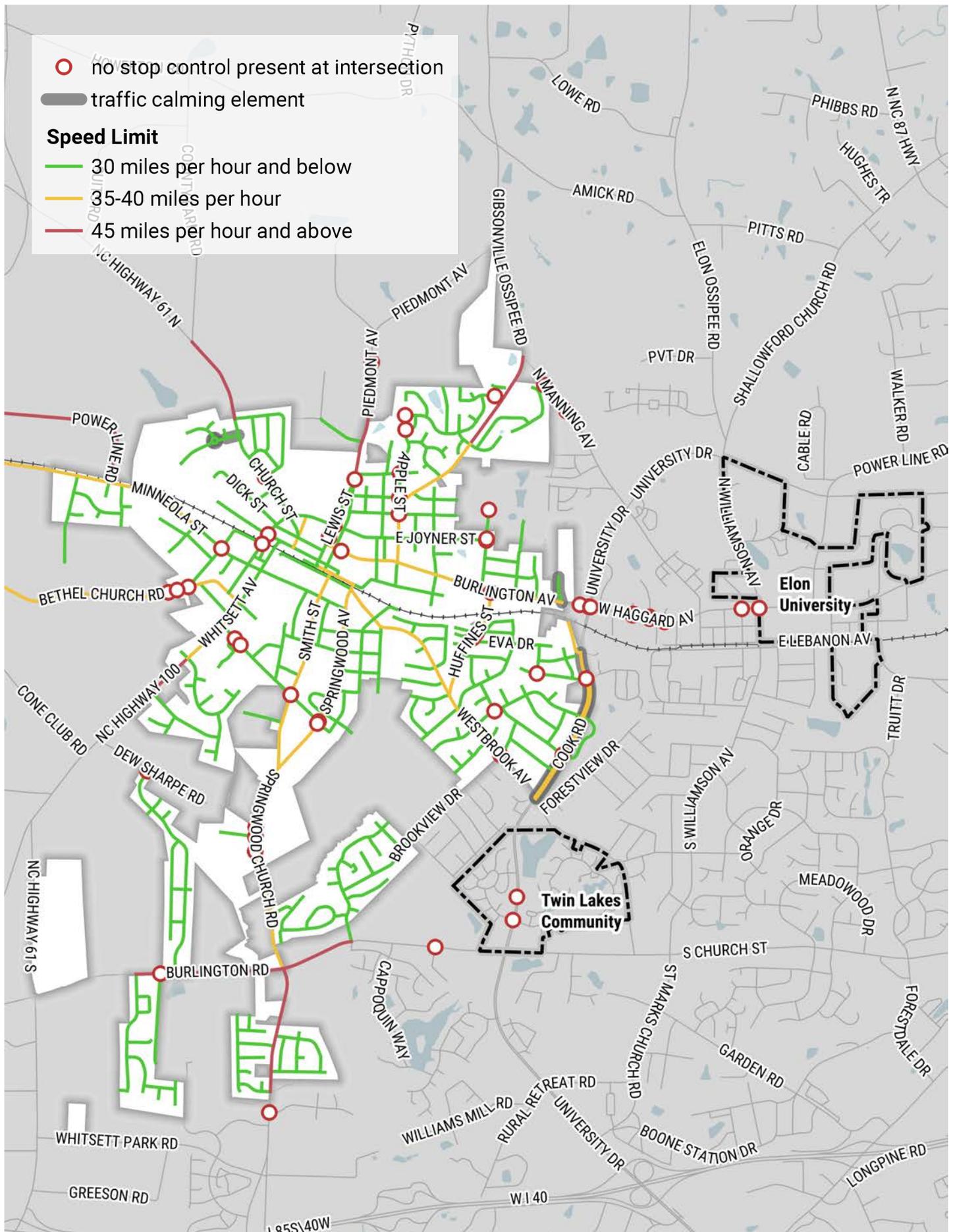


**IMAGE 14:** Speed limit and travel lanes along Burlington Avenue.



**IMAGE 15:** A signalized intersection in downtown Gibsonville.

FIGURE 9: Gibsonville Street Characteristics



## Successful Network

A successful bikeway network is one that creates safe, connected infrastructure and allows mobility for all ages, incomes, and abilities throughout the Town of Gibsonville. In addition, a successful bikeway network will establish the Town as a bicycle-friendly community, drawing visitors throughout the Piedmont Triad region. Several factors influence the quality and success of the bikeway network.

- **High quality infrastructure** can make the entire network more accessible and enjoyable for all users, regardless of age or ability and for both residents and visitors. Implementing safe and well-designed bicycle facilities can encourage more people to use the network and generate a culture for bicycling in the Town.
- **Location of the proposed infrastructure** should leverage a variety of factors, including existing/future land uses that best support bicycling and walking, the community's needs/desires, existing facilities, and equity. Infrastructure placement should be well-connected, offering people multiple ways to get where they need and want to go seamlessly by bicycling.
- **Facility types** proposed for each route should suit the character and context of the street to enhance user experience and provide the highest degree of safety for users.
- **Overall bicycle network** should provide a pleasant and enjoyable experience for residents and visitors of all ages and abilities and expand access to destinations along the network.

## Gibsonville Bike Plan Network

**Figure 10** illustrates the overall bicycle network recommendations for the Town of Gibsonville. These recommendations are intended to be used collectively to shape a better environment for bicycling and contribute to the Town's overall development of mobility infrastructure. More detail on bikeway types throughout the network are described in **Chapter 4**.

The bikeway network was crafted with the intent to increase accessibility for all Gibsonville community members. **Figures 11** and **12** highlight how the proposed bikeway network expands half-mile access to bicycle facilities for Gibsonville residents.

FIGURE 10: The Gibsonville Bike Plan Network

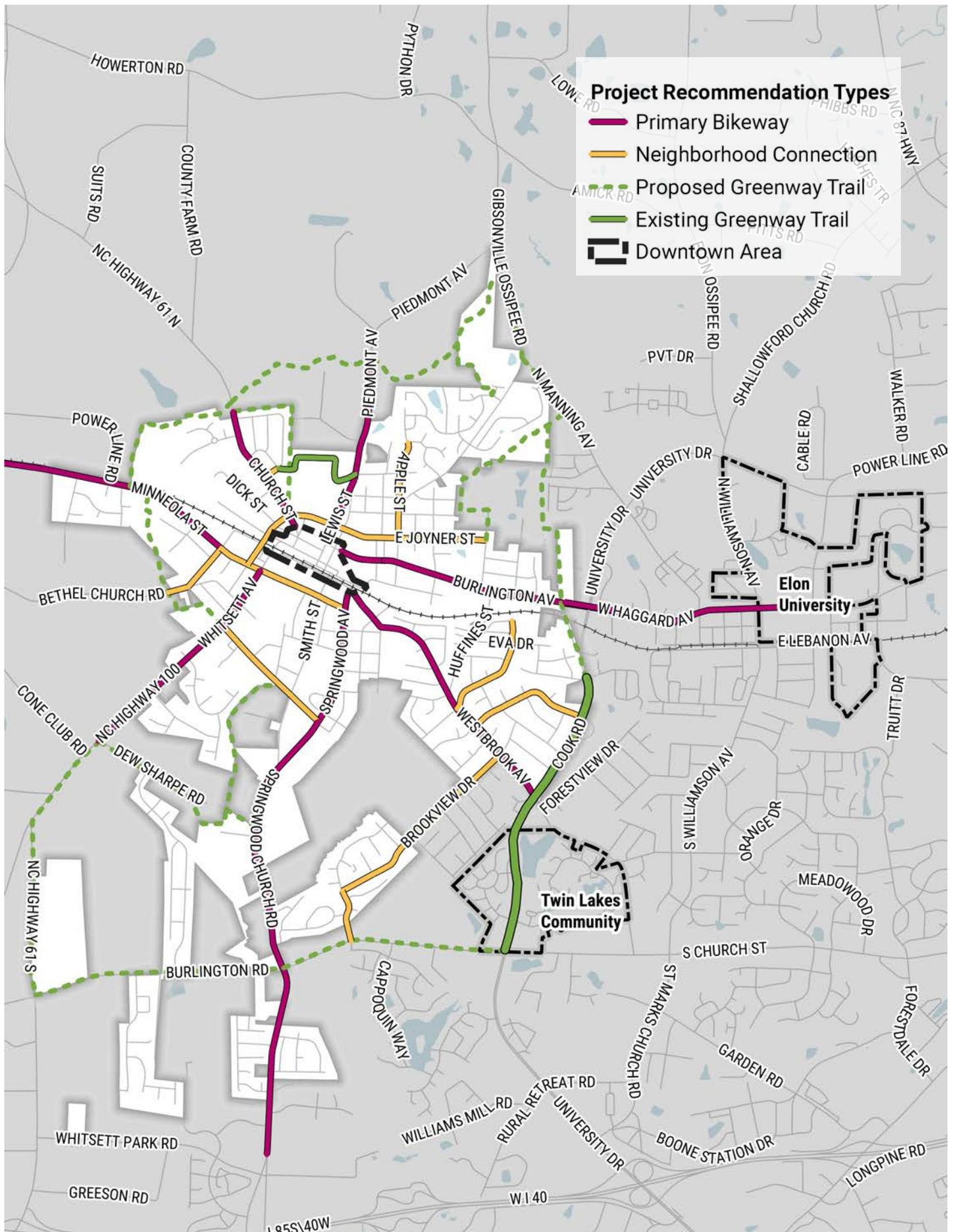


FIGURE 11: 1/2 Mile Access to the Existing Bike Network

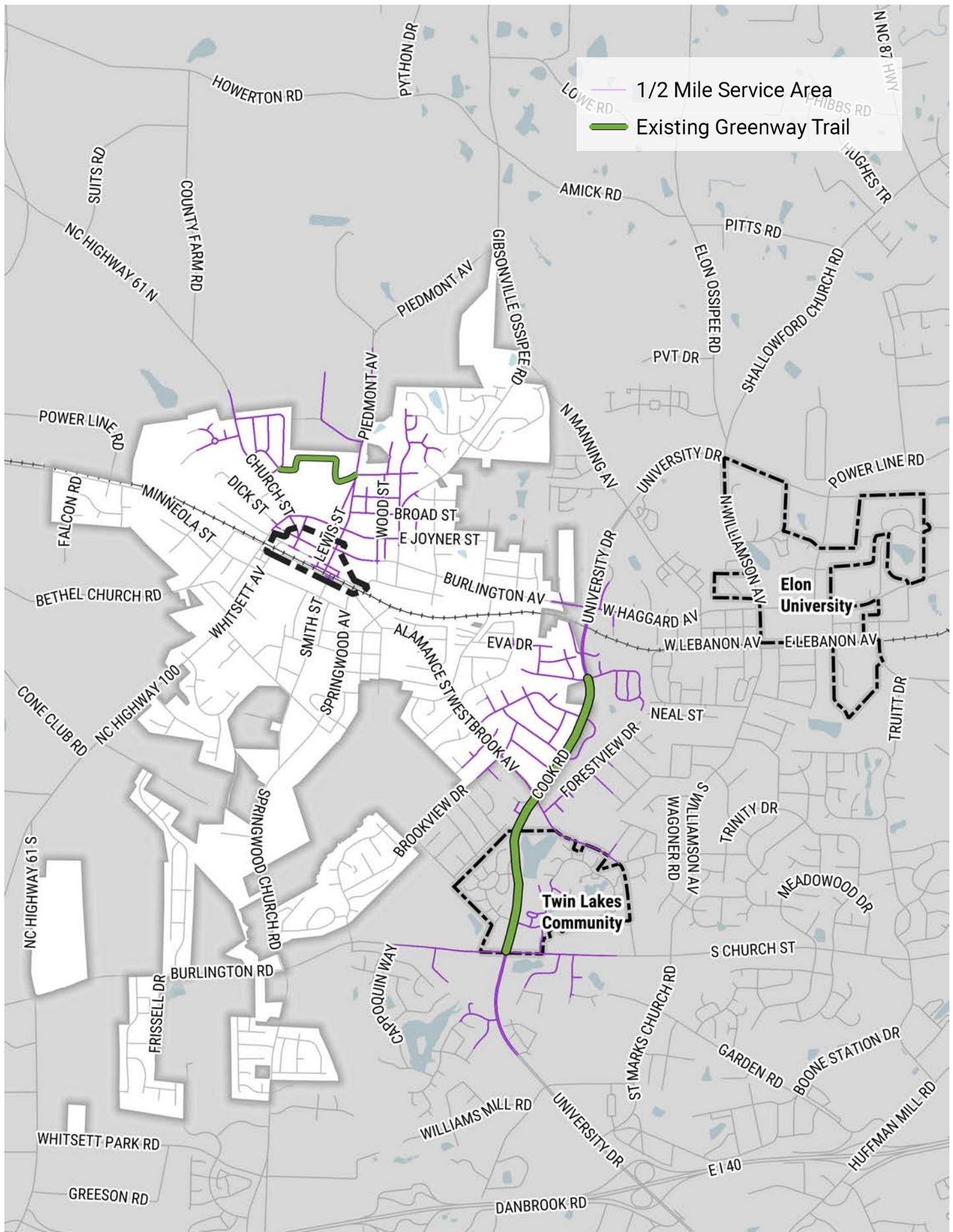
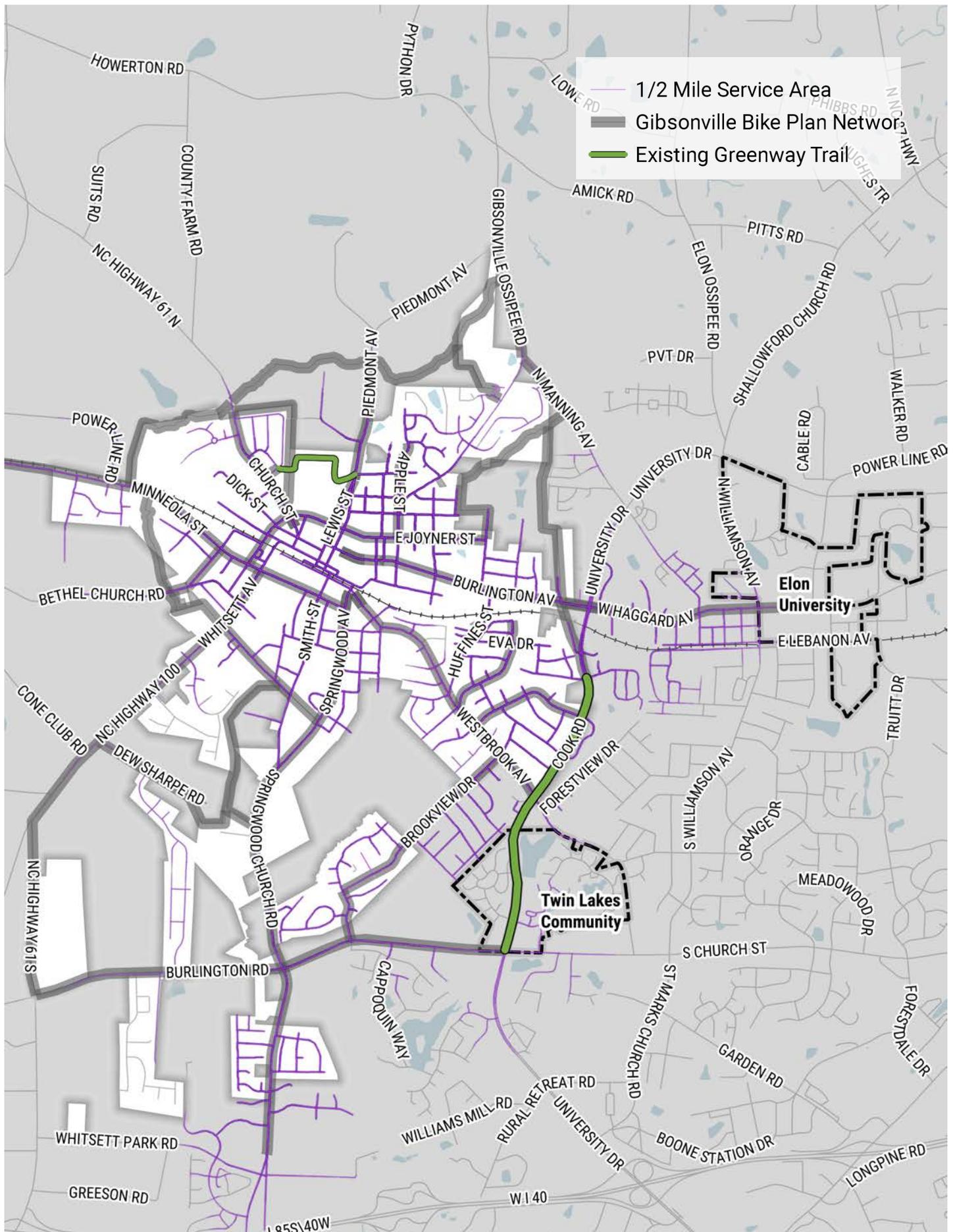


FIGURE 12: 1/2 Mile Access to the Proposed Bike Network



## Chapter 3 Sources

1. US Census Bureau. (2017). "Tenure By Vehicles Available."
2. Transportation for America. (2011). Aging in Place, Stuck without Options: Fixing the Mobility Crisis Threatening the Baby Boom Generation, <https://t4america.org/docs/SeniorsMobilityCrisis.pdf>
3. AARP. (2015). "Bicycles Aren't Just for Kids," <https://www.aarp.org/livable-communities/getting-around/info-2015/bicycles-bike-riding-older-adults.html>
4. Santa Barbara Bike Coalition. (2017). "Research Shows Benefits of Biking," <http://www.sbbike.org/bikebenefitsresearch>

**This page intentionally left blank.**

# 04: *Implementation Plan*



# Summary

The *Gibsonville Bike Plan* provides a clear path forward to creating a connected, safe, and convenient bikeway network. However, the plan is only the beginning; momentum built through the planning process must be sustained and leveraged leading to action and resulting in real projects.

While completing the Plan is important and necessary to build the groundwork for a more bicycle-friendly community, the desired outcome is the implementation of recommendations identified in this document. To this end, an implementation plan has been crafted and is presented on the pages that follow. This chapter outlines the process for prioritizing projects, presents details for measures for success, summarizes recommendations, identifies funding and partnership opportunities, lays out a matrix of critical actions, and provides clear direction for realizing projects.



**IMAGE 16: The Guilford-Alamance County Line on Howerton Road.**

# Project Prioritization

Previous chapters of the Plan present the process that led to the development of the proposed network for Gibsonville. While the proposed network is the framework for bicycle connections throughout the Town, implementation begins with the realization of individual projects. To begin moving from vision to reality, the Plan prioritizes individual projects within the proposed network and recommends strategies for selecting and building bikeway facilities, creating a clear path toward implementation. The full list of prioritized projects can be found in **Appendix B**.

Developing a prioritized project list used a quantitative approach that incorporated a variety of factors. Individual projects were identified within the network of varying lengths based upon characteristics noted during network development. Projects are comprised of multiple segments that are portions of the network between existing roadway intersections. These street segments received weighted scores based on the factors listed in **Table 5** to calculate

a prioritization score. During the prioritization process, each segment was scored independently then averaged with all other segments within the respective project. Calculating the prioritization score in this way ensured that each factor was captured at a detailed level for scoring of the overall projects.

The criteria shown in **Table 5** were used to prioritize projects into multiple levels that could be used to phase implementation. While not every project can be in the highest level, each project on the proposed network is a critical piece of increasing connectivity and safety for bicyclists in Gibsonville. Projects that rank lower but fill essential gaps in the network may be considered for more rapid implementation or in conjunction with adjacent projects. Additionally, while levels have been established, these designations are for planning purposes only and it is understood that there will be “projects of opportunity”; therefore, projects should be implemented when opportunities arise or funding is available.

**TABLE 5: Prioritization Criteria**

FACTOR	RATIONALE	SCORING
Comfort	Streets that are less comfortable to bicycle on deter people from bicycling for trips or recreation; even one uncomfortable segment of a trip could discourage a bicyclist altogether. To encourage bicycling in Gibsonville, projects that are on low-comfort roads are given higher priority. Factors used in this analysis included speed limit, number of travel lanes, and intersection stop control type.	Low Comfort – 15 points Medium Comfort – 10 points High Comfort – 0 points
Connection to Destinations	Connecting key destinations is an important element to developing a safe and convenient bikeway network, while increasing ridership. Parks, schools, and downtown are keystone locations for all community members in Gibsonville. Elon University has also been included due to its prominence in the region and the Town’s desire for bikeway connections to the university. Additionally, multifamily housing provides a high volume of potential network users, while connecting the network to the places people live.	Within ½ mile of 3 or more destinations – 15 Within ½ mile of two destinations – 10 points Within ½ mile of one destination – 5 points Not within ½ mile of destination – 0 points
Connection to Existing Trails	Building off Gibsonville’s existing trail system is key to developing a bikeway network that allows users to get where they need and want to go.	Within ½ mile of existing trail – 10 points Not within ½ of existing trail – 0 points

**TABLE 5: Prioritization Criteria continued**

FACTOR	RATIONALE	SCORING
Equity	<p>Often, groups within a community that are already economically or systemically disadvantaged are more severely impacted by limited or inadequate bicycling networks. Without access to vehicles or other reliable transportation, community resources and assets vital to quality of life (e.g., work, parks, healthcare, and grocery stores) become inaccessible. The Plan's Equity Analysis identifies areas in the community with higher concentrations of people who may more often rely on bicycling for trips. The analysis' areas of high vulnerability represent US census blocks with the highest concentrations of people who identify as a person of color, are over 65 or under 18, are living in poverty, or live in a zero-car household.</p>	<p>In area of high vulnerability – 15 points                      In area of medium vulnerability – 10 points                      In area of low vulnerability – 0 points</p>
Public Input	<p>Throughout the planning process, people who live in Gibsonville have shared their experiences bicycling. Feedback from the public via Wikimap, an online survey, and an open house meeting was incorporated into project prioritization. Specific projects or roadways that were mentioned by the community as difficult to bike along or a desired bike route were given points.</p>	<p>Community mentioned project as priority – 15 points                      Community did not mention project as priority – 0 points</p>
Public Prioritization	<p>In addition to general public input, the project's steering committee was asked to prioritize projects within the bikeway network. Whether they considered each project high, medium, or low priority was captured and factored into overall project prioritization.</p>	<p>High priority for community – 15 points                      Medium priority for community – 10 points                      Low priority for the community – 5 points                      Not a community priority – 0 points</p>
Safety	<p>Concentrations of bicycle crashes can pinpoint areas in a network that are unsafe for bicycling due to high speeds, unsafe roadway designs, or other reasons. Projects in Gibsonville that are along a roadway that has a history of bicycle-related crashes were prioritized.</p>	<p>One or more crashes – 15 points                      No crashes – 0 points</p>
<b>TOTAL</b>		<b>100 POINTS</b>

# Performance Measures

The Action Plan detailed later in this chapter provides a roadmap for advancing the various recommendations outlined in the *Gibsonville Bike Plan*. It is important to establish measures of success, also called performance measures, that can be used to evaluate and monitor the progress of those individual recommendations. These measures will be valuable in documenting and celebrating progress and success, while also demonstrating the benefits achieved by the Plan. For each measure of success, the following section provides a definition, ways to use the measure, a menu of measurement options, data necessary for measurement, case studies of other areas using this performance measure, and key considerations. This allows for a more informed decision-making process for implementing recommendations in this Plan and from future planning efforts.



**IMAGE 17: A gravel road behind Moricle Park.**

# Access to Community Destinations

PLAN GOALS ACHIEVED:



## Definition

The proximity of bicycle infrastructure and services to origins and destinations (e.g., shopping, recreation, entertainment).

## How to Use:

- **Benchmarking:** Access to destinations can be used in benchmarking by assessing the ratio of households that have access to destinations within biking distance along the transportation network. As transportation connectivity investments are made and land uses evolve, this metric will show increased access.
- **Project Prioritization:** A measure of access to destinations can also be used to prioritize investments in filling gaps in the bicycle network. For instance, projects that will allow for continuous access to a high number of destinations can be prioritized over projects that are not critical for access to destinations.

## How to Track:

First, the Town needs to define which destinations will be included in the analysis. Community destinations may include schools, parks, retail areas, grocery stores, medical centers, businesses with a certain number of employees, or even high-density residential locations. An “access to community destinations” analysis can also be related to a specific land use, such as “access to neighborhood elementary schools.”

There are a variety of methods for evaluating the

bikeway network’s effectiveness in providing access to community destinations. Each of the following measures can substitute travel time (e.g. 20 minutes) for distance (e.g. ½ mile) or vice versa:

- Proportion of residences within a ½-mile biking distance to specific key destinations, such as parks or elementary schools.
- Proportion of residences within ½-mile biking distance to specific key destinations along a completed pedestrian or bicycle facility.
- Proportion of residences with access to a predefined set of “community destinations” within a 20-minute bike ride.
- Percent of the network complete for bicyclists within ½ mile of each designated destination.
- Number of destinations that can be accessed within a ½ mile along a bikeway network from a given point on the network.
- Number of destinations within 3 miles along a bicycling network from a given point on the network.

Many communities calculate these distances “as the crow flies,” but this method assumes that a destination may be accessed equally from all sides. A network analysis method allows for more reliable distance calculations. Keep in mind that network distance does not account for the safety or comfort of a route.

## DATA NEEDS AND SOURCES:

- Local parcel data.
- GIS data on schools, parks, healthcare centers, and other daily destinations.
- NAICS coded employment data, available from the U.S. Bureau of Labor Statistics.
- GIS bikeway network.
- *Optional:* Demographic data from the U.S. Census Bureau.

## KEY CONSIDERATIONS:

The quality of certain types of destinations may be relevant in more detailed analyses. For example, the quality and features of parks also relate to equity and health, so parks data may also include information about available amenities (e.g., activity fields, bike parking, bathrooms, internal trails, etc.) and the analysis can include a breakdown of access to particular activities by neighborhood, if desired. Some destinations may generate much more activity than others, for example a major regional park versus a small neighborhood park. Destinations can be weighted in the analysis to reflect these differences.

# Crashes

PLAN GOALS ACHIEVED:



## Definition

The measured number of crashes or rate of crashes (i.e., crashes per volume of users) over a designated period of time, typically separated into modes (i.e., vehicles, pedestrians, bicyclists) and severity (i.e., fatalities, injuries, property damage only).

## How to Use:

- **Project Prioritization:** The frequency and rate of crashes can be used to prioritize safety improvements along various corridors and/or intersections. For examples, locations with higher rates of specific crashes may receive funding priority to address the safety issues before a location that may have less of a demonstrated or objective safety issue.
- **Benchmarking:** The frequency and rate of crashes involving pedestrians and bicyclists can be used as a benchmark in an area actively seeking to improve walking and biking conditions. For example, States typically set a specific goal to annually gauge progress towards improving safety. Likewise, another example is "Vision Zero," an initiative originating in Europe and now being used in various US cities which sets a benchmark of zero fatalities or severe injuries resulting from roadway crashes.

## How to Track:

Crash data is useful for identifying the number and severity of crashes, where crashes occur, the circumstances surrounding each crash, who is involved in crashes, and the conditions and time of

day that crashes occur. By understanding common crash types and locations, the Town of Gibsonville can determine the appropriate countermeasures and prioritize projects to improve safety. Additionally, the number of crashes can be tracked over time to track progress towards meeting safety goals. Crash data is often used along with volume data and facility type data to determine crash rates and identify crash hotspots. Some of the common measures used to evaluate the safety of the transportation system based on crash history are:

- Number of bicycle-involved and/or pedestrian-involved crashes over 5 years.
- Number of fatal or serious injuries of bicyclists and/or pedestrians over 5 years.
- Crashes per volume of bicyclists and/or pedestrians over 5 years (crash rates).

State DOTs, MPOs, and other agencies may use data for non-motorized fatalities and serious injuries that is being collected by State DOTs to satisfy the requirements of 23 CFR 490. This data includes the number of non-motorized fatalities computed from Fatality Analysis Report System (FARS) and FARS Annual Report File (ARF), and the number of nonmotorized serious injuries from the reported values in the Highway Safety Improvement Program (HSIP) Report.

## DATA NEEDS AND SOURCES:

- Local or State crash report database.
- Fatality Analysis Reporting System (FARS).
- Potentially: emergency room visit data.
- Pedestrian and bicycle counts (volumes).
- Demographic information.
- Facility inventories.
- Highway Safety Improvement Program (HSIP) Online Reporting Tool.
- Highway Performance Monitoring System (HPMS).
- State Highway Safety Plan (HSP) and the State Strategic Highway Safety Plan (SHSP).

## KEY CONSIDERATIONS:

Pedestrian and bicycle crashes are often underreported and can be inconsistent from source to source. Comprehensive safety studies have sought to compile records from police and ambulance/ hospital sources to supplement those that are officially reported.

Each State Highway Safety Office must annually establish a performance measure for the statewide totals for pedestrian fatalities and the statewide totals for bicyclist fatalities, involving a crash with a motor vehicle on a public roadway (23 U.S. Code 402(k)4).

# Equity

PLAN GOALS ACHIEVED:



## Definition

The proportion of communities who are low-income, people with disabilities, older adults, children, and people of color that have access to bicycle infrastructure and services.

### How to Use:

- **Project Prioritization:** Projects serving a community's most vulnerable neighborhoods, particularly those without access to a personal vehicle, can be prioritized for funding.
- **Alternatives Comparison:** Project alternatives can be evaluated on their ability to serve vulnerable and/or transportation-dependent populations. For example, alternatives that promote auto mobility at the expense of pedestrian accessibility would be harmful to households who do not have access to a vehicle.
- **Benchmarking:** The Town can annually track its transportation system's ability to serve people, especially those who lack access to a vehicle.
- **Establishing Standards:** The Town can set a minimum level of access for vulnerable and/or transportation-dependent populations.

### How to Track:

Evaluate the effectiveness of the Town's transportation network in providing access to bicycle facilities for vulnerable or transportation-dependent populations. Vulnerable or transportation-dependent populations are frequently represented as an index of certain population characteristics and could include one or more of the following: low-income households, persons with disabilities, under 18, 65 and over, minority populations, households without access to a vehicle, or single parent households. A variety of metrics can be used to measure access to the bikeway network for vulnerable or transportation-dependent populations, but the most common method is to calculate the ratio of vulnerable or transportation-dependent population within a ¼ or ½ mile distance to a trail, bike facility, or sidewalk.

### DATA NEEDS AND SOURCES:

- U.S. Census demographic data, including income, levels of poverty, zero car households, seniors, children, ability level, and race/ethnicity.
- GIS transportation network for all modes, including existing and proposed pedestrian and bicycle infrastructure. This data is usually found in local GIS Clearinghouses and/or from relevant local, regional, and State agencies.

### KEY CONSIDERATIONS:

A focus on vulnerable and transportation-disadvantaged populations provides an important equity perspective. The Town should explicitly understand the impact of investments on those with the least means, and who rely most on public infrastructure. In addition, the Town should consider the demographics that comprise its residents and visitors and define what its 'vulnerable' or 'transportation-dependent' populations are.

# Network Completeness

PLAN GOALS ACHIEVED:



## Definition

The portion of the transportation network that is usable for people bicycling, and represents the minimum accommodations needed for a facility to be considered part of the bicycling network.

## How to Use:

- **Project Prioritization:** A measure of network completeness can be used to prioritize projects that fill crucial gaps or meet unaddressed needs for bicyclists.
- **Alternatives Comparison:** When comparing design options, the Town may consider how two or more possible configurations contribute to a more complete transportation network for those walking or biking. Scenario Evaluation: Network Completeness can be applied in evaluating future scenarios of potential transportation investments and land use changes.
- **Benchmarking:** The Town can report change over time through regular updates to inventories of intersection treatments, bicycle facilities, and sidewalks.
- **Establishing Standards:** A performance baseline related to network completeness may call for a given percentage of the network to be completed each year.

the street (e.g., wider sidewalks in commercial areas or separated bike lanes in higher traffic conditions). System completeness can be defined and measured in a variety of ways:

- Percent of roadway miles with complete sidewalks or bicycle facilities on both sides.
- Percent of planned bicycle network that is constructed.
- Percent of bicycle network that serves users ages 8 to 80.
- Percent of signalized intersections that have complete pedestrian and bicycle facilities, such as detection, push buttons or pedestrian-recall, striped crossings.
- Percent of sidewalk facilities accessible to users of all abilities.
- Percent of arterial and collector roadways with crossing opportunities every certain number of miles.
- Percent of signals with accessible pedestrian signals (APS).
- Percent of bus stops with accessible boarding and alighting areas.

## How to Track:

In some cases, the Town may set a threshold for what qualifies as complete based on the context of

System completeness and inventory information can be reported as an aggregate measure (e.g., total miles of bike lanes) or stored in a GIS database.

## DATA NEEDS AND SOURCES:

Inventory data for:

- Roadways.
- Sidewalks.
- Bike facilities.
- Pavement markings.
- Signs.
- Signals.

## KEY CONSIDERATIONS:

Completeness can be a subjective term and should be explicitly defined. For example, a minimum width of a multiuse path should be identified to qualify as part of a complete system. Collecting inventory data can be time consuming and expensive, and some municipalities lack documentation on pedestrian and bicycle infrastructure. Network Completeness can also be tied in with ADA Transition Plans, which require DOTs and other agencies to identify barriers to access for persons with disabilities and schedule removal of such barriers.

# Retail Impacts

PLAN GOALS ACHIEVED:



## Definition

The commercial impacts (e.g., change in revenue, spending habits) and the ability to access retail establishments by pedestrians and bicyclists as a result of transportation investment.

## How to Use:

- **Alternatives Comparison:** Results from intercept surveys that ask about transportation mode and spending habits can be used to compare project design options.
- **Benchmarking:** An intercept survey or survey of business owners can be used to track progress in an area actively seeking to increase the proportion of people who access businesses by foot or by bike. A survey can also be used to benchmark business owner-reported revenue or spending habits, by transportation mode.

## How to Track:

Street-level retail depends on its customers' ability to access and patronize their shops. Investments

in walking and bicycling have been shown to increase retail activity, especially in areas with latent pedestrian and bicycle demand.<sup>1,2</sup> Parking supply, both for bicycles and autos, and transit also impacts access to storefronts. Two common methods are used to evaluate retail impacts:

- **Sales tax receipts** – sales tax data provide an objective and consistent method for tracking how much spending takes place within a given study area. Measuring sales before and after a project is constructed may indicate how transportation investment impacted retail sales.
- **Shopper surveys** – surveys of customers can reveal access mode choice and stated preferences for walking and bicycling infrastructure. Surveys can be done before or after a project is built to understand how it may impact shopping.

## DATA NEEDS AND SOURCES:

- Sales tax data.
- Survey data.

## KEY CONSIDERATIONS:

Some transportation agencies have difficulty obtaining sales tax records. Retail sales are impacted by a variety of factors, so caution should be used in relating impacts to transportation investment.

# User Volume

PLAN GOALS ACHIEVED:



## Definition

The number of bicyclists counted in a specified area for a designated period of time.

### How to Use:

- Project Prioritization: Bicycle volume data can be used to estimate demand for bicycling, which would indicate a higher priority for a project.
- Benchmarking: Counting and tracking bicyclist volumes can show impacts of educational programming, bicycle-friendly policies/ordinances, and the presence of more bikeway facilities on community interest in and level of comfort with bicycling in Gibsonville.

### How to Track:

Bicyclist volumes can be used in a number of ways including establishing baselines and measuring use, evaluating before-and-after data on projects, multimodal modeling, and project prioritization and safety analyses. Depending on data goals, bicyclist volumes can be collected in a number of ways, from short duration counts that are collected by a person over a few hours or the course of a day, to longer duration counts collected by automated equipment.

National Cooperative Highway Research Program (NCHRP) Report 797: Guidebook on Pedestrian and Bicycle Volume Data Collection<sup>3</sup> provides guidance

on collecting volume data using manual count methods and automated counters.

Federal Highway Administration's (FHWA) Traffic Monitoring Guide<sup>4</sup> (TMG) is a key data collection reference guide for State highway agencies regarding policies, standards, procedures, and equipment used in a traffic monitoring program.

Bicycle counts generally have greater variability due to generally lower volumes and these modes' susceptibility to the effects of weather; therefore, a combination of long and short duration counts can provide geographic coverage and seasonal insights to more accurately understand demand and travel patterns.

The "means of transportation to work" data provided by the American Community Survey (ACS) can provide additional insight on how people are traveling to work within specified geographic areas. The major drawback of this data is that it does not consider the trips that occur during non-commuting periods of the typical weekday.

### DATA NEEDS AND SOURCES:

- Bicycle volume counts.
- Classification data (e.g., gender, race, helmet use).

### KEY CONSIDERATIONS:

Advances in both counting technology and guidance will help move towards more consistency in pedestrian and bicycle volume counts. NCHRP Report 797: Guidebook on Pedestrian and Bicycle Volume Data Collection provides a wealth of information designed to assist agencies with developing and implementing pedestrian and bicycle count programs. The report contains chapters on applications for count data; planning and implementing a count program; applying adjustment factors and expanding count data; and guidance for choosing a particular automated count technology for various contexts.

## Additional Measures of Success

There are several other measures of success that could be used to track progress and tell the story of bicycling in Gibsonville. Additional measures that were not included in this Plan have been noted below as a resource for the Town:



### Access to Jobs

The ability of bicycle infrastructure and services to connect people to places of employment.



### Adherence to Traffic Laws

A measurement of how well pedestrians, bicyclists, and motorists obey current traffic laws.



### Community Commitment

A measure of the steps taken within Gibsonville to make the community more bicycle-friendly. These can range from policies adopted by the Town's Board of Aldermen to programming managed and operated by local nonprofits or community organizations.



### Miles of Facilities

The total distance, expressed in miles, of all bicycle facilities in a specified geographic area.



### Job Creation

The change in the number of jobs in a neighborhood or region related to modifications in bicycle infrastructure and policies.



### Land Value

The assessment and valuation of property, land development, and revenue of a particular location. Changes in land value resulting from investments in bicycling can be used to quantitatively evaluate transportation projects.



### Mode Share

The proportion of total trips by transportation mode. This can be calculated by trip type (i.e., commuting, utilitarian, recreational).



### Population Served

The proximity of bicycle infrastructure and services (e.g., travel time, distance) to residential populations.



### Network Directness

A measurement of the most direct routes for bicycling between two designated locations. Ideally, bicycling routes should be as short and direct as possible without sacrificing user comfort.



### Physical Activity and Community Health

Measure of the level of physical activity per capita or the portion of the population that is physically active.



### User Perceptions

A measurement of how safe a user feels under various network scenarios. For example, a bicyclist will likely perceive a street to be "unsafe" if it lacks bicycle infrastructure and permits high vehicular speeds.

# Plan Recommendations: Projects, Policies, Programs, & Funding

This Plan's recommendations are intended to be a resource for the Town for both capital projects and future policy and program decisions. To create a bicycle-friendly environment, the Town of Gibsonville will need to implement changes to infrastructure and policies, while leveraging and building upon existing programming.

This section provides information on projects, policies, and programming that will guide Gibsonville to choices that promote and provide safe, accessible space for residents and visitors to ride their bicycles, whether they are picking up groceries, commuting to work, or going on a leisurely ride with friends and family. Information on these recommendation categories are followed by a customized Action Plan (Table 7) that provides a phased approach to recommendations along with key partnerships, goals achieved, and corresponding performance measures.

## Project Recommendations

### Bikeways

Projects within the bikeway network have been split into one of three categories:

- **Primary Bikeways**

Projects that are denoted as "primary bikeways" are those that will serve as primary connections for bicycling between major destinations in Gibsonville, as well as between Gibsonville and surrounding communities. These bikeways are envisioned to be beautiful, safe, and comfortable places to bicycle. The bikeways should be designed so that they encourage more users through increased access, comfort, and convenience. Many of the primary bikeway projects are on streets that may be less comfortable for bicycling in their current state and are intended to be facilities separated from vehicular traffic (i.e., a multiuse path or sidepath).

- **Neighborhood Connections**

Neighborhood connection projects will connect neighborhoods to primary routes or trails. These streets are envisioned to become neighborhood bikeways—routes that encourage residential bicycling by connecting to primary routes and for recreation. Neighborhood bikeway corridors are primarily residential routes with low traffic speeds and volumes, fewer travel lanes, and higher volumes of people bicycling and walking. Neighborhood connections require striping and other traffic calming elements that deter cut-through vehicular traffic and keep speeds low (i.e., under 25 miles per hour). Critical to the success of neighborhood connections are major intersection crossings that maintain user comfort for the approach and crossing of streets.

- **Greenway Trails**

Greenway trail projects provide an off-street facility for people to bicycle, walk, and wheel. Greenway trails adjacent or parallel to streets, like shared use paths and sidepaths, are similar to primary bikeways. However, those with alignments that follow stream corridors, utility easements, or other natural landscapes provide a more unique user experience. The proposed greenway projects closely align with those included in Gibsonville's Comprehensive Pedestrian Plan. These trails supplement the proposed network of primary bikeways and neighborhood connections by increasing access to high-comfort, off-street facilities throughout the Town.

A complete list of proposed bikeway projects, along with the prioritization score for each, can be found in **Appendix B**.



**This page intentionally left blank.**

## Slow Streets

Streets make up the largest portion of the public realm. The character and allocation of space on a street plays a key role in user experience. Streets should be attractive, inviting, accessible, safe, and comfortable for all users. Although improvements for pedestrians and bicyclist should be a major consideration in street design and redesign, all transportation modes must be accommodated. The design of streets should focus on a holistic approach that is context sensitive to produce streets that not only deliver a balanced quality of service to all modes of transportation but also a high quality of life for the surrounding community. In essence, properly designed streets have the ability to change road safety, health, and economic trajectory of a community.

Implementing slow streets in downtown Gibsonville is a key component of the *Gibsonville Bike Plan*.

**Figures 14** and **15** provide short-term and long-term design recommendations. The primary goal of slow streets is to reduce speeds in a defined area to improve the safety of pedestrians, bicyclists, public transport users and motorists. The area can vary

in size from a single block (e.g., a school zone) to an entire residential neighborhood or commercial district. Within the slow street, an effort is made to keep motor vehicle speeds below a certain target speed. A variety of strategies can be implemented to encourage speeds below the target speed. The most important strategy is design features that encourage slower speeds, but other strategies include enforcement, education, and changes in speed limits. Typically, the most effective approach is a combination of strategies.

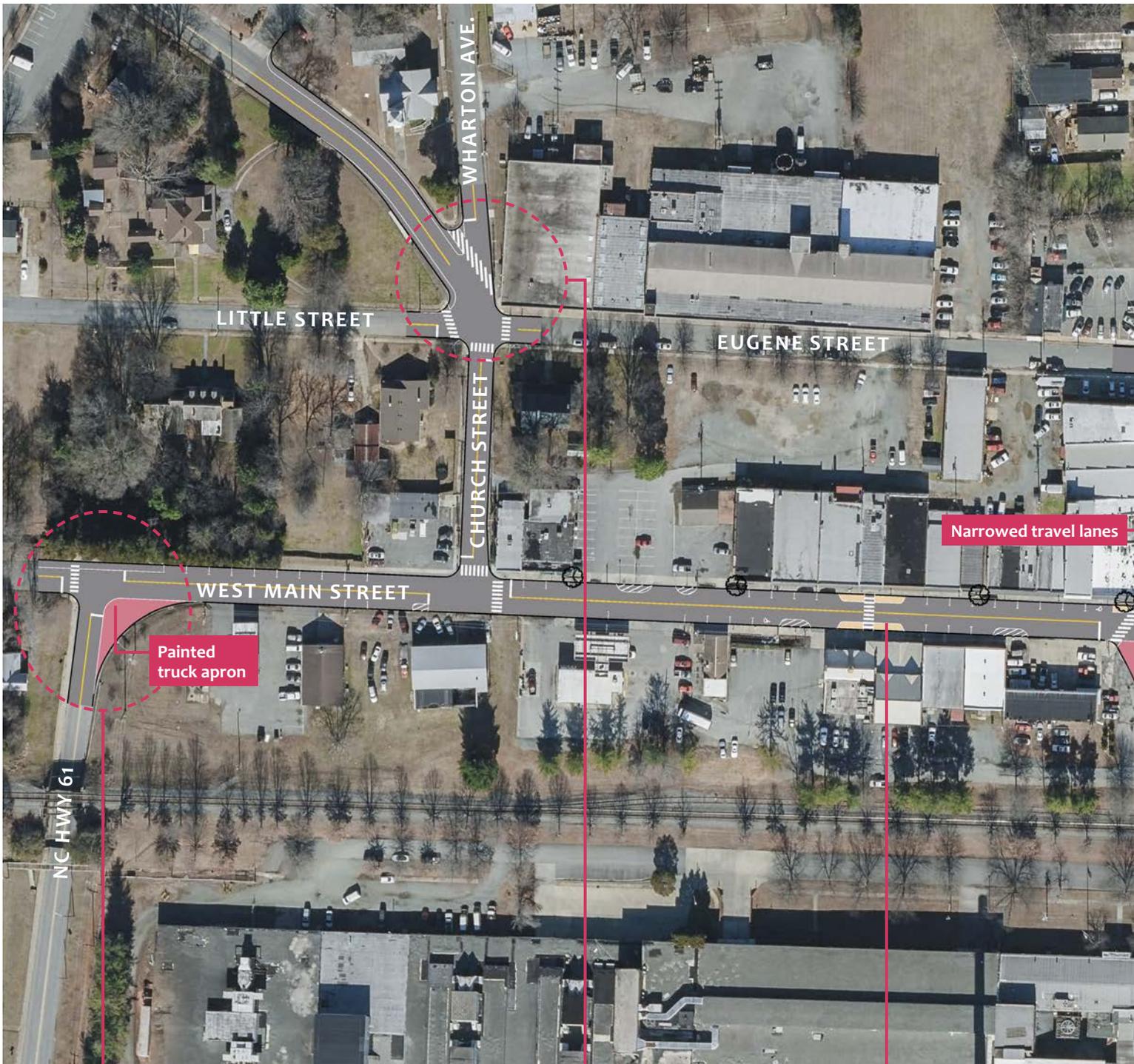
Slow streets have many benefits, including:

- Fewer traffic fatalities and serious injuries.
- Improved quality of life through reduced cut-through traffic and traffic noise.
- Economic development via environments that feel safer and are more inviting to people on foot, which encourages them to linger, socialize, and shop.
- Improved public health through reduced emissions and increased physical activity related to walking and bicycling.

### NOTE FOR THE LONG-TERM CONCEPT (FIGURE 15):

*This preliminary concept is for planning purposes only. Field verification, site condition assessments, engineering analysis, and design are necessary prior to implementing recommendations contained herein. Additional turning movement studies conducted with NCDOT are necessary to determine proper vehicle size.*

**FIGURE 14: Short-Term Slow Street Concept**



**DOWNTOWN GATEWAY**

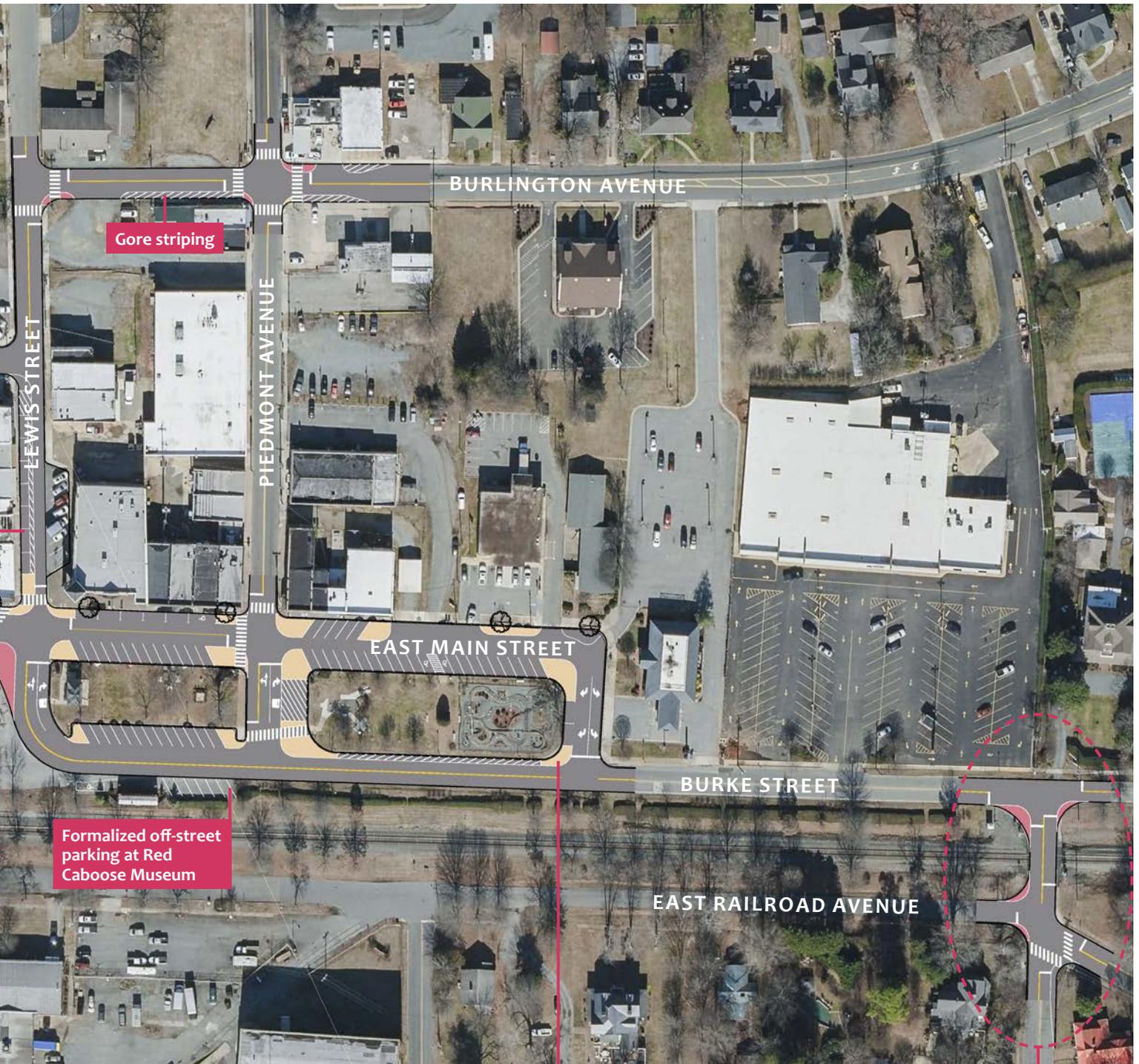
Converting the intersection of West Main Street and NC Hwy 61 to a three-way stop slows traffic before entering the downtown core.

**NEIGHBORHOOD CONNECTION**

- Striping visually narrows the lane width, slowing traffic in advance of the 5-way stop
- New crosswalk over Church Street

**SAFE ON-STREET PARKING**

Twenty-two of the existing on-street parking spaces in the area do not meet safety standards. Removing parking near crosswalks and driveways is critical for creating safe streets for all.



### HIGH VISIBILITY CROSSWALKS

Many of the existing crosswalks are simple parallel bars. High visibility crosswalks help draw attention to people crossing the roadway.

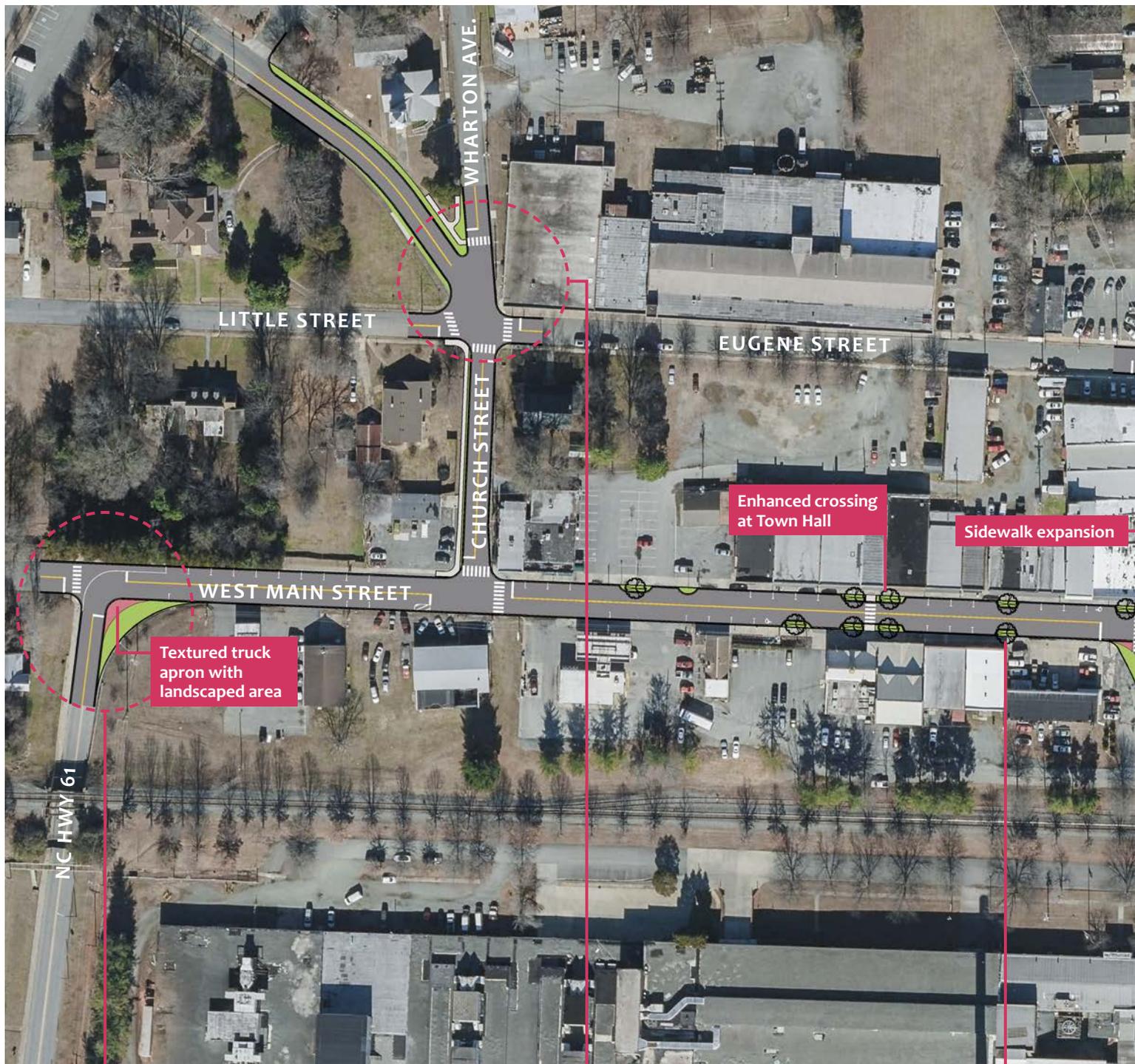
### PAINTED CURB EXTENSIONS

Combining painted truck aprons with painted curb extensions will visually narrow travel lanes and visually tighten turning radii. This calms traffic when vehicles adhere to these visual cues.

### NEIGHBORHOOD CONNECTION

- Painted truck aprons at Burke Street and Railroad Avenue
- Three-way stop created at Burke Street and Springwood Avenue to slow traffic before entering downtown

FIGURE 15: Long-Term Slow Street Concept



### DOWNTOWN GATEWAY

Installing a textured truck apron at the new three-way stop creates space for a landscaped area with wayfinding signs.

### NEIGHBORHOOD CONNECTION

- Reduced crossing distance across Wharton Street
- Place-making opportunity in landscape area between Wharton Avenue and Church Street

### STREET TREES

Landscaped areas and street trees throughout downtown create more comfortable pedestrian experience, provide place-making, contribute to traffic calming, absorb stormwater, and utilize areas unsafe for on-street parking.



### CURB EXTENSIONS

Curb extensions in areas with on-street parking shorten crossing distances and help reduce vehicle turning speeds.

### PARK EXPANSION

Narrowing travel lanes on Piedmont Avenue and East Main Street creates an opportunity for additional greenspace downtown. Reallocating space in the roadway allows for continuous sidewalks around both sides of the park.

### NEIGHBORHOOD CONNECTION

- Crosswalk and curb ramps at Burke Street makes crossing accessible to all
- Improved sidewalk over the railroad
- Curb extensions

# Policy Recommendations

---

## Invest in Data Collection and Analysis

For many of the *Gibsonville Bike Plan's* recommendations to be effective, and for the measures of success to be benchmarked over time, consistent, accurate, and up-to-date data is critical. The Town of Gibsonville should initiate or expand data collection and analysis efforts to continue to tell the story of changing mobility throughout the community. Data that supports an in-depth analysis of crashes, near-misses, and systemic safety issues should also be collected. Furthermore, counting bicyclists will ensure a clear understanding of which facilities are attracting new users and various user types. Finally, all data must be accessible, easy to understand and interpret, and readily passed between databases and GIS platforms throughout the region to support regional bicycle initiatives. These steps will enable a data-driven approach to routine refinements to the Plan and assist with planning efforts and implementation throughout the region.

## Determine Responsibilities

The Town should assign greenway and bikeway construction and maintenance to the appropriate department and staff members. While many departments may collaborate on pedestrian and bicycle connectivity, the overall implementation of the network should be housed within a single department that can champion its progress.

## Plan for Regional and Local Connectivity

Continue strengthening regional partnerships to collaborate on inter-jurisdictional trails and bikeways. These opportunities can be explored in-depth during pedestrian and bicycle planning and design processes but should be ongoing.

## Foster a Bicycle-Friendly Downtown

Consider fostering a bicycle friendly downtown in the following ways:

- Make bicycle parking easily available and accessible near priority community destinations, especially throughout downtown.
- Encourage restaurants to adopt bicycle-friendly practices, such as posting menus outside the building so that bicyclists can easily see them from the sidewalk or making sealable take-out containers available for easier takeout orders not being transported in a vehicle.
- Work with local businesses to make sure that some basic biking gear is available for sale. This should include mechanical items such as spare tubes, tools, protective gear, some basic bike parts and tools, rain gear, packs, and other wearables.
- 

## Build the Framework for Bicycle Tourism

Encourage the establishment of a bicycle shop, which could serve as a hub for the local bicycling scene, visitors, and bike tourism. They are often staffed by riders that know the region and can provide visitors with the information they need. They also offer visiting bicyclists the option of professional repairs and servicing while they are in the area. They can provide a social connection for riders by organizing group rides, and training sessions. Many are also involved in sponsoring local bicycling events.

# Policy Recommendations

---

## Adopt a “Safe Systems” or Vision Zero Approach

Safety—both the perception of safety and actual crash numbers and rates experienced in the community—is an important component of the *Gibsonville Bike Plan*. If people don’t feel safe riding a bicycle, they will not choose to do it. Adopting a “Safe Systems” or Vision Zero approach will allow Gibsonville to focus on increasing bicycling, walking, and wheeling without increasing crash rates. This approach establishes a series of essential principles to eliminating deaths and serious injuries on roadways; six key elements set Vision Zero apart from traditional road safety efforts:

- **Traffic deaths are preventable.** Zero is upheld as the only acceptable number of traffic fatalities and the word “accident” is eliminated from the traffic safety vocabulary.
- **System failure is the problem.** In the safe systems framework, individuals are not the problem. It is flaws in the system – from planning through design, construction, and maintenance – which cause conflicts between high-speed motor vehicles and pedestrians and bicyclists.
- **Road safety is a public health issue.** While traditional approaches to transportation safety have prioritized reducing or preventing collisions, Vision Zero focuses on preventing injuries and fatalities.
- **The approach is holistic.** Roadway design is part of the issue, but so are land use and development decisions, school siting choices, housing policies, and many other factors that affect transportation options and choices.
- **Data drives decisions.** Vision Zero demands a relentless focus on eliminating fatalities and serious injuries first.
- **Social equity is a key goal and component of Vision Zero.** Traffic crashes disproportionately affect vulnerable populations, particularly among those who do not have access to a motor vehicle and who are more likely to be dependent on walking, bicycling, and transit. Vulnerable communities must be meaningfully engaged in addressing the safety, accessibility, and larger cultural and societal issues around road safety and community development.

Formally adopting the Safe System Approach will allow the Town of Gibsonville to increase bicycle mode share while prioritizing the safety of residents and visitors.

## Prioritize Cohesive Signage and Wayfinding Throughout the Town

Whether for first-time visitors or regular users, proper signage can contribute to a quality user experience, increase safety (particularly when connecting between bikeway facilities), and establish ‘rules of the road’. Signage along bikeways and at intersections can contribute to a seamless experience for people bicycling in Gibsonville. In addition, wayfinding in downtown Gibsonville can direct visitors to community attractions and advertise local business offerings. Incorporating branding into wayfinding elements will enhance Gibsonville’s sense of place.

## Adopt Bicycle-Friendly Local Ordinances and Policies

The *Gibsonville Bike Plan* has prioritized bikeway connections and slow street enhancements around downtown and other key destinations as a valuable step in creating a great bicycle network. The Town should consider adopting ordinances or policies outlined in **Table 6** to make the community more bicycle friendly.

# Policy Recommendations

TABLE 6: Local Ordinance Recommendations

LOCAL ORDINANCE/ POLICY	RATIONALE	RESOURCES
Develop and adopt a Complete Streets policy.	A Complete Streets policy allows cities and towns to work towards creating a street network that encourages pedestrian and bicycle travel and provides safe and comfortable roadways for all users. Update development regulations and engineering standards to include and reflect best practices for Complete Streets and bikeway design.	<ul style="list-style-type: none"> <li>NCDOT Complete Streets Policy<sup>5</sup></li> <li>NCDOT Complete Streets<sup>6</sup> Implementation Guide</li> <li>AARP Complete Streets in the Southeast: A Tool Kit<sup>7</sup></li> </ul> <p>Sample local ordinance language:</p> <ul style="list-style-type: none"> <li>Black Mountain, NC Complete Streets Commitment Resolution<sup>8</sup></li> </ul>
Require bikeways and bicycle-friendly crossings to be included on roads in new development or redevelopment.	Bikeway design expectations can be tailored to the characteristics of the planned roadway (e.g. functional class, speed limit, intersection type) and the land use context of the development. Requiring some sort of bikeway accommodation, whether through a dedicated facility or traffic calming design features, on roads in new development will supplement to overall bikeway network and contribute to the Town’s overall level of bicycle-friendliness.	<ul style="list-style-type: none"> <li>FHWA Bikeway Selection Guide<sup>9</sup></li> <li>NCDOT Complete Streets Planning and Design Guidelines<sup>10</sup></li> <li>Chapter 6 of Wake Forest, NC UDO for recommendations for bikeways and greenways, esp. sections 6.8.2, 6.9, 6.10.<sup>11</sup></li> <li>Chapter 7 of the Wilson, NC UDO.<sup>12</sup></li> <li>Section 6.6.A of the Burlington, NC UDO.<sup>13</sup></li> <li>Section 5.7.4.2 of the Elon, NC Land Development Ordinance.<sup>14</sup></li> </ul>
Require dedication or development of adopted greenway alignments.	Establish requirements for greenway dedication or development in new developments where a greenway or trail is shown on an adopted plan or where a property connects to an existing or proposed greenway. Where greenway construction cannot politically or legally be required, consider offering incentives for in the form of reduced fees, cost sharing, density bonuses, or reduction in other open space requirements when adopted greenways are constructed through private development.	<p>Sample required dedication language:</p> <ul style="list-style-type: none"> <li>Chapter 7 of the Wilson, NC UDO<sup>12</sup></li> <li>Section 8.2.3 of the Cary, NC Land Development Ordinance<sup>15</sup></li> <li>Section 6.8.3 of the Davidson, NC Planning Ordinance<sup>16</sup></li> <li>Section 15-182.2 of the Carrboro, NC Land Use Ordinance<sup>17</sup></li> </ul> <p>Sample incentive language:</p> <ul style="list-style-type: none"> <li>Section 7-11-4-C of the Asheville, UDO<sup>43</sup><sup>18</sup></li> <li>University of Florida Developer Incentive Strategies<sup>19</sup></li> <li>Section 6.6.D-E of the Burlington, NC UDO<sup>13</sup></li> </ul>
Establish a fee-in-lieu of dedication program for greenways.	A fee-in-lieu program provides flexibility for developers, while also benefiting the Town with additional funding that can be used for land acquisition and greenway development.	<p>Sample ordinance language:</p> <ul style="list-style-type: none"> <li>Section 11-7-4-G of the Asheville, NC UDO<sup>18</sup></li> <li>Section 7.3 of Wilson, NC UDO<sup>12</sup></li> <li>Sections 5.5.3.B and 5.5.3.C of the Morrisville, NC UDO<sup>20</sup></li> <li>Section 6.6.B of the Burlington, NC UDO<sup>13</sup></li> </ul>

# Policy Recommendations

TABLE 6: Local Ordinance Recommendations continued

LOCAL ORDINANCE/ POLICY	RATIONALE	RESOURCES
Require connectivity with existing bicycle or pedestrian facilities.	Connectivity of facilities is critical for walking and biking conditions. New development should be required to connect to or extend existing bicycle and pedestrian facilities.	<ul style="list-style-type: none"> <li>Section 6.5.3 of the Wake Forest, NC UDO<sup>11</sup></li> <li>Section 7.10.4 of the Cary, NC Land Development Ordinance<sup>15</sup></li> </ul>
Require bicycle parking based on land use.	Bicycle parking should be provided in commercial areas and community gathering places. Different land uses may warrant different requirements to provide on-site bicycle parking.	<p>Sample ordinance language:</p> <ul style="list-style-type: none"> <li>Section 7.1.8 of Raleigh, NC UDO<sup>21</sup></li> <li>Section 5.6.2.3 of Elon, NC LDO<sup>14</sup></li> <li>Sections 30-11-8 and 30-11-13 of Greensboro, NC LDO<sup>22</sup></li> <li>Section 15-291 of Carrboro, NC Land Use Ordinance<sup>17</sup></li> <li>Section 7-11-2 of Asheville, NC UDO<sup>18</sup></li> </ul>
Adopt local standards for the construction and maintenance of greenways and other bicycle facilities.	Setting and maintaining minimum standards for acceptable bicycle facility conditions will enable all users to use the facilities safely. Developers who chose to construct their own sidewalks, greenways, or bikeways should be held to Town-adopted design standards that build upon state and national expertise. Concerning maintenance, the Town should establish a minimum set of standards, including replacing worn pavement markings and damaged signs, sweeping away debris, repaving streets, and repairing potholes. The Town should establish a mechanism for residents and visitors to easily report maintenance issues. In the short term, facility inspection and hotline response should be incorporated into the duties of existing Code Enforcement staff, but additional staff may be necessary in the future.	<p>Sample design standards language:</p> <ul style="list-style-type: none"> <li>Sections 6.8.1, 6.8.2, 6.8.3, and 6.9.2 of Wake Forest, NC UDO<sup>11</sup></li> <li>Section 15-295 of Carrboro, NC Land Use Ordinance<sup>17</sup></li> </ul> <p>Other resources:</p> <ul style="list-style-type: none"> <li>NCDOT Design Toolbox<sup>23</sup></li> <li>Design Guidelines in <b>Chapter 5</b></li> </ul>
Consider flexibility in enforcing “no riding on sidewalk” laws.	Since the law in North Carolina requires bicycles to follow the same rules of the road as other vehicles, they are technically prohibited from the sidewalk. Riding on the sidewalk is often dangerous for both cyclists and pedestrians, particularly when cars pull out of driveways. However, in the absence of existing bicycle infrastructure, the sidewalk may be a safer place for bicyclists to ride. While the Town is working towards building a complete bikeway network, flexibility towards bicycling on sidewalks laws should be considered. Educational programming can reinforce safety for all road users.	See programming recommendations later in this chapter.

# Programming Recommendations

---

## Celebrate Bike Month

May is National Bike Month, promoted by the League of American Bicyclists and celebrated in communities from coast to coast. Established in 1956, National Bike Month is a chance to showcase the many benefits of bicycling and encourage more folks to giving bicycling a try. The Town of Gibsonville can host events centered around bicycling, such as an open streets event or Town-sponsored bicycle ride. Games with prizes—such as a photo contest, scavenger hunt, or bingo cards—can add competition and fun to local celebrations. Town staff can also run a social media campaign, educating community members about the benefits of bicycling. Partnerships with local businesses can be pursued to offer small prizes or discounts for patrons who bicycle downtown.

## Leverage Bicycle Tourism

Gibsonville's central location between Greensboro, Burlington, and Elon—as well as the surrounding stunning rural landscapes—prime the Town to serve as a place for recreational cyclists who enjoy long rides on country roads to re-fuel on their journey. In addition, bicycle connections between Gibsonville and Elon could boost visits from university students. Regardless of the type of bicyclist, Gibsonville has many unique assets to offer visitors on bikes, such as open spaces like the Gibsonville Garden Railroad, fairly lightly traveled roads, and a small-town charm and atmosphere. Efficiently identifying opportunities and creating targeted marketing plans can help Gibsonville become a bicycling destination and reap the economic benefits of increased tourism. The Town can convene a working group to focus specifically on increasing tourism, with a focus on bicycle tourism. This group should:

- Develop an understanding of the bicycle tourism market around Gibsonville,
- Organize a series of events, including rides to multiple destinations (e.g., farms, historic sites, natural areas),
- Create an action plan to prioritize efforts that will make the biggest impact,
- Launch a media outreach strategy to market the Town to potential tourists, and
- Evaluate efforts and revise as needed.

## Train Staff on Bicycle and Pedestrian Planning and Design

Ensure that relevant Town staff are encouraged or required to attend regular trainings on bicycle and pedestrian planning and design topics. Understanding how infrastructure design, as well as policies and programs, influence behavior and impact safety and level of comfort, will be critical in transforming Gibsonville's streets and generating a culture that supports bicycling.

## Build Momentum Through Local Advocates and Committees

Many community members in Gibsonville are interested in and supportive of bicycling. The Town should build off of existing momentum by engaging local and regional advocates through partnerships. These partnerships can aide in specific programming efforts or guide future bikeway development through participation on a committee. The Town can consider establishing a Bicycle and Pedestrian Advisory Committee (BPAC) to assist in the implementation of this Plan, champion its recommendations, and engaging members of the community in shaping the future of bicycling and walking in Gibsonville. The BPAC should meet periodically and be tasked with assisting the Town staff in community outreach, marketing and educational activities recommended by this Plan. Formation of the BPAC will also represent a significant step in becoming a Bicycle Friendly Community.

# Programming Recommendations

---

## Support Safe Routes to School Programming Efforts

A Safe Routes to School program aims to make walking and bicycling safer and more accessible for children, particularly between their homes and schools. Where safe infrastructure is lacking or has significant gaps, parents may choose to drive their children to school rather than allow them to walk or bike. Through the North Carolina Safe Routes to School program, NCDOT works to make walking and riding a bicycle to school a safe and more appealing options for all children. The program facilitates the planning, development and implementation of projects and activities to improve safety and reduce traffic, fuel consumption and air pollution near schools. Initiatives included in Safe Routes to School programming include:

- Active Routes to School, which encourages students to be more active on their way to school and while at school;
- Let's Go NC! Pedestrian & Bicycle Safety Curriculum, a comprehensive tool designed to teach and encourage safe and healthy pedestrian and bicycle behaviors in children;
- Safe Routes to School Non-Infrastructure Transportation Alternatives Program, a cost reimbursement program for non-infrastructure programs and activities to local governments, regional planning organizations, schools, and other local/regional entities; and
- Bike to School Day and Walk to School Day, which encourage students to be physically active and enjoy time with friends and family on the way to school.

The Town can partner with the Gibsonville Elementary School to develop a plan of action for pursuing Safe Routes to School funding and developing Safe Routes to School programming. Many communities begin by celebrating Walk to School Day and Bike to School Day; this would be a low-cost way for Gibsonville to begin building a local Safe Routes to School program.

## Host Open Streets Events

The Town should encourage bicycling in Gibsonville by periodically closing a street to automobile traffic and creating a safe and inviting place for people of all ages and abilities to bicycle. These events transform the street into a temporary park open to the public for walking, bicycling, dancing, hula-hooping, roller-skating, and other non-motorized activities. By creating a safe space for physical activity, movement, and social interaction, open streets events promote health. They are also cost-effective. Events can be held in key gathering areas in Gibsonville as regular events or one-time occasions. Providing space and visibility for people on bicycles will contribute to a culture that celebrates bicycling.

## Utilize the Bicycle Helmet Initiative

Since 2007, the Bicycle Helmet Initiative has helped equipped thousands of low-income children with a helmet – a simple and essential means of reducing bicyclist injuries and fatalities. This program helps to promote helmet usage and support local bicycle activities. Funding for this program is made possible through the “Share the Road” specialty license plate. The Town can partner with local community organizations to apply for up to 100 bicycle helmets from NCDOT and develop a program for distributing the helmets.

# Programming Recommendations

---

## Invest in Marketing

Marketing materials can encourage Gibsonville residents to bicycle and draw visitors from throughout the region to come explore the town by bike. While the Town does have a “Walking-Running-Bicycling” page on its website, additional educational materials and descriptive guides can be added. Some materials can be created now, and others can be created as the Town begins establishing a bicycle network. This website should be updated regularly. Now, the Town should consider:

- Creating educational materials—such as brochures—on the benefits of bicycling, how to bicycle, and bicycling ‘rules of the road’ and other safety tips
- Add additional links to regional walking and bicycling groups (e.g., clubs, racing teams, and advocacy groups)
- Add a list of regional bike shops and bicycle rental places
- Information about current bicycle and pedestrian projects and public input opportunities (e.g., links to project websites, surveys, public meeting times and comment periods)
- Information about laws and statutes related to bicycling (i.e., FAQs about bicycling rules – do you need to wear a helmet, can you bicycle on the sidewalk, do you need bicycle lights)
- Information about bicycling events (e.g., group rides, classes, volunteer opportunities) and an events calendar

As the bicycle infrastructure becomes more complete, the Town should consider:

- Creating an interactive map of existing bikeways within the Town and how they connect to local and regional destinations, as well as regional bikeways and NCDOT signed bicycle routes. This map should be updated as new facilities are implemented. It can be placed on the website and printed and distributed to partner organizations and local businesses.
- 

## Educate the Community

Education will be a critical component to transforming bicycling culture in Gibsonville. Teaching people how to ride bicycles, in addition to bicycle etiquette, can make Gibsonville residents feel more comfortable on a bicycle. In addition, when visitors see educational campaigns and programming as they explore Gibsonville, the community’s level of care and consideration for people on bicycles will be apparent. The Town can educate the community by:

- Investing in education for travelers of all modes to increase the safety of people who bicycle. The Town of Gibsonville should establish innovative practices to educate motorists about sharing the road with people who are bicycling, as well as ensuring Gibsonville community members know how to safely ride a bicycle. The League of American Bicyclists provides an extensive curriculum for teaching adults safe riding tips and techniques, with trained instructors.<sup>24</sup> The program also has a component for drivers. Educational activities aimed at youth can be part of Gibsonville’s Safe Routes to School program and Vision Zero plan.<sup>25</sup>
- Partnering with NCDOT in the “Watch for Me NC” program. The state-wide safety and awareness campaign is geared towards bicycle and pedestrian safety and education. It combines multimedia and public engagement strategies to promote safety messages and local events and targeted enforcement in areas with heightened risk of crashes involving pedestrians and bicyclists.

# Programming Recommendations

---

## Foster Partnerships to Boost Programming

Many local agencies and community organizations already support people getting outdoors to bicycle. Collaboration with other government agencies and local community organizations can increase efficient use of resources and help reach a larger audience. Potential partners include:

- Town of Gibsonville Parks & Recreation Department
- Town of Gibsonville Fire Department
- Town of Gibsonville Police Department
- Town of Gibsonville Public Works Department
- Downtown Gibsonville business owners
- Gibsonville Garden Railroad Inc
- Gibsonville Elementary School
- Elon University
- Town of Elon Recreation & Parks Department
- Town of Elon Planning Department
- Alamance County Health Department
- Alamance County Parks & Recreation Department
- Alamance County Planning Department
- Alamance/Burlington Convention and Visitors Bureau
- Alamance-Burlington Schools
- Guilford County Health Department
- Guilford County Planning & Development
- Guilford County Transportation & Mobility Services
- Guilford County Schools
- NCDOT
- Burlington-Graham Metropolitan Planning Organization
- Burlington Velo Club
- Alamance Bicycle Club
- Spokes Bicycle Company
- Galactic Bikes
- Recycles Bike Shop
- Cycles de ORO, Inc.
- Elonbikeshop
- Public health nonprofit organizations
- Parent Teacher Associations (PTAs)
- Youth-oriented service providers (e.g., YMCA, Boys and Girls Clubs)
- Chambers of Commerce
- Economic and tourism development organizations
- Senior centers and retirement communities
- Hospitals and private health professionals

## Funding & Partnership Opportunities

---

A variety of funding and partnering opportunities exist that the Town of Gibsonville can access to build a stronger bikeway network. These include opportunities at the local, state, federal, and private levels. Many of these require coordination with regional and state agencies, so it is important for the Town of Gibsonville to be strategic in how it positions for them. Additionally, with some creative strategies, local, state, and private funding can be leveraged for larger federal dollars.

### Surface Transportation Block Grant Program

Through FHWA and NCDOT, the Surface Transportation Block Grant (STBG) Program leverages federal funds to preserve and improve the conditions and performance of federal-aid highway, bridge and tunnel projects on public roads, pedestrian and bicycle infrastructure, transit capital projects, and public bus terminals and facilities. The current policy has a focus on projects of regional significance, defined as improvements to major routes that enhance access, reduce crash rates, and/or relieve congestion.

### Transportation Alternatives Program

The Fixing America's Surface Transportation (FAST) Act replaced the Transportation Alternatives Program (TAP) with a set-aside of STBG Program funding for transportation alternatives. These set-aside funds include all projects and activities that were previously eligible under TAP, encompassing a variety of smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, Safe Routes to School projects, community improvements such as historic preservation and vegetation management, and environmental mitigation related to stormwater and habitat connectivity. While the FHWA refers to these funds as the "Transportation Alternatives Set-Aside", NCDOT continues to refer to the program as TAP for consistency. For projects funded under this program, the federal share is 80% and a 20% match is required from the eligible project sponsor. Federal funds provided can only be used for project construction. Costs associated with preliminary engineering, environmental documentation, right-of-way and utility adjustments, and construction inspection will be the responsibility of the eligible sponsor.

### Recreational Trails Program

The North Carolina Department of Natural and Cultural Resources (NC DNCR) administers FHWA's National Recreational Trails Fund in the state. The Recreational Trails Program is an annual competitive cost-sharing opportunity that is funded through a portion of the Transportation Alternatives Set-Aside that is specifically directed to the construction and maintenance of non-motorized recreational trails and trail support facilities. Up to 75% of project costs can be funded through this program, with maximum awards up to \$250,000 for trail grants. Eligible projects include construction of recreational trail projects, land acquisition for trails, enhancing existing trails, and the development of trailheads and trailside facilities.

### Land & Water Conservation Fund

The Land and Water Conservation Fund (LWCF) is a federal program supporting the protection of federal public lands and waters – including national parks, forests, wildlife refuges, and recreation areas – and voluntary conservation on private land. Investments from the LWCF secure public access, improve recreational opportunities, and preserve ecosystem benefits for local communities. The grant program provides matching grants to state and tribal governments for the acquisition and development of public parks and other outdoor recreation areas and facilities.

# Funding & Partnership Opportunities

---

## Better Utilizing Investments to Leverage Development Transportation Grants

Better Utilizing Investments to Leverage Development (BUILD) Transportation grants (i.e., previously known as TIGER grants) are nationally competitive grants for capital investments on surface transportation projects that achieve a significant impact for a local or metropolitan area. A total of \$1 billion has been allocated to BUILD Grants in 2020, which the U.S. Department of Transportation (USDOT) aims to benefit a greater number of projects located in rural areas. States are eligible to receive up to \$100 million in BUILD Grants. The BUILD program enables USDOT to use a rigorous merit-based process to select projects with exceptional benefits, explore ways to deliver projects faster and save on construction costs, and make needed investments in national infrastructure. This is a highly competitive program. In 2019, USDOT received nearly 670 applications, with over ten times the available funding being requested; only 55 applicants received awards.

## Federal Lands Access Program

The Federal Lands Access Program was established to improve transportation facilities that provide access to, are adjacent to, or are located within federal lands. The program supplements state and local resources for public roads, transit systems, and other transportation facilities, with an emphasis on high-use recreation sites and economic generators. Funding for the program is provided from the Highway Trust Fund and allocated among the states using a statutory formula based on road mileage, number of bridges, land area, and visitation. A minimum of 20% matching share of the project total is required for this program. With some exceptions, other federal funds may be used as a match.

## Small Cities Community Development Block Grants

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

## Railway-Highway Crossing Program

The Railway-Highway Crossings Program provides funds for the elimination of hazards at railway-highway crossings. In 2015, this program's annual set-aside for railway-highway crossing improvements was continued through the FAST Act. The funds are set-aside from the Highway Safety Improvement Program apportionment and are distributed to states by a formula. Projects funded through this program are awarded a 90% federal share.

## AARP Livable Community Initiatives Grant

Through their Livable Community Initiatives grant program, the American Association of Retired Persons (AARP) provides small grants to fund "quick-action" projects to help communities become more livable for people of all ages. As an action-oriented program, planning activities, assessment, and surveys are not eligible for funding, as well as land or building acquisition. Of relevance to the goals of the *Gibsonville Bike Plan*, the AARP prioritizes projects that deliver a range of transportation and mobility options by increasing connectivity, walkability, bikeability, wayfinding, access to transportation options, and roadway improvements. Grant awards can range from several hundred dollars for smaller, short-term activities to several thousand or tens of thousands of dollars for larger projects.

# Funding & Partnership Opportunities

---

## Conservation Alliance Grant

The Conservation Alliance seeks to protect threatened wild places throughout North America for their habitat and recreational values. Grants are awarded to registered 501(c)(3) organizations whose project meets the following criteria: 1) secures lasting and quantifiable protection of a specific wild land or waterway; 2) engages citizens through grassroots action in support of conservation effort; 3) has a clear recreational benefit; and 4) has a good chance of success within four years.

## PeopleForBikes Community Grant Program

This program provides funding for projects that build momentum for bicycling in communities across the U.S. These projects include bike paths and rail trails, mountain bike trails, bike parks, BMX facilities, and large-scale bicycle advocacy initiatives. Grants of up to \$10,000 are awarded to non-profit organizations and local governments and have totaled more than \$3.5 million since 1999. This program is funded by PeopleForBike's partners in the bicycle industry, including the following companies: Batch, Cannondale, Giant, Niner, Shimano, Trek, and Vaast.

## Kodak American Greenway Awards Program

The Eastern Kodak Company, The Conservation Fund, and the National Geographic Society team up each year to sponsor the Kodak American Greenways Awards Program. The program provides seed grant funding to non-profit organizations, public agencies, and community groups for projects that create or improve greenways, walking trails and waterways across the country. A wide variety of planning, design, implementation, and educational projects have been awarded in the past. Most grants range from \$500 to \$1,000, with a maximum grant of \$2,500.

## Rails-to-Trails Conservancy

Through their grant programs, Rails-to-Trails Conservancy emphasizes strategic investments that support regional and community trail development goals. Many of the projects they fund are small in scope and scale and are more difficult to finance within traditional funding streams. They focus these relatively small investments on completing and connecting trails, improving the trail user experience, and supporting local organizations dedicated to new and existing trails across the country. They have awarded nearly 300 grants totaling approximately \$2 million since 2008.

## Powell Bill Fund

The Powell Bill was passed in 1951 to provide state support for the building and maintenance of major city streets in North Carolina. These funds are used primarily for street resurfacing within the corporate limits of the municipality, but they can also help pay for the planning, construction and maintenance of bikeways, greenways or sidewalks. The program is operated through NCDOT.

## Public Health Funding through the Centers for Disease Control and Prevention

A wide variety of grants are provided by the Centers for Disease Control and Prevention (CDC) to fund public health programs that advance the agency's mission to keep Americans safe and healthy where they work, live, and play. In Fiscal Year 2019, over \$7.8 billion in grant funding was provided for public health programs across the nation. Local, regional, or state public health departments could assist the Town of Gibsonville in navigating the grant application process.

## **Funding & Partnership Opportunities**

---

### **Governor’s Highway Safety Program (GHSP)**

Dedicated to reducing the numbers of traffic crashes and fatalities in North Carolina, the Governor’s Highway Safety Program promotes efforts to reduce traffic crashes in North Carolina and promotes highway safety awareness through a variety of grants and safe-driving initiatives. Grants fund projects or programs that address drunk driving, seat belt safety, police traffic services, young drivers, motorcycle safety, and traffic record-keeping. In addition, funds are also available for initiatives that aim to address distracted driving and make roads safer for pedestrians and bicyclists. Bicycle facility projects are divided into two categories—independent projects and incidental projects—which determine the types of funds that may be available. Independent projects are not related to a scheduled highway project, while incidental projects are related to a scheduled highway project.

### **BlueCross BlueShield of North Carolina Foundation**

The BlueCross BlueShield of North Carolina Foundation is a private, charitable foundation with a focus on improving the health and well-being of North Carolinians. Their focus areas include early childhood, healthy communities, healthy food, and oral health. They do not have a traditional grant cycle, but rather announce opportunities to apply for grant funding on a periodic basis. Grants range from small-dollar grants to larger, multi-year partnerships.

# Action Plan

The Action Plan presented in **Table 7** provides a succinct listing of recommendations made throughout the *Gibsonville Bike Plan*. Each action is categorized as immediate-, near-, mid-, or long-term, depending on the level of need and ease or complexity of implementation. Potential partners are provided for each action. In addition, the goals guiding the *Gibsonville Bike Plan* echo throughout the proposed actions; as such, the goal(s) that each action achieves are also highlighted.

**TABLE 7: Action Plan**

RECOMMENDED ACTION	POTENTIAL PARTNERS	GOALS ACHIEVED
<b>IMMEDIATE TERM (0-2 YEARS)</b>		
Determine which Town Department will be responsible for managing and maintaining bicycle facilities and programming.	-	
Develop a plan to facilitate training on bicycle planning and design for appropriate staff.	Alamance County Planning Department, Guilford County Transportation & Mobility Services, Burlington-Graham MPO, NCDOT, HSRC	
Establish a Bicycle and Pedestrian Advisory Committee.	-	
Establish a Safe Routes to School program.	Gibsonville Elementary School, Alamance-Burlington Schools, Guilford County Schools, PTAs, local youth-focused nonprofits	
Host event(s) promoting bicycling (e.g., Open Streets); make these annual or biannual events moving forward.	Town of Gibsonville Parks & Recreation Department, Town of Gibsonville Fire Department, Town of Gibsonville Police Department, Downtown Gibsonville business owners, Gibsonville Garden Railroad Inc, Gibsonville Elementary School, Elon University, regional cycling groups and advocates, local community organizations	
Develop a plan to establish performance measure benchmarks as detailed in the <i>Gibsonville Bike Plan</i> ; evaluate progress annually.	Alamance County Planning Department, Guilford County Transportation & Mobility Services, Burlington-Graham MPO, NCDOT, HSRC	
Establish a program to educate motorists on bicycle and pedestrian safety.	NCDOT, Town of Gibsonville Parks & Recreation Department, Town of Gibsonville Fire Department, Town of Gibsonville Police Department, HSRC	

TABLE 7: Action Plan continued

RECOMMENDED ACTION	POTENTIAL PARTNERS	GOALS ACHIEVED
Make a plan for annual bicycle- and pedestrian-related crash analysis.	NCDOT	
Develop and adopt a Complete Streets policy.	NCDOT	
Update land use and development ordinances based on recommendations in the <i>Gibsonville Bike Plan</i> .	-	
Adopt bikeway design standards.	NCDOT	
Continue to encourage local businesses to adopt bicycle-friendly policies and procedures.	Downtown Gibsonville business owners, Chambers of Commerce	
Celebrate Bike Month in May.	Town of Gibsonville Parks & Recreation Department, Town of Gibsonville Fire Department, Town of Gibsonville Police Department, Downtown Gibsonville business owners, Gibsonville Garden Railroad Inc, Gibsonville Elementary School, Elon University, regional cycling groups and advocates, local community organizations, regional bike shops	
Utilize the Bicycle Helmet Initiative to equip low-income youth in Gibsonville with bicycle helmets.	NCDOT	
Update the "Waking-Running-Bicycling" page on the Town's website based on recommendations in the <i>Gibsonville Bike Plan</i> .	-	
Develop educational brochures that show how to ride a bicycle safely.	NCDOT	
Take part in the "Watch for Me NC" program.	NCDOT	
Continue to develop partnerships for programming.	-	
Implement the short-term slow streets recommendations.	See Funding and Partnerships section.	

TABLE 7: Action Plan continued

RECOMMENDED ACTION	POTENTIAL PARTNERS	GOALS ACHIEVED
<b>NEAR-TERM (3-5 YEARS)</b>		
Create branding for bikeway and neighborhood connection wayfinding.	Gibsonville Tourism Working Group, NCDOT, Burlington-Graham MPO	
Maintain data on the Town's GIS system of bicycle and trail routes.	-	
Advance one (1) priority bikeway or greenway project.	See Funding and Partnerships section in this Chapter and Project List in Appendix B.	
Advance one (1) priority neighborhood connection project.	See Funding and Partnerships section in this Chapter and Project List in Appendix B.	
Develop an action plan to incorporate a Vision Zero approach in Gibsonville.	Town of Gibsonville Fire Department, Town of Gibsonville Police Department, NCDOT, HSRC, Burlington-Graham MPO	
Develop a tourism working group. Have them kickoff their efforts by analyzing the regional bicycle tourism industry and developing a Bicycle Tourism Action Plan.	Regional cycling groups and advocates, regional bike shops	
Create a bicycle and pedestrian counting program.	NCDOT	
Develop and implement a community transportation survey to measure progress on Plan goals; conduct the survey every three years moving forward and track progress.	Alamance County Planning Department, Guilford County Transportation & Mobility Services, Burlington-Graham MPO, NCDOT, HSRC	
Continue to develop partnerships for programming.	-	
Evaluate Plan progress in meeting performance measures.	-	
<b>MID-TERM (5-10 YEARS)</b>		
Use the tourism working group to develop a marketing campaign advertising Gibsonville.	Gibsonville Tourism Working Group, regional cycling groups and advocates, regional bike shops	
Maintain an up-to-date Town of Gibsonville bikeway map.	-	

**TABLE 7: Action Plan continued**

RECOMMENDED ACTION	POTENTIAL PARTNERS	GOALS ACHIEVED
Invest in bicycle wayfinding throughout Gibsonville.	NCDOT, Gibsonville Tourism Working Group, Downtown Gibsonville business owners, regional cycling groups and advocates	
Advance two (2) more priority bikeway or greenway projects.	See Funding and Partnerships section in this Chapter and Project List in Appendix B.	
Advance two (2) more neighborhood connection projects.	See Funding and Partnerships section in this Chapter and Project List in Appendix B.	
Make a plan to transition from the short-term slow streets approach to the long-term approach.	See Funding and Partnerships section.	
Continue to develop partnerships for programming.	-	
Evaluate bicycle tourism efforts and adjust the Bicycle Tourism Action Plan accordingly.	-	
Evaluate Plan progress in meeting performance measures.	-	
<b>LONG-TERM (10+ YEARS)</b>		
Advance one (1) priority bikeway project annually moving forward.	See Funding and Partnerships section in this Chapter and Project List in Appendix B.	
Advance one (1) priority slow streets project annually moving forward.	See Funding and Partnerships section in this Chapter and Project List in Appendix B.	
Implement the long-term slow streets recommendations.	See Funding and Partnerships section.	
Continue to develop partnerships for programming.	-	
Evaluate bicycle tourism efforts and adjust the Bicycle Tourism Action Plan accordingly.	-	
Evaluate Plan progress in meeting performance measures.	-	

## Chapter 4 Sources

1. Flusche, D. "The Economic Benefits of Bicycle Infrastructure." (2009). [http://www.advocacyadvance.org/docs/economic\\_benefits\\_bicycle\\_infrastructure\\_report.pdf](http://www.advocacyadvance.org/docs/economic_benefits_bicycle_infrastructure_report.pdf).
2. People for Bikes. "Economic benefits of bicycle facilities and transportation." <http://www.peopleforbikes.org/statistics/category/economic-statistics>
3. Kittelson & Associates, Inc., University of WisconsinMilwaukee, Safe Transportation Research & Education Center, Toole Design Group, & McGill University. (2014). NCHRP Report 797: Guidebook on Pedestrian and Bicycle Volume Data Collection. Transportation Research Board of the National Academies, Washington, D.C.
4. U.S. Department of Transportation. (2013). Traffic Monitoring Guide. Federal Highway Administration, Office of Highway Policy Information, Washington, D.C.
5. NCDOT. Complete Streets Policy. (2019). <https://connect.ncdot.gov/projects/BikePed/Documents/CS%20Policy%208.28.19.pdf>
6. NCDOT. Complete Streets Implementation Guide. (2020). <https://www.completestreetsnc.org/wp-content/uploads/2020/01/Complete-Streets-Implementation-Guide-v1.31.20-FINAL.pdf>
7. AARP. Complete Streets in the Southeast: a tool kit. (2014). <https://www.smartgrowthamerica.org/app/legacy/documents/complete-streets-southeast-toolkit.pdf>
8. Town of Black Mountain. Resolution R-14-02. [https://library.municode.com/nc/black\\_mountain/munidocs/munidocs?nodId=13605d6ae6c60](https://library.municode.com/nc/black_mountain/munidocs/munidocs?nodId=13605d6ae6c60)
9. FHWA. Bikeway Selection Guide. (2019). [https://safety.fhwa.dot.gov/ped\\_bike/tools\\_solve/docs/fhwasa18077.pdf](https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf)
10. NCDOT. Complete Streets Planning and Design Guidelines. (2012). [https://www.completestreetsnc.org/wp-content/themes/CompleteStreets\\_Custom/pdfs/NCDOT-Complete-Streets-Planning-Design-Guidelines.pdf](https://www.completestreetsnc.org/wp-content/themes/CompleteStreets_Custom/pdfs/NCDOT-Complete-Streets-Planning-Design-Guidelines.pdf)
11. Town of Wake Forest. Unified Development Ordinance. (2019). <https://www.wakeforestnc.gov/planning/unified-development-ordinance>
12. City of Wilson. Unified Development Ordinance. (2013). <https://www.wilsonnc.org/residents/city-services/all-departments/development-services/unified-development-ordinance>
13. City of Burlington. Unified Development Ordinance. (2020). <https://www.burlingtonnc.gov/DocumentCenter/View/17758/Official-Burlington-UDO-3-17-20?bidId=>
14. Town of Elon. Land Development Ordinance. (2018). <https://www.townofelon.com/wp-content/uploads/2018/11/Town-of-ELON-LDO-Amended-3.13.2018.pdf>
15. Town of Cary. Land Development Ordinance. (2019). [https://codelibrary.amlegal.com/codes/cary/latest/cary\\_nc/0-0-0-53848](https://codelibrary.amlegal.com/codes/cary/latest/cary_nc/0-0-0-53848)
16. Town of Davidson. Planning Ordinance. (2017). <https://www.ci.davidson.nc.us/DocumentCenter/View/10191/Complete-Davidson-Planning-Ordinance-20200601>
17. Town of Carrboro. Land Use Ordinance. (2018). <https://townofcarrboro.org/DocumentCenter/View/2021/Land-Use-Ordinance-combined->
18. City of Asheville. Unified Development Ordinance. (2016). <https://www.ashevillenc.gov/department/development-services/codes-and-ordinances/>
19. University of Florida. Incentive Strategies: Density Bonuses, Fee Waivers & Expedited Approvals. [https://www.law.ufl.edu/\\_pdf/academics/centers-clinics/clinics/conservation/resources/incentive\\_strategies.pdf](https://www.law.ufl.edu/_pdf/academics/centers-clinics/clinics/conservation/resources/incentive_strategies.pdf)
20. Town of Morrisville. Unified Development Ordinance. (2020). <https://user-cjghrlw.cld.bz/Morrisville-Unified-Development-Ordinance-May-2020>
21. City of Raleigh. Unified Development Ordinance. (2020). <https://user-2081353526.cld.bz/UnifiedDevelopmentOrdinance/198/>
22. City of Greensboro. Land Development Ordinance. (2020). <http://online.encodeplus.com/regs/greensboro-nc/doc-viewer.aspx#secid-1460>
23. NCDOT. Design Toolbox. <https://www.ncdot.gov/bikeped/walkbikenc/pictures/designtoolbox.pdf>
24. League of American Bicyclists. RideSmart. (2020). <https://www.bikeleague.org/ridesmart>
25. League of American Bicyclists. Bicycle-Friendly Driver Training. (2020). <https://www.bikeleague.org/content/bicycle-friendly-driver-training-page>

**This page intentionally left blank.**

# 05: *Design Guidance*



# Summary

Recommendations that achieve a safe, connected, accessible, comfortable, and convenient bicycle and pedestrian network require design guidance that reflects best practices and can serve as a resource for the Town moving forward. This design guidance, along with the entire *Gibsonville Bike Plan*, should be used by planners and engineers to better understand important considerations as they plan and design safe and comfortable infrastructure for Gibsonville. Bikeway design features in this chapter may update existing standards while others may be new treatments to be adopted by the Town for implementation.



IMAGE 18: Bicycles outside Elonbikeshop, the closest bike shop to Gibsonville.

# Philosophy of Safe Bicycle Facility Design

## Why design bicycle infrastructure using these guidelines?

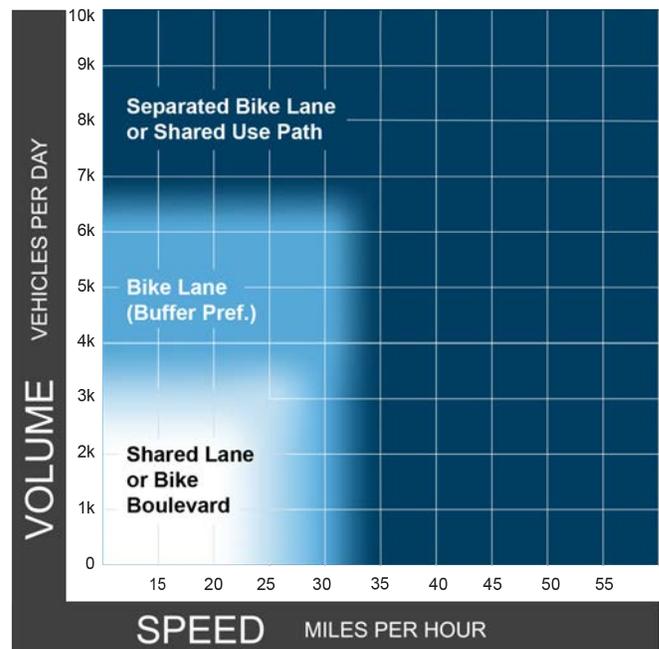
Estimates show that most of the US population—upwards of 60-70%—would like to bicycle for some trips but are uncomfortable interacting with intense vehicular traffic. This group, commonly identified as the “Interested, but Concerned” category, are most comfortable cycling separated from motorized vehicles. Conversely, roughly 8% of the US population indicate they are “Highly/Somewhat Confident” bicyclists, somewhat comfortable sharing the road with motorized vehicles.

While a survey of residents and visitors tells us that there are more “Highly/Somewhat Confident” bicyclists in Gibsonville, the largest share fall under the “Interested, but Concerned” category. If the Town of Gibsonville wants to increase bicycling, particularly for a diverse array of trip types, it is essential to select and design facilities that will allow more people to feel comfortable bicycling for these trips. Less confident bicyclists (i.e., “interested but, concerned”) prefer physical separation as traffic volumes and speeds increase. The bikeway facility selection chart below identifies bikeway facilities that improve operating environment for users based on vehicle speeds and traffic volumes.

## Facility Selection Guidance

The selection of bicycle and pedestrian facilities requires a balance of community priorities of local land use context, analysis, engineering judgment, available funding, and physical constraints based on existing street characteristics. The facility selection process is iterative; as more data about the street and surrounding context is gathered, the type of facility that designers and planners deem most appropriate may change. It is important to consider all priorities previously listed to make the best selection for any given project. The FHWA Bikeway Selection Guide is a valuable resource for bikeway specific selection and uses vehicle speed and traffic volumes to assist practitioners with planning and designing bikeways for all ages and abilities.<sup>1</sup>

**FIGURE 16: FHWA Separated Bike Lane Guidelines**



## Facility Overview

### Separated Bike Lane

Separated bike lanes are an exclusive bikeway facility type that combines the user experience of a sidepath with the on-street infrastructure of a conventional bike lane. They are vertically and horizontally separated from motor vehicle traffic and distinct from the sidewalk.



#### TYPICAL APPLICATION

Separated bike lanes will generally be considered on any road with one or more of the following characteristics:

- Total traffic lanes: 3 lanes or greater
- Posted speed limit: 30 mph or more
- Average Daily Traffic: 9,000 vehicles or greater
- Parking turnover: frequent
- Bike lane obstruction: likely to be frequent
- Streets that are designated as truck or bus routes

Preferred in higher density areas, adjacent to commercial and mixed-use development, and near major transit stations or locations where observed or anticipated pedestrian volumes will be higher.

### Buffered Bike Lane

Buffered bicycle lanes are designated by painting or otherwise creating a flush buffer zone between a bicycle lane and the adjacent travel lane. While buffers are typically used between bicycle lanes and motor vehicle travel lanes to increase bicyclists' comfort, they can also be provided between bicycle lanes and parking lanes in locations with high parking turnover to discourage bicyclists from riding too close to parked vehicles.



#### TYPICAL APPLICATION

Buffered bike lanes will generally be considered on any road with one or more of the following characteristics:

- Total traffic lanes: 3 lanes or fewer
- Posted speed limit: 30 mph or lower
- Average Daily Traffic: 9,000 vehicles or fewer
- Parking turnover: infrequent.
- Bike lane obstruction: likely to be infrequent
- Where a separated bike lane or sidepath are infeasible or not desirable

## Bike Lane

Bike lanes provide an exclusive space for bicyclists in the roadway. Bike lanes are established through the use of lines and symbols on the roadway surface. Bike lanes are for one-way travel and are normally provided in both directions on two-way streets and/or on one side of a one-way street. Bicyclists are not required to remain in a bike lane when traveling on a street and may leave the bike lane as necessary to make turns, pass other bicyclists, or to properly position themselves for other necessary movements. Bike lanes may only be used temporarily by vehicles accessing parking spaces and entering and exiting driveways and alleys. Stopping, standing and parking in bike lanes is prohibited.



### TYPICAL APPLICATION

Conventional bike lanes will generally be considered on any road with one or more of the following characteristics:

- Total traffic lanes: 3 lanes or fewer
- Posted speed limit: 30 mph or lower
- Average Daily Traffic: 9,000 vehicles or fewer
- Parking turnover: infrequent
- Bike lane obstruction: likely to be infrequent
- Where a separated bike lane, buffered bike lane, or sidepath are infeasible or not desirable

## Neighborhood Bikeway

Neighborhood bikeways are established on quiet streets, often through residential neighborhoods. These treatments are designed to prioritize bicycle through-travel, while discouraging motor vehicle traffic and maintaining relatively low motor vehicle speeds. Treatments vary depending on context, but often include elements of traffic calming, including traffic diverters, speed attenuators such as speed humps or chicanes, pavement markings, and signs. Neighborhood bikeways are also known as neighborhood greenways and bicycle boulevards, among other locally-preferred terms.



### TYPICAL APPLICATION

Neighborhood bikeways can be considered on any road with one or more of the following characteristics:

- Posted speed limit: Target speeds for motor vehicle traffic are typically around 20 mph; there should be a maximum < 15 mph speed differential between bicyclists and vehicles
- Average Daily Traffic: Up to 3,000 vehicles; preferred ADT is up to 1,000 vehicles

## Shared Use Path and Greenway

A shared use path or sidepath, often called a shared use paved trail in other parts of the region, is a two-way facility physically separated from motor vehicle traffic and used by bicyclists, pedestrians, and other non-motorized users. Shared use paths, also referred to as greenways, are often located in an independent alignment, such as a greenbelt or abandoned railroad. However, they are also regularly constructed along roadways; often bicyclists and pedestrians will have increased interactions with motor vehicles at driveways and intersections on these sidepaths.



## Crosswalks

Legal crosswalks exist at all locations where sidewalks meet the roadway, regardless of whether pavement markings are present. Drivers are legally required to yield to pedestrians at intersections, even when there are no pavement markings. Providing marked crosswalks communicates to drivers that pedestrians may be present and helps guide pedestrians to locations where they should cross the street. In addition to pavement markings, crosswalks may include signals/beacons, warning signs, and raised platforms.



### TYPICAL APPLICATION

Shared use paths will generally be considered on any road with one or more of the following characteristics:

- Total traffic lanes: 3 lanes or greater
- Posted speed limit: 30 mph or greater
- Average Daily Traffic: 9,000 vehicles or greater
- Parking turnover: frequent
- Bike lane obstruction: likely to be frequent
- Streets that are designated as truck or bus routes

Shared use paths may be preferable to separated bike lanes in low density areas where pedestrian volumes are anticipated to be fewer than 200 people per hour on the path.

## Resources

The publications listed here are excellent resources for planning and design guidance in implementing safe, comfortable accommodations for pedestrians and bicyclists in a variety of environments. Many of these resources are available online at no cost.

### Massachusetts Department of Transportation (MASSDOT)

Separated Bike Lane Planning & Design Guide, 2016

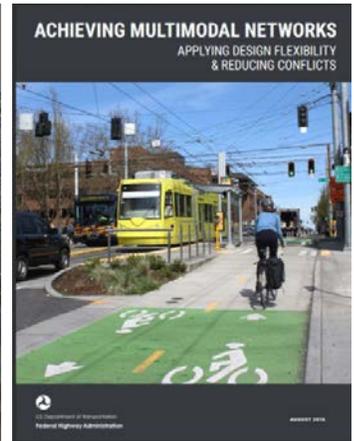
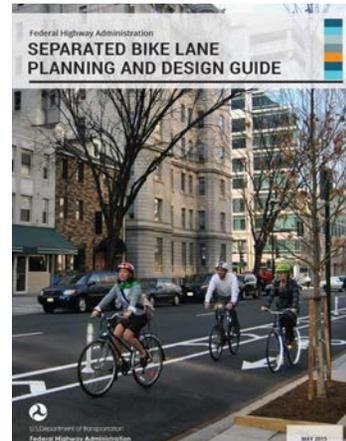


### Federal Highway Administration (FHWA)

Separated Bike Lane Planning and Design Guide, 2015

Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts (2016)

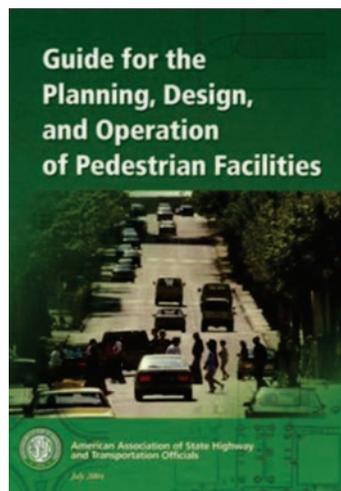
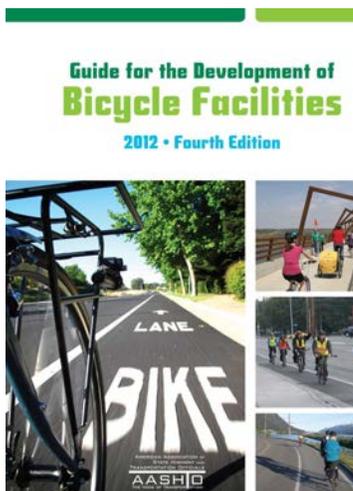
Incorporating On-Road Bicycle Networks into Resurfacing Projects (2016)



### American Association of State Highway and Transportation Officials (AASHTO)

Guide for the Development of Bicycle Facilities, 2012

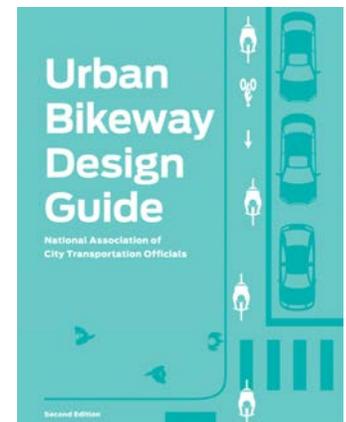
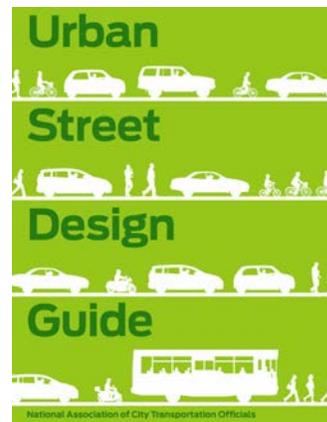
Guide for the Planning, Design, and Operation of Pedestrian Facilities, 2004



### National Association of City Transportation Officials (NACTO)

Urban Street Design Guide

Urban Bikeway Design Guide



# Bikeway Facilities

## Separated Bike Lanes

FIGURE 17: Curb-Separated Directional SBL

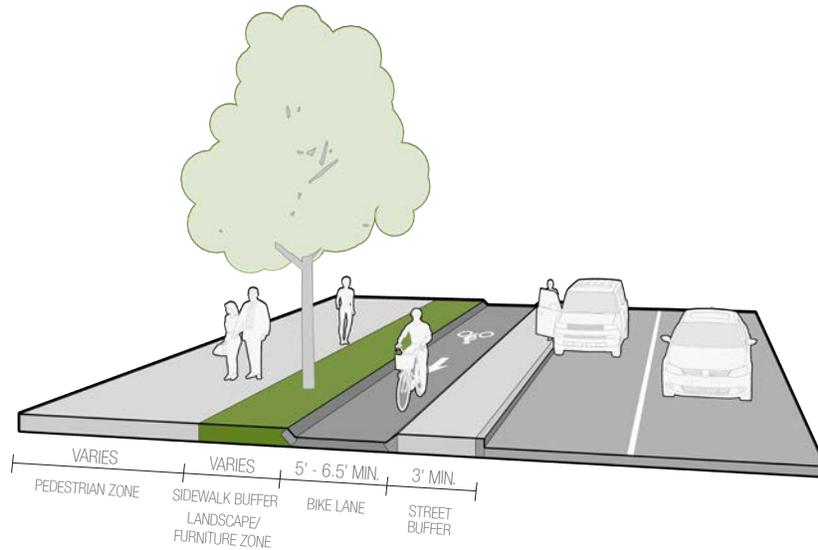
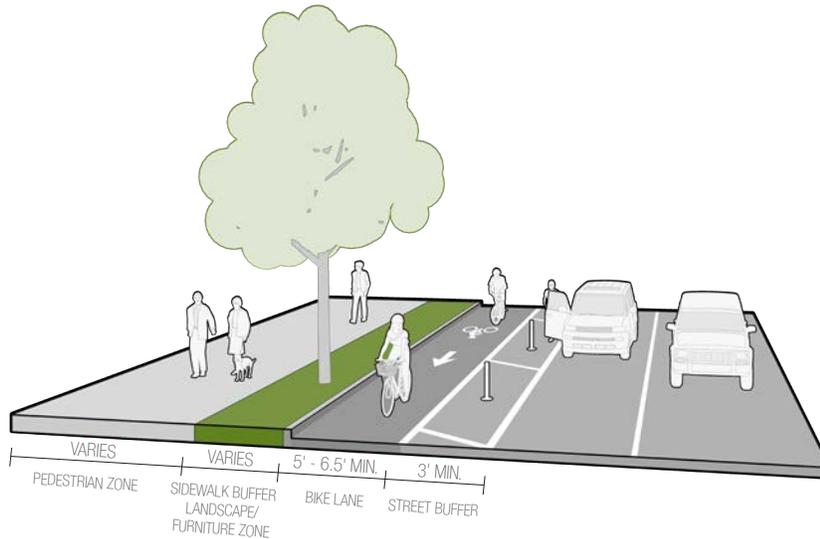


FIGURE 18: Directional SBL with Flex Posts



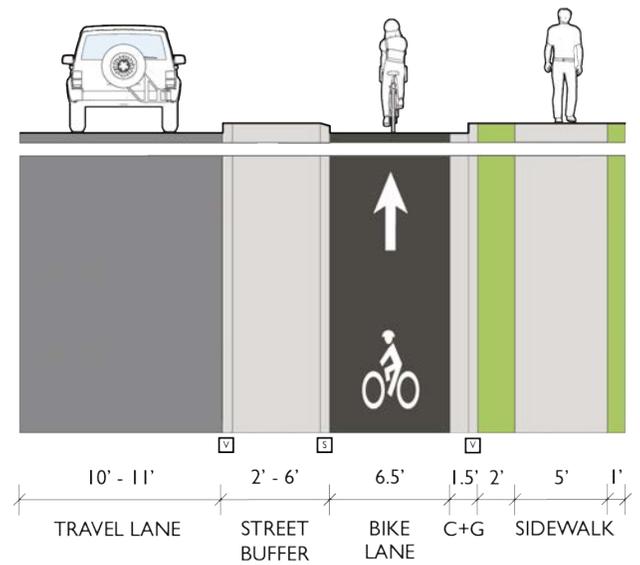
### Considerations

Separated bike lanes are more attractive to a wider range of bicyclists than conventional bike lanes on higher volume and higher speed roads. They eliminate the risk of a bicyclist being hit by an opening car door and prevent motor vehicles from driving, stopping, or waiting in the bikeway. They also provide greater comfort to pedestrians by separating them from bicyclists operating at higher speeds.

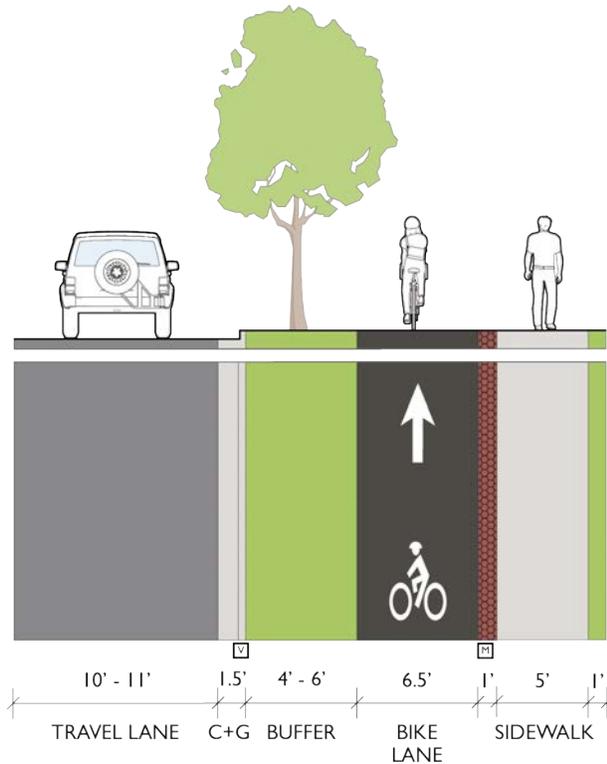
*Separated bike lanes can provide different levels of separation from traffic:*

- Separated bike lanes with flexible delineator posts ("flex posts") alone offer the least separation from traffic and are appropriate as an interim solution.
- Separated bike lanes that are raised with a wider buffer from traffic provide the greatest level of separation from traffic but will often require road reconstruction.
- Separated bike lanes that are protected from traffic by a row of on-street parking offer a high-degree of separation.

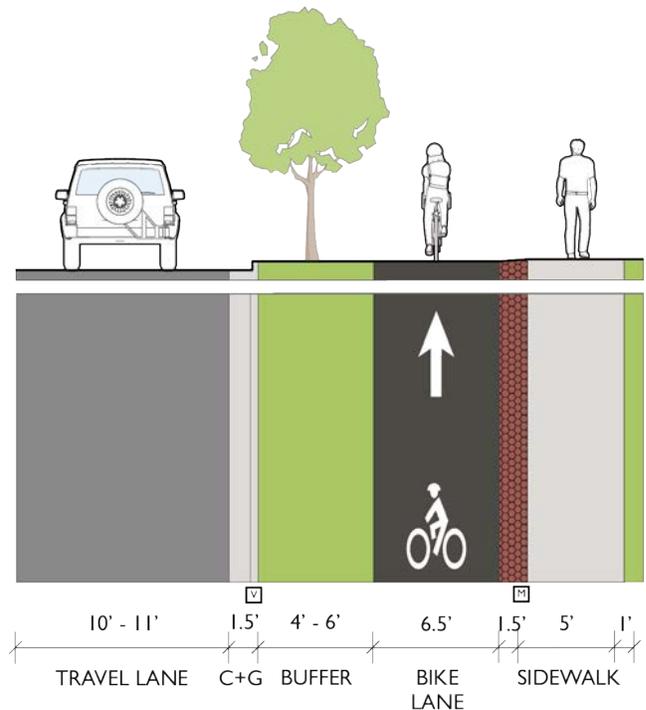
**FIGURE 19: Street-Level SBL**



**FIGURE 21: Sidewalk-Level SBL**



**FIGURE 20: Intermediate-Level SBL**



## Separated bike lanes can be one-way or two-way facilities:

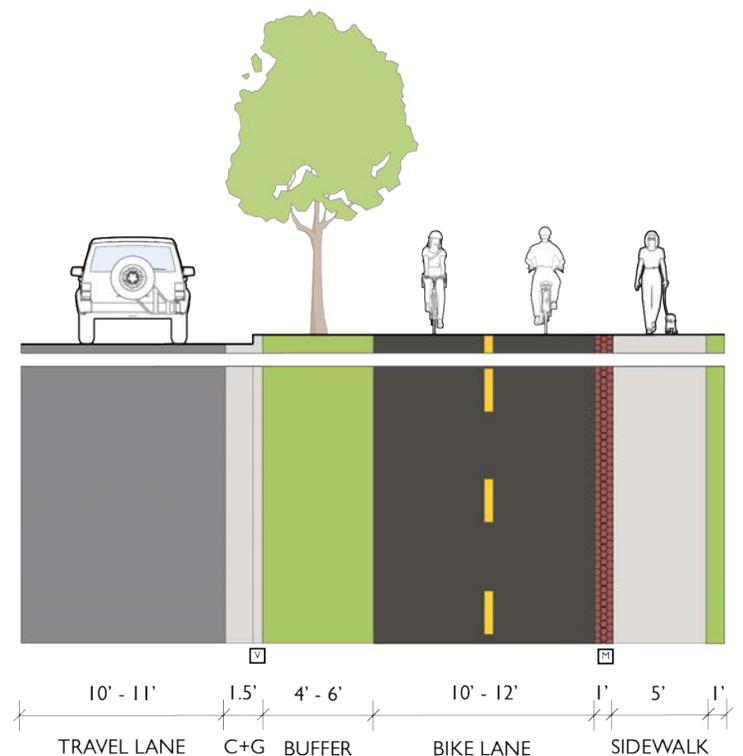
- One-way separated bike lanes in the direction of motorized travel provide intuitive and simplified transitions to existing bike lanes and shared travel lanes.
- Two-way separated bike lanes will require special attention to properly transition the contra-flow bicyclist into existing bike lanes and shared travel lanes.
- Depending on context, motorists may not expect bicyclists to approach crossings from both directions. For this reason, two-way separated bike lanes may require detailed treatments at alley, driveway, and cross street crossings to enhance the safety of these crossings. Additionally, bike signals may be appropriate to ensure proper yielding of right-of-way for two-way facilities.

## Separated bike lanes can provide different levels of separation from pedestrians:

### SIDEWALK-LEVEL SEPARATED BIKE LANES:

- Allow separation from motor vehicles in locations with limited right-of-way.
- Maximize usable bike lane width.
- Require no transition for raised bicycle crossings at driveways, alleys, or cross streets.
- May provide level landing areas for parking, loading, or bus stops along the street buffer.
- May reduce maintenance needs by prohibiting debris build-up from roadway runoff.
- May simplify plowing operations.
- May result in pedestrian and bicyclist encroachment, unless a continuous sidewalk buffer is provided.
- Allow bicyclists to use a portion of the sidewalk or street buffer to pass other bicyclists in constrained corridors where sidewalk buffers are eliminated.

FIGURE 22: Two-Way Sidewalk-Level SBL



## INTERMEDIATE OR STREET-LEVEL SEPARATED BIKE LANES:

- Preserve separation between bicyclists and pedestrians where sidewalk buffers are eliminated.
- Ensures a detectable edge is provided for people with vision disabilities.
- May increase maintenance needs to remove debris from roadway runoff, unless street buffer is raised.
- May complicate snow plowing operations.
- May require careful consideration of drainage design, and, in some cases, may require catch basins to manage bike lane runoff.

FIGURE 24: Two-Way Intermediate-Level SBL

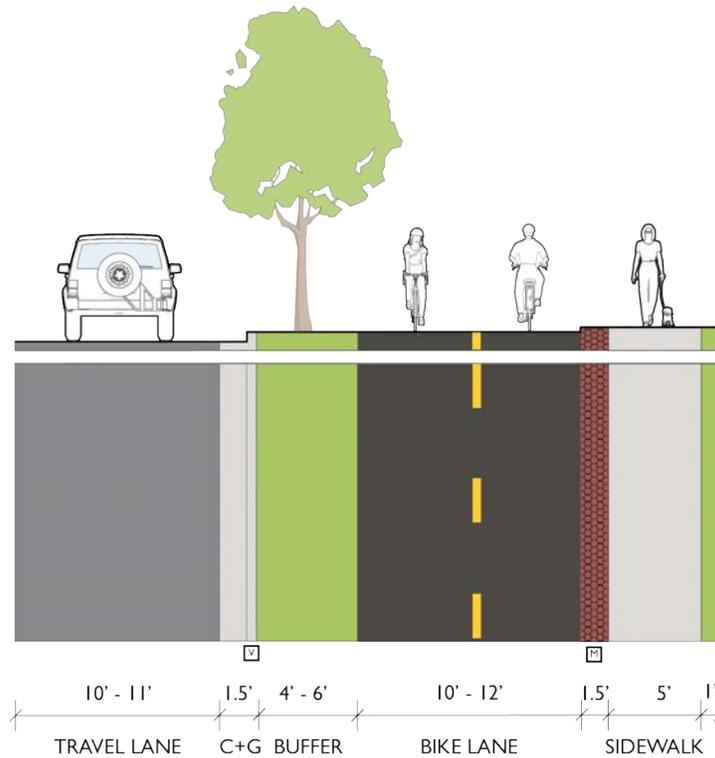
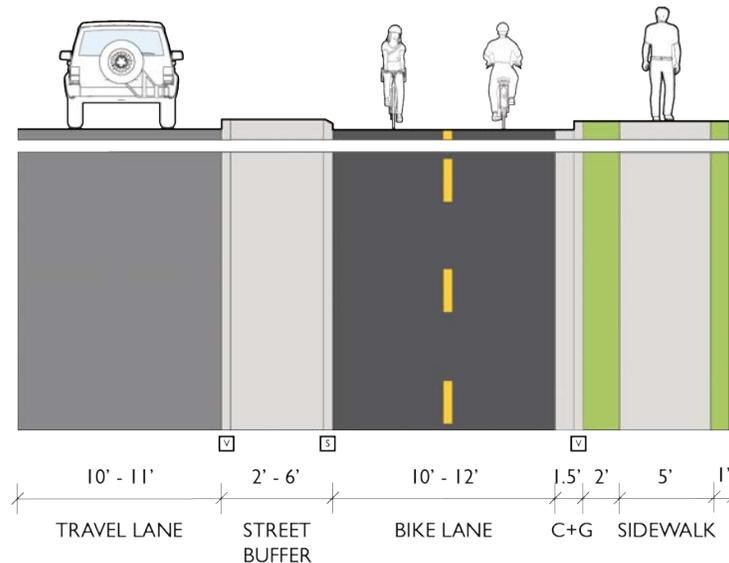


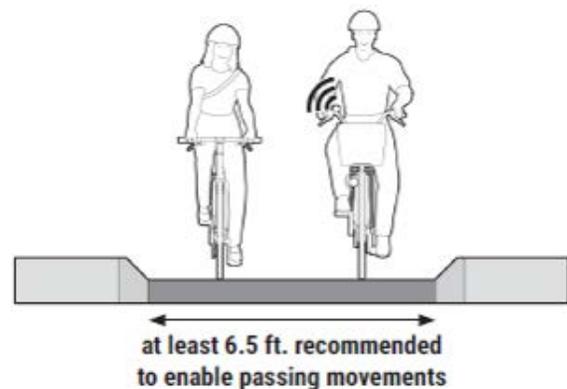
FIGURE 23: Two-Way Street-Level SBL



## Separated Bike Lane Guidance

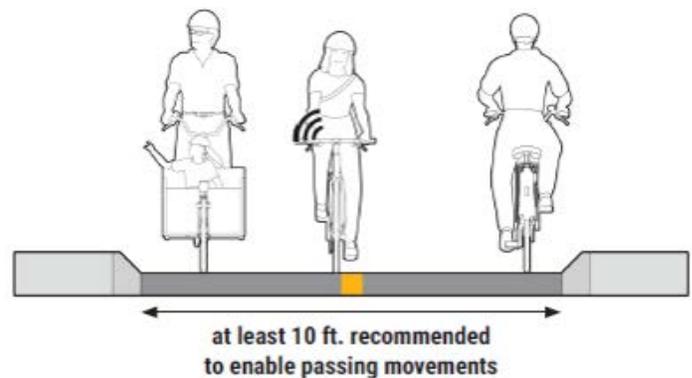
- Bike lane width should be determined by the anticipated peak hour bicycle volume.
- A minimum shy distance of 1 foot should be provided between any vertical objects in the sidewalk or street buffer to the bike lane.
- The street buffer is required and should be separated from the street by vertical objects or a median.
- Travel lanes and parking should be narrowed to the minimum widths in constrained corridors.
- Designers should prioritize reduction of the space allocated to the street before narrowing other spaces. This reduction can include decreasing the number of travel lanes, narrowing existing lanes, and/or adjusting on-street parking.
- The sidewalk should not be narrowed beyond the minimum necessary to accommodate pedestrian demand.
- The sidewalk buffer may be eliminated at locations with low pedestrian volume. At locations with increased pedestrian volume, it is desirable to provide vertical separation and/or clear delineation between the bicycle lane and the sidewalk.
- The street buffer is critical to the safety of separated bike lanes; narrowing or eliminating it should be avoided wherever possible. The buffer should not be reduced below 2 feet at midblock locations and should be between 6 feet and 20 feet at intersections to provide maximum safety benefits. Where the buffer is reduced below 6 feet, a raised bicycle crossing or signal phase separation should be considered.
- The bike lane width should not be reduced below 5 feet for one-way bike lanes and 8 feet for two-way bikeways, to ensure bicyclists can safely pass other bicyclists.

**FIGURE 25: One-Way Recommended Widths**



Same Direction Bicyclists/ Peak Hour	Bike Lane Width (ft.)	
	Rec.	Min.*
<150	6.5	5.0
150-750	8.0	6.5
>750	10.0	8.0

**FIGURE 26: Two-Way Recommended Widths**



Bidirectional Bicyclists/ Peak Hour	Bike Lane Width (ft.)	
	Rec.	Min.*
<150	10.0	8.0
150-400	11.0	10.0
>400	14.0	11.0

# Street Buffer Types

There are a variety of street buffer types for separated bike lanes. These include raised buffers such as raised islands, flexible delineator posts, rigid bollards, and planters. Parking is another option and can be combined with other raised buffers.

FIGURE 27: Raised Island Street-Level SBL

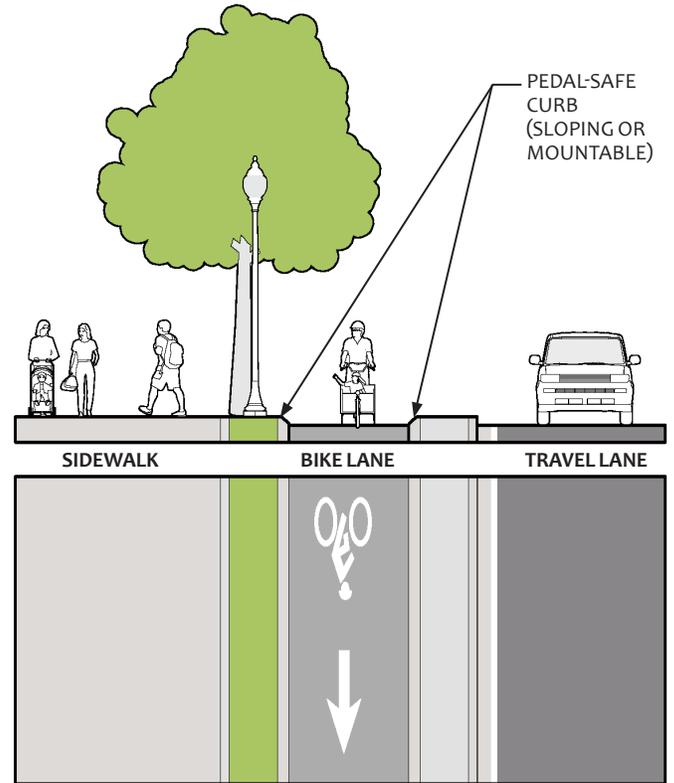


FIGURE 28: Raised Island Intermediate-Level SBL

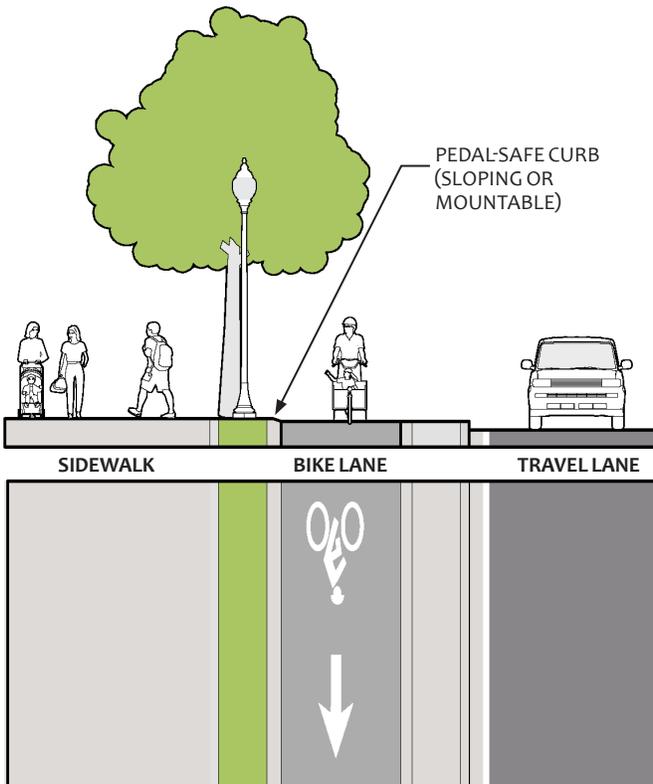


FIGURE 29: Raised Island Sidewalk-Level SBL

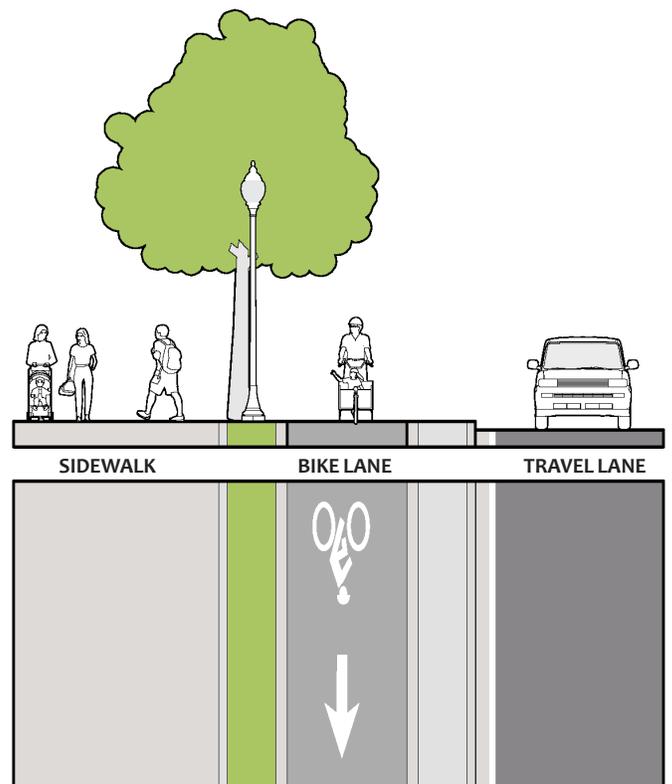


FIGURE 33: Planters

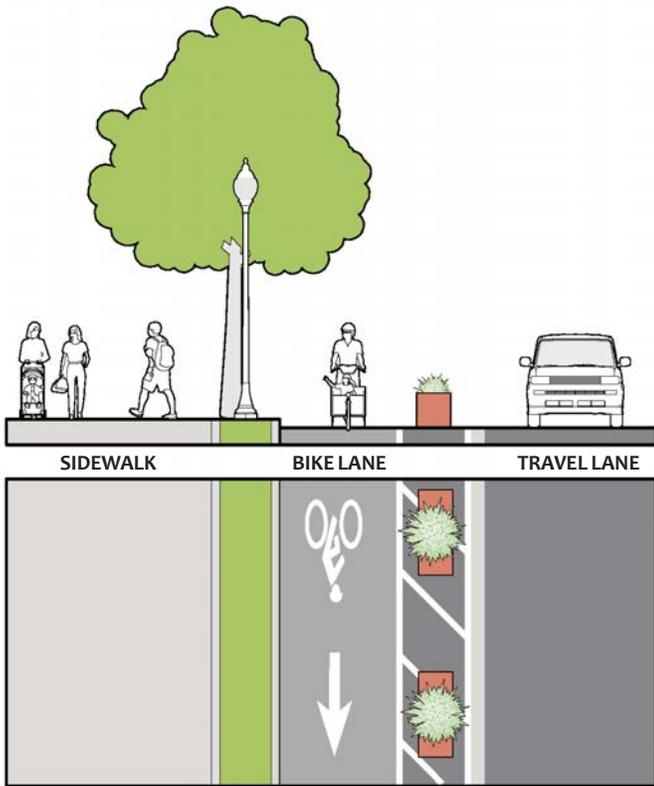


FIGURE 31: Flexible Delineator Posts/Rigid Bollards

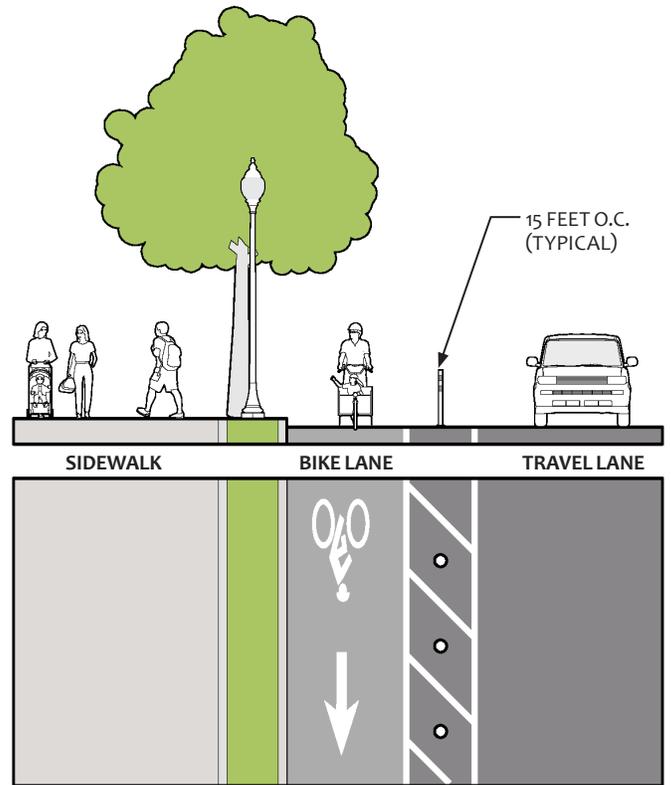


FIGURE 32: On-Street Parking

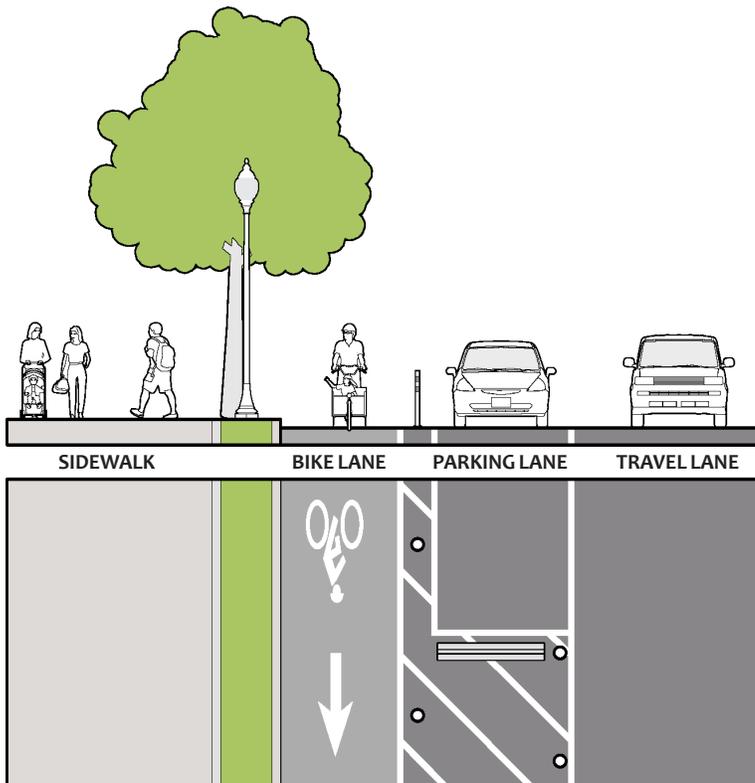
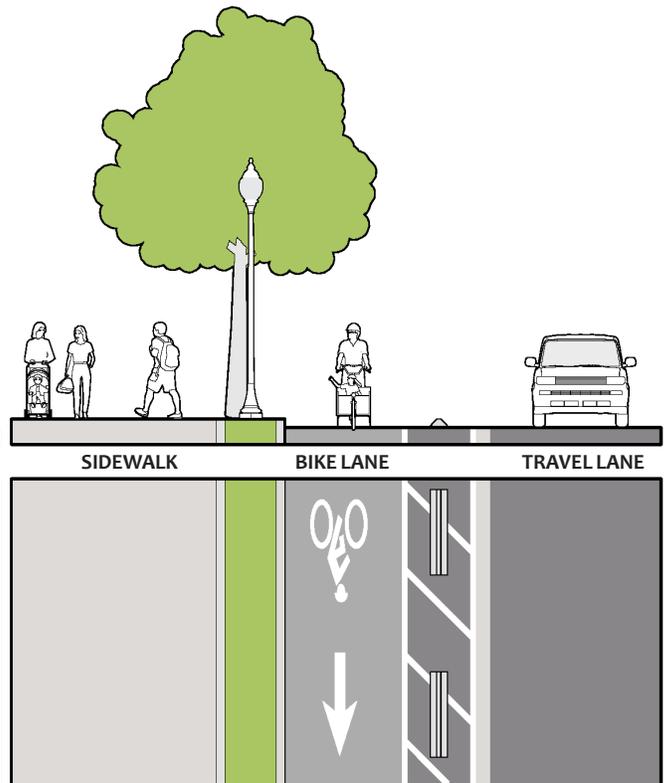
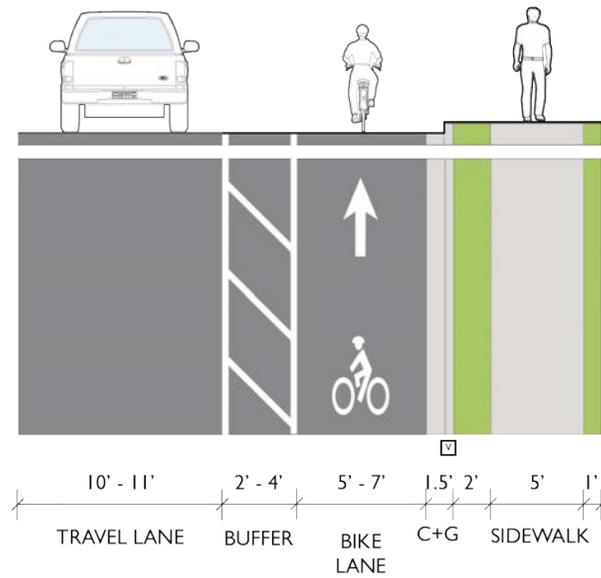


FIGURE 30: Parking Stops



# Buffered Bike Lanes

FIGURE 34: Buffered Bike Lane



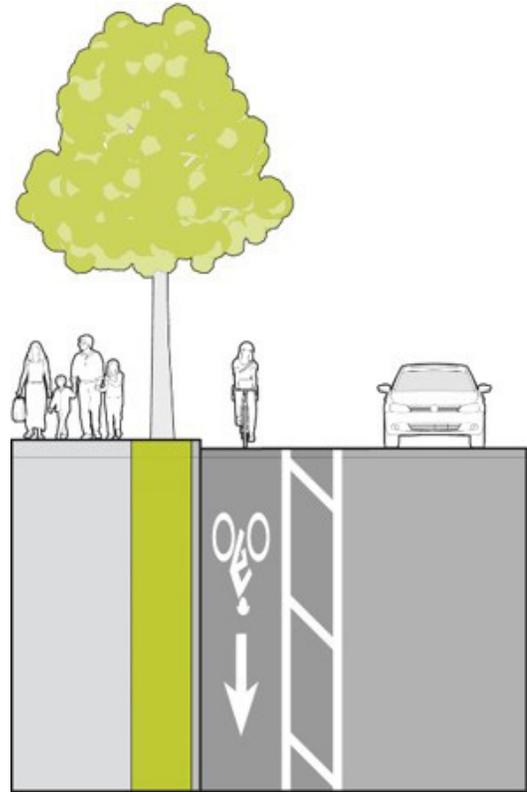
## Considerations

- Typically installed by reallocating existing street space.
- Can be used on one-way or two-way streets.
- Consider placing buffer next to parking lane where there is commercial or metered parking.
- Consider placing buffer next to travel lane where speeds are 30 mph or greater or when traffic volume exceeds 6,000 vehicles per day.
- Where there is 7 feet of roadway width available for a bicycle lane, a buffered bike lane should be installed instead of a conventional bike lane
- Buffered bike lanes allow bicyclists to ride side by side or to pass slower moving bicyclists.
- Research has documented buffered bicycle lanes increase the perception of safety.
- Preferable to a conventional bicycle lane when used as a contra-flow bike lane on one-way streets with sufficient pavement width.

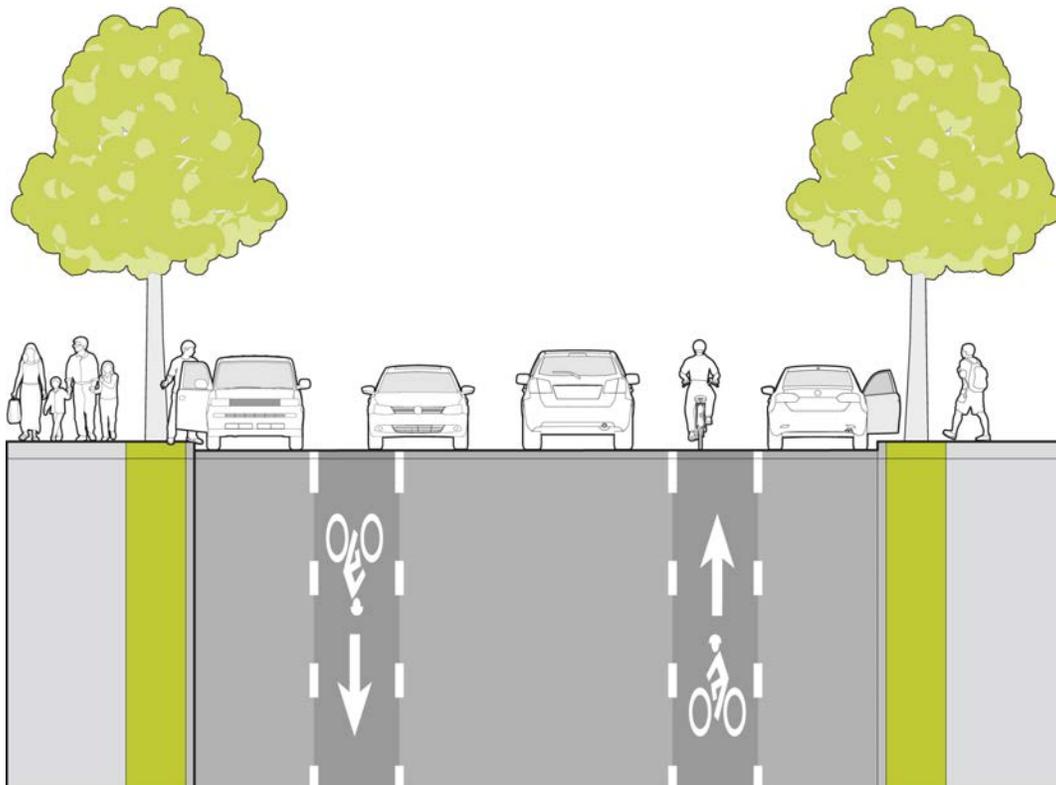
## Buffered Bike Lane Guidance

- The minimum width of a buffered bike lane adjacent to parking is 4 feet, a desirable width is 6 feet.
- Buffers are to be broken where curbside parking is present to allow cars to cross the bike lane.
- The minimum buffer width is 18 inches. There is no maximum. Diagonal cross hatching should be used for buffers <3 feet in width. Chevron cross hatching should be used for buffers >3 feet in width.
- The use of high visibility paint is encouraged.

**FIGURE 35: Buffered Bike Lane without Parking**



**FIGURE 36: Buffered Bike Lane with Parking**



# Bike Lanes

FIGURE 37: Bike Lane

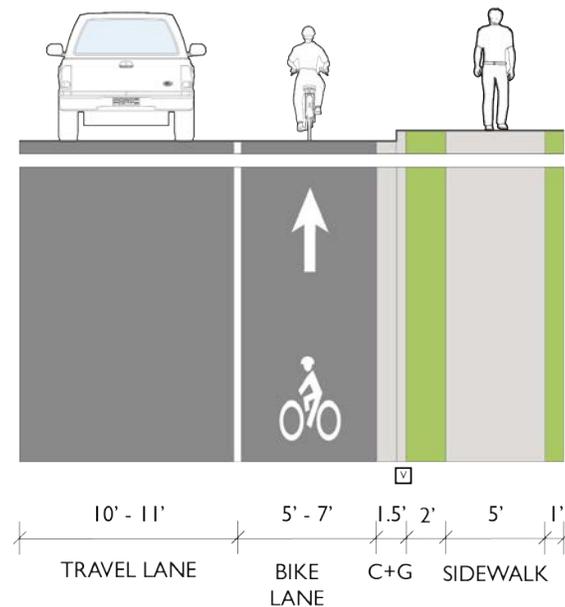
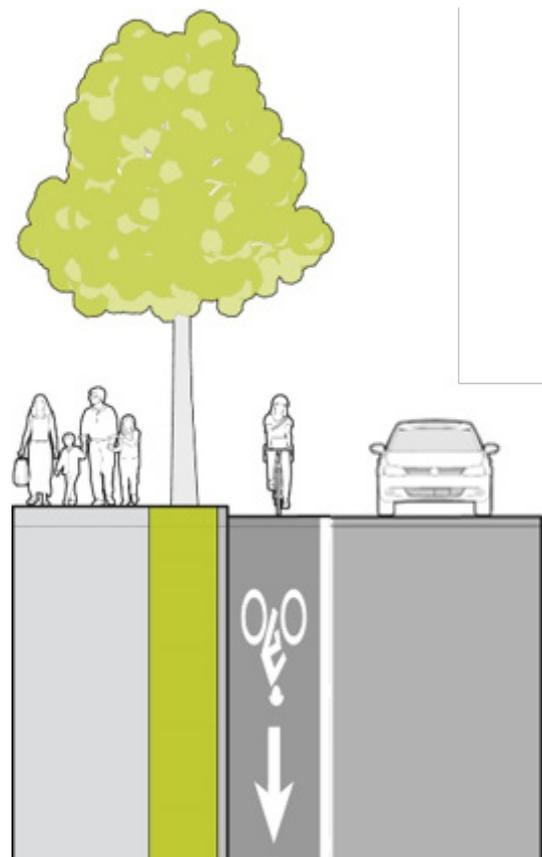


FIGURE 38: Bike Lane without Parking

## Considerations

- Typically installed by reallocating existing street space.
- Can be used on one-way or two-way streets.
- Contra-flow bicycle lanes may be used to allow two-way bicycle travel on streets designated for one-way travel for motorists to improve bicycle network connectivity.
- Stopping, standing, and parking in bike lanes may be problematic in areas of high parking demand and deliveries, especially in commercial areas.
- Wider bike lanes or buffered bike lanes are preferable at locations with high parking turnover.



## Bike Lane Guidance

- The minimum width of a bike lane is 5 feet, a desirable width is 6 feet.
- The width of the bike lane must be exclusive of the gutter.
- High frequency parking turnover may inhibit bike lane implementation or require additional width to add a door zone, marked with Parking T's or hatch marks to protect and inform bicyclists.

FIGURE 39: Bike Lane with Parking

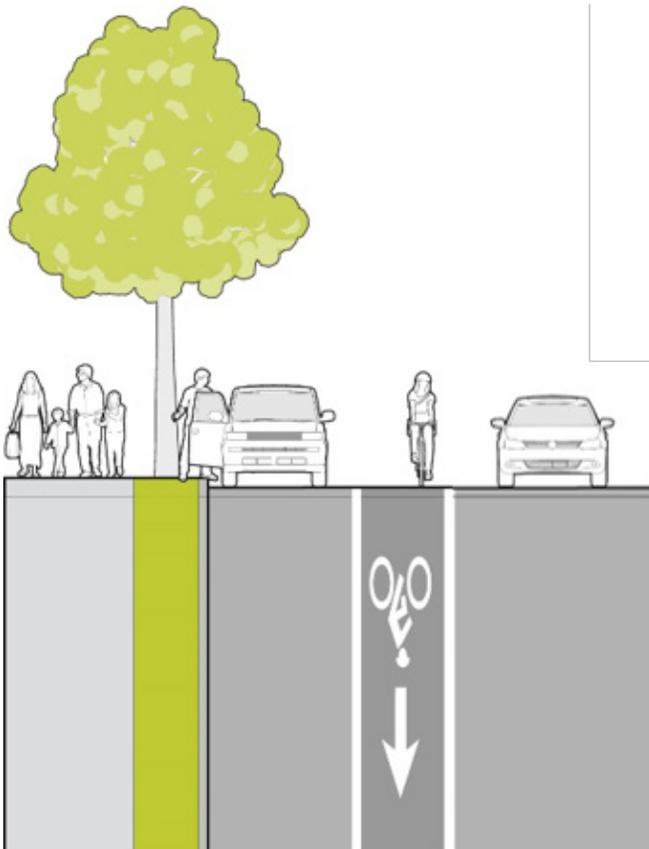
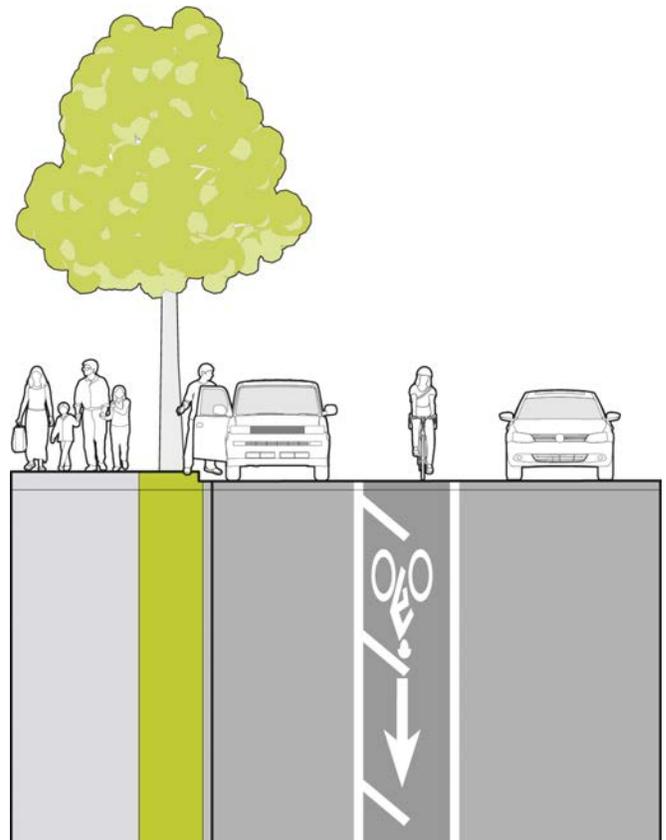


FIGURE 40: Bike Lane with Parking and Door Zone



## *Life of a Bike Lane*

Separated bike lanes have been implemented in many cases as low-cost retrofit projects (e.g. using flex posts and paint within the existing right-of-way). More permanent forms of separation, such as curb-protected bike lanes, cost more and are less flexible once implemented. A phased implementation approach, where “pilot” projects transition to permanent protected bike lanes may solve both of these problems, by implementing the facility slowly and troubleshooting before permanent materials and high costs are necessary.



IMAGE 19: A cyclist rides in a demonstration bike lane.

## Considerations

Lower-cost retrofits or demonstration projects allow for quick implementation, responsiveness to public perception, and ongoing evaluation. Separation types for short-term separated bike lane designs often include non-permanent separation, such as flexible delineator posts, planters, or parking stops. Pilot projects allow the Town to:

- Test the separated bike lane configuration for bicyclists and traffic operations
- Evaluate public reaction, design performance, and safety effectiveness
- Make changes if necessary
- Transition to permanent design as funds become available

## Guidance

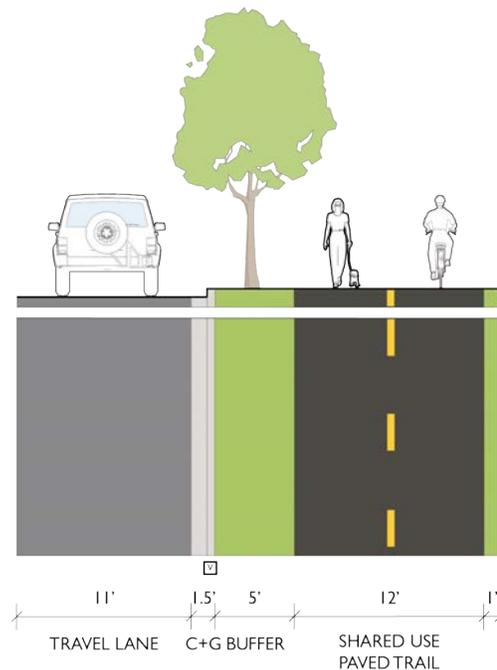
Permanent separation designs provide a high level of protection and often have greater potential for placemaking, quality aesthetics, and integration with features such as green stormwater infrastructure. Communities often implement permanent separation designs by leveraging private development (i.e., potentially through developer contribution), major capital construction, and including protected bike lanes in roadway reconstruction designs. Examples of permanent separation materials include rigid bollards, raised medians, and grade-protected bike lanes at an intermediate or sidewalk level.

**IMAGE 20: Kids ride bicycles along a buffered bike lane with curb stops.**



# Greenways and Shared Use Paths

FIGURE 41: Shared Use Path



## Considerations

- According to AASHTO, "Shared use paths should not be used to preclude on-road bicycle facilities, but rather to supplement a network of on-road bike lanes, shared roadways, bicycle boulevards, and paved shoulders." In other words, in some situations it may be appropriate to provide an on-road bikeway in addition to a sidepath along the same roadway.
- Many people express a strong preference for the separation between bicycle and motor vehicle traffic provided by paths when compared to on-street bikeways. Sidepaths may be desirable along high-volume or high-speed roadways, where accommodating the targeted type of bicyclist within the roadway in a safe and comfortable way is impractical. However, sidepaths may present increased conflicts between path users and motor vehicles at intersections and driveway crossings. Conflicts can be reduced by minimizing the number of driveway and street crossings present along a path and otherwise providing high-visibility crossing treatments.
- Paths typically have a lower design speed for bicyclists than on-street facilities and may not provide appropriate accommodation for more confident bicyclists who desire to travel at greater speeds. In addition, greater numbers of driveways or intersections along a sidepath corridor can decrease bicycle travel speeds and traffic signals can increase delay for bicyclists on off-street paths compared to cyclists using in-street bicycle facilities such as bike lanes. Therefore, paths should not be considered a substitute to accommodating more confident bicyclists within the roadway.

## Greenway and Shared Use Path Guidance

---

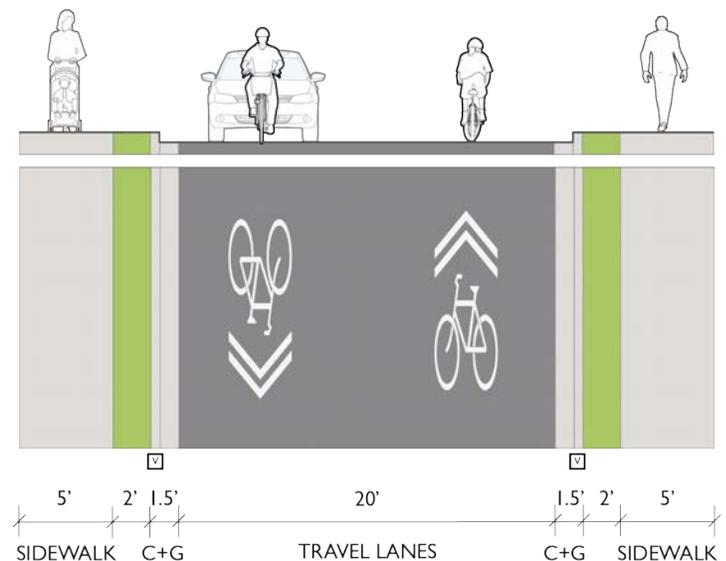
- Widths as narrow as 8 feet are acceptable for short distances under physical constraint. Warning signs should be considered at these locations.
- In locations with heavy volumes or a high proportion of pedestrians, widths exceeding 10 feet are recommended. A minimum of 11 feet is required for a user to pass another user traveling in the same direction when there is also a user traveling in the opposite direction. It may be beneficial to separate bicyclists from pedestrians by constructing parallel paths for each mode.
- Paths must be designed according to state and national standards. This includes establishing a design speed (i.e., typically 18 mph) and designing path geometry accordingly. Consult the AASHTO Guide for the Development of Bicycle Facilities for guidance on geometry, clearances, traffic control, railings, drainage, and pavement design.
- On hard surfaces it can be useful to include soft surface parallel paths which are preferred by some users, such as runners.
- Path clearances are an important element in path design and reducing user conflicts. Vertical objects close to the path edge can endanger users and reduce the comfortable usable width of the path. Along the path, vertical objects should be set back at least two feet from the edge of the path. Path shoulders may also reduce conflicts by providing space for users who step off the path to rest, allowing users to pass one another, or providing space for viewpoints.

# Neighborhood Bikeways

## Considerations

- Many cities already have signed bike routes along neighborhood streets that provide an alternative to traveling on high-volume, high-speed arterials. Applying bicycle boulevard treatments to these routes makes them more suitable for bicyclists of all abilities and can reduce crashes as well.
- Stop signs or traffic signals should be placed along the neighborhood bikeway in a way that prioritizes the bicycle movement, minimizing stops for bicyclists whenever possible.
- Neighborhood bikeway treatments include traffic calming measures such as street trees, traffic circles, chicanes, and speed humps. Traffic management devices such as diverters or semi-diverters can redirect cut-through vehicle traffic and reduce traffic volume while still enabling local access to the street.
- The Town should begin by implementing neighborhood bikeway treatments on one pilot corridor to measure the impacts and gain community support. The pilot program should include before-and-after crash studies, motor vehicle counts, and bicyclist counts on both the neighborhood bikeway and parallel streets. Findings from the pilot program can be used to justify neighborhood bikeway treatments on other neighborhood streets.
- Additional treatments for major street crossings may be needed, such as median refuge islands, rapid flashing beacons, bicycle signals, and HAWK or half signals.

FIGURE 42: Neighborhood Bikeway



## Traffic Calming

- Traffic calming aims to slow the speeds of motorists to a “desired speed” (i.e., usually 20 mph or less for residential streets and 25 to 35 mph for collectors and minor arterials). The greatest benefit of traffic calming is increased safety and comfort for all users on and crossing the street. Compared with conventionally designed streets, traffic calmed streets typically have fewer collisions and far fewer injuries and fatalities. These safety benefits are the result of slower speeds for motorists that result in greater driver awareness, shorter stopping distances, and less kinetic energy during a collision.
- Prior to permanently implementing a traffic calming measure, it may be useful to introduce a temporary measure using paint, cones, or street furniture, as changes can easily be made to the design. A formal policy or procedure can help a community objectively determine whether traffic calming measures should be installed on a street or in a neighborhood. Such a procedure should include traffic and speed studies and a way to gather input and approval from neighborhood residents.

**IMAGE 21: Speed Cushion**



**IMAGE 22: Speed Hump**



**IMAGE 23: Raised Crosswalk**



### *Vertical Treatment Guidance*

- Vertical deflections such as speed humps and speed cushions should have a smooth leading edge, a parabolic rise, and be engineered for a speed of 25 to 30 mph. Speed humps should be clearly marked with reflective markings and signs.
- Typically, speed humps are 22 feet in length, with a rise of 6 inches above the roadway. They should extend the full width of the roadway and be tapered to the gutter to accommodate drainage. Speed humps are not typically used on roads with rural cross sections; however, if they are used on such roads, they should match the full pavement width (i.e., including paved shoulders).
- Speed humps or speed cushions are not typically used on collector or arterial streets.
- The size of chicanes will vary based on the targeted design speed and roadway width, but they must be 20 feet wide curb-to-curb at a minimum to accommodate emergency vehicles.

### **VERTICAL TREATMENTS:**

Vertical traffic calming treatments compel motorists to slow speeds. By lowering the speed differential between bicyclists and motorists, safety and bicyclist comfort is increased. These treatments are typically used where other types of traffic controls are less frequent, for instance along a segment where stop signs may have been removed to ease bicyclist travel.

- A typical curb radius of 20 feet should be used wherever possible, including where there are higher pedestrian volumes and fewer larger vehicles.
- Speed humps and raised crosswalks impact bicyclist comfort. The approach profile should preferably be sinusoidal or flat.
- Where traffic calming must not slow an emergency vehicle, speed cushions or raised tables or crosswalks should be considered. Speed cushions provide gaps spaced for an emergency vehicle's wheelbase to pass through without slowing.
- Consider using raised crosswalks at intersections to slow traffic turning onto a neighborhood bikeway from a major street. Vertical traffic calming will not be necessary on all neighborhood bikeways but should be considered on any road with measured or observed speeding issues (50th percentile of traffic exceeding 25 miles per hour).
- Continuous devices, such as speed humps and raised crosswalks, are more effective to achieve slower speeds than speed cushions.

## HORIZONTAL TREATMENTS:

Horizontal traffic calming reduces speeds by narrowing lanes, which creates a sense of enclosure and additional friction between passing vehicles. Narrower conditions require more careful maneuvering around fixed objects and when passing bicyclists or oncoming automobile traffic. Some treatments may slow traffic by creating a yield situation where one driver must wait to pass.



IMAGE 24: Curb Extension

### *Horizontal Treatment Guidance*

- Horizontal traffic calming treatments must be designed to deflect motor vehicle traffic without forcing the bicycle path of travel to be directed into a merging motorist.
- Neighborhood traffic circles should be considered at local street intersections to prioritize the through movement of bicyclists (i.e., by removing stop control or converting to yield control) without enabling an increase in motorist's speed.
- Infrastructure costs will range depending upon the complexity and permanence of design. Simple, interim treatments, such as striping and flex posts, are low-cost. Curbed, permanent treatments that integrate plantings or green infrastructure are higher cost. Horizontal traffic calming treatments can be appropriate along street segments or at intersections where width contributes to higher motor vehicle speeds. It can be particularly effective at locations where:
  - On-street parking is low-occupancy during most times of day.
  - There is a desire to remove or decrease stop control at a minor intersection.
- Horizontal treatments are most effective if they deflect motorists midblock (e.g., chicanes) or within intersections (e.g., neighborhood traffic circles)

**IMAGE 25: Neckdown**



**IMAGE 26: Neighborhood Traffic Circle**



**IMAGE 27: Chicane**



## TRAFFIC DIVERSION:

Traffic diversion strategies are used to reroute traffic from a neighborhood bikeway onto other adjacent streets by installing design treatments that restrict motorized traffic from passing through.

IMAGE 28: Diagonal Diverter



### *Traffic Diversion Guidance*

- Diversion necessarily moves trips from the neighborhood bikeway onto adjacent streets. This change in traffic volume on other local streets must be identified and addressed during the planning, design, and evaluation process.
- Other traffic calming tools should be explored for their effectiveness before implementing traffic diversion measures. In communities where the street network is not a traditional grid, the impacts of diversion to the larger street network will be greater due to the inability of traffic to easily disperse and find alternate routes.
- Temporary materials may be used to test diversion impacts before permanent, curbed diverters are installed.
- Consultation with emergency services will be necessary to understand their routing needs.
- Preferred motor vehicle volumes are in the range of 1,000 to 1,500 per day, while up to 3,000 vehicles per day is acceptable.
- Diversion devices must be designed to provide a minimum clear width of 6 feet for a bicyclist to pass through.
- Some treatments may require a separate pedestrian accommodation.

**IMAGE 29: Partial Traffic Closure - Interim Stop Control**



**IMAGE 30: Partial Traffic Closure - Permanent Signal**



**IMAGE 31: Full Traffic Closure**



## CURB EXTENSIONS:

Curb extensions, also known as neckdowns, bulb-outs, or bump-outs, are created by extending the sidewalk at corners or mid-block. Curb extensions are intended to increase safety, calm traffic, and provide extra space along sidewalks for users and amenities.

FIGURE 43: Curb Extensions



### Traffic Diversion Guidance

- The turning needs of emergency and larger vehicles should be considered in curb extension design.
- Care should be taken to maintain direct routes across intersections aligning pedestrian desire lines on either side of the sidewalk. Curb extensions often make this possible as they provide extra space for grade transitions.
- Consider providing a 20-foot long curb extension to restrict parking within 20 feet of an intersection.
- When curb extensions conflict with turning movements, the reduction of width and/or length should be prioritized over elimination.
- Emergency access is often improved through the use of curb extensions as intersections are kept clear of parked cars.
- Curb extensions should be considered only where parking is present or where motor vehicle traffic deflection is provided through other curbside uses such as bicycle share stations or parklets.
- Curb extensions are particularly valuable in locations with high volumes of pedestrian traffic, near schools, at unsignalized pedestrian crossings, or where there are demonstrated pedestrian safety issues.
- A typical curb extension extends the approximate width of a parked car (or about 6 feet from the curb).
- The minimum length of a curb extension is the width of the crosswalk, allowing the curvature of the curb extension to start after the crosswalk, which should deter parking; NO STOPPING signs should also be used to discourage parking. The length of a curb extension can vary depending on the intended use (i.e., stormwater management, transit stop waiting areas, restrict parking).
- Curb extensions should not reduce a travel lane or a bicycle lane to an unsafe width.

# Intersection Design & Other Crossing Treatments

## Separated Bike Lanes & Sidepaths at Intersections (Protected Intersections)

Separated bicycle lanes and sidepaths provide an exclusive travel way for bicyclists alongside roadways that is separate from motor vehicle travel lanes, parking lanes, and sidewalks. Separated bike lane and sidepath designs at intersections should manage conflicts with turning vehicles and increase visibility for all users.

FIGURE 44: Shared Use Path Street Crossing - A

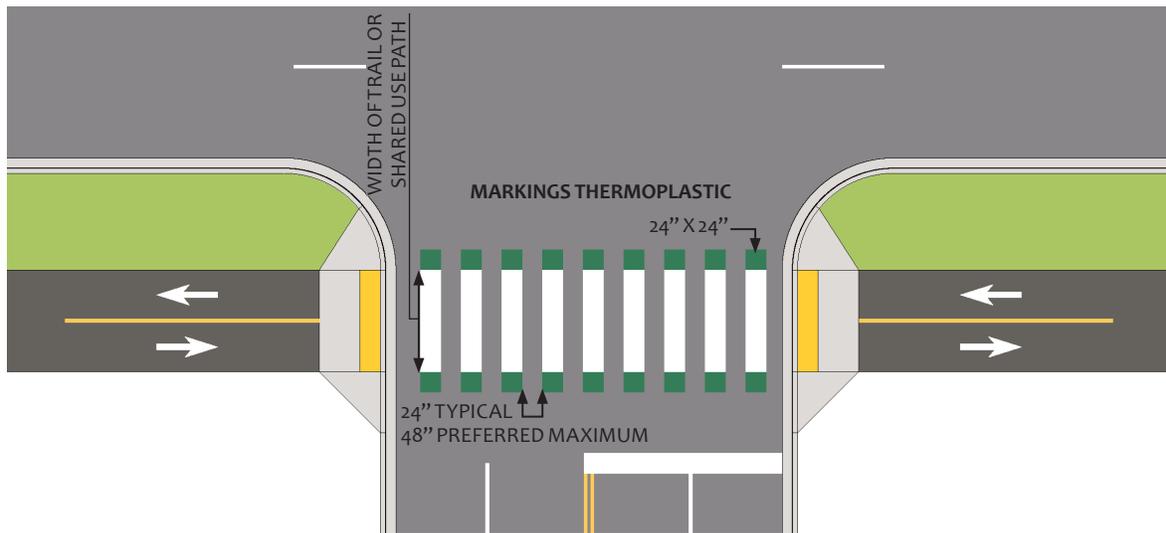
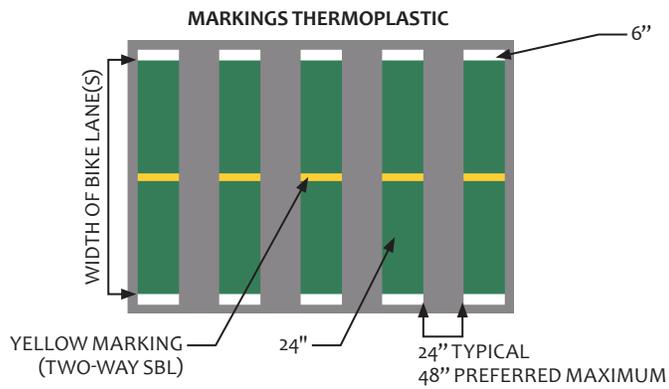


FIGURE 45: Shared Use Path Street Crossing - B



**FIGURE 46: Separated Bike Lane (SBL) Street Crossing**



**FIGURE 47: Bike Lane Street Crossing**

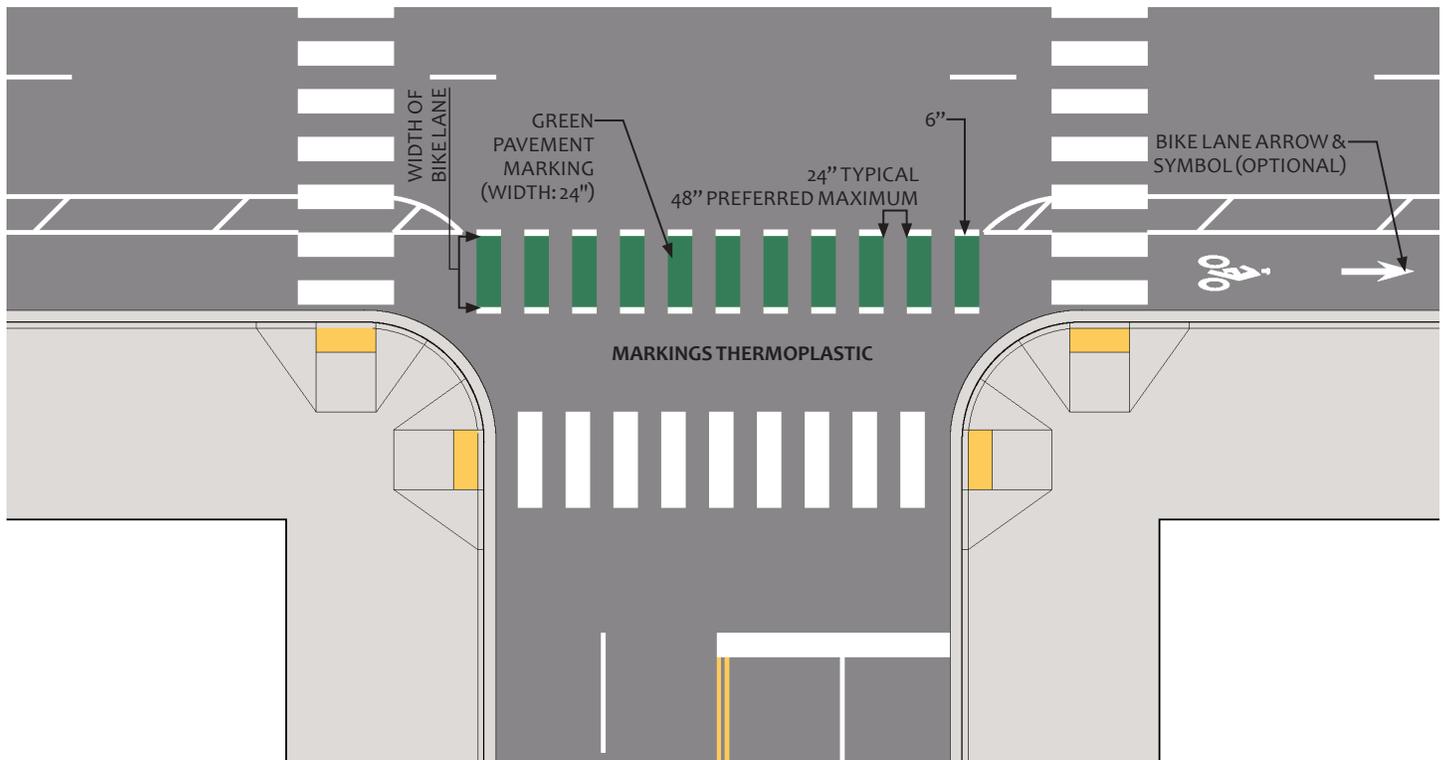
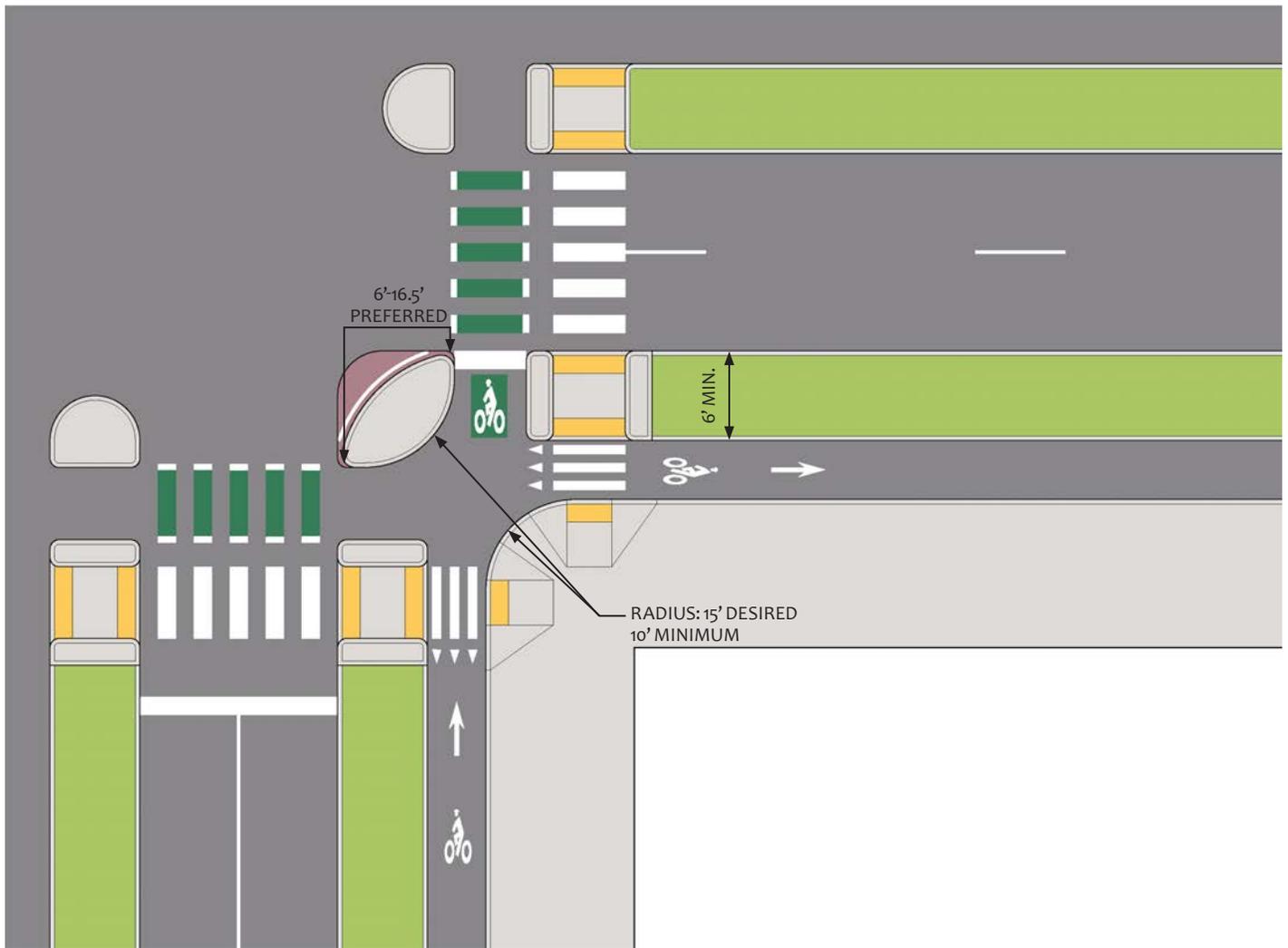


FIGURE 48: Protected Intersection



## Protected Intersection Guidance

---

- Separated bicycle lane and sidepath designs at intersections should consider signal operation and phasing to manage conflicts between turning vehicles and bicyclists. Bicycle signal heads should be considered to separate conflicts. Shared lane markings and/or colored pavement can supplement short dashed lines to demarcate the protected bike lane through intersections, where engineering judgment deems appropriate. At non-signalized intersections, design treatments to increase visibility and safety include:
  - Warning signs
  - Raised intersections
  - Special pavement markings (including colored surface treatment)
  - Removal of parking prior to the intersection
- It is preferable to maintain the separation of the bike lane through the intersection rather than introduce the bicyclist into the street with a merge lane. Where this is not possible, see guidance on Mixing Zones.
- Increasing visibility and awareness are two key design goals for separated bike lanes at intersections. In some cases, parking restrictions between 20 feet to 40 feet are needed to ensure the visibility of bicyclists at intersections.
- Separated bike lanes and sidepaths should typically be routed behind transit stops (i.e., the transit stop should be between the bike lane and motor vehicle travel lanes). If this is not feasible, the separated bike lane or sidepath should be designed to include treatments such as signage and pavement markings to alert the bicyclist to stop for buses and pedestrians accessing transit stops.
- Markings and signage should be used at intersections to give priority to separated bicycle lanes and sidepaths.

## Raised Intersections

Raised intersections reinforce slow speeds and encourage people driving cars to yield to people walking and bicycling at the intersection.

### *Raised Intersection Guidance*

- Raised intersections are flush with the sidewalk and ensure that drivers traverse the crossing slowly. Crosswalks do not need to be marked unless they are not at grade with the sidewalk. ADA-compliant ramps and detector strips are always required.
- Bollards along corners keep motorists from crossing into the pedestrian space. Bollards protect pedestrians from errant vehicles.
- Where two one-way streets intersect, there will be two corners around which no drivers turn. This can be designed with the smallest constructible radius (approximately 2 feet) as long as a 40-foot fire truck can make the turn without encroaching upon the sidewalk.
- Don't use if sight distance is limited and/or the street is steep.
- If the street is a bus or emergency route, design must be coordinated. One raised crossing may be appropriate and may serve the primary need. Several raised crossings may be disruptive, so other measures should be considered.
- Raised intersections and crosswalks can be an urban design element through the use of special paving materials.
- Add tactile warning strips at edges to enable site impaired people to detect the crossing.
- Care must be taken in adding drainage.

**FIGURE 49: Raised Intersection**



## Conflict Area Markings

Intersection pavement markings designed to improve visibility, alert all roadway users of expected behaviors, and to reduce conflicts with turning vehicles are critical to establishing a safe and comfortable network.

### *Conflict Area Markings Guidance*

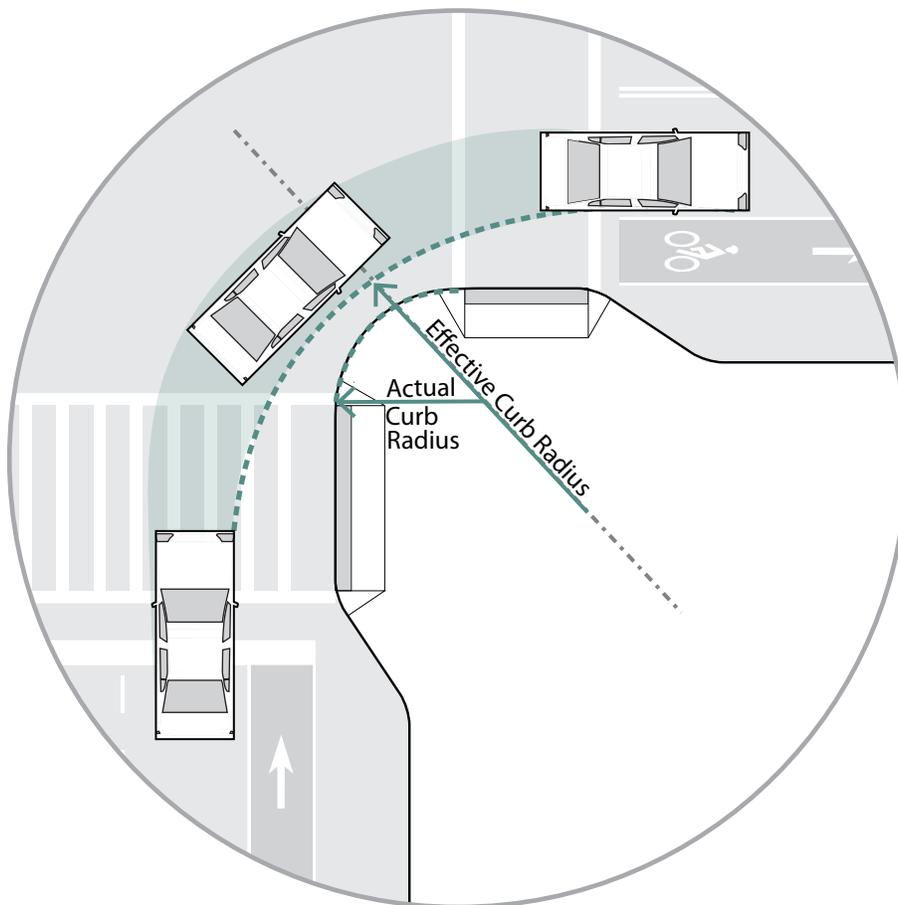
---

- The level of emphasis and visibility: dashed lane lines may be sufficient for guiding bicyclists through intersections; however, consider providing enhanced markings with green pavement and/or symbols at complex intersections or at intersections with documented conflicts and safety concerns.
- Symbol placement within intersections should consider vehicle wheel paths for maintenance.
- Driveways with higher volumes may require additional pavement markings and signage.
- Consideration should be given to using intersection pavement markings as spot treatments or standard intersection treatments. A corridor-wide treatment can maintain consistency; however, spot treatments can be used to highlight conflict locations.
- Dashed white lane lanes should conform to the latest edition of the MUTCD. These can be used through different types of intersections based on engineering judgment.
- A variety of pavement marking symbols can enhance intersection treatments to guide bicyclists and warn of potential conflicts.
- Green pavement markings can be used along the length of a corridor or in select conflict locations.

## Corners & Curb Radii

Pedestrian safety and comfort are directly impacted by the width and configuration of street corners; however, streets must accommodate large turning vehicles, including school buses and transit vehicles. One of the most challenging aspects of intersection design is to determine methods of accommodating large vehicles while keeping intersections as compact as possible. This requires a great deal of design flexibility and engineering judgment, as each intersection is unique in terms of the angles of the approach and departure, the number of travel lanes, the presence of a median, and a number of other features that fundamentally impact corner design.

FIGURE 50: Curb Radii



## *Corners & Curb Radii Guidance*

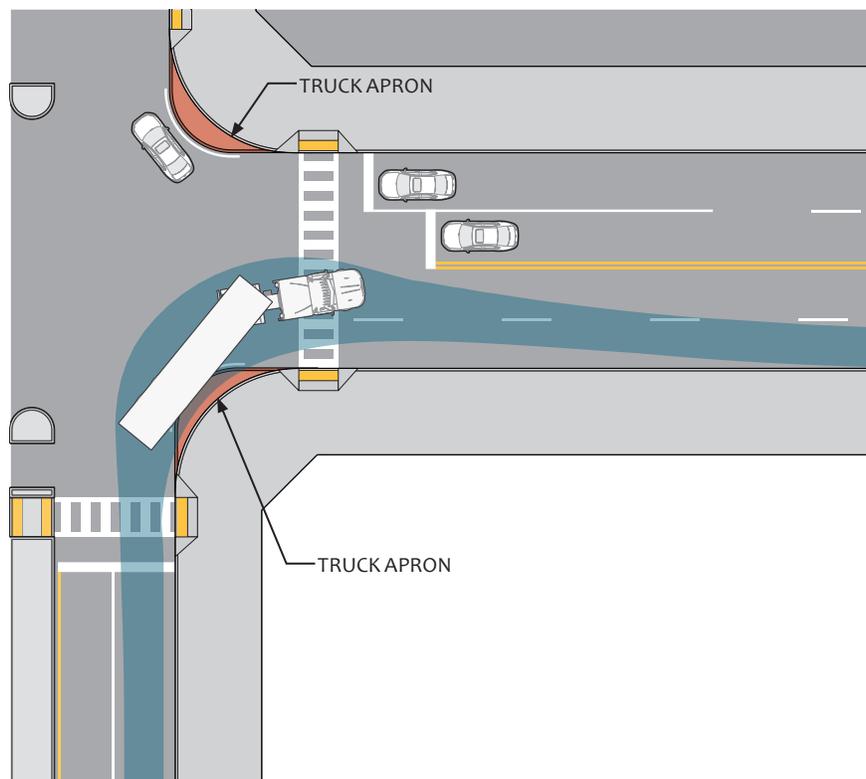
---

- The design vehicle should be selected according to the types of vehicles using the intersection with considerations to relative volumes and frequencies. In most cases, the curb radii are based on a Single Unit (SU) vehicle with a 42-foot turning radius. If the Town anticipates the need to accommodate a larger design vehicle, a radius evaluation based on this larger vehicle would be required. Examples of typical turning templates would include an SU, WB-40, WB-50, WB-60 and WB-62.
- Intersection design should strive for an actual curb radii that is between 10 feet to 25 feet . The default curb radii for two intersecting Neighborhood Residential Streets is 10 feet (i.e., exceptions apply for angled streets). For all other street classifications, including streets that intersect with Neighborhood Residential Streets, corner design should strive for an actual curb radius that is no more than 15' (i.e., exceptions apply for angled streets).
- Methods to minimize curb radii include:
  - On-street parking and bicycle lanes may provide the larger effective radii to accommodate the appropriate design vehicle.
  - On low volume (i.e., less than 4,000 vehicles per day), two-lane streets, corner design should assume that a large vehicle will use the entire width of the departing and receiving travel lanes, including the oncoming travel lane.
  - At signalized intersections, corner design should assume the large vehicle will use the entire width of the receiving lanes on the intersecting street.
  - At signalized intersections where additional space is needed to accommodate turning vehicles, consideration can be given to recessing the stop bar on the receiving street to enable the vehicle to use the entire width of the receiving roadway (i.e., encroaching on the opposing travel lane).
  - In some cases, it may be possible to allow a large turning vehicle to encroach on the adjacent travel lane on the departure side (i.e., on multi-lane roads) to make the turn.
  - A compound curve can be used to vary the actual curb radius over the length of the turn so that the radius is smaller as vehicles approach a crosswalk and larger when making the turn.
  - In some cases where there is a grid network and/or alternative access routes, it may be possible to restrict turning movements by large vehicles at certain intersections and driveways to enable tighter curb radii.

## Truck Aprons

While bicyclist and pedestrian safety is negatively impacted by wide crossings, bicyclists and pedestrians are also at risk if the curb radius is too small. Curb radii that are too small for large vehicles to navigate can result in the rear wheels of a truck tracking over queuing areas at the corner. Maintenance problems are also caused when trucks must regularly drive over street corners to make turns. Mountable truck aprons are a solution that can reduce turning speeds for passenger vehicles while accommodating the off-tracking of larger vehicles where a larger corner radius is necessary. In locations where large vehicles make occasional turns, designers can consider mountable truck aprons. Mountable truck aprons deter passenger vehicles from making higher-speed turns but accommodate the occasional large vehicle without encroachment or off-tracking into pedestrian waiting areas. Mountable truck aprons should be visually distinct from the adjacent travel lane and sidewalk.

FIGURE 51: Truck Aprons



### Truck Apron Guidance

- Mountable truck aprons are part of the traveled way and as such should be designed to discourage pedestrian or bicycle refuge. Bicycle stop bars, detectable warning panels, traffic signal equipment and other intersection features must be located behind the mountable surface area.
- The mountable surface should be visually distinct from the adjacent travel lane, sidewalk, and separated bike lane. The heights of mountable areas and curbs should be no more than 3 inches above the travel lane to accommodate lowboy trailers.

## Bicycle Signals, Detection, Actuation

Bicyclists have unique needs at signalized intersections. Bicycle movements may be controlled by the same indications that control motor vehicle movements, by pedestrian signals, or by bicycle-specific traffic signals. The introduction of separated bike lanes creates situations that may require leading or protected phases for bicycle traffic, or place bicyclists outside the cone of vision of existing signal equipment. In these situations, provision of signals for bicycle traffic will be required.

FIGURE 52: Signal Types



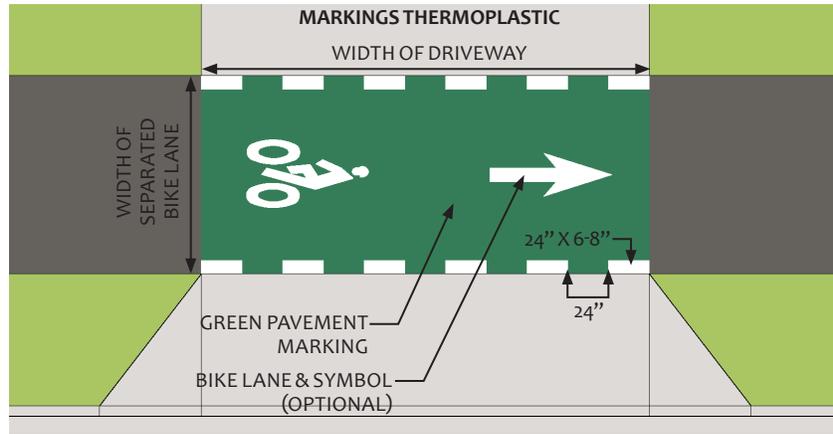
### *Bicycle Signals Guidance*

- Bicycle-specific signals may be appropriate to provide additional guidance or separate phasing for bicyclists per the AASHTO Guide for the Development of Bicycle Facilities.
- It may be desirable to install advanced bicycle detection on the intersection approach to extend the phase, or to prompt the phase and allow for continuous bicycle through movements.
- Video, microwave, and infrared detection can be alternates to loop detectors.
- Another strategy in signal timing is coordinating signals to provide a “green wave,” such that bicycles will receive a green indication and not be required to stop. Several cities including Portland, OR and San Francisco, CA have implemented “green waves” for bicycles.
- A stationary, or “standing,” cyclist entering the intersection at the beginning of the green indication can typically be accommodated by increasing the minimum green time on an approach per the AASHTO Guide for the Development of Bicycle Facilities.
- A moving, or “rolling,” bicyclist approaching the intersection towards the end of the phase can typically be accommodated by increases the red times (i.e., change and clearance intervals) per the AASHTO Guide for the Development of Bicycle Facilities.
- Set loop detectors to the highest sensitivity level possible without detecting vehicles in adjacent lanes and field check. Type D and type Q loops are preferred for detecting bicyclists.
- Install bicycle detector pavement markings and signs per the MUTCD, AASHTO Guide for the Development of Bicycle Facilities, and the NACTO Urban Bikeway Design Guide.

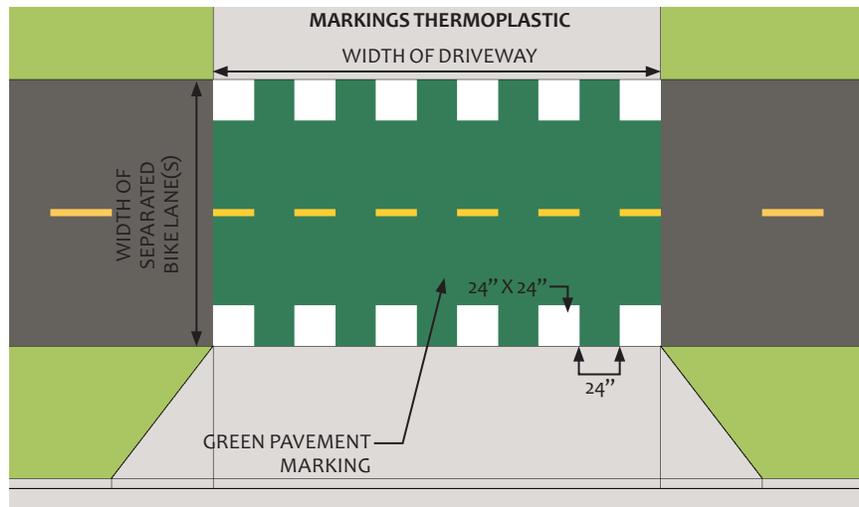
# Driveways

Most bicycle facilities will need to cross streets, driveways, or alleys at multiple locations along a corridor. At these locations, the crossings should be designed to: (a) delineate a preferred path for people bicycling through the intersection; and (b) to encourage driver yielding behavior, where applicable. Bicycle crossings may be supplemented with green pavement, yield lines, and/or regulatory signs.

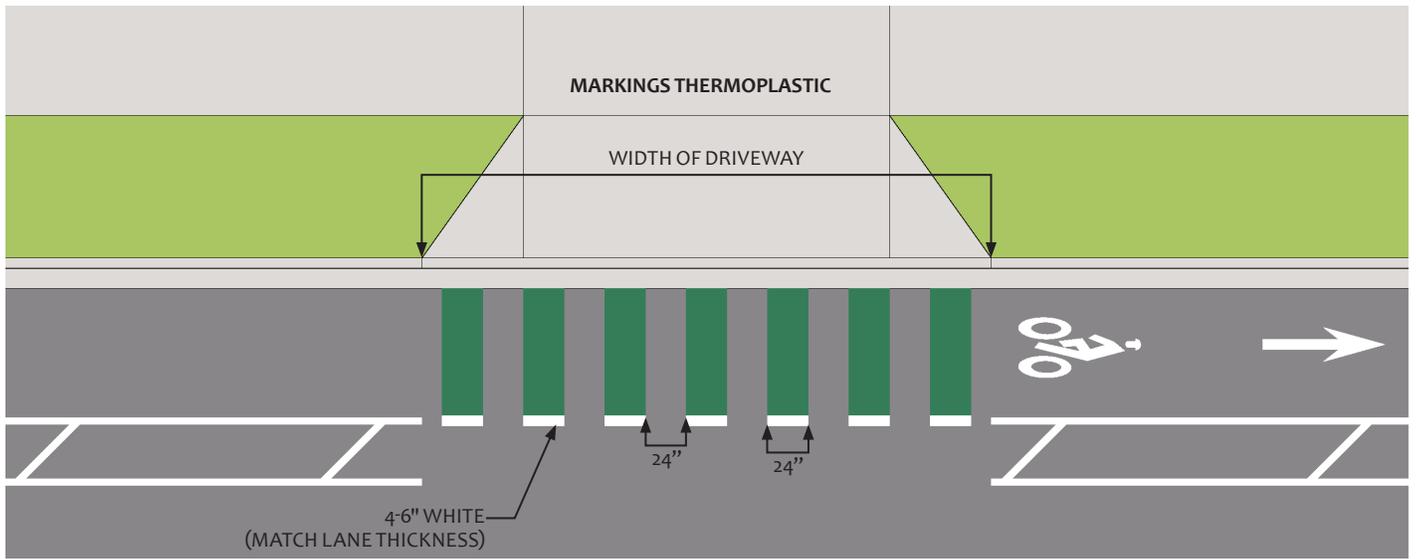
**FIGURE 53: Directional Separated Bike Lane Driveway Crossing**



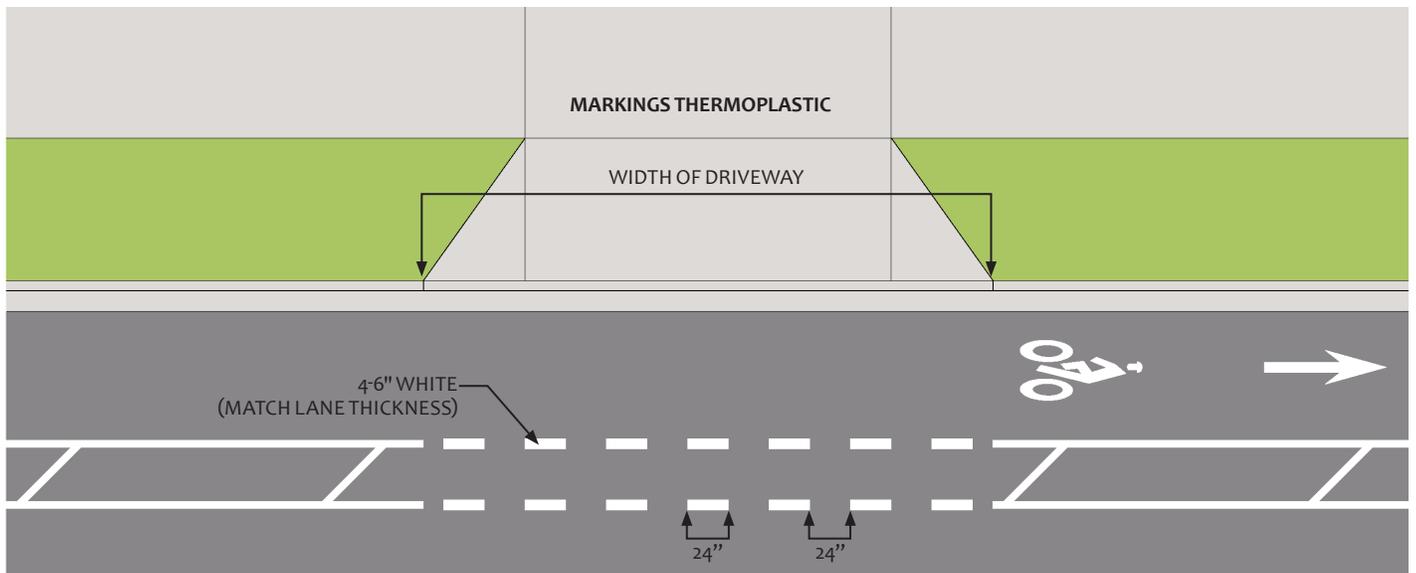
**FIGURE 54: Two-Way Separated Bike Lane Driveway Crossing**



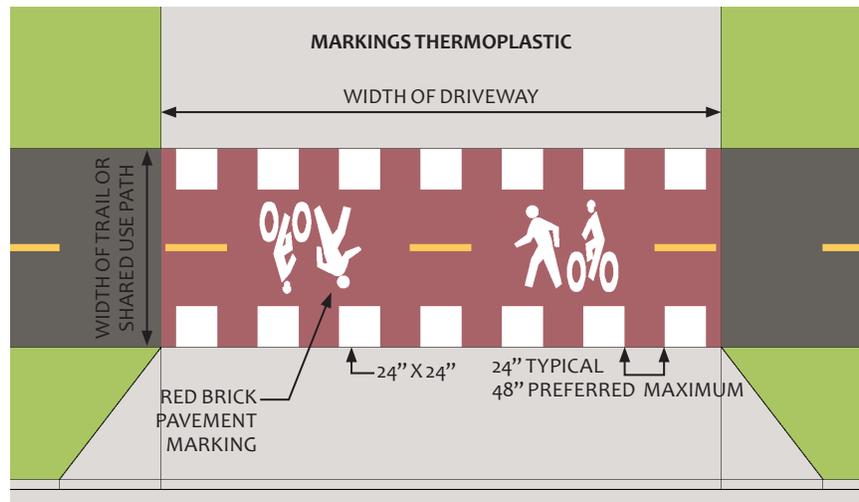
**FIGURE 55: Buffered Bike Lane Driveway Crossing - A**



**FIGURE 56: Buffered Bike Lane Driveway Crossing - B**



**FIGURE 57: Trail or Shared Use Path Driveway Crossing**



## Driveway Guidance

- Supplemental yield lines, otherwise known as shark's teeth, can be used to indicate priority for people bicycling and may be used in advance of unsignalized crossings at driveways, at signalized intersections where motorists may turn across a bicycle crossing during a concurrent phase, and in advance of bicycle crossings located within roundabouts.
- Raised bicycle crossings further promote driver yielding behavior by slowing their speed before the crossing and increasing visibility of people bicycling.
- The bicycle crossing may be bounded by 12-inch (perpendicular) by 24-inch (parallel) white pavement dashes, otherwise known as elephant's feet. Spacing for these markings should be coordinated with zebra, continental, or ladder striping of the adjacent crosswalk.
- The bicycle crossing should be a minimum of 6 feet wide for one-way travel and 10 feet wide for two-way travel, as measured from the outer edge of the elephant's feet. Bicycle lane symbol markings should be avoided in bicycle crossings. Directional arrows are preferred within two-way bicycle crossings.
- Dashed green colored pavement may be utilized within the bicycle crossing to increase the conspicuity of the crossing where permitted conflicts occur. Green color may be desirable at crossings where concurrent vehicle crossing movements are allowed and where sightlines are constrained, or where motor vehicle turning speeds exceed 10 mph.

# Transitions Between Bicycle Facilities

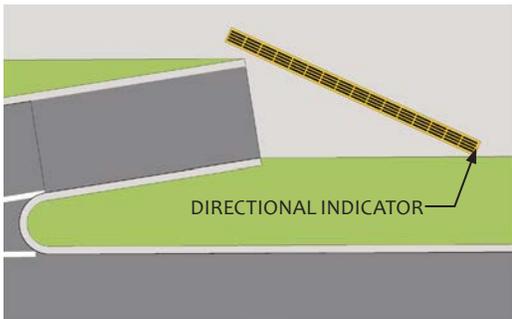
Facility types may vary along a roadway corridor based on land use, parking needs, right-of-way constraints and other characteristics. Additionally, a common or logical route for bicyclists may turn at an intersection. It is important to provide transitions between different types of facilities (e.g., wayfinding signage, pavement markings, turn-queue boxes).

Planning for appropriate connections and transitions between facility types should be conducted as a part of network planning. It is important that facilities have logical termini and a network is planned that serves a range of users. Enhance visibility with green pavement markings and/or bicycle symbols at conflict locations. Two-stage left turn movements can be accommodated using two-stage turn queue boxes. These movements can be easier for some bicyclists to execute. Two-stage left turns may be more comfortable for many bicyclists because the maneuver does not require waiting for gaps in the adjacent same-direction traffic stream before merging laterally to reach a left-turn lane.

**FIGURE 58: Trail to Street-Level Bicycle Lane Transition - A**



**FIGURE 59: Trail to Street-Level Bicycle Lane Transition - B**



## *Guidance for Transitions Between Bicycle Facilities*

---

- Always carry bicycle facilities to a logical terminus. Specifically, designers should avoid abruptly ending facilities without considering transitions and interactions with vehicles.
- At locations where bicycle lanes transition to shared lanes, it may be desirable to provide a transition to a short segment of shared lane markings, even if the shared lane markings will not continue.
- Signage should be provided per recommendations in the latest edition of the MUTCD and AASHTO Guide for the Development of Bicycle Facilities. Pavement markings should alert motorists of the change in facility and intended shared use of travel lanes.
- Taper lengths for lane drops and transitions should follow the MUTCD and AASHTO Green Book recommendations.
- Bicycle boxes and turn-queue boxes should be placed out of vehicle paths and be wide/long enough to support multiple bicyclists queuing at intersections. Bicycle boxes should only be used where a dedicated facility is provided prior to the intersection (e.g., bicycle lane); however, queue boxes may be used at a variety of locations with or without dedicated facilities.

# Bike Parking

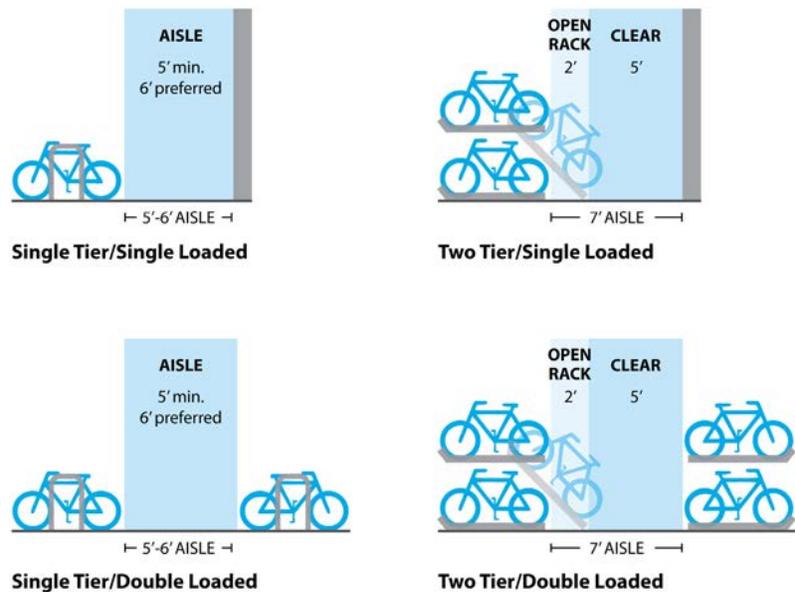
Bicycle parking enhances the usefulness of bicycle networks by providing locations for the secure storage of bicycles during a trip. Bicycle parking enables bicyclists to secure their bicycles while enjoying the offerings of a street or patronizing businesses and destinations in the Town. Bicycle parking requires far less space than automobile parking-- in fact, 10 bicycles can typically park in the area needed for a single car.

Bicycle parking consists of a rack that supports the bicycle upright and provides a secure place for locking. Bicycle racks should be permanently affixed to a paved surface. Movable bicycle racks are only appropriate for temporary use, such as at major community gatherings. On-street bicycle parking is intended for short term use. Bicyclists parking overnight should utilize off-street bicycle parking facilities. Bicyclists typically find a variety of fixed objects in the street to which they lock their bicycles. These include parking meters, tree well fences, lawn fences or other objects. These objects may satisfy the need for bicycle parking, but if this is the intent, they should be be designed and located with this use specifically in mind. The use of such objects for parking may indicate insufficient or inappropriately located bicycle parking facilities, create obstructions in accessible pathways, and/or result in an unsightly and disorganized street frontage.

## Bike Parking Guidance

- Bicycle racks should provide two points of support for bicycles to prevent locked bicycles from falling over.
- Bicycle rack footings can be mounted in soil, concrete, or asphalt, or mounted to stable surfaces using anchors.

**FIGURE 60: Bicycle Parking Recommendations**



## Chapter 5 Sources

1. Federal Highway Administration. *Bikeway Selection Guide*. (2019). [https://safety.fhwa.dot.gov/ped\\_bike/tools\\_solve/docs/fhwas18077.pdf](https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwas18077.pdf)

**This page intentionally left blank.**

# A: *Plan Review*



# Plan Review

The Gibsonville Bicycle Master Plan supports existing planning efforts within the Town of Gibsonville, as well as Alamance and Guilford counties. In addition, the Plan desires to build upon and complement these previous endeavors. This memo summarizes a complete review of previous planning document, including local regulations, market conditions, and plans focused on infrastructure, programs and policies that influence bicycling in Gibsonville. The contextual understanding that this review provides will guide the development of the Plan and ensure that its recommendations are relevant, realistic, and in-touch with community needs.

## Bicycle, Pedestrian, and Transportation Plans

### Gibsonville Comprehensive Pedestrian Plan (2014)

The Comprehensive Pedestrian Plan for the Town of Gibsonville intends to guide future development of pedestrian facilities within the Town and connecting the Town to regional destinations. This Plan envisioned Gibsonville as “a place where pedestrian connectivity and access is provided to downtown, schools, parks, and other recreation destinations; where comprehensive pedestrian design is integrated into all future planning and development; and where active transportation improvements enable residents of Gibsonville to enjoy a high quality of life.” Goals of this Plan included the following:

- Adoption of the Plan
- Provide for a strong, interconnected network of sidewalks
- Develop and implement educational programs
- Identify and prioritize gaps in the pedestrian network
- Revise development regulations to include a sidewalk ordinance
- Increase the quality of sidewalks

As a part of the planning process, a survey of Gibsonville residents was conducted. Key findings relevant to the bicycle planning process include the following:

- Over 60% of respondents felt that “Gibsonville should be a community where

greenway trails are available throughout the community and people can use them to get to important destinations.”

- Nearly 80% of respondents felt that the lack of sidewalks and trails was a major factor discouraging walking in Gibsonville.

While the Plan primarily focuses on pedestrian-specific analyses and recommendations (e.g., sidewalk and ADA accessibility), it does include recommendations that also accommodate people on bicycles. A network of nearly 17 miles of off-street multi-use facilities, including greenways and sidepaths, were proposed throughout Gibsonville. These trails are focused on Gibsonville’s northern boundaries, with few connections into the Town’s commercial core. Proposed trails fall adjacent to the William R Moricle Recreational Complex, Gibsonville Public Library, and John O. Harper Senior Center.

While proposed trails are primarily within town limits or the extraterritorial jurisdiction, multi-use trails are also proposed to make regional connections. Sidepaths are proposed along Burlington Ave/NC 100 to connect the Town to Elon University and along NC 61, NC 100, Burlington Road/US 70, and Springwood Church Road to connect Gibsonville with Burlington. Longer-term connections to Greensboro through multi-use trails or rail-trail projects is also recommended. These are planning-level proposals, and the Plan emphasizes that each corridor and crossing (e.g., waterway, roadway, railroad) will require additional evaluation and feasibility study.

Recommended projects were prioritized according to the following criteria, provided in order of importance according to the weighted score assigned:

- Elementary, middle, and high school proximity (within a ½ mile)
- Direct access to major shopping centers/business areas/downtown
- Reported pedestrian crash location
- Park, library, or recreation center proximity (within a ½ mile)
- Direct access to/from an existing trail or sidewalk
- Low-income area
- High density area
- Existing footpath(s)
- Minority population area
- Top 1-3 recommendations from public

comment

- Connectivity/access to proposed facilities
- Low-vehicle access area

The majority of the top ten priority projects encompassed filling sidewalk gaps, installing ADA-accessible curb ramps and high-visibility crosswalks, and in-road signage at mid-block crossings. No multi-use trail projects were considered high priority.

This Plan also includes program and policy recommendations to encourage walking in Gibsonville, one of which includes the goal of establishing trails as a part of Gibsonville's public infrastructure. The creation of a local pedestrian and bicycle committee was also suggested. A review of the Town's Code of Ordinance is also provided, as well as implementation strategies, funding resources, and design guidelines.

### **Burlington Greenways & Bikeways Plan (2017)**

The purpose of this Plan was to create a connected and comprehensive system of greenways and bikeways that enhance quality of life throughout the City of Burlington. It provides a framework for city staff, elected officials, and local and regional partners. The goals of the Plan focused on enhancing connectivity, creating a positive economic impact, protecting the environment, promoting equity, enhancing health, increasing safety, and increasing livability. An overarching theme from public feedback during the planning process was a desire to increase greenway and bikeway connectivity to local destinations, including downtown Gibsonville. The priority projects proposed in the Plan are as follows:

- Haw River Greenway – connects Town and Country Park with the Haw River
- Burlington-Elon Greenway/Bikeway – connects downtown Burlington with Elon University
- Town and Country Bikeway – connects downtown Burlington with the Town and Country Park, and
- Springwood-Davidson Greenway – Joe C. Davidson Park with Burlington-Springwood Park.

The Springwood-Davidson Greenway is also proposed to connect to the existing shared use path from University Drive to Beth Schmidt Park on Gibsonville's southeastern edge. It is proposed to be 1.7 miles long with an estimated construction cost of \$955,534. The Plan suggests that future greenway

links along Back Creek should be considered to connect the Springwood-Davidson greenway to surrounding neighborhoods.

### **Alamance County Trails Plan (2015)**

Primarily focused on the health and economic benefits of trails, this Plan aimed to guide the County and its municipalities in determining how to best improve the health and quality of life for their community through recreational trail access.

The goals of the Plan were to:

- Link safe places to improve health by increasing the variety of opportunities residents have and providing more off-road venues for physical activity.
- Expand recreation opportunities and improve access, providing outdoor activities for all age groups.
- Protect open space, streams and rivers by allowing people to experience and appreciate open space on designated routes and ensuring that sensitive environmental areas are left open instead of being developed for other more intense uses.
- Support economic development by offering local destinations, attracting people to area recreational opportunities and luring industry with high quality of life for their employees.

Through a survey of Alamance County residents, 68% of respondents stated they had not used a nature trail in the past three months. When asked why, over 15% did not know where the nature trails were located or did not have access to a nature trail. Adding wayfinding and designing trails for people of all ability levels were suggested.

The Plan identified several short-term and long-term goals. Short-term goals (0-4 years) included: extending the Haw River Trail, aiding in the development of Gibsonville's Pedestrian Plan, and identifying opportunities for connections between the communities and the County. Long term goals (5-10 years) included: updating Land Development Plans, updating Bicycle and Pedestrian Plans, connecting the Haw River Trail to municipal parks and trails, and providing trail access at schools.

### **Town of Elon Bicycle, Pedestrian and Lighting Plan (2008)**

This plan identifies and prioritizes proposed improvements to Elon's bicycle, pedestrian, and lighting systems for a 20-year horizon to build a coordinated network of alternative transportation facilities. This plan envisions that "spacious bicycle and pedestrian paths will exist downtown and will also connect with Burlington and Gibsonville encouraging walking, running, and biking throughout Elon and neighboring communities." Plan goals were separated into pedestrian, bicycling, and lighting system goals with the overarching objectives of improving health and air quality, reducing traffic congestion, and improving safety and walkability. Goals specific to bicycling include:

- Provide safe, well-lit places to lock bicycles;
- Provide separated bicycle lanes on major roads and arteries;
- Provide bikeway connections to community parks, shopping, and other destinations, while providing opportunities to exercise;
- Connect the University housing areas with key University academic, athletic, and entertainment anchors;
- Create bicycle paths connecting Elon to Burlington and other outlying areas; and
- Provide safe off-road bicycle paths with adequate lighting.

### **Burlington Graham Metropolitan Planning Organization 2040 Transportation Plan Update (2015)**

This long-range planning document identifies major transportation improvement needs and develops long-term solutions for the next 25 to 30 years. It is a joint effort between the Burlington-Graham MPO and the NCDOT - Transportation Planning Branch. During public involvement efforts, a survey was conducted to understand trip types, modes, and opinions of transportation and environmental issues. 'Walking and biking safely' and 'building sidewalks, crosswalks, and greenways' were identified as 'very important' by 70% and 95% of respondents respectively. Half of those surveyed felt that building bicycle lanes and trails was 'very important' to them. In addition, respondents indicated that most of their trips are between work and home, and they drive their personal vehicle for the majority of the trips they take.

The Plan includes one goal targeted towards people walking and biking, "promote development of an integrated bicycle and pedestrian network." The two

objectives for this goal are as follows:

- Pursue funding for a coordinated and comprehensive network of sidewalks and bicycle routes throughout the Urban Area.
- Improve the transportation system with accommodations to bicycle and pedestrian access.

Bicycle and pedestrian mobility are increasingly becoming of interest to the Burlington-Graham Urban Area. The City of Burlington adopted a Comprehensive Bike Plan in 2012 and the City of Mebane completed a Bike and Pedestrian Plan in 2014. Graham and Gibsonville both adopted Pedestrian Plans (in 2006 and 2014, respectively). In addition, the BGMPO Technical Coordinating Committee highlighted the need for bicycle/pedestrian-related projects that could be tied in with specific TIP projects.

## **Other Surrounding Area Master Plans**

### **Alamance County Recreation & Parks Comprehensive Master Plan (2007)**

The Alamance County Recreation and Parks Comprehensive Master Plan was developed to guide the County's decision-making concerning the park system, as well as identify challenges and opportunities that exist with developing a tourism action plan. Creating bicycle routes is highlighted as being an important consideration in developing future parks sites.

### **Elon University Campus Master Plan Update (2016)**

The Elon University Master Plan Update was conducted to build a community consensus for the future of Elon's campus and set goals for campus development. One of the driving principles highlighted for future development was a Connected and Coherent Campus, which aimed to extend the campus green space, expand the pedestrian activity on campus and locate parking on the campus periphery. The Campus Master Plan identified six core strategies to advance the guiding principles. The following strategies could impact people on bicycles:

- Clarify Road Network – focus on increasing pedestrian safety, campus connectivity and pedestrian accessibility.

- Extend Network of Open Space – focus on linking campus extensions by leveraging pedestrian crossroads and bicycle infrastructure.
- Strengthen and Connect Edge Neighborhoods – focus on pedestrian connectivity between the campus and adjacent neighborhoods.

In addition, the Plan’s implementation chapter suggests parking strategies to accommodate future university growth by relocating parking lots out of the campus core to better facilitate pedestrian activity. Other relevant recommendations include:

- Haggard Avenue Streetscape, which aims to address vehicle-pedestrian conflicts by reducing crossing distance and calming vehicular traffic as it goes through the campus, is identified as a near-term priority.
- Conversion of East College Avenue into a pedestrian path that can accommodate service vehicles is identified as a medium-term project.
- A pedestrian pathway connecting Schar Convocation Center, the Oaks, and downtown Elon is identified as a near-term project.

## Other Gibsonville Plans and Reports

### Marketing Analysis (2019)

Motley Studio, LLC conducted a marketing analysis with the goal of understanding Gibsonville businesses’ level of reach and developing strategies to draw a greater audience to downtown Gibsonville. They found that the town has significant strengths, including proximity to Elon University (5 minutes) and downtown Burlington (10 minutes) while possessing a reachable population of 1.4 million residents within a 25-mile radius. However, the analysis found that businesses were not implementing a unified message promoting all that downtown Gibsonville has to offer. It was recommended to develop a unified marketing campaign to drive foot traffic and retail sales. To supplement the campaign, the following strategies were also suggested: wayfinding, place-based marketing, public art, community-informed business recruitment, and small business workshops. Wayfinding, in particular, has the potential to impact bicycling in Gibsonville. Signage directing people to key destinations could make bicycling in the downtown area a more user-friendly experience.

### Gibsonville Land Development Plan (2001-2021)

This twenty-year document addresses various elements of growth, ranging from community appearance to economic development, with the aims of building community consensus on future development patterns, creating a Land Development Plan to guide future development decisions, and developing goals and policies for major types of development. Ultimately, this Plan is designed as a growth management guide for the community; it is a tool that Town staff, developers, and citizens can use while making development decisions. The Plan’s vision emphasizes Gibsonville’s desire to retain and enjoy its small-town atmosphere. In addition, the Plan envisions a Town Center where community activities are focused and a downtown that attracts new businesses.

The Plan differentiates between “unconnected roads” (e.g., roads on residential subdivisions or commercial development with lower capacity, fewer route choices, longer driving distances, and a single mode of transportation) and a “road network” (e.g., better connected roads that allow for more capacity, more route choices, shorter distances, and multiple modes of transportation). The use of road networks within new subdivisions, commercial centers, and office parks to provide the Town with more transportation options is emphasized. To support the goal of decreasing traffic and congestion, the Plan also encourages mixed-use development, especially within and around the Town Center.

The Plan establishes goals for the following focus areas: water and sewer, economic development, transportation, residential development, commercial and industrial development, parks and recreation, and natural resources and open space. The Transportation goal centers around maximizing roadway capacity to serve the needs of people driving, walking, and bicycling. While most of the objectives and strategies developed to meet this goal are not mode-specific, there are some that would be relevant for Gibsonville’s Bicycle Plan:

- Strategy 5.3A-3: Require alternative transportation modes (sidewalks, greenways, bike paths) to be included in all new developments.
- Objective 5.3B: Explore regional transportation options that will link Gibsonville to neighboring municipalities and commercial

centers.

- Objective 5.3D: Maximize the functionality of the Town's existing road system.

## **Downtown Gibsonville Revitalization Commission Report (2005)**

This report summarizes the work of the Downtown Revitalization Commission, appointed by Mayor Williams to inventory downtown businesses, survey town residents, and recommend changes to revitalize downtown and attract new businesses. The Commission agreed upon principles to guide their recommendations, including the following:

- High priority given to projects that provide the maximum positive impact for the maximum number of Gibsonville residents.
- Projects should enhance and not change the fundamental nature of Gibsonville's small town character.
- Downtown Gibsonville should include a mix of businesses that would appeal to both residents and people loving within a 20-mile radius.
- Prioritize low cost, high impact projects to generate the maximum momentum for the revitalization program.

The Commission surveyed residents and merchants to better understand residents' opinions and attitudes about downtown Gibsonville, as well as the state of merchants' businesses. In addition, focus groups were conducted with Elon University students to discover what would attract them to spend time in Gibsonville.

Eighty-three (83) recommendations were proposed. Overall, the recommendations revolved around creating more housing within walking distance of downtown, gaining more businesses with more variety, hosting more community events, and improving communication with residents and visitors. Recommendations relevant to bicycling in Gibsonville include the following:

- Build a bike shop.
- Establish a yearly bike race or distance running race.
- Provide sidewalk or a bike path on Burlington Street to Cook Road, encourage Elon to add sidewalks to Cook Road as well.
- NCDOT should make a truck route turning

radius analysis to minimize the impact of big (60 foot) trucks driving through downtown. Truck traffic should be discouraged from using downtown, but car traffic should continue to use Main Street.

- Have NCDOT install "Truck Route" sign at Burlington and Cook Road, as well as "140/85" sign pointing to Cook Road. Reroute large trucks off Alamance Road at Cook Road.
- Decide which roads leading to town are the "front door" where we make our first impression to visitors.

## **Gibsonville Market Analysis and Development Strategies (2019)**

A market analysis was conducted for the purpose of developing a dynamic Main Street. This analysis primarily focuses on the Gibsonville Shopping Center, which was vacated by Lowes Grocery Store in 2008. The following principles guided this analysis: 1) maximize existing downtown assets and infrastructure, 2) create a collaborative partnership between Town of Gibsonville, businesses, and property owners, and 3) benchmark performance and promote accountability for a downtown development initiative. Northeast Park, boasting 374 acres of walking, biking, equestrian, and nature trails, was highlighted as an asset unique to the Gibsonville community. Of note, the analysis assessed market gaps based on a 5-, 10-, or 15-minute drive time; the 'walkability' or 'bikeability' of these trips was not included. The Plan's final recommendations suggested using a variety of strategies to increase market demand, traffic and population in and around downtown. Strategies pertinent to bicycling in Gibsonville include the following:

- Wayfinding signage – to direct more traffic to the downtown area;
- Housing – adding more housing, particularly multifamily and other more dense formats; and
- Destination Tourism marketing – to increase traffic and the opportunity to capture more consumer expenditures.

In its Downtown Strategy chapter, the Plan emphasizes the needs to leverage the region's interest in biking and hiking activities with family- and youth-oriented recreation.

# B: *Priority Projects*



**Table 8** outlines all projects separated by facility type (primary bikeway, 2014 Gibsonville Comprehensive Pedestrian Plan greenway trail, and neighborhood connection), as well as by priority level. Once prioritized, projects were broken into different levels of priority based on their overall score.

- **Priority Level 1:** score over 50
- **Priority Level 2:** score between 40 and 50
- **Priority Level 3:** score below 40

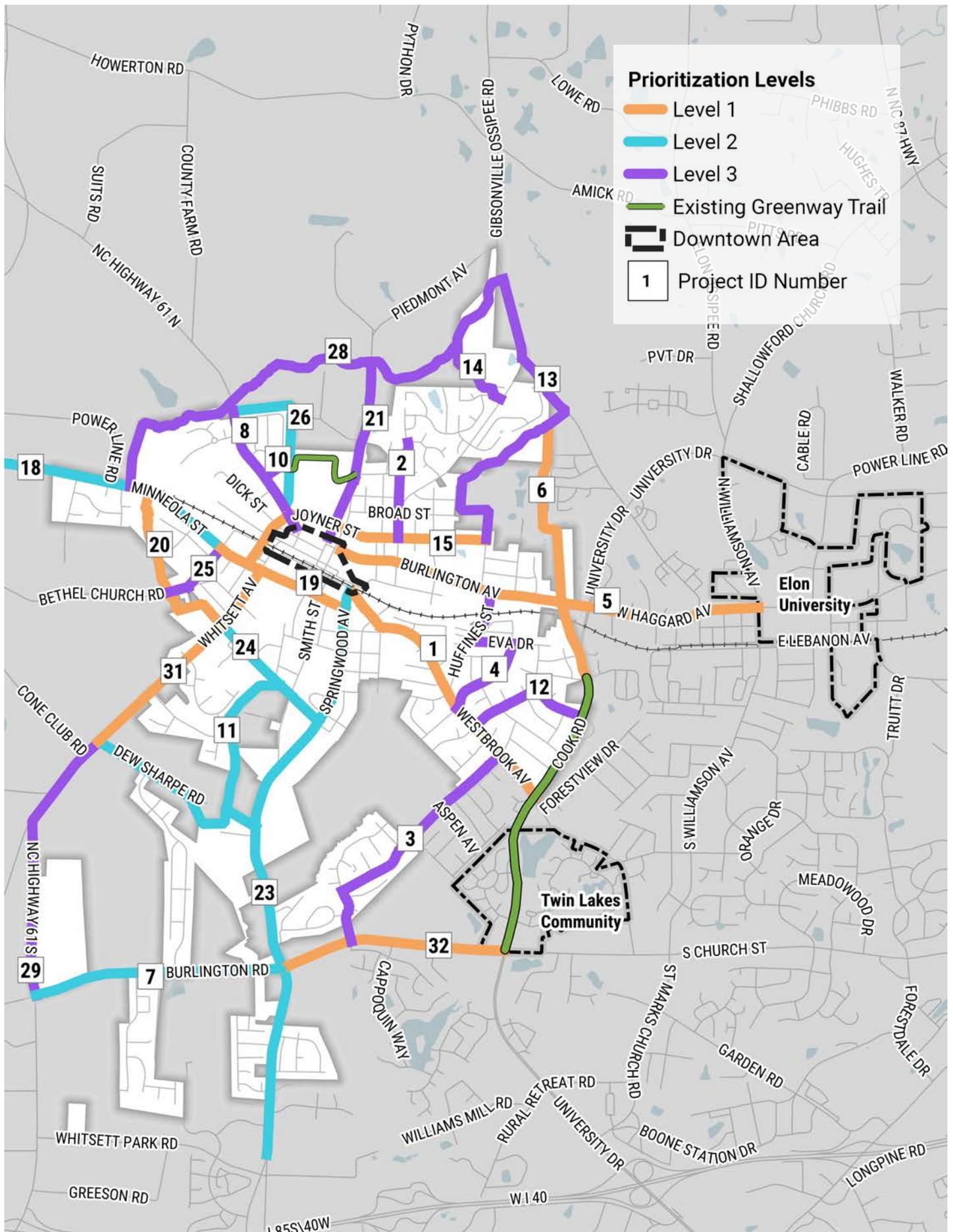
**TABLE 8: Priority Projects**

NAME	PROJECT ID	SCORE
<b>PRIMARY BIKEWAYS</b>		
<b>LEVEL ONE</b>		
Alamance Street/Westbrook Drive	1	62
Whitsett Avenue	31	60
Burlington Avenue	5	52
<b>LEVEL TWO</b>		
Minneola Street Bikeway	18	42
Springwood Church Road	23	43
<b>LEVEL THREE</b>		
Piedmont Avenue/Lewis Street	21	27
Church Street	8	37
<b>PEDESTRIAN PLAN GREENWAY TRAILS</b>		
<b>LEVEL ONE</b>		
Minneola Street/Whitsett Avenue Connector	20	60
Burlington Avenue Connector Trail	6	53
South Church Street Trail	32	52
Timbergate Drive/Moricle Park Connector Trail	26	50
<b>LEVEL TWO</b>		
Dew Sharpe Road/Steele Street/Springwood Avenue Trail	11	48

**TABLE 8: Priority Projects continued**

NAME	PROJECT ID	SCORE
Burlington Road Trail	7	45
<b>LEVEL THREE</b>		
Gibsonville Ossipee Road to Joyner Street Trail	13	40
NC 100 Trail	29	40
Gibsonville Ossipee Road Trail Connector	14	20
West Minneola Street to Gibsonville Ossipee Road Trail	28	37
<b>NEIGHBORHOOD CONNECTIONS</b>		
<b>LEVEL ONE</b>		
Minneola Street Neighborhood Connection	19	70
Joyner Street	15	53
<b>LEVEL TWO</b>		
Steele Street	24	42
<b>LEVEL THREE</b>		
Brookview Drive	3	34
Brown Bark Lane, Eva Drive, and Huffines Street	4	25
Driftwood Drive	12	32
Apple Street	2	28
Church Street/Moricle Park Trail Connector	10	35
Tenth Street Trail Connector	25	35

FIGURE 61: Priority Levels for Gibsonville Bike Plan Network Projects



# C: *Cost Estimates*



The tables on the following pages include detailed probable costs for key bicycle facilities and slow streets design, many of which are included in Chapter 5 of the *Gibsonville Bike Plan*. The costs presented are planning-level estimates for each facility. This table should serve as a just one tool in creating more accurate estimates for construction and design of such projects.

More detailed costs should be calculated at the time of design based on individual project criteria and constraints. Where feasible, costs reflect NCDOT bid unit prices for the Spring of 2020; construction costs should be adjusted for inflation at the time of implementation. Furthermore, estimates do not include any costs for easements, right-of-way acquisition, utility relocation, general roadway improvements, major drainage modifications, or life-cycle maintenance.

**TABLE 9: Probable Cost Assumptions**

ITEM NO.	COST PER LINEAR FOOT ASSUMPTIONS
ITEM 1.0	SAWCUT & REMOVAL: Assume \$1 per LF to remove existing paving for bulb outs, protected bike lane buffers, or new road base construction.
ITEM 2.0	CURB & GUTTER: Assume standard curb and gutter including dirtwork = \$25.00 per LF. Multiply by number of curb/gutters within each street cross section.
ITEM 3.0	PAVEMENT: Assume standard 3" asphalt surface course (\$20/SY), 3.5" binder course (\$20/SY), + 6" base (\$12/SY) + dirtwork (\$1/SF) = \$7 per SF. Multiply by pavement width within each street cross section.
ITEM 3.0A	PAVEMENT OVERLAY: Mill existing surface course and overlay with 1.5" surface course = \$1.5/SF
ITEM 4.0	STRIPING-LINEAR: Assume the cost per LF will include thermoplastic lane lines = \$2 per LF. Multiply by number of stripe lines within each street cross section.
ITEM 4.1	STRIPING-ARROW/SYMBOL/LEGEND: Assume arrow/symbol/legend placement every 200 LF - \$250 each = \$1.25 per LF. Per direction.
ITEM 4.2	CROSSWALK: Assume 2 crosswalks each block per side of street every 400 LF, \$1200 per crosswalk = \$5/LF
ITEM 4.3	DRIVEWAY STRIPING: Hi-visibility thermoplastic, assume 12'x8' every 100', per side of street = \$3/LF
ITEM 5.0	SIDEWALK: Assume a 4" thick concrete sidewalk including dirtwork = \$8.00 per SF. Multiply by the total sidewalk widths within each street cross section.
ITEM 6.0	RAISED BUFFER: Assume concrete median, 6" thick concrete including dirtwork = \$15.00 per LF. Curb and gutter priced separately, see Item 2.0.
ITEM 7.0	DRAINAGE: Assume replacement of trunk line average 24" pipe the length of the improvements. \$70.00/LF for a 24" RCP, where trunk line remains and existing structures are modified use \$10/LF. 1 INLET/100 LF = \$25/LF.
ITEM 8.0	STREET LIGHTS: Assume \$3500 per pedestrian light, spaced at 60' o.c. = \$58.30 per LF. Multiply by the number of rows of pedestrian lights (example: one for each side of street, plus one in the median = 3 rows)
ITEM 9.0	SOD/LANDSCAPE: Assume an average of \$0.50 per SY = approximately \$0.60 per LF. Multiply by the total width of sod/buffer areas within the street cross section.
ITEM 10.0	TREES: Assume \$500 per 4" caliper tree, spaced 30' o.c. Multiply by the number of rows of trees (example: one for each side of street, plus one in the median = 3 rows), due to driveways and intersections, reduce average spacing to 120' o.c., use \$5/LF
ITEM 11.0	IRRIGATION: Assume an average of \$2 per SF = 2.00 per LF. Multiply by the total width of sod/buffer areas within the street cross section.

**TABLE 9: Probable Cost Assumptions continued**

ITEM NO.	COST PER LINEAR FOOT ASSUMPTIONS
ITEM 12.0	TREE WELLS & PLANTERS: Assume \$1500 per tree grate spaced at 30' o.c. = \$50 per LF. Assume 24' long x 6' wide area of pavers between grates = 144 SF at \$6 per SF every 30 LF = \$28.80 per LF. \$50/LF tree grates + \$28.80/LF pavers = \$78.80 or \$79 per LF.
ITEM 13.0	PAVERS: VEHICULAR
ITEM 14.0	PAVERS: PEDESTRIAN
ITEM 15.0	WAYFINDING SIGNAGE: Assume \$600 per sign, every 200' = \$3/LF per one direction of travel (1 direction of travel = 1 row)
ITEM 15.1	SIGNAGE: Assume \$350 per sign, every 200' = \$1.75/LF per one direction of travel (1 direction of travel = 1 row)
ITEM 15.2	TRAFFIC SIGNAL: Assume \$20k in signal mods., every 1000' = \$ /LF per one direction of travel
ITEM 16.0	TRAFFIC CALMING: Assume \$20,000/400 LF = \$50 per LF, treatments every block. Multiply ROWS for every half block, etc.
ITEM 17.0	CLEARING & GRUBING+ GRADING: Assume \$50,000/MI
ITEM 18.0	EROSION CONTROL: Assume \$12/LF

**Notes:**

- 1) right of way acquisition & utility relocation costs are not included
- 2) costs do not assume full street reconstruction
- 3) directional and two-way SBL assumes retrofit and no additional pavement overlay
- 4) directional and two-way SBL assumes reconstruction of drainage mainline, single side of street
- 5) shared slow street striped assumes widening of sidewalks and 5' of landscape with trees
- 6) directional SBLs to use ex. ped signals, new sign mods. at two-way SBLs

The slow streets preliminary cost estimates included the following streets:

- Main Street (Whitsett Avenue to Burke Street)
- Burlington Avenue (Lewis Street to Piedmont Avenue)
- Piedmont Avenue (Burlington Avenue to Burke Street)
- Lewis Street (Burlington Avenue to Main Street)

**TABLE 10: Slow Streets Probable Cost Summary**

<b>PROJECT</b>	<b>TOTAL APPROXIMATE COST</b>	<b>LOW (-25%)</b>	<b>HIGH (+25%)</b>
Short-Term Downtown	\$463,000	\$347,250	\$578,750
Long-Term Downtown	\$2,068,000	\$1,551,000	\$2,585,000

**TABLE 11: Short-Term Slow Streets Probable Cost**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
	Mobilization & Demobilization	1	LS	\$35,609	\$35,609
	Traffic Control	1	LS	\$14,131	\$14,131
	Erosion Control	1	LS	\$2,798	\$2,798
	Removal of Pavement Marking Lines (4")	6833	LF	\$2	\$13,665
	Thermoplastic Pavement Marking (Symbol)	34	EA	\$250	\$8,500
	Thermoplastic Pavement Marking, White (8")	1010	LF	\$4	\$4,040
	Thermoplastic Pavement Marking, White (24")	1497	LF	\$20	\$29,940
	Thermoplastic Pavement Marking, White (4")	4100	LF	\$2	\$8,200
	Thermoplastic Pavement Marking, Yellow (4")	5010	LF	\$2	\$10,020
SP	Epoxy Gravel, Tan Marking (Bulbouts)	7300	SF	\$20	\$146,000
SP	Thermoplastic Pavement Marking, Sienna (Truck Apron)	3500	SF	\$15	\$52,500
	Flexible Delineators	0	EA	\$125	\$0
SP	Speed Hump (6') (Treetop or Approved Equiv.)	14	EA	\$175	\$2,450 <sup>1</sup>
	Furnish and Install Sign with Support	15	EA	\$300	\$4,500
<b>SUB-TOTAL ITEMS</b>					<b>\$332,353</b>
	Construction Survey			5%	\$16,700
	Engineering				\$30,000
	ROW Acquisition			0%	\$0
	Construction Contingency			25%	\$83,100
<b>TOTAL COST ESTIMATE</b>					<b>\$463,000</b>

**Notes:**

1) two per apron+ 10 for centerlines

**Assumptions:**

- Striping is assumed to be thermoplastic.

- Truck aprons are assumed to be colored thermoplastic.
- Tan buffer zones are assumed to be epoxy gravel.
- No curb line adjustments or curb ramp/ sidewalk improvements are assumed.

**TABLE 12: Long-Term Slow Streets Probable Cost**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
	Mobilization & Demobilization	1	LS	\$158,032	\$158,032
	Traffic Control	1	LS	\$61,521	\$61,521
	Clearing & Grubbing	1	LS	\$57,730	\$57,730 <sup>1</sup>
	Erosion Control	1	LS	\$23,092	\$23,092
	Misc. Removals	1	LS	\$20,000	\$20,000
	R&D Asphalt Pavement	1200	SY	\$10	\$12,000
	Curb	310	LF	\$22	\$6,820 <sup>2</sup>
	24" Curb and Gutter	7000	LF	\$27	\$189,000
	Concrete Sidewalk	1497	SY	\$70	\$104,767
	Concrete Driveway (6")	222	SY	\$75	\$16,667 <sup>3</sup>
SP	Stamped Concrete	303	SY	\$175	\$53,083 <sup>4</sup>
	Pavement Milling	4672	SY	\$7	\$32,706
	Asphalt Conc Base Course, Type B25.0C	800	TON	\$70	\$56,000
	Asphaly Conc Intermediate Course, Type I19.0C	270	TON	\$90	\$24,300
	Asphalt Conc Surface Course, Type S9.5B	660	TON	\$100	\$66,000
	Asphalt Binder for Plant Mix	90	TON	\$650	\$58,500
	Thermoplastic Pavement Marking (Symbol)	34	EA	\$250	\$8,500
	Thermoplastic Pavement Marking, White (8")	1010	LF	\$4	\$4,040
	Thermoplastic Pavement Marking, White (24")	1497	LF	\$20	\$29,940
	Thermoplastic Pavement Marking, White (4")	4100	LF	\$2	\$8,200
	Thermoplastic Pavement Marking, Yellow (4")	5010	LF	\$2	\$10,020
	Furnish and Install Sign with Support	20	EA	\$300	\$6,000
	Drainage Allowance	1	LS	\$200,000	\$200,000

**TABLE 12: Long-Term Slow Streets Probable Cost continued**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
	4" Topsoil Placement	0	SY	\$8	\$0
	Landscape	10800	SF	\$4	\$43,200 <sup>5</sup>
	Light Shrubs + Landscaping	0	SF	\$7	\$0
	Sodded Lawn	0	SY	\$6	\$0
	Trees (min 3" caliper)	18	EA	\$1,200	\$21,600
SP	Site Furnishings: Seating, Trash, Drinking Fountainsment	1	LS	\$100,000	\$100,000 <sup>6</sup>
SP	Utility Allowance	1	LS	\$75,000	\$75,000
SP	Street Light Fixture, Pole & Foundation	5	EA	\$5,000	\$25,000 <sup>7</sup>
<b>SUB-TOTAL ITEMS</b>					<b>\$1,474,968</b>
	Construction Survey			5%	\$73,800
	Engineering				\$150,000
	ROW Acquisition			0%	\$0
	Construction Contingency			25%	\$368,800
<b>TOTAL COST ESTIMATE</b>					<b>\$2,068,000</b>

**Notes:**

- 1) heavier for grading, pavement adjustments
- 2) landscape/at aprons
- 3) assume 10 driveways re-configured
- 4) padding for higher quality
- 5) higher quality, could reduce as needed.
- 6) park area
- 7) add park area

**Assumptions:**

- Striping is assumed to be thermoplastic.
- Truck aprons are assumed to be stamped concrete.
- Tan buffer zones are assumed to be epoxy gravel.
- Existing drainage inlets and curb & gutter to remain, outside of adjustments at curb extensions.
- A 2' Pavement sawcut is assumed at curb extensions.
- Assumes a mill and overlay for the project extents.
- Assumes a majority of streets, adding or replacing with curb & gutter.
- Temporary paint on new pavement is assumed to be included in permanent thermo costs.

**TABLE 13: Greenway Probable Cost**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST/ FOOT
4.0	Striping - Linear	1.0	ROWS	\$2.00	\$2.00
4.3	Driveway Striping	1.0	ROWS	\$3.00	\$3.00
5.0	Sidewalk / Side Path / Paved Trail	12.0	WIDTH	\$8.00	\$96.00
9.0	Sod / Landscape	4.0	WIDTH	\$0.60	\$2.40
10.0	Trees	2.0	ROWS	\$5.00	\$10.00
11.0	Irrigation	4.0	WIDTH	\$2.00	\$8.00
15.1	Signage	2.0	ROWS	\$1.75	\$3.50
17.0	Clearing & Grubbing + Grading	1.0	ROWS	\$10.00	\$10.00
18.0	Erosion Control	1.0	ROWS	\$12.00	\$12.00
			Traffic Control	3%	\$4.41
			Mobilization	8%	\$12.10
			Contingency	25%	\$40.85
			Engineering	12%	\$24.51
<b>COST PER LINEAR FOOT OF STREET</b>					<b>\$ 229</b>

**TABLE 14: Shared Use Paved Trail Probable Cost**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST/ FOOT	
1.0	Sawcut & Removal	1.0	WIDTH	\$1.00	\$1.00	
2.0	Curb & Gutter	1.0	ROWS	\$25.00	\$25.00	
4.0	Striping - Linear	1.0	ROWS	\$2.00	\$2.00	
4.2	Crosswalk	2.0	ROWS	\$6.00	\$12.00	
4.3	Driveway Striping	1.0	ROWS	\$3.00	\$3.00	
5.0	Sidewalk / Side Path / Paved Trail	12.0	WIDTH	\$8.00	\$96.00	
9.0	Sod / Landscape	4.0	WIDTH	\$0.60	\$2.40	
10.0	Trees	2.0	ROWS	\$5.00	\$10.00	
11.0	Irrigation	4.0	WIDTH	\$2.00	\$8.00	
15.1	Signage	2.0	ROWS	\$1.75	\$3.50	
17.0	Clearing & Grubbing + Grading	1.0	ROWS	\$10.00	\$10.00	
18.0	Erosion Control	1.0	ROWS	\$12.00	\$12.00	
				Traffic Control	3%	\$5.55
				Mobilization	8%	\$15.24
				Contingency	25%	\$51.42
				Engineering	12%	\$30.85
<b>COST PER LINEAR FOOT OF STREET</b>					<b>\$ 288</b>	

**TABLE 15: Shared Use Paved Trail (Constrained) Probable Cost**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST/ FOOT	
1.0	Sawcut & Removal	1.0	WIDTH	\$1.00	\$1.00	
2.0	Curb & Gutter	1.0	ROWS	\$25.00	\$25.00	
4.0	Striping - Linear	1.0	ROWS	\$2.00	\$2.00	
4.2	Crosswalk	2.0	ROWS	\$6.00	\$12.00	
4.3	Driveway Striping	1.0	ROWS	\$3.00	\$3.00	
5.0	Sidewalk / Side Path / Paved Trail	10.0	WIDTH	\$8.00	\$80.00	
9.0	Sod / Landscape	2.5	WIDTH	\$0.60	\$1.50	
11.0	Irrigation	2.5	WIDTH	\$2.00	\$5.00	
15.1	Signage	2.0	ROWS	\$1.75	\$3.50	
17.0	Clearing & Grubbing + Grading	1.0	ROWS	\$10.00	\$10.00	
18.0	Erosion Control	1.0	ROWS	\$12.00	\$12.00	
				Traffic Control	3%	\$4.65
				Mobilization	8%	\$12.77
				Contingency	25%	\$43.11
				Engineering	12%	\$25.86
<b>COST PER LINEAR FOOT OF STREET</b>					<b>\$ 242</b>	

**TABLE 16: Directional Separated Bike Lane Probable Cost**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST/FOOT	
1.0	Sawcut & Removal	8.0	WIDTH	\$1.00	\$8.00	
2.0	Curb & Gutter	6.0	ROWS	\$25.00	\$150.00	
3.0	Pavement	2.0	WIDTH	\$7.00	\$14.00	
4.0	Striping - Linear	4.0	ROWS	\$2.00	\$8.00	
4.1	Striping - Arrow/Symbol/Legend	2.0	ROWS	\$1.25	\$2.50	
4.2	Crosswalk	2.0	ROWS	\$6.00	\$12.00	
4.3	Driveway Striping	2.0	ROWS	\$3.00	\$6.00	
5.0	Sidewalk / Sidepath / Paved Trail	13.0	WIDTH	\$8.00	\$104.00	
6.0	Raised Separated Bike Lane Buffer	2.0	ROWS	\$15.00	\$30.00	
7.0	Drainage	1.0	ROWS	\$70.00	\$70.00	
9.0	Sod/Landscape	4.0	WIDTH	\$0.60	\$2.40	
10.0	Trees	1.0	ROWS	\$5.00	\$5.00	
11.0	Irrigation	4.0	WIDTH	\$2.00	\$8.00	
15.1	Signage	2.0	ROWS	\$1.75	\$3.50	
17.0	Clearing & Grubbing + Grading	1.0	ROWS	\$10.00	\$10.00	
18.0	Erosion Control	1.0	ROWS	\$12.00	\$12.00	
				Traffic Control	3%	\$13.36
				Mobilization	8%	\$36.70
				Contingency	25%	\$123.87
				Engineering	12%	\$74.32
<b>COST PER LINEAR FOOT OF STREET</b>					<b>\$694</b>	

**TABLE 17: Directional Separated Bike Lane (Constrained) Probable Cost**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST/FOOT	
1.0	Sawcut & Removal	8.0	WIDTH	\$1.00	\$8.00	
2.0	Curb & Gutter	6.0	ROWS	\$25.00	\$150.00	
3.0	Pavement	2.0	WIDTH	\$7.00	\$14.00	
4.0	Striping - Linear	4.0	ROWS	\$2.00	\$8.00	
4.1	Striping - Arrow/Symbol/Legend	2.0	ROWS	\$1.25	\$2.50	
4.2	Crosswalk	2.0	ROWS	\$6.00	\$12.00	
4.3	Driveway Striping	2.0	ROWS	\$3.00	\$6.00	
5.0	Sidewalk / Sidepath / Paved Trail	10.0	WIDTH	\$8.00	\$80.00	
6.0	Raised Separated Bike Lane Buffer	2.0	ROWS	\$15.00	\$30.00	
7.0	Drainage	1.0	ROWS	\$70.00	\$70.00	
9.0	Sod/Landscape	4.0	WIDTH	\$0.60	\$2.40	
10.0	Trees	1.0	ROWS	\$5.00	\$5.00	
11.0	Irrigation	4.0	WIDTH	\$2.00	\$8.00	
15.1	Signage	2.0	ROWS	\$1.75	\$3.50	
17.0	Clearing & Grubbing + Grading	1.0	ROWS	\$10.00	\$10.00	
18.0	Erosion Control	1.0	ROWS	\$12.00	\$12.00	
				Traffic Control	3%	\$12.64
				Mobilization	8%	\$34.72
				Contingency	25%	\$117.19
				Engineering	12%	\$70.31
<b>COST PER LINEAR FOOT OF STREET</b>					<b>\$657</b>	

**TABLE 18: Two-Way Separated Bike Lane Probable Cost**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST/FOOT	
1.0	Sawcut & Removal	8.0	WIDTH	\$1.00	\$8.00	
2.0	Curb & Gutter	3.0	ROWS	\$25.00	\$75.00	
3.0	Pavement	1.0	WIDTH	\$7.00	\$7.00	
4.0	Striping - Linear	4.0	ROWS	\$2.00	\$8.00	
4.1	Striping - Arrow/Symbol/Legend	2.0	ROWS	\$1.25	\$2.50	
4.2	Crosswalk	2.0	ROWS	\$6.00	\$12.00	
4.3	Driveway Striping	1.0	ROWS	\$3.00	\$3.00	
5.0	Sidewalk / Sidepath / Paved Trail	12.0	WIDTH	\$8.00	\$96.00	
6.0	Raised Separated Bike Lane Buffer	1.0	ROWS	\$15.00	\$15.00	
7.0	Drainage	1.0	ROWS	\$70.00	\$70.00	
9.0	Sod/Landscape	4.0	WIDTH	\$0.60	\$2.40	
10.0	Trees	1.0	ROWS	\$5.00	\$5.00	
11.0	Irrigation	4.0	WIDTH	\$2.00	\$8.00	
15.1	Signage	2.0	ROWS	\$1.75	\$3.50	
15.2	Traffic Signals	1.0	ROWS	\$20.00	\$20.00	
17.0	Clearing & Grubbing + Grading	1.0	ROWS	\$10.00	\$10.00	
18.0	Erosion Control	1.0	ROWS	\$12.00	\$12.00	
				Traffic Control	3%	\$10.54
				Mobilization	8%	\$28.96
				Contingency	25%	\$97.72
				Engineering	12%	\$58.63
<b>COST PER LINEAR FOOT OF STREET</b>					<b>\$548</b>	

**TABLE 19: Two-Way Separated Bike Lane (Constrained) Probable Cost**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST/FOOT
1.0	Sawcut & Removal	2.0	WIDTH	\$1.00	\$2.00
2.0	Curb & Gutter	3.0	ROWS	\$25.00	\$75.00
3.0	Pavement	1.0	WIDTH	\$7.00	\$7.00
4.0	Striping - Linear	4.0	ROWS	\$2.00	\$8.00
4.1	Striping - Arrow/Symbol/Legend	2.0	ROWS	\$1.25	\$2.50
4.2	Crosswalk	2.0	ROWS	\$6.00	\$12.00
4.3	Driveway Striping	1.0	ROWS	\$3.00	\$3.00
5.0	Sidewalk / Sidepath / Paved Trail	10.0	WIDTH	\$8.00	\$80.00
6.0	Raised Separated Bike Lane Buffer	1.0	ROWS	\$15.00	\$15.00
7.0	Drainage	1.0	ROWS	\$70.00	\$70.00
9.0	Sod/Landscape	2.5	WIDTH	\$0.60	\$1.50
10.0	Trees	1.0	ROWS	\$5.00	\$5.00
11.0	Irrigation	2.5	WIDTH	\$2.00	\$5.00
15.1	Signage	2.0	ROWS	\$1.75	\$3.50
15.2	Traffic Signals	1.0	ROWS	\$20.00	\$20.00
17.0	Clearing & Grubbing + Grading	1.0	ROWS	\$10.00	\$10.00
18.0	Erosion Control	1.0	ROWS	\$12.00	\$12.00
			Traffic Control	3%	\$9.95
			Mobilization	8%	\$27.32
			Contingency	25%	\$92.19
			Engineering	12%	\$55.31
<b>COST PER LINEAR FOOT OF STREET</b>					<b>\$517</b>

**TABLE 20: Buffered Bike Lanes Probable Cost**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST/ FOOT	
4.0	Striping - Linear	7.0	ROWS	\$2.00	\$14.00	
4.1	Striping - Arrow/Symbol/Legend	2.0	ROWS	\$1.25	\$2.50	
4.2	Crosswalk	2.0	ROWS	\$6.00	\$12.00	
4.3	Driveway Striping	2.0	ROWS	\$3.00	\$6.00	
15.0	Wayfinding Signage	2.0	ROWS	\$3.00	\$6.00	
				Traffic Control	3%	\$1.22
				Mobilization	8%	\$3.34
				Contingency	25%	\$11.26
				Engineering	12%	\$6.76
<b>COST PER LINEAR FOOT OF STREET</b>					<b>\$64</b>	

**TABLE 21: Directional Bike Lanes Probable Cost**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST/ FOOT	
4.0	Striping - Linear	4.0	ROWS	\$2.00	\$8.00	
4.1	Striping - Arrow/Symbol/Legend	2.0	ROWS	\$1.25	\$2.50	
4.2	Crosswalk	2.0	ROWS	\$6.00	\$12.00	
4.3	Driveway Striping	2.0	ROWS	\$3.00	\$6.00	
15.0	Wayfinding Signage	2.0	ROWS	\$3.00	\$6.00	
				Traffic Control	3%	\$1.04
				Mobilization	8%	\$2.84
				Contingency	25%	\$9.59
				Engineering	12%	\$5.76
<b>COST PER LINEAR FOOT OF STREET</b>					<b>\$54</b>	

**TABLE 22: Neighborhood Greenway/Bikeway Probable Cost**

ITEM CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST/FOOT	
4.0	Striping - Linear	2.0	ROWS	\$2.00	\$4.00	
4.1	Striping - Arrow/Symbol/Legend	2.0	ROWS	\$1.25	\$2.50	
4.2	Crosswalk	2.0	ROWS	\$6.00	\$12.00	
15.0	Wayfinding Signage	2.0	ROWS	\$3.00	\$6.00	
15.1	Signage	2.0	ROWS	\$1.75	\$3.50	
16.0	Traffic Calming	1.0	ROWS	\$50.00	\$50.00	
				Traffic Control	3%	\$2.34
				Mobilization	8%	\$6.43
				Contingency	25%	\$21.69
				Engineering	12%	\$13.02
<b>COST PER LINEAR FOOT OF STREET</b>					<b>\$ 122</b>	

**TABLE 23: Traffic Calming Probable Cost**

ITEM CODE	DESCRIPTION	UNIT	UNIT COST
1.0	Raised Intersection	EA	\$168,000
2.0	Mid-Block Crossing	EA	\$20,000
3.0	Curb Extension	EA	\$78,000
4.2	Pedestrian Signals (One Crossing)	EA	\$23,000
4.4	Raised Crossing	EA	\$47,000
4.5	Chicane	EA	\$13,000
4.6	Neighborhood Traffic Circle	EA	\$43,000
4.7	Pedestrian Median Refuge	EA	\$18,000
5.0	Standard Crosswalk	EA	\$400
7.0	Hi-Visibility Crosswalk	EA	\$1,500

**This page intentionally left blank.**

