Thank you to the hundreds of local residents, community leaders, and government staff that participated in the development of this plan through meetings, interactive maps, public webinars, comment forms, and plan review. Special thanks to those who participated as Steering Committee members, and as members of Winston-Salem’s Bicycle/Pedestrian/Active Mobility Advisory Committee (BPAMAC), listed below.

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<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
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<tbody>
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<td>Ginger Wilkins</td>
<td>Safe Kids Coalition NW Piedmont</td>
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EXECUTIVE SUMMARY

BACKGROUND AND PURPOSE (CHAPTER 1)

The Winston-Salem Pedestrian Plan, or Walkable Winston-Salem, builds on past efforts to create a new vision for walking throughout the City. The plan will be used by the City of Winston-Salem to prioritize, fund, and implement high-quality pedestrian infrastructure, with supportive programs and policies for walking.

Walkable Winston-Salem builds from a citywide goal identified in Legacy 2030 (Winston-Salem’s Comprehensive Plan), which calls for, “a balanced and sustainable transportation system linking highways, transit, greenways, bikeways, and sidewalks into a seamless transportation network that provides choices for people’s travel needs.”

This plan focuses on the pedestrian aspects of that goal, including recommendations for sidewalks, crosswalks, greenway trails, and similar features. The purpose of Walkable Winston-Salem is to improve the safety, accessibility, and comfort of walking routes throughout the City, for everyday trips and recreational trips alike.

PLAN VISION

Winston-Salem is walkable for all, through a connected, accessible, safe sustainable network of sidewalks and trails that improve the health and well-being of Winston-Salem’s people, economy, and environment.

PLAN GOALS

- Enhance Health
- Enhance Connectivity, Mobility, and Accessibility
- Increase Safety
- Protect the Environment
- Create a Positive Economic Impact
- Promote Equity
- Increase Livability
- Protect the Environment

PLANNING PROCESS

- Online Public Input Map
  - 646 Public Comments
- Public Input from Past Plans
  - 22 Plans Reviewed
- July & Nov 2020 Public Webinars
- Virtual Meetings/Webinars
- Strategic Outreach/Interviews
- Targeted Stakeholder Interviews/Presentations
- Public Surveys & Project Postcards
- Draft Plan Outreach
EXISTING CONDITIONS ANALYSIS HIGHLIGHTS (CHAPTER 2)

An extensive series of analyses were conducted to understand Winston-Salem’s existing pedestrian network and focus future resources in parts of the City that need them most. Existing conditions analyses included reviewing past plans, gathering public input, evaluating commute trends, mapping current and historic areas of inequity, calculating areas of demand, evaluating crash data, and recording existing and in-development pedestrian projects. These inputs were used as the foundation of a data-driven process that can be used to prioritize future pedestrian projects throughout Winston-Salem. Below are a few examples of the analyses reviewed later in the Plan.

**Demand Analysis**

**Pedestrian Collision Clusters**

**Equity and Pedestrian Collisions**
### PRIORITY SCORING (CHAPTER 3)

<table>
<thead>
<tr>
<th>Plan Goal</th>
<th>Plan Objective</th>
<th>Score Input</th>
<th>Possible Points</th>
<th>Max Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promote Equity</td>
<td>Prioritize investment in areas with the greatest historic underinvestment in pedestrian infrastructure and with historically under-served populations where need may be higher.</td>
<td>Equity analysis results 1.6-8</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Enhance Connectivity, Mobility, and Accessibility</td>
<td>Complete and maintain a pedestrian network, providing better connectivity, ensuring accessibility for people of all ages and abilities.</td>
<td>Each school or library within 1/4 mile +2, Each school or library within 1/4 mile to 1/2 mile +1, Each university within 1/4 mile +5, Each university within 1/2 mile +3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Increase Safety</td>
<td>Protect the public safety and personal security of people walking.</td>
<td>Each crash on segment +1, Any fatality along segment +7, Street classification of Collector or above +3</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Increase Livability, Create a Positive Economic Impact</td>
<td>Establish a strategic prioritization process that commits to funding pedestrian network improvements and existing sidewalk maintenance in the most critical locations.</td>
<td>Demand analysis results 1-5, Segment is along a top 10 transit route (by ridership) +5, Segment has a transit stop +3, Each public comment or support vote +1, Project proposed in adopted plan + 2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Enhance Health, Protect the Environment</td>
<td>Improve the health of residents and the environment by getting more people walking for their transportation, recreation, and daily needs through policies, programs, and projects.</td>
<td>Each park, greenway, or recreation center within 1/4 mile +2, Each park, greenway, or recreation center within 1/2 mile +1</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

**Maximum Score** 40
PRIORITY RESULTS (CHAPTER 3)
Walkable Winston-Salem, Winston-Salem’s Pedestrian Plan, is an update of the 2007 Sidewalk and Pedestrian Facilities Plan. Since 2007, the City has implemented new policies and projects to make Winston-Salem more walkable. However, despite this, significant network gaps remain and new policy questions have emerged. This new plan will be used by the City of Winston-Salem to prioritize, fund, and implement high-quality pedestrian infrastructure, with supportive programs and policies for walking.

Walkable Winston-Salem builds from a citywide goal identified in Legacy 2030 (Winston-Salem’s Comprehensive Plan), which calls for, “a balanced and sustainable transportation system linking highways, transit, greenways, bikeways, and sidewalks into a seamless transportation network that provides choices for people’s travel needs.” In addition, the Winston-Salem Urban Area MPO 2040 Metropolitan Transportation Plan identified key goals and objectives, including the following objective for bicycle and pedestrian transportation:

“Create a safe and effective bikeway/sidewalk/greenway network that is integral to the transportation system, links together resources and destinations, provides an alternative to automobile travel, increases recreational opportunities, and advances healthy lifestyles and quality of life.”
**PLANNING PROCESS**
The planning process began in February 2020 and continued through early 2021. The graphic below illustrates the breadth of analysis and stakeholder input that came together to form a dynamic and representative plan for the City of Winston-Salem.
PLAN VISION, GOALS, AND OBJECTIVES

The Walkable Winston-Salem vision, goals, and objectives guide every aspect of the Plan. The framework provides a foundation for the Plan’s needs analysis, prioritization process, implementation strategies, and performance measures. The vision, goals, and objectives were developed with input from the project’s steering committee.

PLAN VISION

Winston-Salem is walkable for all, through a connected, accessible, safe sustainable network of sidewalks and trails that improve the health and well-being of Winston-Salem’s people, economy, and environment.

PLAN GOALS

- Enhance Health
- Increase Safety
- Promote Equity
- Create a Positive Economic Impact
- Enhance Connectivity, Mobility, and Accessibility
- Protect the Environment
- Increase Livability
Complete and maintain a pedestrian network, providing better connectivity, ensuring accessibility for people of all ages and abilities.

Prioritize investment in areas with the greatest historic underinvestment in pedestrian infrastructure and with historically under-served populations where need may be higher.

Protect the public safety and personal security of people walking.

Make walking an inviting, attractive, and enjoyable experience through sound design.

Establish a strategic prioritization process that commits to funding pedestrian network improvements and existing sidewalk maintenance in the most critical locations.

Improve the health of residents and the environment by getting more people walking for their transportation, recreation, and daily needs through policies, programs, and projects.
WHY IS WALKING IMPORTANT?

HEALTH BENEFITS
Sidewalks and greenways offer safe and accessible opportunities for physical activity. People who utilize pedestrian facilities are able to connect with places that they want or need to go.

33% ADULT OBESITY in Forsyth County (compared with 30% for the state of North Carolina)

23% Adults are PHYSICALLY INACTIVE in Forsyth County (compared with 23% for the state of North Carolina)


Every 0.6 MILES WALKED = 5% REDUCTION IN THE LIKELIHOOD OF OBESITY. Frank, 2004

THOSE WHO ARE PHYSICALLY ACTIVE GENERALLY LIVE LONGER and have a lower risk for heart disease, stroke, Type 2 diabetes, depression, some cancers, and obesity. CDC, 2015

20 MINUTES walking or biking each day is associated with a

21% LOWER RISK OF HEART FAILURE FOR MEN &

29% LOWER RISK FOR WOMEN Rahman, 2014 and 2015
ENVIRONMENTAL BENEFITS

Decreasing reliance on automobiles and reducing congestion by utilizing sidewalks and trails will lead to improved air quality. Trails and greenways serve as a tool for conserving open space and preserving wetlands.

AIR QUALITY IN WINSTON-SALEM

107 BAD-AIR DAYS (the worst in North Carolina)

One of 89 metro areas in the U.S. that had MORE THAN 100 DAYS OF DEGRADED AIR QUALITY

3 months/year in which ground-level ozone and/or particulate pollution was above the level that the EPA has determined presents “little or no risk.”


If 8% more children living within 2 miles of a school were to walk or bike to school, the air pollution reduced from not taking a car would be equivalent to removing 60,000 cars from the road for one year, nationally.

Pedroso, 2008, SRTS
**ECONOMIC BENEFITS**

Connected walkways and trails often yield high returns on investment through economic revitalization, recreational tourism, increased property values, and small business opportunities.

Building sidewalk and bicycle facilities creates 36% more jobs than building highways and almost 100% more jobs than pavement improvements.

_American Association of State Highway and Transportation Officials (AASHTO) Average Direct Jobs by Project Type (2012); Job in terms of full-time equivalents (FTE)._  

---

40% Of all trips (in the US) are two miles (or less)  

_NHTS, 2009_  

Driving 4 miles/day costs $847/year in fuel and vehicle wear and tear  

_AAA, 2015_  

**WALKING & BICYCLING is FREE**

---

A 2018 study looking at the economic impact of four greenways in North Carolina (Brevard Greenway, Little Sugar Creek Greenway, American Tobacco Trail, and Duck Trail) found that _every $1.00 of initial trail construction supports $1.72 annually_ from sales revenue, sales tax revenue, and benefits related to health and transportation. A one-time $26.7M capital investment in the four greenways supports:

- **$19.4M** Estimated annual sales revenue at local businesses along the four greenways
- **$684K** Estimated annual local and state sales tax revenue from businesses along the greenways
- **$25.7M** Estimated annual savings due to more physical activity, less pollution and congestion, and fewer traffic injuries from use of the greenways
- **$48.7M** Estimated business revenue from greenway construction
- **790 JOBS** Are supported annually through greenway construction
SAFETY BENEFITS

Pedestrian treatments and traffic calming help to save lives. Additionally, natural surveillance for trails and greenways occurs through increased numbers of trail users, creating an environment where behavior on the trail is monitored by trail users themselves.

Over the last five years (2014-2018), Winston-Salem has averaged 2 Fatalities / year & 63 Crashes / year

A pedestrian hit by a vehicle traveling at 25 MPH has a 89% chance of survival

A pedestrian hit by a vehicle traveling at 35 MPH has a 68% chance of survival

A pedestrian hit by a vehicle traveling at 45 MPH has a 35% chance of survival


Crash Reduction Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>% decrease in crashes</th>
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<tbody>
<tr>
<td>Install sidewalk to avoid walking along roadway</td>
<td>65-89</td>
</tr>
<tr>
<td>Increase enforcement to reduce speed</td>
<td>70</td>
</tr>
<tr>
<td>Install pedestrian refuge island</td>
<td>56</td>
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<tr>
<td>Add exclusive pedestrian phasing to signalized intersection</td>
<td>34</td>
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</tbody>
</table>

“Communities designed to be walkable can improve safety not only for people who walk but for all community members.”

- Surgeon General, 2015
**Chapter 2: Existing Conditions**

**OVERVIEW**
An existing conditions analysis was performed to better understand current pedestrian trends and issues in Winston-Salem. Results of the analyses in this chapter will help guide recommendations and delineate where the most impactful investments can be made.

**PUBLIC ENGAGEMENT**
The following pages highlight public input about existing conditions for walking in Winston-Salem. The graphic below outlines the various ways such input was collected during this planning process.

- **Online Public Input Map**
  - 646 comments, summarized on the following pages

- **Public Input from Past Plans**
  - Examples: East End Master Plan, East-Northeast Area Plan, Creative Corridors Plan, etc.

- **July & Nov 2020 Public Webinars**
  - Virtual meetings/webinars in July and November 2020 focused on existing conditions and the draft plan

- **Strategic Outreach/Interviews**
  - Interviews conducted to balance and supplement geographic reach of online input

- **Public Surveys & Project Postcards**
  - Survey focused on draft plan feedback; project postcards sent to areas with lower engagement, with info on how to get involved
MAP 2: PUBLIC INPUT

Additional Outreach: Project post cards, interviews, and presentations

Intersection Comments  
- Low Public Response
- High Public Response

Travel Comments  
- Low Public Response
- High Public Response

WHAT TYPES OF IMPROVEMENTS DO PEOPLE WANT?

This map shows the locations of 646 public comments collected through this plan’s online public input map. The results are summarized by area of the city on the following pages, with a full digest of comments available in the appendix.

The locations of input also revealed a “digital divide” in the city in terms of participation, with less input in eastern Winston-Salem. Additional outreach through project mailings, interviews, and presentations supplemented the online outreach in these areas.
EXISTING CONDITIONS IN THE CENTRAL BUSINESS DISTRICT

Top Comments (most “likes” by other users)

A  “Crosswalk needed here [W First Street and Town Run Lane] for the Strollway” (8 likes)
   »  [Comment at W First Street and E Salem Avenue] “Would like to see better pedestrian connections from downtown to Research Parkway & Long Branch Trail. Currently there is no access to these areas between 3rd St. down to Rams Dr. If no bridges are possible over the railroad tracks, some at-grade pedestrian crossings would suffice.” (4 Likes)
B  “There needs to be more crosswalks or other safe ways to get across MLK between Trade and Patterson. Between Arts-Based School families crossing in the mornings and afternoons (with no crossing guard or crosswalk), evening pedestrian crossings (with the growth of Industry Hill and more apartments just south of MLK), and other pedestrian activity, it’s dangerous.” (4 Likes)
   »  “Downtown needs family-friendly green spaces. A small playground, splash pad, or just a safe (i.e., fenced) place for children to run around or picnic in means more families will come for the day and spend more time.” (2 likes)

Other Comments

»  “The crossing on Main with the exit ramp is scary. It is difficult to see if cars are coming off the ramp on Main Street from Salem Parkway.”
C  Point placed at N Martin Luther King Jr. Drive and N Patterson Avenue: “This is an intersection we use when walking from work to the Long Branch Trail. The signals and crosswalks are great, but the driver understanding of yielding to pedestrians is lacking.”
   »  “The sidewalks on First through Fourth Streets both sides of the streets from Broad St. into the downtown core (up to Cherry St.) are generally in poor condition for walking with large cracks and uneven surfaces.”
   »  Comments along Martin Luther King Jr. Drive identify intersection improvements needed as well as sidewalk gaps.
EXISTING CONDITIONS IN NORTHWEST WINSTON-SALEM

Top Comments (most “likes” by other users)

There were about 36 comments made in the vicinity of Reynolda Rd and Coliseum Dr NW, with an aggregated total of 116 likes (example comments below).

» [Along Reynolda Rd] “Why is there no sidewalk here? It is dangerous and difficult to walk to Reynolda Village from West End and Buena Vista. There is a worn path here, indicating frequent foot traffic, however the terrain is irregular and hard to walk on.” (10 Likes)

» “Need a pedestrian bridge between the Graylyn and Reynolda field. People are always trying to cross here and it is dangerous.” (9 Likes)

» “Sidewalk needed along coliseum drive on side closest to Graylyn. High traffic walking area!” (8 Likes)

» “Sidewalk needed on Reynolda Rd between Coliseum Dr and Van Hoy Ave.” (8 Likes)

» “There is no good way to cross Peacehaven to get to the shopping center or the Y. The Moravian church at Chester is too far away and the intersection at Robinhood is dangerous for pedestrians” (10 Likes)

» [At Robinhood/Peace Haven] “Getting across this intersection is almost impossible for pedestrians. There are no [pedestrian] lights, no markings, nothing to help.” (10 Likes)

“Sidewalk is needed on Mountain View Rd. There is a dangerous “S” curve in the middle of the road and there are often many people and families walking and running on the road.” (9 likes and 13 similar comments, aggregating a total of 75 Likes)

“A sidewalk on both sides of the bridge on Robinhood crossing Silas Creek to access the Greenway across the bridge and the Buena Vista neighborhood.” (8 Likes)

“Any chance the eventual replacement of the Robinhood bridge over Silas Creek includes a way for pedestrians to safely cross to access, among other things, the northern edge of the Silas Creek greenway?” (8 Likes)
EXISTING CONDITIONS IN NORTHEAST WINSTON-SALEM

Top Comments (most “likes” by other users)

» “Request sidewalk installation on Northampton Drive from New Walkertown Road to Old Walkertown Road. People are currently walking in the street along this section of roadway causing traffic hazards.” (2 Likes)

A [Point placed at the intersection of Ogburn Ave and Efird St] “There are children in almost every house on the block but no sidewalks or protection from speeding traffic. The new detour that routes ALL traffic down Efird Street right now is extremely hazardous because they speed through at an excess of 60 mph.” (1 Like)

» “Fairchild Road needs a sidewalk built before Forsyth Tech’s new building is finished. All the students will need a way to safely walk to the bus stop on Liberty. Fairchild is quite busy with the Fire department and other business coming and going, and the only option is to walk on the curb or grass.” (1 Like)

Other Comments

B Lansing Drive near Carver School Road: “There are 2 retirement communities and a school on this road. There are no sidewalks to connect to the main crossroad, Carver School Road. Students and the disabled walk in the street where there aren’t even shoulders.”

C SR 52 Presents a major pedestrian barrier: “Ramps at 311 and 52 are poorly designed for safe crossings”; “5th Street Bridge over 52 is scary”; “Connectivity issues from east 5th street towards 52, and so close to Innovation Quarter!”

» “See East End Master Plan. The main goals of the Master Plan are to leverage the neighborhood’s assets and strengths, address its needs and challenges and create long-term benefits to the community, with focus on: history and social fabric, proximity and connectivity, inclusive growth, and economic development.”

» “There are no sidewalks along Thomasville rd 109 but there are bus routes. I live at Fiddlers creek Apts and see people standing at the end of the road and its scary. Kids get off the school bus along this route as well. Also, several people walk along this road and drivers often drive around them. It’s very dangerous along this route.”
EXISTING CONDITIONS IN SOUTHEAST WINSTON-SALEM

Top Comments (most “likes” by other users)

A “WSTA routes 101, 105, and 108 meet here causing a lot of foot traffic. There is no pedestrian safety infrastructure for crossing the street.” (6 likes)

B “Salem Lake Road needs a sidewalk or dedicated bike lane! It is a terrible road to walk down, as cars tend to drive faster than the posted limit, and pedestrians or bikes are often forced onto the grassy shoulder and get very wet due to the humidity and dew on the grass. We live on Salem Lake Road and would very much welcome a sidewalk between Reynolds Park and Salem Lake Park!!” (6 likes)

C “This is probably a known issue, but the narrow section of the greenway [near Lowery St.] that directly fronts Salem Creek, including but not limited to the ford over the creek, is impassable after even moderate rain, really limiting the greenway’s usefulness as a connector between downtown and Salem Lake.” (5 likes)

- “The section of the Salem Lake Trail that passes behind the gate to the parking area is so narrow. Passing safely is difficult, especially on a crowded day.” (5 likes)

- “There are no sidewalks or bike lanes going down 109 which is a pretty heavily walked area. With as fast as cars travel down this stretch of road, it would be great if something could be down 109 to make it safer for the community of the Southeast Ward” (3 likes)

Other Comments

- Sidewalk gaps identified on Sprague Street, Old Lexington Rd, Glenn Hi Rd, Patterson Ave, Ridgewood Rd, Cole Rd, Allistair Rd

- “More sidewalks need to be added in the neighborhoods that feed into Smith Farm Elementary. Maybe sidewalks can be built along Robbins Road, Lenora Dr, Townsend Ridge Dr, Millers Ridge Ln, Corbin Str, and Smith Farm Ln. Kids and parents need a safe way to walk to a neighborhood school.”

- “A sidewalk is needed on Glenn Hi Rd. There is a lot of unsafe foot traffic with students walking to and from the high school and other residents walking to and from businesses at the Union Cross/Glenn Hi area.”
EXISTING CONDITIONS IN SOUTHWEST WINSTON-SALEM

Top Comments (most “likes” by other users)

A “Extend strollway to connect with proposed UNCSA artwalk and link to campus. Improve street crossing for ease of access.” (9 Likes)

B [Intersection of Miller St and Elizabeth Ave] “Cars do not yield to pedestrians in crosswalk. Suggest either slowing traffic with speed bumps or installing one of those ‘yield to pedestrians’ panels on the double yellow line.” (9 likes)

» “Traffic Circle near Old Salem visitor center: cars often fail to stop for the pedestrian crosswalks. Could flashing lights or some other way of alerting drivers to pedestrians in the crosswalk be added?” (8 Likes)

» “Pedestrian/bike sidewalk and trail along Stratford Rd, parallel to the unused railroad tracks. Can start just with Stratford Rd, but would love to see it extend from the Hanes Mall area all the way to downtown along the tracks.” (7 likes)

» [Stratford Rd and Oakwood Dr] “The crosswalk to this intersection needs to have the lines repainted and make sure the signals give enough time to pedestrians to cross.” (6 likes)

» “It would be very helpful if there was a crosswalk and even a bike lane at this intersection to help pedestrians/cyclists cross Peter’s Creek at Academy. For crosswalk, it could even be just for half and then have people wait at a median or island.” (6 likes)

» “This is a constant problem all over town, but I see it a lot on S. Main near the UNCSA campus. People don’t stop for crosswalks. At all. And when I stop for pedestrians in crosswalks, I get people blowing their horns at me. Can we get more signage, bollards, etc. to make it clear that state law demands that drivers yield to pedestrians in crosswalks?” (6 likes)

C [Miller St and Cloverdale Ave NW] “There needs to be a crosswalk here, from the restaurant side of the street to the Walgreen’s for those who use the bus stop and don’t need to walk all the way around. There should also be a real bus stop, not a random spot of grass where the bus stop sign is covered by a church sign. This is dangerous and I see people waiting there all the time.” (6 likes)
STRATEGIC OUTREACH/INTERVIEWS

Preliminary results of the online input map were discussed during the Steering Committee meetings and Public Webinars, which resulted in suggestions for strategic outreach and interviews in underrepresented areas of the city.

Several groups were invited to participate in interviews, as suggested by the committee and public. The comments below were collected from the East-Northeast Winston Neighborhood Association President and the Happy Hills Neighborhood Association President.

Comments

- Trees lifting the sidewalk is a major issue. It’s dangerous to people walking, especially older, less stable people; It’s dangerous to wheelchair users because it can tilt/tip the chair; and It’s challenging to get over these areas on a wheelchair, specially without electric assist. Perhaps most of all, it causes people to walk in the street instead, on smoother surface.

- Heavy truck traffic on N Liberty St (east of 52) makes it a poor walking environment. This section of Liberty will never be a good pedestrian space or revitalized space until heavy trucks are not allowed.

- E 16th St bridge over US 52 feels very unsafe when walking over it, especially as trucks pass underneath. Need improvement if it is to be used as a pedestrian connection.

- Bus stops should have shelters, at least for the ones used most often. We heard the city has shelters in storage waiting to be installed.

- 104 Bus Route: This route changed about 2 years ago and the new route is not good for the neighborhood. People are having to walk all the way down to the clock tower (Mock St and Alder St intersection) along Liberia St, Alexander St, and Humphrey St. Some are old, have babies, are handicapped, or just have to get to work on time.

- We need more speed bumps, especially on Mock St from Vargrave St to Alder St.

- We need street lights on Free St between Mock St and Liberia St. Also needed on Willows Peak and Pitt Street.

- Sidewalk needs were identified throughout the Happy Hills Neighborhood [see appendix for full listing].

N Liberty Street gets heavy truck traffic and does not provide a comfortable environment for pedestrians.

The E 16th Street bridge over US 52. The narrow sidewalk has little protection from traffic on the bridge and a short railing over the highway.

Even some high use WSTA bus stops are without shelters, including this one at Waughton Street & Broadbay Dr (3rd most used bus stop in WSTA network).

This image from Mock Street illustrates how low traffic and limited traffic calming elements could facilitate speeding.

There are many areas throughout the Happy Hill neighborhood that need sidewalks or sidewalk improvements. This image was captured on Alder Street in front of Happy Hill Park.
EXISTING CONDITIONS AND PREVIOUS RECOMMENDATIONS FROM PAST PLANNING EFFORTS

Examples of RELEVANT PAST PLANS

» Sidewalk and Pedestrian Facilities Plan (2007): This plan provides a vision for creating a pedestrian-friendly environment throughout the Winston-Salem Urban Area that “provides access for all, promotes healthy lifestyles, and improves air quality.” The goals of the plan are to increase the quantity and quality of pedestrian facilities, improve pedestrian safety and security, include pedestrian considerations in all transportation and land use decisions, and enhance quality of life. A network of new and improved sidewalks, crosswalks, and intersection treatments are recommended, along with policy updates and education, encouragement, and enforcement programs.

» East End Master Plan (2017): The main goals of the Master Plan are to leverage the East End neighborhood’s assets and strengths, address its needs and challenges and create long-term benefits to the community. Key focus areas are History and Social Fabric; Proximity and Connectivity; Inclusive Growth; and Economic Development. Pedestrian recommendations include crossing ideas for US 52, a greenspace along the east side on US 52, and MLK as a key connecting corridor for the neighborhood.

» Creative Corridors Visionary Master Plan and Design Guidelines (2011): In response to planned improvements by North Carolina Department of Transportation (NCDOT) to the Business 40 corridor, a group of civic leaders joined together to create the Creative Corridors Coalition (C3). The Creative Corridors Visionary Master Plan and Design Guidelines provides recommendations for bridge design, lighting design, landscaping, and pedestrian crossings based on four guiding principles: Green, Artful, Iconic, and Network.
4% of households in Winston-Salem don’t have access to a Motor Vehicle\(^1\)

WHERE ARE PEOPLE WALKING TO WORK IN WINSTON-SALEM?

Whereas the online input map captured many comments about where people walk (and run), this map shows Winston-Salem’s highest concentrations of people walking to work.

MAP 3: WHERE PEOPLE WALK TO WORK

Percent of People who Walk to Work

- Small Share of Commuters Who Walk to Work
- Moderate Share of Commuters Who Walk to Work
- Large Share of Commuters Who Walk to Work
- Area where over 20% of People Walk to Work
- High Concentration of Equity Indicators

\(^1\)https://datausa.io/profile/geo/winston-salem-nc#num_vehicles
WHAT ARE LIKELY AREAS OF NEED AND EQUITY FOR PEDESTRIANS IN WINSTON-SALEM?

Transportation facilities are essential components in creating communities of opportunity and reducing the disproportionate economic and health burdens on communities of concern. Often, traditionally vulnerable populations, such as children, older adults, people of color, people with limited English proficiency, and low-income individuals rely heavily on affordable transportation options, specifically walking, biking, and transit.

The project team conducted an equity analysis using existing demographic information from the US Census Bureau. All data was obtained from the 2017 American Community Survey 5-year estimates and analysis was conducted at the census block group level for the City of Winston-Salem.

MAP 4: EQUITY ANALYSIS INPUTS

EQUITY ANALYSIS INPUTS

The analysis scored the study area using the following economic and demographic indicators:

- **RACE**: This indicator shows the percentage of the population that identifies as non-white or multiple races/ethnicities.
- **AGE**: These indicators show the percent of the population that is under the age of 18 and over the age of 64.
- **LIMITED ACCESS TO MOTOR VEHICLE**: This indicator shows the percent of households that said they did not have regular access to a motor vehicle.
- **LIMITED ENGLISH PROFICIENCY**: This indicator shows the percent of the population that identified as not speaking English well or at all.
- **INCOME**: This indicator shows the percent of the population that is living at or below 200% of the Federal Poverty Level.
What are HOLC grades and how do they impact equity today?

“These grades were a tool for redlining: making it difficult or impossible for people in certain areas to access mortgage financing and thus become homeowners. Redlining directed both public and private capital to native-born white families and away from African American and immigrant families. As homeownership was arguably the most significant means of intergenerational wealth building in the United States in the twentieth century, these redlining practices from eight decades ago had long-term effects in creating wealth inequalities that we still see today.”

https://dsl.richmond.edu/panorama/redlining/
WHAT ARE LIKELY AREAS OF DEMAND FOR PEDESTRIANS?

A non-motorized demand analysis was completed for the City of Winston-Salem to determine areas of expected pedestrian activity. The areas of high demand are focused within the more urban areas of the city, where residential and commercial density are highest.

High density areas include:

» Downtown
» Corridor south to Old Salem
» Corridor south along Peters Creek Parkway
» Corridor west along Business 40 to North Carolina Baptist Hospital and Stratford village
» Wake Forest University
» The area just east of US 52 around MLK Jr Dr

The map on the following page shows the composite demand in Winston-Salem, which was calculated based on a combination of the following factors:

MAP 6: DEMAND ANALYSIS INPUTS

WHERE PEOPLE PLAY: Trails and parks are attractors and generators of walking activity.

WHERE PEOPLE SHOP: Retail shopping areas are attractors for walking. Places where people can complete errands, such as banks, are also generators of walking trips.

WHERE PEOPLE LIVE: People are likely to walk near their homes for recreation or to visit nearby friends and family.

WHERE PEOPLE WORK: Higher densities of workers translates to higher propensity for people to walk.

WHERE PEOPLE ACCESS TRANSIT: All transit trips start or end with a walking trip.

WHERE PEOPLE LEARN: Schools are a significant source of walking by populations that either cannot drive because they are not old enough or are more likely to walk for economic reasons.
Chapter 2: Existing Conditions

MAP 7: DEMAND ANALYSIS

Winston-Salem Pedestrian Plan

- Low Demand
- Medium Demand
- High Demand
WHERE ARE THE PEDESTRIAN SAFETY ISSUES?

FIGURE 1: CRASHES BY MONTH AND TIME OF DAY (2009 - 2018)

TEMPORAL TRENDS

The fall months see an increase in pedestrian crashes as compared to the rest of the year (with exception of May). This is in spite of good walking conditions throughout the year. The number of crashes occurring during daylight vary slightly throughout the year, while crashes in evening and night increase dramatically in the fall. This is a fairly common trend in the United States as the daylight hours decrease but walking/driving habits are maintained as fair weather persists. This suggest that current streetlighting conditions may not be sufficient to ensure pedestrians and motorists see each other. May is an anomaly month and should be investigated further.
Pedestrian crashes have been on the rise in Winston-Salem as the four highest crash totals are in the last four years of data. In addition, the number of fatal + disabling injuries have hit their highest numbers in the most recent two years of data (2017 and 2018). Addressing the factors potentially correlated with fatal and serious injury pedestrian crashes can help to improve pedestrian safety in Winston-Salem.
MAP 9: EQUITY AND PEDESTRIAN COLLISIONS

2013-2017 American Community Survey Equity Indicator

Low Concentration of Equity Indicators
Medium Concentration of Equity Indicators
High Concentration of Equity Indicators

MAJOR ROADWAYS

0 2.5 5 MILES

*Total collision value is slightly higher (difference of 4 crashes) due to geographic differences between municipal and Census block group boundaries.
MAP 10: CRASHES BY STREET CLASSIFICATION

64% OF FATAL CRASHES OCCUR ON ARTERIAL OR LIMITED ACCESS ROADS

42% OF SUSPECTED SERIOUS INJURY CRASHES OCCUR ON ARTERIAL OR LIMITED ACCESS ROADS

Limited Access Roads¹
159 miles (10%)

Arterial Roads²
74 miles (5%)

Collector and Local Roads³
1,305 miles (85%)

¹Limited Access Roads are defined using NCDOT Functional Classification Codes for Principal Arterial - Interstate and Principal Arterial - Other Freeway/Expressway.

²Arterial Roads are defined using NCDOT Functional Classification Codes for Principal Arterial - Other and Minor Arterial.

³Collector and Local Roads are classified as Major Collector, Minor Collector, and Local.

*For an accurate analysis of crash rates relative to street function classification, the total of 804 collisions was filtered to 333 incidents that occurred on a roadway (removing intersection, and other public driving areas like parking lots.)
TABLE 1: CRASHES BY STREET CLASSIFICATION

<table>
<thead>
<tr>
<th>Crash Severity</th>
<th>Street Function Class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local</td>
</tr>
<tr>
<td>Fatality</td>
<td>13</td>
</tr>
<tr>
<td>Suspected Serious Injury</td>
<td>15</td>
</tr>
<tr>
<td>Other Crash Types</td>
<td>211</td>
</tr>
<tr>
<td>Total Collisions</td>
<td>239</td>
</tr>
</tbody>
</table>
WHERE ARE THE SIDEWALKS AND TRAILS?

PEDESTRIAN FACILITY TYPES

Sidewalks
Sidewalks provide dedicated space intended for use by pedestrians that is safe, comfortable, and accessible to all. Sidewalks are physically separated from the roadway by a curb or unpaved buffer space.

Shared-use Path/Greenway
Shared-use paths provide a travel area separate from motorized traffic for bicyclists, pedestrians, skaters, wheelchair users, joggers, and other users. Shared-use paths can provide a low-stress experience for a variety of users using the network for transportation or recreation.

MAP 11: EXISTING CONDITIONS

- Existing Greenway
- Sidewalk
- Rail Line
- Recreation Center
- School
- Public Library
- University

Most Used WSTA Bus Stops - February 2020
Top 5 Transit Route (WSTA)
Body of Water
Park
WHERE ARE THE KEY SIDEWALK AND TRAIL GAPS?

<table>
<thead>
<tr>
<th>Citywide Sidewalk Gaps</th>
<th>Arterial</th>
<th>Collector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>67</td>
<td>97</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gaps in High Equity Areas</th>
<th>Arterial</th>
<th>Collector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13</td>
<td>21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gaps in High Demand Areas</th>
<th>Arterial</th>
<th>Collector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gaps in Both High Demand and High Equity Areas</th>
<th>Arterial</th>
<th>Collector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

MAP 12: KEY SIDEWALK GAPS

- Missing Sidewalk on a Collector St
- Missing Sidewalk on an Arterial St
- High Concentration of Equity Indicators
- Medium High to High Demand Area
- Existing Greenway
- Sidewalk
- Rail Line
- Body of Water
- Park
Chapter 2: Existing Conditions

- Missing Sidewalk on a Collector St
- Missing Sidewalk on an Arterial St
- High Concentration of Equity Indicators
- Medium High to High Demand Area
- Existing Greenway
- Sidewalk
- Rail Line
- Body of Water
- Park

Map of the area with labeled streets and infrastructure.
OVERVIEW

This chapter builds upon the findings of the existing conditions analysis to inform recommendations and prioritization of projects. Developing recommendations consisted of these main steps:

1. **Identify an Overall Pedestrian Network:** Map 12 shows a proposed overall network of walkways, consisting of Winston-Salem’s primary network of major and minor roadways, connecting pedestrians from local neighborhoods to transit stops and destinations.

2. **Identify Gaps:** Map 13 is the same as Map 12, but removes all the existing sidewalks and sidepaths, revealing only the network “gaps” that need to be filled.

3. **Prioritize Projects:** Maps 14-20 show the results of a data-driven prioritization process outlined in this chapter. These results can be used to guide decision-making for filling the pedestrian facility gaps in different areas of the city. The scoring results can be kept up to date and adjusted as needed and conditions change, or could be adjusted to meet needs of specific funding criteria.

The graphic on the following page illustrates this methodology in greater detail, and the maps and tables that follow illustrate the results.

This chapter concludes with important supporting recommendations related to maintenance and policy for pedestrian infrastructure development.
## Recommendations

### Previous plan proposals on Corridor speed reduction

Highest Demand Areas

- Demand
- Safety
- Equity

### Plan Recommendations

- MTP 2040
- East End Master Plan
- MLK Jr Dr Streetscape Plan

Downtown Streetscape Plan
Downtown Street Study
Cloverdale Ave Study
Wake Forest University Study

### Overall Pedestrian Network (Map 12)

Map 12 shows a proposed overall network of walkways, consisting of Winston-Salem’s primary network of major and minor roadways, connecting pedestrians from local neighborhoods to transit stops and destinations. The network is organized by the characteristics and needs in each category listed below, drawing upon the Chapter 2 inputs above, and the land use context of each corridor. This is useful in guiding types of recommendations for each category. For example, some areas may need more frequent crossings, or sidewalks on both sides as opposed to one.

### Urban Major Walkway

**Identifiers**

- High-Use Transit Routes
- Highest Demand Areas
- Previous plan proposals

**Needs**

- High-quality sidewalks both sides
- Crossings every 500 - 800 ft
- Corridor speed reduction

### Urban Minor Walkway

**Identifiers**

- Low to moderate use Transit Routes
- Moderate demand in urban areas
- Previous plan proposals

**Needs**

- Sidewalks both sides
- Crossings every 500 - 800 ft
- Corridor speed reduction

### Neighborhood Walkway

**Identifiers**

- Previous plan proposals on local roads
- Public input
- Access to key destinations (schools, parks)

**Needs**

- Sidewalk (one side) or pedestrian shared street treatments

### Suburban Walkways

**Identifiers**

- Suburban commercial corridors on major roads
- Moderate to high demand
- Previous plan proposals

**Needs**

- High-quality sidewalks or sidepaths both sides
- Crossings every 800 ft

### Suburban Low Density Walkways

**Identifiers**

- Previous plan proposals on major suburban roads
- Low demand
- Connect neighborhoods to commercial centers and other key destinations

**Needs**

- Sidewalk or sidepath on one or both sides

### Rural Commercial Walkways

**Identifiers**

- Previous plan proposals on major or minor rural roads
- Moderate demand
- Commercial clusters in rural areas

**Needs**

- Sidewalk on both sides
- Crossings every 800 ft

### Rural Walkways

**Identifiers**

- Previous plan proposals on major or minor rural roads
- Low to moderate demand
- Connect residential clusters to commercial areas and other key destinations

**Needs**

- Sidewalk on one side

### Pedestrian Network Gaps (Map 13)

This map is the same as Map 12, but removes all the existing sidewalks and sidepaths, revealing only the network “gaps” that need to be filled.

### Prioritized Network (Maps 14-20)

This map series shows the results of a prioritization process (outlined pp. 39-40) that can be used to guide decision making for filling the gaps in different areas of the city.
This map shows the ideal overall network of walkways, organized by the categories listed below. This includes both existing and proposed pedestrian facilities. This does not include small residential streets or roadways where pedestrians are not allowed (such as interstate highways). See descriptions below and on the previous page for more on the identifying characteristics and needs for each category.

**Urban Major Walkways**
High-use transit routes and high-density mixed-use corridors along major urban roadways.

**Urban Minor Walkways**
Mixed-use residential and commercial corridors along major and minor urban roadways.

**Neighborhood Walkways**
Local or Collector roadways linking neighborhoods to parks, schools, and transit.

**Suburban Walkways**
Commercial and mixed-use corridors along major suburban roadways.

**Suburban Low Density Walkways**
Major suburban roadways with residential, light commercial, or office uses.

**Rural Commercial Walkways**
Retail clusters on major roadways in rural areas.

**Rural Walkways**
Major rural roadways connecting residential and commercial clusters.
What about small residential streets?

Key goals of this plan include enhancing overall connectivity and safety. Most fatal and serious injury pedestrian crashes occur outside of the residential street environment. Roads that serve a small number of local residents are better addressed through traffic calming programs and sidewalk request policy. However, all streets (including small residential streets) are included in the overall prioritization process introduced on pages 39-40, so that project planners and decision makers can rank any street in Winston-Salem alongside overall citywide needs.
MAP 14: PEDESTRIAN NETWORK GAPS

This map is the same as Map 13 (Overall Pedestrian Network), but removes all the existing sidewalks and sidepaths, revealing only the network “gaps” that need to be filled.
PRIORITIZING NEEDS: A DATA-BASED APPROACH

A prioritization scoring approach was developed based on the plan goals/objectives, existing conditions analysis, and public input. Table 2 shows the scoring inputs, how they connect back to plan goals, and how they combine to give each project a unique score. The result of scoring is a prioritized project list that can be kept up to date and adjusted as needs and conditions change.

Figure 4 on the following page shows the process from project scoring to funding, putting sociodemographic and geographic equity at the forefront of implementation. Broad funding strategies are then outlined according to prioritization outcomes.

<table>
<thead>
<tr>
<th>Plan Goal</th>
<th>Plan Objective</th>
<th>Score Input</th>
<th>Possible Points</th>
<th>Max Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhance Connectivity,</td>
<td>Complete and maintain a pedestrian network, providing better connectivity,</td>
<td>Each school or library within 1/4 mile</td>
<td>1.6-8</td>
<td>8</td>
</tr>
<tr>
<td>Mobility, and Accessibility</td>
<td>ensuring accessibility for people of all ages and abilities.</td>
<td>Each school or library within 1/4 mile to 1/2 mile</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Each university within 1/4 mile</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Each university within 1/2 mile</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Increase Safety</td>
<td>Protect the public safety and personal security of people walking.</td>
<td>Each crash on segment</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Any fatality along segment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Street classification of Collector or above</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Increase Livability, Create</td>
<td>Establish a strategic prioritization process that commits to funding</td>
<td>Demand analysis results</td>
<td>1-5</td>
<td>5</td>
</tr>
<tr>
<td>a Positive Economic Impact</td>
<td>pedestrian network improvements and existing sidewalk maintenance in the most</td>
<td>Segment is along a top 10 transit route (by ridership)</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>critical locations.</td>
<td>Segment has a transit stop</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Each public comment or support vote</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Enhance Health, Protect</td>
<td>Improve the health of residents and the environment by getting more people</td>
<td>Each park, greenway, or recreation center within 1/4 mile</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>the Environment</td>
<td>walking for their transportation, recreation, and daily needs through policies,</td>
<td>Each park, greenway, or recreation center within 1/2 mile</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>programs, and projects.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum Score</td>
<td>40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**FIGURE 4: PROJECT IDENTIFICATION AND IMPLEMENTATION**

<table>
<thead>
<tr>
<th>Prioritization Scoring</th>
<th>Project Categorization</th>
<th>Funding Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Promote Equity</strong></td>
<td>Prioritized list of sidewalks and intersection improvements that can be grouped by the following:</td>
<td><strong>CIP + Bond Funding</strong></td>
</tr>
<tr>
<td>Equity Analysis</td>
<td><strong>Sociodemographic Equity</strong></td>
<td>Fund top scoring projects that are less likely to obtain federal funds using local resources</td>
</tr>
<tr>
<td></td>
<td>Projects in areas scoring highest in the equity analysis or in areas with historic disinvestment as determined by the HOLC maps*</td>
<td></td>
</tr>
<tr>
<td><strong>Enhance Connectivity, Mobility, and Accessibility</strong></td>
<td><strong>Geographic Equity</strong></td>
<td><strong>STIP</strong></td>
</tr>
<tr>
<td>Proximity to schools, libraries, and colleges/universities</td>
<td>Projects are grouped by City quadrant to ensure that investment is distributed around the City. High priorities are identified in each quadrant</td>
<td></td>
</tr>
<tr>
<td><strong>Increase Safety</strong></td>
<td></td>
<td>Conduct preliminary scoring analysis on top Major City Walkway and City Walkway projects and strategically allocate local points based on results</td>
</tr>
<tr>
<td>» Collisions and fatalities</td>
<td></td>
<td><strong>Policy</strong></td>
</tr>
<tr>
<td>» Street characteristics</td>
<td></td>
<td>» Implement proposed code updates for development and updates to design guidelines</td>
</tr>
<tr>
<td><strong>Increase Livability, Create a Positive Economic Impact</strong></td>
<td></td>
<td>» Add sidewalk requests to the Overall Pedestrian Network if they are not already and apply prioritization score. As provided in the City code, homeowners may fund sidewalks via assessment if they want them sooner than their scoring and City funding allows.</td>
</tr>
<tr>
<td>» Demand Analysis</td>
<td></td>
<td>» Upgrade bridges with bridge replacement projects.</td>
</tr>
<tr>
<td>» Proximity to transit stops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>» Public input</td>
<td></td>
<td></td>
</tr>
<tr>
<td>» Previous planning recommendations</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Enhance Health, Protect the Environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proximity to parks, greenways, and recreation centers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*What are HOLC grades and how do they impact equity today?*

“These grades were a tool for redlining: making it difficult or impossible for people in certain areas to access mortgage financing and thus become homeowners. Redlining directed both public and private capital to native-born white families and away from African American and immigrant families. As homeownership was arguably the most significant means of intergenerational wealth building in the United States in the twentieth century, these redlining practices from eight decades ago had long-term effects in creating wealth inequalities that we still see today.”

[https://dsl.richmond.edu/panorama/redlining/](https://dsl.richmond.edu/panorama/redlining/)
MAP 15: PRIORITIZED NETWORK

This map series (maps 14-20) shows the results of the prioritization process outlined on the previous pages. These results can be used to guide decision making for filling the pedestrian facility gaps in different areas of the city. The results of scoring can be kept up to date and adjusted as needs and conditions change, or could be adjusted to meet needs of specific funding criteria. For example, if a project grant were available that focused only on safety the prioritization table and resulting maps could be re-sorted to emphasize projects scoring high in safety only.

SCORING INPUTS (P. 39)

Promote Equity
» Equity Analysis

Enhance Connectivity, Mobility, and Accessibility
» Proximity to schools, libraries, and colleges/universities

Increase Safety
» Collisions and fatalities
» Street characteristics

Increase Livability, Create a Positive Economic Impact
» Demand Analysis
» Proximity to transit stops
» Public input
» Previous planning recommendations

Enhance Health, Protect the Environment
» Proximity to parks, greenways, and recreation centers
TABLE 3: TOP NE PROJECTS

<table>
<thead>
<tr>
<th>Project ID</th>
<th>To</th>
<th>From</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motor Rd</td>
<td>Old Rural Hall Rd</td>
<td>29</td>
</tr>
<tr>
<td>2</td>
<td>Ogburn Av</td>
<td>Oak Summit Rd</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>Old Rural Hall Rd</td>
<td>Helen Av</td>
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</tr>
<tr>
<td>4</td>
<td>Akron Dr</td>
<td>US 52 nb ramp</td>
<td>23</td>
</tr>
<tr>
<td>5</td>
<td>Oak Summit Rd</td>
<td>Whittier Rd</td>
<td>23</td>
</tr>
<tr>
<td>6</td>
<td>Ogburn Av</td>
<td>Hudson St</td>
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<td>Akron Dr</td>
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<td>8</td>
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<td>Whittier Rd</td>
<td>20.4</td>
</tr>
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<td>9</td>
<td>University Pw</td>
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</tr>
<tr>
<td>10</td>
<td>University Pw</td>
<td>E Hanes Mill Rd</td>
<td>20.4</td>
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MAP 16: NORTHEAST PRIORITIZED PROJECTS

Intersection  Sidewalk

- Low Prioritization Score
- High Prioritization Score
- Top Scoring Project in Quadrant
- Other Potential Projects in Quadrant
- Highest Tier Equity
- Park
### Chapter 3: Recommendations

**MAP 17: SOUTHEAST PRIORITIZED PROJECTS**

**Intersection**

- Low Prioritization Score
- High Prioritization Score

**Sidewalk**

- Top Scoring Project in Quadrant
- Other Potential Projects in Quadrant
- Highest Tier Equity Indicator
- Park

**TABLE 4: TOP SE PROJECTS**

<table>
<thead>
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<th>To</th>
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<th>Score</th>
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<td>Starlight Dr</td>
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<td>3</td>
<td>Thomasville Rd</td>
<td>Louise Rd</td>
<td>23</td>
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<tr>
<td>4</td>
<td>High Point Rd</td>
<td>Waughtown St</td>
<td>22</td>
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<tr>
<td>5</td>
<td>Louise Rd</td>
<td>Betty Dr</td>
<td>21</td>
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<tr>
<td>6</td>
<td>Waughtown St</td>
<td>E Sprague St</td>
<td>21</td>
</tr>
<tr>
<td>7</td>
<td>Allen St</td>
<td>S Martin Luther King Jr Dr</td>
<td>19</td>
</tr>
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<td>8</td>
<td>Kernersville Rd</td>
<td>Wintergreen Rd</td>
<td>18.8</td>
</tr>
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<td>9</td>
<td>Belleauwood St</td>
<td>Peachtree St</td>
<td>18</td>
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<td>10</td>
<td>Marne St</td>
<td>Argonne Bv</td>
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**TABLE 4: TOP SE PROJECTS**

<table>
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<th>From</th>
<th>Score</th>
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<td>Waughtown St</td>
<td>22</td>
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<tr>
<td>5</td>
<td>Louise Rd</td>
<td>Betty Dr</td>
<td>21</td>
</tr>
<tr>
<td>6</td>
<td>Waughtown St</td>
<td>E Sprague St</td>
<td>21</td>
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<tr>
<td>7</td>
<td>Allen St</td>
<td>S Martin Luther King Jr Dr</td>
<td>19</td>
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<td>8</td>
<td>Kernersville Rd</td>
<td>Wintergreen Rd</td>
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<td>9</td>
<td>Belleauwood St</td>
<td>Peachtree St</td>
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<td>Marne St</td>
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<td>11</td>
<td>Williamson St</td>
<td>Bruce St</td>
<td>18</td>
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### TABLE 5: TOP SW PROJECTS

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<th>From</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Peters Creek Pw</td>
<td>NC 67</td>
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<td>Business 40 Multiuse Trail</td>
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</tr>
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<td>2</td>
<td>Peters Creek Pw</td>
<td>Silas Creek Pw</td>
<td>25.4</td>
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<td></td>
<td>W Clemmonsville Rd ramp</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Peters Creek Pw</td>
<td>Silas Creek Pw</td>
<td>25.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W Clemmonsville Rd ramp</td>
<td></td>
</tr>
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<td>4</td>
<td>S Stratford Rd</td>
<td>NC 67 ramp - EB</td>
<td>25.4</td>
</tr>
<tr>
<td>5</td>
<td>S Hawthorne Rd</td>
<td>Bethesda Rd</td>
<td>24.4</td>
</tr>
<tr>
<td>6</td>
<td>S Stratford Rd</td>
<td>Atwood Rd</td>
<td>24.4</td>
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<tr>
<td>7</td>
<td>Silas Creek Pw (EB)</td>
<td>S Hawthorne Rd</td>
<td>22.4</td>
</tr>
<tr>
<td>8</td>
<td>Silas Creek Pw (WB)</td>
<td>S Hawthorne Rd</td>
<td>22.4</td>
</tr>
<tr>
<td>9</td>
<td>Peters Creek Pw</td>
<td>Business 40 ramps</td>
<td>22</td>
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<tr>
<td>10</td>
<td>Hanes Mall Bv</td>
<td>NC 67</td>
<td>21.8</td>
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<tr>
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<td></td>
<td>Truliant Wy</td>
<td></td>
</tr>
</tbody>
</table>

### MAP 18: SOUTHWEST PRIORITIZED PROJECTS

**Intersection**
- Low Prioritization Score
- Top Scoring Project in Quadrant
- Other Potential Projects in Quadrant
- Highest Tier Equity Issues
- Park

**Sidewalk**
- High Prioritization Score
TABLE 6: TOP NW PROJECTS

<table>
<thead>
<tr>
<th>Project ID</th>
<th>To</th>
<th>From</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University Pw</td>
<td>Coliseum Dr</td>
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</tr>
<tr>
<td>2</td>
<td>W Twenty-Eighth St</td>
<td>Shorefair Dr</td>
<td>Greenway Av</td>
</tr>
<tr>
<td>3</td>
<td>Indiana Av</td>
<td>Akron Dr</td>
<td>28</td>
</tr>
<tr>
<td>4</td>
<td>Reynolda Rd</td>
<td>Radford St</td>
<td>27.8</td>
</tr>
<tr>
<td>5</td>
<td>W Northwest Bv</td>
<td>Reynolda Rd</td>
<td>N Hawthorne Rd</td>
</tr>
<tr>
<td>6</td>
<td>N Patterson Av</td>
<td>Akron Dr</td>
<td>Indiana Av</td>
</tr>
<tr>
<td>7</td>
<td>University Pw</td>
<td>Deacon Bv</td>
<td>Polo Rd ramp</td>
</tr>
<tr>
<td>8</td>
<td>University Pw</td>
<td>W Thirteenth St</td>
<td>W Eleventh St</td>
</tr>
<tr>
<td>9</td>
<td>W Second St</td>
<td>W First St</td>
<td>Brookstown Av</td>
</tr>
<tr>
<td>10</td>
<td>Akron Dr</td>
<td>N Patterson Av</td>
<td>US 52 - sb ramp</td>
</tr>
<tr>
<td>11</td>
<td>Reynolds Bv</td>
<td>Shorefair Dr</td>
<td>Indiana Ave</td>
</tr>
</tbody>
</table>

MAP 19: NORTHWEST PRIORITIZED PROJECTS

Intersection

- Low Prioritization Score
- Top Scoring Project in Quadrant
- Other Potential Projects in Quadrant
- Highest Tier Equity Indicator
- Park

Sidewalk

High Prioritization Score
TABLE 7: TOP CBD PROJECTS

<table>
<thead>
<tr>
<th>Project ID</th>
<th>To</th>
<th>From</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N Broad St</td>
<td>W Seventh St</td>
<td>22.4</td>
</tr>
<tr>
<td>2</td>
<td>N Chestnut St</td>
<td>E Fifth St</td>
<td>17.2</td>
</tr>
<tr>
<td>3</td>
<td>Pilot View St</td>
<td>Summit St</td>
<td>16.2</td>
</tr>
</tbody>
</table>

MAP 20: CBD PRIORITIZED PROJECTS
These grades [HOLC grades] were a tool for redlining: making it difficult or impossible for people in certain areas to access mortgage financing and thus become homeowners. This data is a key metric in understanding intergenerational wealth disparities within communities. For more information, see the equity analysis on pages 19-20.
ADDITIONAL RECOMMENDATIONS IN EAST WINSTON-SALEM

This plan’s data-driven process does not capture many of the more nuanced recommendations from past plans. These plans include elements beyond the presence of sidewalk that make a space comfortable and add to perceived safety/comfort of pedestrians. This page and the next highlight some key recommendations in East Winston-Salem, including the MLK Streetscaping Project and East End Master Plan. The Walkable Winston-Salem Pedestrian Plan supports these efforts and recommends their implementation by City staff, BPAMAC, and other stakeholders and project partners. Please see these full plans for more information.

Martin Luther King Jr. Drive Streetscape Master Plan Schematic Design

The MLK Jr. Drive Streetscape Master Plan offers a design schematic as well as a streetscape framework that relates to the pedestrian experience and safety. The first of five design principles is to:

Create a safe pedestrian environment

» Crosswalk signal timing
» Enhanced crosswalks
» Lighting and fencing
» Speed limit

The Plan also provides guidance for the major typologies of the corridor, “Crossings, Edges, and Medians.” This information is valuable as a framework for analyzing a corridor and applying enhanced features that improve placemaking and safety.
East End Master Plan

The East End Master Plan lays out a comprehensive vision for the future of the East End of Winston-Salem. Included in the Plan are a range of recommendations addressing pedestrian infrastructure and experience both directly (new streets, open space, and circulation patterns) and indirectly (land use, human scale development, building character). In addition to specific project recommendations, such as streetscape improvements along 5th Street, the Plan also provides guidance specifically addressing the pedestrian network. The holistic approach outlined below should be considered when scoping projects in high-need areas.

“Pedestrian safety, access and mobility should be the most important considerations for public infrastructure in the East End. All new and improved streets should have continuous and accessible sidewalks and intersection crosswalks. In addition to the street-based network of sidewalks, jogging and walking paths are proposed for the various new parks throughout the neighborhood.

The master plan also supports features and amenities that will maximize the use of sidewalks and pathways. These include typical street furniture like pedestrian-scaled lighting, waste receptacles, benches or seat walls, as well as conveniences such as pet waste stations. Placemaking and visual interest can be achieved through creative and special elements like shade structures, public art, sculptures and other landscape design.”
PRIORITY PROJECT LIST

Project Table as a “Living” Document

The actual project table is a “living” document and tool to be used by City of Winston-Salem staff, decision makers, committee members, and any groups interested in analyzing pedestrian needs according to the variety of criteria discussed on previous pages. The table is in the form of a spreadsheet with information that corresponds to Geographic Information Systems (GIS) Data to make maps that reflect the project scoring. Table 9 shows only a portion of the overall project table for the purposes of communicating the top projects according to the ranking and criteria used as an example for this plan.

Full Table Includes More Factors

The full table includes additional columns of information useful for project planning, such as broad feasibility (whether or not the segment already has curb and gutter), council districts, number of public comments, city vs. state maintenance, project length, and over a dozen connectivity factors, such as proximity to parks, schools, and transit. See the Appendix for the full project table as of early 2021.

TABLE 9: TOP PRIORITIZED PROJECTS

<table>
<thead>
<tr>
<th>Score</th>
<th>Project ID</th>
<th>To</th>
<th>From</th>
<th>Equity Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>University Pw (Suburban Low Density Walkway)</td>
<td>Coliseum Dr</td>
<td>W Fourteenth St</td>
<td>Yes</td>
</tr>
<tr>
<td>29</td>
<td>Motor Rd (Neighborhood Walkway)</td>
<td>Ogburn Av</td>
<td>Old Rural Hall Rd</td>
<td>Yes</td>
</tr>
<tr>
<td>29</td>
<td>Peters Creek Pw (Suburban Walkway)</td>
<td>NC 67</td>
<td>Business 40 Multiuse Trail</td>
<td>Yes</td>
</tr>
<tr>
<td>29</td>
<td>W Twenty-Eighth St (Neighborhood Walkway)</td>
<td>Shorefair Dr</td>
<td>Greenway Av</td>
<td>Yes</td>
</tr>
<tr>
<td>28</td>
<td>Indiana Av (Suburban Low Density Walkway)</td>
<td>Akron Dr</td>
<td>Iverness St</td>
<td>Yes</td>
</tr>
<tr>
<td>27.8</td>
<td>Reynolda Rd (Suburban Walkway)</td>
<td>Radford St</td>
<td>Sunnynoll Dr</td>
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<tr>
<td>27.4</td>
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<td>Reynolda Rd</td>
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<tr>
<td>27</td>
<td>N Patterson Av (Suburban Walkway)</td>
<td>Akron Dr</td>
<td>Indiana Av</td>
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<tr>
<td>27</td>
<td>University Pw (Suburban Low Density Walkway)</td>
<td>Deacon Bv</td>
<td>Polo Rd ramp</td>
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<tr>
<td>27</td>
<td>University Pw (Suburban Low Density Walkway)</td>
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<td>W Eleventh St</td>
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<td>26.8</td>
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<td></td>
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<td>26</td>
<td>Akron Dr (Suburban Walkway)</td>
<td>N Patterson Av</td>
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<td>26</td>
<td>Reynolds Bv (Suburban Low Density Walkway)</td>
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<td>Indiana Ave</td>
<td>Yes</td>
</tr>
<tr>
<td>25.4</td>
<td>Peters Creek Pw (Suburban Walkway)</td>
<td>Silas Creek Pw</td>
<td>W Clemmonsville Rd ramp</td>
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</tbody>
</table>

Geographic zones are one of many factors that can be used to sort the project table.

Full Table Includes More Factors

The full table includes additional columns of information useful for project planning, such as broad feasibility (whether or not the segment already has curb and gutter), council districts, number of public comments, city vs. state maintenance, project length, and over a dozen connectivity factors, such as proximity to parks, schools, and transit. See the Appendix for the full project table as of early 2021.
<table>
<thead>
<tr>
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<th>Project ID</th>
<th>To</th>
<th>From</th>
<th>Equity Zone</th>
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</thead>
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<td>W Clemmonsville Rd ramp</td>
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<tr>
<td>25.4</td>
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</tr>
<tr>
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<td>Coliseum Dr (Suburban Walkway)</td>
<td>Pilgrim Ct</td>
<td>University Pw</td>
<td>Yes</td>
</tr>
<tr>
<td>25</td>
<td>Ogburn Av (Neighborhood Walkway)</td>
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<td>Oak Summit Rd</td>
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<td>25</td>
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<tr>
<td>24.4</td>
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<td>Atwood Rd</td>
<td>NC 67 ramp</td>
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<td>Marguerite Dr</td>
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<td>Van Hoy Av</td>
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</tr>
<tr>
<td>23.4</td>
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<td>23</td>
<td>Akron Dr (Suburban Walkway)</td>
<td>Ogburn Av</td>
<td>US 52 - nb ramp</td>
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<td>Cline St</td>
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<tr>
<td>23</td>
<td>Oak Summit Rd (Rural Walkway)</td>
<td>Whittier Rd</td>
<td>Old Rural Hall Rd</td>
<td>Yes</td>
</tr>
<tr>
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<td>Ogburn Av (Neighborhood Walkway)</td>
<td>Kapp St</td>
<td>Hudson St</td>
<td>Yes</td>
</tr>
<tr>
<td>23</td>
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<td>Starlight Dr</td>
<td>E Clemmonsville Rd</td>
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</tr>
<tr>
<td>23</td>
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<td>Louise Rd</td>
<td>Baden Rd</td>
<td>Yes</td>
</tr>
<tr>
<td>23</td>
<td>University Pw (Suburban Low Density Walkway)</td>
<td>Bethabara Rd</td>
<td>Polo Rd ramp</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>University Pw (Suburban Low Density Walkway)</td>
<td>North Point Bv</td>
<td>Polo Rd ramp</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Yadkinville Rd (Suburban Low Density Walkway)</td>
<td>NC 67</td>
<td>Valley Rd</td>
<td>Yes</td>
</tr>
<tr>
<td>22.8</td>
<td>Coliseum Dr (Suburban Low Density Walkway)</td>
<td>Robinhood Rd</td>
<td>E Kent Rd</td>
<td></td>
</tr>
<tr>
<td>22.6</td>
<td>Meadowlark Dr (Rural Walkway)</td>
<td>Beauchamp Rd</td>
<td>Robinhood Rd</td>
<td></td>
</tr>
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<td>W Seventh St</td>
<td>West End Bv</td>
<td></td>
</tr>
<tr>
<td>22.4</td>
<td>Shattalon Dr (Rural Walkway)</td>
<td>Murray Rd</td>
<td>University Pw</td>
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<tr>
<td>22.4</td>
<td>Silas Creek Pw (Suburban Walkway)</td>
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<td>22.4</td>
<td>Silas Creek Pw (Suburban Walkway)</td>
<td>S Hawthorne Rd</td>
<td>Bolton St</td>
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<tr>
<td>22.4</td>
<td>University Pw (Suburban Low Density Walkway)</td>
<td>Oak Summit Rd</td>
<td>Home Rd</td>
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<tr>
<td>22</td>
<td>Bethabara Park Bv (Neighborhood Walkway)</td>
<td>NC 67</td>
<td>Brian Center Ln</td>
<td></td>
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<tr>
<td>22</td>
<td>High Point Rd (Rural Walkway)</td>
<td>Waughtown St</td>
<td>Robbins Rd</td>
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<tr>
<td>22</td>
<td>N Cherry St (Rural Commercial Walkway)</td>
<td>Melody Ln</td>
<td>Lodge St</td>
<td>Yes</td>
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<tr>
<td>22</td>
<td>Ogburn Av (Neighborhood Walkway)</td>
<td>Kapp St</td>
<td>Akron Dr</td>
<td>Yes</td>
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<tr>
<td>22</td>
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<td>Business 40 ramps</td>
<td>Business 40 Overpass</td>
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<tr>
<td>22</td>
<td>Shorefair Dr (Suburban Low Density Walkway)</td>
<td>W Thirty-Second St</td>
<td>W Thirtyieth St</td>
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<tr>
<td>22</td>
<td>W Twentieth St (Neighborhood Walkway)</td>
<td>Cannon Av</td>
<td>Thurmond St</td>
<td>Yes</td>
</tr>
<tr>
<td>21.8</td>
<td>Hanes Mall Bv (Suburban Walkway)</td>
<td>NC 67</td>
<td>Truliant Wy</td>
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Chapter 4: Design Guidelines

OVERVIEW

This toolbox presents guidance for local agency staff, transportation practitioners, elected officials and community advocates to improve the walkability of Winston-Salem and create more comfortable streets for pedestrians of all ages and abilities. Planners and project designers should refer to these guidelines in developing the infrastructure projects recommended by this plan, but they should not be used as the sole reference for any detailed engineering design.

As a starting point, the following list of resources are from the NCDOT website, for “Bicycle & Pedestrian Project Development & Design Guidance”, located here (resources listed are linked through this page; Last retrieved in April 2020):


NORTH CAROLINA GUIDELINES

North Carolina Department of Transportation (NCDOT):

» WalkBikeNC: Statewide Pedestrian & Bicycle Plan
» Glossary of North Carolina Terminology for Active Transportation
» NCDOT Complete Streets, including the Complete Streets Planning and Design Guidelines
» Evaluating Temporary Accommodations for Pedestrians
» NC Local Programs Handbook
» Traditional Neighborhood Development Guidelines

Greenway Construction Standards:

» Greenway Standards Summary Memo
» Design Issues Summary
» Greenway Design Guidelines Value Engineering Report
» Summary of Recommendations
» Minimum Pavement Design Recommendations for Greenways
» Steps to Construct a Greenway or Shared-Use Trail
NATIONAL GUIDELINES

Rails-to-Trails Conservancy:
» General Design Guidance: https://www.railstotrails.org/build-trails/trail-building-toolbox/

American Association of State Highway and Transportation Officials (AASHTO):
» Guide for the Development of Bicycle Facilities
» Guide for the Planning, Design, and Operation of Pedestrian Facilities

The Federal Highway Administration (FHWA):
» Accessibility Guidance
» Design Guidance
» Facility Design
» Facility Operations

Manual on Uniform Traffic Control Devices (MUTCD):
» 2009 NC Supplement to MUTCD
» Part 4E: Pedestrian Control Features
» Part 7: Traffic Controls for School Areas
» Part 9: Traffic Controls for Bicycle Facilities

National Association of City Transportation Officials (NACTO):
» Urban Bikeway Design Guide
» Urban Street Design Guide

Safe Routes to School (SRTS) Non-Infrastructure:
» National Center for Safe Routes to School
» National Partnership for Safe Routes to School

US Access board:
» ABA Accessibility Standards
» ADA Accessibility Guidelines
» ADA Accessibility Standards
» Public Rights-of-Way, Streets & Sidewalks, and Shared Use Paths

NCDOT Bicycle and Pedestrian Policies

Additional FHWA resources not currently linked through the main NCDOT link above:
» Small Town and Rural Multimodal Networks Design Guide (2017)
  » Main Guide: https://ruraldesignguide.com/
  » Section specific to side paths: https://ruraldesignguide.com/physically-separated/sidepath
SIDEWALK INFILL + IMPROVEMENTS

Due to historic development patterns, sidewalks may be missing or underbuilt for limited segments along an otherwise continuous corridor, or may be provided on only one side of the street where demand exists for access on both sides. Sidewalk infill and improvement strategies should identify and prioritize gaps in order to provide complete, accessible facilities.

Providing a sidewalk along a roadway can reduce pedestrian crashes by 88%.

TYPICAL APPLICATION

» Missing segments in an otherwise complete corridor
» Missing on one side of a corridor
» Where sidewalks are completely absent from the roadway
» The AASHTO Guide for the Development of Pedestrian Facilities states “Wherever there is developed frontage along a road or street, there will be people walking for exercise, visiting neighbors, accessing bus stops, or walking for pure enjoyment. Sidewalk or pathways are needed to safely accommodate these activities.” (2004, p.25)

DESIGN FEATURES

» Sidewalk width will vary depending on the available public right-of-way between the curb line and private property line.
» Generally, sidewalk infill projects do not change the configuration of the roadway travel area.
» When filling gaps in a corridor, sidewalk segments should provide adequate width and landscaped buffer. A buffer zone of four to six feet is desirable to separate pedestrians from the street.

A Infill sidewalks may need to transition at the ends of the segments to connect to existing sidewalk alignment and design.

B New and reconstructed sidewalks must meet accessibility guidelines. This includes the design of curb ramps and driveway curb cuts.

PLANNING-LEVEL COST ESTIMATE

» Varies significantly dependent on project specifications

1 http://www.cmfclearinghouse.org/index.cfm
**SIDEWALK OBSTRUCTIONS AND DRIVEWAYS**

Obstructions to pedestrian travel in the sidewalk corridor typically include driveway ramps, curb ramps, sign posts, utility and signal cabinets, pull boxes and poles, mailboxes, fire hydrants and street furniture.

Driveways and entrances to parking structures can also be particularly challenging due to the restricted visibility of exiting motorists.

**TYPICAL APPLICATION**

» Limiting the number and width of access points reduces the need for special provisions.

» Obstructions such as utility boxes, pull boxes and traffic signal cabinetry should be placed in the furnishing or utility zone between the sidewalk and the roadway, or behind the sidewalk. They should be set back from driveway entrances to increase visibility of pedestrians.

**DESIGN FEATURES**

A When sidewalks abut angled on-street parking, increase the width of the sidewalk by 3’ to account for vehicle overhang.

B Planter strips allow sidewalks to remain level, with the driveway grade change occurring within the planter strip. The furnishing or utility zone also serves as the extended area where driveway grade changes should occur. This ensures a continuous elevation along the pedestrian through zone.

C When sidewalks abut hedges, fences, or buildings, an additional two feet of lateral clearance should be added to provide appropriate shy distance.

D Where constraints preclude a planter strip, or where the planter strip is narrow, wrapping the sidewalk around the driveway allows the sidewalk to still remain level.

E Driveways are a common sidewalk obstruction, especially for wheelchair and other mobility assisted device users. When constraints only allow curb-tight sidewalks, lowering the entire sidewalk at the driveway approach keeps the cross-slope at a constant grade. However, this may be uncomfortable for pedestrians and could create drainage problems behind the sidewalk. Frequent driveways in this configuration create a “roller coaster” effect forcing pedestrians to constantly be climbing or descending.

**FURTHER CONSIDERATIONS**

Pedestrians easements may allow for the installation of sidewalks outside of the available right-of-way.

**PLANNING-LEVEL COST ESTIMATE**

» Varies significantly dependent on project specifications
PEDESTRIAN LANE

A pedestrian lane is a low-cost alternative to a separated path or sidewalk that may be appropriate on roads with moderate speeds and volumes. The lane provides a space for pedestrians to walk and separated from motor vehicle traffic by roadway striping.

**TYPICAL APPLICATION**

» As an affordable alternative to a sidewalk. In some suburban and rural communities, sidewalks may not be the appropriate pedestrian facility choice, due to right of way constraints, storm water infrastructure, economic impacts, or other reasons.

» On streets with low to moderate volumes and low to moderate speeds.

» Works best inside more built up areas, such as near commercial areas.

» Preferred application is on roadways with a motor vehicle volume (ADT) under 2,000 and a motor vehicle operating speed under 25 mph. The range for potential application extends to roadways with 6,000 ADT and 30 mph.

**DESIGN FEATURES**

A Pedestrian lane width of 8 feet is preferred, 5 foot minimum.

B A pedestrian lane must be separated from the adjacent travel lanes with some form of lane delineation, such as a 6”-8” white line or a double 4” white line. A marked buffer may also be used to provide additional separation.

C Pedestrian lanes should be marked with the appropriate pavement legend markings in white color, positioned laterally in the center of the lane (MUTCD, 2009, p. 415).

D Pedestrian Warning Sign (W11-2) paired with an “ON ROADWAY” legend sub plaque may be used to indicate to drivers to expect pedestrians within the paved road surface.

E Vehicles need to be able to traverse the roadway without encroaching into the pedestrian lane. The minimum clear width would be 18 feet in low volume and speed scenarios and 20-22 feet minimum typical.

» Pedestrian lanes should meet accessibility requirements to the greatest extent possible, including having cross-slopes less than 2% and detectable warnings in appropriate locations.

**PLANNING-LEVEL COST ESTIMATE**

» $10 - $15 per linear foot dependent on bollard and stencil placement.
**CURB RAMP ORIENTATION**

Accessible curb ramps provide equal service under ADA law to those with mobility impairments. Accessible curb ramps are a requirement of new construction and for most maintenance activities. There are a number of factors to be considered in the selection and orientation of curb ramps.

Although diagonal curb ramps might seem more efficient, they create potential safety and mobility problems for pedestrians, particularly those using wheelchairs and blind pedestrians. Diagonal ramps orient users into the traffic zone, and force wheelchairs to turn and re-enter the crosswalk. Pedestrians with vision impairments may be oriented into the middle of the intersection, instead of directly into the crosswalk as with perpendicular ramps. Diagonal curb ramp configurations are not recommended.

**TYPICAL APPLICATION**

» The ramp shall slope no more than 1:10, with a maximum cross slope of 2.0%. A slope of no more than 1:12 is desirable.

» If the ramp runs directly into a crosswalk, the landing at the bottom will be in the roadway.

» The level landing at the top of a ramp shall be a minimum of 5'-0" long (in the direction of the ramp run) and at least as wide as the ramp. If there is a change in direction between ramps and landings, the landing should be a minimum of 5'-0" wide.

» Curb ramps shall be located so that they do not project into vehicular traffic lanes, parking spaces, or parking access aisles. Three configurations are illustrated above.

**DESIGN FEATURES**

**A**

Diagonal curb ramps are not recommended. If used, diagonal ramps shall include a clear space of at least 48" within the crosswalk for user maneuverability.

**B**

Parallel Curb Ramp

**C**

Perpendicular Curb Ramps

» B+C Combination ramps may include elements of both parallel and perpendicular ramps to meet grading challenges.

**PLANNING-LEVEL COST ESTIMATE**

» $1,000 - 1,500 per ramp depending on complexity
RAISED CROSSWALKS
Typically limited to 2 and 3-lane roadways (30mph max), raised crosswalks slow vehicles and have a studied crash reduction factor of 45%.

Raised crosswalks create a special emphasis on crossing pedestrians and should be used on a limited basis. Schools and Neighborhood Greenways are good candidate locations. Some raised crossings can eliminate the need for grade changes over the pedestrian path of travel and improve comfort for users.

TYPICAL APPLICATION
» Use detectable warnings at the curb edges to alert vision-impaired pedestrians that they are entering the roadway.
» Approaches to the raised crosswalk may be designed to be similar to speed humps.
» Drainage improvements may be required depending on the grade of the roadway.

DESIGN FEATURES
A tactile warning device should be used at the curb edge
No grade change with sidewalk level is preferred

FURTHER CONSIDERATIONS
Like a speed hump, raised crosswalks have a traffic slowing effect which may be unsuitable on high-speed streets, designated transit or freight routes, and in locations that would reduce access for emergency responders. The noise of vehicles traveling over raised crosswalks may be of concern to nearby residents and businesses.

PLANNING-LEVEL COST ESTIMATE
» $300-400 per linear foot of crossing width utilizing concrete construction. Does not include bulbouts as depicted in graphic.

1 http://www.cmfclearinghouse.org/index.cfm
**MARKED CROSSWALKS AT INTERSECTIONS**

Marked crosswalks signal to motorists that they must yield for pedestrians and encourages pedestrians to cross at designated locations. Installing crosswalks alone, without additional treatments, will not necessarily make crossings safer, particularly on multi-lane roadways.

**TYPICAL APPLICATION**

At signalized intersections, all crosswalks should be marked. At unsignalized intersections, crosswalks may be marked under the following conditions:

- At an intersection within a school zone or on a walking route, and at parks, libraries, or community centers.
- At a complex intersection, to orient pedestrians in finding their way across.
- At an offset intersection, to show pedestrians the shortest route across traffic with the least exposure to vehicular traffic and traffic conflicts.
- At an intersection with visibility constraints, to position pedestrians where they can best be seen by oncoming traffic.
- In enhanced pedestrian zones like main streets or town centers, universities or other focal points.

**DESIGN FEATURES**

The crosswalk should be located to align as closely as possible with the through pedestrian zone of the sidewalk corridor.

- Transverse lines are the most basic crosswalk marking type. These are generally less visible and not as durable as Continental markings.
- Continental markings provide additional visibility and can be oriented to avoid the wheel path for improved longevity.

**FURTHER CONSIDERATIONS**

Continental crosswalk markings should be used at crossings with high pedestrian use, particularly where the crossing is not controlled by signals or stop signs, such as a local street crossing of a multi-lane arterial. These type of markings should also be used where vulnerable pedestrians are expected, including crossings near schools. Continental crosswalk marking also requires less on-going maintenance and lasts longer than other marking techniques.

**PLANNING-LEVEL COST ESTIMATE**

- Traditional paint - $9/linear foot
- Thermoplastic paint - $15/linear foot
- Total cost varies by crosswalk length and design e.g. solid, standard, continental, dashed, zebra, or ladder
**MARKED CROSSWALKS AT MID-BLOCK**

An effective pedestrian crossing at an uncontrolled location consists of a marked crosswalk, appropriate pavement markings, warning signage, and other markings to slow or stop traffic such as curb extensions, median refuges, beacons, hybrid beacons, or signals. Designing crossings at mid-block locations depends on an evaluation of motor vehicle traffic volumes, line of sight, pedestrian traffic volumes, land use patterns, vehicle speed, and road type and width.

When space is available, a median refuge islands have shown to have a 46% crash reduction factor with marked crosswalks. See *Median Refuge Islands* for more guidance.

### TYPICAL APPLICATION

- **Locations where mid-block crossings should be considered include:**
  - Long blocks (longer than 600 ft.) with destinations on both sides of the street
  - Locations with heavy pedestrian traffic, such as schools, shopping centers, and shared use path crossings
  - At transit stops, where transit riders must cross the street on one leg of their journey
  - Marked crosswalks at mid-block or other uncontrolled locations should not be installed without additional crossing enhancements when the speed limit of the roadway is greater than 40 MPH and the roadways has either of the following volume and physical characteristics:
    - 12,000 ADT or greater on four-lane roads without a raised median or pedestrian refuge island
    - 15,000 ADT or greater on four-lane roads, with a raised median or pedestrian refuge island

See *Enhanced Crossing Treatment Selection* for more guidance on the need for crossing enhancements at mid-block crossings based on speed, lane, and traffic volume levels. Minimum sight distance:

- 25 MPH zone: 155 feet
- 35 MPH zone: 250 feet
- 45 MPH zone: 360 feet

### DESIGN FEATURES

- **A** Detectable warnings help visually impaired pedestrians identify the edge of the street and are required through ADA
- **B** Advance yield lines should be placed 20-50 feet in advance of multi-lane uncontrolled mid-block crossings. Advance yield lines have a crash reduction factor of 25%.
- **C** Crosswalk markings legally establish mid-block pedestrian crossings
- **D** Pedestrian and stop warning signage (W11-2, W16-7P, and R1-5C) should be installed in advance of the crossing to alert drivers of the potential presence of pedestrians in the roadway

### FURTHER CONSIDERATIONS

Uncontrolled crossings of multi-lane roadways with over 15,000 ADT may be possible with features such as sufficient crossing gaps in vehicular traffic (more than 60 per hour), median refuges, or active warning devices like rectangular rapid flash beacons or in-pavement flashers, and good sight distance.

### PLANNING-LEVEL COST ESTIMATE

- Varies significantly dependent on project specifications

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1 http://www.cmfclearinghouse.org/index.cfm
**MEDIAN REFUGE ISLANDS**

Median refuge islands are located at the mid-point of a marked crossing and help improve safety by increasing visibility and allowing pedestrians to cross one direction of traffic at a time.

Refuge islands minimize pedestrian exposure at mid-block crossings by shortening the crossing distance and increasing the number of available gaps for crossing.

Median refuge islands can also be configured as an off-set crossing. This requires pedestrians to change their direction of travel while in the median - to face on-coming vehicles - before crossing. Refuge islands have a crash reduction factor between 32% and 46% depending on configuration.1

**TYPICAL APPLICATION**

» Refuge islands can be applied on any roadway with a left turn center lane or median that is at least 6’ wide.

» Islands are appropriate at signalized or unsignalized crosswalks.

» The refuge island must be accessible, preferably with an at-grade passage through the island rather than ramps and landings.

» The island should be at least 6’ wide between travel lanes (to accommodate wheelchair users) and at least 20’ long (40’ minimum preferred).

» Provide double centerline marking, reflectors, and “KEEP RIGHT” signage in the island on streets with posted speeds above 25 mph.

**DESIGN FEATURES**

A Cut-through median refuge islands are preferred over curb ramps to better accommodate wheelchair users.

B Pedestrian warning signage should be placed in advance of the crossing

**FURTHER CONSIDERATIONS**

» Median refuge islands can be installed on roadways with existing medians or on multi-lane roadways where adequate space exists. Median Refuge Islands at mid-block crossings must be paired with crosswalks, and should include advance pedestrian warning signage when installed at uncontrolled crossings.

» On multi-lane roadways, consider off-set crossings and configuration with active warning beacons for improved yielding compliance.

» This treatment may be combined with Rectangular Rapid Flashing Beacons (RRFBs) or Pedestrian Hybrid Beacons (PHBs). See treatment description for more information.

**PLANNING-LEVEL COST ESTIMATE**

» $10,000 - $20,000 depending on presence of existing median and length of new median.

1 [http://www.cmfclearinghouse.org/index.cfm](http://www.cmfclearinghouse.org/index.cfm)
RECTANGULAR RAPID FLASH BEACONS (RRFB)

Rectangular Rapid Flash Beacons (RRFB) are a type of active warning beacon used at unsignalized crossings. They increase motor vehicle yielding compliance when compared to older style flashing beacons.

TYPICAL APPLICATION

» Guidance for marked/unsignalized crossings applies.

» RRFBs shall not be used at crosswalks controlled by YIELD signs, STOP signs, Pedestrian Hybrid Beacons (HAWKs), or traffic control signals.

» RRFBs shall initiate operation based on user actuation and shall cease operation at a predetermined time after the user actuation or, with passive detection, after the user clears the crosswalk.

» Rectangular Rapid Flash Beacons (RRFB) dramatically increase compliance over conventional warning beacons.

DESIGN FEATURES

» RRFBs are typically activated by pedestrians manually with a push button, or can be actuated automatically with passive detection systems. See Enhanced Crossing Treatment Selection page for more details on appropriate applications.

» Providing secondary installations of RRFBs on median islands further improves conspicuity and driver yielding behavior.

» Beacons may be installed as side mounted or in overhead installations.

» Must be used in conjunction with W11-2, S1-1, or W11-15, (and W16-7P if post-mounted). See FHWA Interim Approval Z1 for more information.

FURTHER CONSIDERATIONS

Rectangular rapid flash beacons elicit the highest increase in compliance of all the warning beacon enhancement options.

A study of the effectiveness of going from a no-beacon arrangement to a two-beacon RRFB installation increased yielding from 18 percent to 81 percent. A four-beacon arrangement raised compliance to 88%. Additional studies of long term installations in Florida show little to no decrease in yielding behavior over time. However, Local yielding rates will vary with prevailing driving culture and driver expectancy.

PLANNING-LEVEL COST ESTIMATE

» $12,000-$18,000 for purchase and installation of two units (one on either side of a street). Costs would be proportionately higher for additional units placed on a median island, etc. (Source: FHWA Office of Safety; costs adjusted to 2021)
PEDESTRIAN HYBRID BEACON

Hybrid beacons or High-Intensity Activated Crosswalks (HAWK) are used to improve non-motorized crossings of major streets. A hybrid beacon consists of a signal head with two red lenses over a single yellow lens on the major street, and a pedestrian signal head for the crosswalk.

Hybrid beacons are only used at marked mid-block crossings or unsignalized intersections. They are activated with a pedestrian pushbutton at each end. If a median refuge island is used at the crossing, another pedestrian pushbutton can be located on the island to create a two-stage crossing.

TYPICAL APPLICATION

» Suitable for arterial streets where posted speeds are 30-45 mph and multiple travel lanes. In some cases, PHBs are also being implemented along 2-lane roadways.

» Where off-street bicycle facilities intersect major streets without signalized intersections.

» At intersections or midblock crossings where there are high pedestrian volumes.

DESIGN FEATURES

» Hybrid beacons may be installed without meeting traffic signal control warrants based on engineering judgment if roadway speed and volumes are excessive for comfortable pedestrian crossings.

» If installed within a signal system, signal engineers should evaluate the need for the hybrid beacon to be coordinated with other signals. To maximize pedestrian compliance, the PHBs should activate on demand.

» Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk to provide adequate sight distance.

» Crossings with a median refuge and no more than two lanes in each direction may utilize side mounted beacons for reduced cost and complexity.

FURTHER CONSIDERATIONS

» Hybrid beacons are normally activated by push buttons, but may also be triggered by infrared, microwave, or video detectors. If not on-demand, the maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street, but a much shorter delay is strongly preferred.

» Each crossing, regardless of traffic speed or volume, requires review to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity, and safety.

» The installation of hybrid beacons should also include public education and enforcement campaigns to ensure proper use and compliance.

PLANNING-LEVEL COST ESTIMATE

» $30,000 - $150,000 depending on complexity and overhead vs side mounted configuration.
**CURB EXTENSIONS**

Curb extensions, also called curb bulbouts and neckdowns, minimize pedestrian exposure during crossing by shortening the crossing distance and giving pedestrians a better chance to see and be seen before beginning to cross. Curb extensions are appropriate for any crosswalk where it is desirable to shorten the crossing distance and there is a parking lane adjacent to the curb.

**TYPICAL APPLICATION**

- For purposes of efficient street sweeping, the minimum radius for the reverse curves of the transition is 10 ft and the two radii should be balanced to be nearly equal.

**DESIGN FEATURES**

- The curb extension width should terminate one foot short of the parking lane to provide shy distance.
- Crossing distance is shortened by approximately 6-8 feet with a parallel parking lane or 15 feet or more with an angled parking lane.
- Curb extension length can be adjusted to accommodate bus stops or street furniture.

**FURTHER CONSIDERATIONS**

If there is no parking lane, adding curb extensions across a roadway shoulder may be a problem for bicycle travel and truck or bus turning movements.

**PLANNING-LEVEL COST ESTIMATE**

- $6,000 - $20,000 depending on size (per corner)
**CORNER RADII**

The size of a curb's radius can have a significant impact on pedestrian comfort and safety. A smaller curb radius provides more pedestrian area at the corner, allows more flexibility in the placement of curb ramps, results in a shorter crossing distance and requires vehicles to slow more on the intersection approach. During the design phase, the chosen radius should be the smallest possible for the circumstances and consider the effective radius in any design vehicle turning calculations.

**TYPICAL APPLICATION**

The curb radius may be as small as 3 ft where there are no turning movements, or 5 ft where there are turning movements and adequate street width. On-street parking and bike lanes create a larger effective turning radius and can therefore allow a smaller physical curb radius.

**DESIGN FEATURES**

Corners have two critical dimensions which must be considered together.

- **A** The physical radius controls the pedestrian experience.
- **B** The effective radius is the widest turning arc that a vehicle can take through the corner and is larger than the physical radius. The effective radius should be considered when studying design vehicle accommodation.

**FURTHER CONSIDERATIONS**

Several factors govern the choice of curb radius in any given location. These include the desired pedestrian area of the corner, traffic turning movements, street classifications, design vehicle turning radius, intersection geometry, and whether there is on-street parking or a bike lane (or both) between the travel lane and the curb. This is a complex topic and many strategies can be employed to balance the trade-offs between accommodating large vehicles and maximizing pedestrian safety. Truck aprons, mountable corners, and wider turning into multiple receiving lanes can help keep turning speeds low for the vast majority of vehicles.

For more information on corner design, including policy support, recommendations, case studies and more, see *Corner Design for All Users: A review of geometric design practices to improve safety for pedestrians and bicyclists at intersection corners.*
LEFT TURN SIGNAL PHASING

Pedestrians are vulnerable on the permissive left turn interval, where motorists trying to make a left turn are focused on the traffic signal head and potential gaps in on-coming traffic. They may not see pedestrians in the crosswalk before they accelerate to clear the intersection. Protected left turns and Protected-Permissive Left Turns (PPLT) are two phasing options that offer improved safety for pedestrians.

Protected left turns eliminate the left turn conflict altogether. The trade-off is often a longer signal cycle length. Eliminating permissive lefts completely will result in a crash reduction factor of 70% for all user and crash types and is the single most effective change to intersection phasing with regard to safety.

PPLT functions as a combination of the two phasing options, balancing the safety benefits of protected left turns and the efficiency benefits of permissive left turns. Motorists have left turn right-of-way with a protected green arrow, and a permissive left turn on a circular green display or flashing yellow arrow. Protected left turn phasing may be shorter in some cases under this scenario.

TYPICAL APPLICATION

» PPLT should only be used with lead-lead left turn phasing.
» PPLT typically requires the use of a five-section signal display. A four-section signal display can be used if the circular green display and green arrow display end at the same time (when combined with circular displays) or if a flashing yellow arrow is used (when separate left turn signal head is used).
» The use of PPLT should not be considered at intersections where there are a high incidence of pedestrian collisions, poor visibility and sight lines, or unusual roadway geometries.

FURTHER CONSIDERATIONS

Similar to permissive-only left turn phasing, caution must be taken to avoid the “Yellow Trap” lead-lag scenario when motorists assume that traffic in the opposing direction is following a signal with identical and concurrent phasing. The “Dallas Signal” and flashing yellow arrow are two MUTCD approved displays that have been shown to effectively reduce incidence of yellow traps.

1 http://www.cmfclearinghouse.org/index.cfm
WAYFINDING
The ability to navigate across an urbanized area is informed by landmarks, natural features, and other visual cues. Signs throughout the city should indicate the direction of travel, the locations and travel time distances to those destinations. A pedestrian wayfinding system is similar to a transit, vehicular, or bike facility wayfinding system, in that it consists of comprehensive signing and/or pavement markings to guide pedestrians to their destination along routes that are safe, comfortable and attractive.

TYPICAL APPLICATION
» Wayfinding signs will increase users’ comfort and accessibility to the pedestrian system in denser urbanized areas and connections to other destinations across the larger region.
» Signage can serve both wayfinding and safety purposes including:
  » Helping to familiarize users with the pedestrian network
  » Helping users identify the best routes to destinations within walking distance or connections to other modes.
  » Helping to address mis-perceptions about time and distance.
  » Helping overcome a “barrier to entry” for people who are not frequent walkers.

DESIGN FEATURES
» Confirmation signs indicate to pedestrians that they are on the right path to their destinations. They include destinations and distance/time, but not arrows
» Turn signs indicate where a route turns from one street onto another street.
» Decision signs indicate the junction of two or more pedestrian routes to access key destinations. These include destinations, arrows and distances. Travel times are optional but recommended.
» A regional wayfinding sign plan would identify sign locations, sign type, destinations, and approximate distance and travel time to destinations, and highlight connections between urban and non-urbanized areas. See MUTCD Section 2D.50 for guidance on Community Wayfinding Signage.

PLANNING-LEVEL COST ESTIMATE
» Individual signs: $500 - $1,000
» Kiosk: $1,500 - $7,000 dependent on design complexity
PEDESTRIAN TRAFFIC SIGNAL ENHANCEMENTS

Pedestrian-vehicle conflicts can occur when drivers performing turning movements across the crosswalk do not see or yield to pedestrians who have the right-of-way. Pedestrians may also arrive at an intersection late, or may not have any indication of how much time they have to safely cross the intersection. Pedestrian traffic signal enhancements can be made to provide pedestrians with a head start, called a Leading Pedestrian Interval, or extend the walk time to allow them to safely and comfortably cross the street.

TYPICAL APPLICATION

» Leading Pedestrian Intervals (LPI) are used to reduce right turn and permissive left turn vehicle and pedestrian conflicts. The pedestrian interval is initiated 3-10 seconds, in advance of the concurrent green with the potential for permissive right and left turn conflicts. The LPI gives pedestrians a head-start making them more visible, and reducing crossing exposure time. Accessible Pedestrian Signals (APS) should be implemented with an LPI.

» Push buttons can be configured to provide additional crossing time. The MUTCD requires signage indicating the walk time extension at or adjacent to the push button (R10-32P).

» Passive pedestrian detection devices save pedestrians the trouble of having to locate a push button. They are also capable of tracking pedestrians as they cross the intersection, and can be configured to extend the walk/flashing don’t walk interval when pedestrians are still in the intersection, and/ or not dedicate walk time in the absence of pedestrians.

» The PROWAG guidance requires APS installation with any new or altered signal.

FURTHER CONSIDERATIONS

When pedestrians have to wait an entire cycle for the next walk phase, a higher incidence of non-compliance, in the form of jay-walking, or unpredictable behavior may occur. These signal enhancements facilitate safer, more predictable, and conspicuous crossing conditions. The Leading Pedestrian Interval and walk time extensions provide additional time for pedestrians who may need more time to cross the street such as wheel-chair users, people with disabilities, the elderly, and children.
PEDESTRIANS AT SIGNALIZED INTERSECTIONS

TYPICAL APPLICATION

Pedestrian Signal Heads

Pedestrian signal heads indicate to pedestrians when to cross at a signalized crosswalk. Pedestrian signal indications are recommended at all traffic signals except where pedestrian crossing is prohibited by signage.

Countdown pedestrian signals should be retrofitted at existing signals with older style pedestrian signals and on any new installation. Countdown signals have a crash reduction factor of between 25 and 52% in varied studies.

Signal Timing and the Pedestrian Phase

Adequate pedestrian crossing time is a critical element of the walking environment at signalized intersections. The length of a signal phase with parallel pedestrian movements should provide sufficient time for a pedestrian to safely cross the adjacent street. The MUTCD recommends a walking speed of 3.5 ft per second.

At crossings where older pedestrians or pedestrians with disabilities are expected, crossing speeds as low as 3 ft per second should be assumed. Special pedestrian phases can be used to provide greater visibility or more crossing time for pedestrians at certain intersections (See Pedestrian Traffic Signal Enhancements).

Large pedestrian crossing distances can be broken up with median refuge islands. A pedestrian pushbutton can be provided on the median to create a two-stage pedestrian crossing if the pedestrian phase is actuated. This ensures that pedestrians are not stranded on the median, and is especially applicable on large, multi-lane roadways with high vehicle volumes, where providing sufficient pedestrian crossing time for a single stage crossing may be an issue.

Consider the use of a Leading Pedestrian Interval (LPI) to provide additional traffic-protected crossing time to pedestrians. See Pedestrian Traffic Signal Enhancements for additional detail.

Accessible Pedestrian Signals (APS) provide crossing assistance to pedestrians with vision impairment at signalized intersections.

FURTHER CONSIDERATIONS

Pushbuttons should be located so that someone in a wheelchair can reach the button from a level area of the sidewalk without deviating significantly from the natural line of travel into the crosswalk. Pushbuttons should be marked (for example, with arrows) so that it is clear which signal is affected.

In areas with very heavy pedestrian traffic, consider an all-pedestrian signal phase to give pedestrians free passage in the intersection when all motor vehicle traffic movements are stopped. This may provide operational benefits as turning movements are then unimpeded.
In some intersections of arterials streets, design vehicle requirements or intersection angles may result in wide turning radii at corners. Configuring the intersection as a channelized (or free-right) turn lane with a raised refuge island can improve conditions for pedestrians.

To improve safety and comfort for pedestrians, treatments to slow traffic at the pedestrian crossing are recommended such as provision of a raised crosswalk, high visibility crosswalk, and/or pedestrian crossing signage. Signalizing the pedestrian crossing over the channelized right turn lane may be desirable if the intersection is in a location where higher than normal concentrations of pedestrians with disabilities exist.

**TYPICAL APPLICATION**

- At signalized intersections.
- Intersections with high right turn traffic volumes, and very low levels of pedestrian activity.
- Increase intersection efficiency and reduce unnecessary delay at areas with high right-turn traffic volumes.
- Wide streets with long crossing distances.
- As an improvement to intersections with an existing traditional channelized right-turn lane.

**DESIGN FEATURES**

A The preferred angle of approach is no more than 15-30 degrees.1

- Design the right turn lane to encourage appropriate deceleration in preparation for yielding to crossing pedestrians.
- Desired speed through turn lane: 14-18 mph

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» Maximum lane width of 14 feet
» Pedestrian refuge island requires:
  B  5’ clear space in center to accommodate turning movement
  C  4’ wide minimum approach to crosswalk with detectable warning strips
D  Raised or intermediate-level crosswalk may be used to improve yield compliance (optional)
E  Maximum radius 35’
F  A painted or raised corner apron should be provided to keep a narrower travel lane while still allowing for large vehicle tracking.

**FURTHER CONSIDERATIONS**

» Uncontrolled pedestrian crossings of channelized right turn lanes can present difficulties for pedestrians with vision impairments as the normal geometry and audible cues from approaching traffic are different.

» High-speed channelized right turn lanes resulted in the greatest pedestrian delay and risk. High Speed is categorized as a design speed or average observed speed at the crosswalk greater than 25 mph. These locations are good candidates for additional interventions to increase yielding.

» A raised pedestrian crossing may be used to slow driver speeds, encourage yielding, and prioritize crossing pedestrians over turning vehicles. A raised crossing is recommended if the posted speed is 50km/hour or less and turn volumes are 6,000 ADT or less.

» If further yielding compliance is needed, active warning beacons such as a Rectangular Rapid Flashing Beacon (RRFB) may be used.

**PLANNING-LEVEL COST ESTIMATE**

» $40,000 - $50,000

» Cost does not include replacement of the entire signal if it is located within the island.

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2 TRB, NCHRP 674: Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities. 2011.
ACCESS TO TRANSIT
Access to transit is an essential element of a functioning transportation system, and is critical for people who do not have the ability or choice to always drive or rely on rides for all of their daily trips. Access to transit is important for both residents and visitors, in urban and suburban contexts. Because transit has the potential to move the most people, mitigate congestion, reduce emissions, and connect to other modes, it plays a crucial role in determining the social, environmental, and economic health of communities.

TYPICAL APPLICATION
» Across the transit system, transit stations and stops need to be accessible by people walking and bicycling. This means stations and stops need to be spaced throughout the network so that people are within appropriate walking and bicycling distance of them; generally 0.25 mile and 0.5 mile, respectively\(^1\).\(^2\).
» Stops locations should feature high quality sidewalks and comfortable, safe walking environments. Street crossings should provide marked crosswalks, shorter crossing distances, and may feature other crossing and signal enhancements to aid people of all ages and abilities.
» The bus platform and shelter environment must be accessible, well-lit, properly maintained, and provide protection from the elements.

DESIGN FEATURES
» Transit platform and stop design should be based on expected ridership demand, adjacent land uses, and anticipated connections. Platforms and stops need to be integrated into the streetscape, to reduce the potential for conflicts with other modes or uses.
» Sidewalks, stops and platforms need to be ADA compliant, free of visual and physical obstructions, and feature appropriate wayfinding and service information.
» Mid-block, near- or far-side stop locations should be determined on a location-by-location basis.
» Transit service needs to be reliable, frequent, affordable, and connect high demand origins and destinations. Routes should be along major thoroughfares with appropriate stop spacing.

TRANSPORT STOP DESIGN

Bus platforms or waiting areas serve as the critical transition point for pedestrians as transit passengers. As such, bus platforms, shelters, and shelter amenities need to be designed to the benefit of people boarding, alighting, waiting, and passing through. Transit platforms and shelters should be designed to be comfortable and safe, accessible for people with disabilities, sized appropriately based on ridership and demand, use space efficiently, and to minimize delay and conflicts with other modes such as bicycles, and competing sidewalk uses.

TYPICAL APPLICATION

» Bus stops can range from simple curbside stops with a pole and seating, to in-roadway platforms with shelters and other shelter amenities depending on demand, adjacent land use, and available right of way.

» Typically, bus stop shelters and amenities occupy an area of the sidewalk, either in the furnishing zone, or a reserved space in the frontage zone. They can also be located on transit islands which accommodates bicycle through traffic, or in medians for center running alignments.

» Shelters can face toward the roadway or away from the roadway. Shelters facing toward the roadway provide better sightlines, but may compete with other sidewalk uses and adjacent property access and circulation.

DESIGN FEATURES

» Bus shelters should be designed to minimize potential for conflicts between the bus, and people walking and bicycling through the area.

» Site visibility is a critical safety and security factor. The bus operator needs to be able to see waiting passengers, and waiting passengers need to be able to see approaching buses. The shelter, street trees, and other vertical elements must not obstruct visibility. The stop and shelter should be adequately illuminated at night for safety and security.

» The shelter should maximize use of materials that maximize visibility for waiting passengers, and minimize incentive for vandalism.

» The shelter canopy should be sized to provide sufficient coverage based on stop demand.

PLANNING-LEVEL COST ESTIMATE

» Shelter: $5,000 - $15,000

» Floating platform: $6,000 - $15,000 depending on length
ACCESS TO REGIONAL TRAILS
Regional trails are often thought of as desirable recreational facilities, but they also serve important utilitarian transportation functions. Access to the regional trail network is therefore as important of a mobility strategy as it is a leisure or quality of life amenity. Access to regional trails can provide many residents and visitors alike a comfortable, safe way to make many trips, including longer trips, by walking and biking off the busy road network. Trail access means providing a formalized way for people to arrive and depart from the trail network by a variety of travel modes.

TYPICAL APPLICATION
» Regional trail access points can take several different forms ranging from major trailheads, minor trailheads, and neighborhood entryways. These vary in the level of infrastructure and facility amenities.
» These access points are multimodal transition points; they serve as the transition between the on-street network and the off-street network for people walking, biking, riding transit, and driving.
» All trailheads should be open to the public.

DESIGN FEATURES
» Major trailheads feature convenient access to transit, parking for 10 or more vehicles, (including accessible spaces), short- and long-term bicycle parking, restrooms, trash/recycling facilities, wayfinding/interpretive kiosks, benches/picnic tables, and other day use amenities.
» Minor trailheads include similar facilities as major trailheads but a lower provision of vehicle and bike parking and day use amenities, and may be further from major transit and bike connection points.
» Neighborhood entrypoints are the most basic form of local accessways that do not provide many of the amenities of trailheads due to space constraints, neighborhood context, and/or proximity to other trailheads.
TRAFFIC CALMING

City of Winston-Salem Traffic Calming Policy

Winston-Salem’s traffic calming policy is approaching 20 years old and has many foundational elements that could be modernized to improve efficiency and cost while better serving the public and meeting WSDOT goals. It is recommended that the City of Winston-Salem revisit and update this policy to be more congruous with outcomes of this Plan.

RECOMMENDATIONS:

» Use the data driven framework outlined in this plan (pedestrian priority network and prioritization) to take a proactive approach to planning, designing, and implementing traffic calming measures.

» Provide an updated and more flexible process for community engagement and implementation.

» Update the traffic calming toolbox to include modern context-sensitive elements (with updated costs and design considerations) such as quick-build approaches.

The following page on speed management provides general guidance that represents best practices from other communities, but may not be compatible with the current City of Winston-Salem traffic calming policy.

For current information on the approved policy and traffic calming measures visit: https://www.cityofws.org/1288/Traffic-Calming-Policy
SPEED MANAGEMENT*

The ITE publication Traffic Calming: State of the Practice defines traffic calming as “the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for nonmotorized street users” (1999, p.2).

The FHWA Office of Safety Traffic Calming Website note that traffic calming includes physical changes to the roadway, signage, or operation changes and can be thought of as a “silent policeman” enforcing speed limits where no law enforcement is present. For more information on traffic calming, refer to the FHWA Speed Management Safety Website.

BENEFITS OF REDUCING SPEED

Speeding is a major contributing factor in crashes of all types, and increases severity in the event of a crash. Faster speeds also increase the likelihood of a pedestrian being hit as reaction time and the higher speed of the vehicle increase stopping distance. At higher speeds, motorists are less likely to see and react to a pedestrian and are even less likely to be able to stop in time to avoid hitting one.

APPLICATION

Speed management can play an important part of creating multimodal networks. Speed reduction measures are common as part of Neighborhood Greenways to create and enforce desired operating speeds. Speed management can also enhance pedestrian safety in Main Street areas. Refer to the Transitions to Main Streets section in FHWA Achieving Multimodal Networks 2016 for more information on applying traffic calming in advance of built-up areas.

TRAFFIC-CALMING MEASURES

There are three general types of speed reduction measures:

» Physical measures such as vertical deflections, horizontal shifts, and roadway narrowing intended to reduce speed and enhance the street environment for non-motorists.

» Nonphysical measures using signs and markings are intended to raise awareness and reduce speed through visual indications.

» Diversion treatments reduce cut-through traffic by obstructing or otherwise preventing traffic movements in one or more directions.

*Guidance from other communities.

See traffic calming policy note on page 76.
Chapter 5: **Implementation**

**PROJECT DEVELOPMENT**

**PEDESTRIAN PROJECT DEVELOPMENT TODAY**

Through responsiveness to resident requests and complaints, a series of bond initiatives, and short-term initiatives over the past decade, the City has slowly been working towards retrofitting its roadway network with sidewalks and crossing improvements. However, the City faces challenges to developing a connected network of pedestrian facilities through a more strategic, effective approach.

**Current Implementation Barriers:**

- **Challenge of Retrofitting Sidewalks:** Adding sidewalks to existing roadway corridors often requires grading, drainage improvements, utility relocation, and right-of-way acquisition, among other costly improvements. In addition to physical barriers, there may be political barriers as some business owners and homeowners do not support the addition of sidewalks to their sites.

- **Funding:** Like any City, there are budgetary constraints and trade-offs to be made for all City services provided to residents. To date, the City does not have a dedicated, recurring source of funding for pedestrian improvements. It has been dependent upon funding through the Winston-Salem Urban Area MPO and NCDOT STIP process, through “one-off” City-funded projects that address resident complaints and/or safety concerns, and bond initiatives.

- **Staffing:** For a variety of reasons, there are currently not adequate staff resources to process, design, and administer pedestrian projects. Today, the City is short-staffed on engineers who can design pedestrian projects and also oversee the work of contractors who design and construct sidewalks.
» **Inconsistent Process:** Currently, the City does not have a consistent process for pedestrian facility development, from the initial identification of projects through vetting, design, and construction. There is not a defensible and data-driven prioritization process in place so that the City can proactively identify projects that are the highest-need and provide the best “bang for the buck.”

» **Complaint-driven Process:** The bulk of current project identification is derived from resident complaints and requests. When individual members of the public drive project identification, projects that get funded do not always reflect the greatest citywide needs. Often, “lower-value” residential sidewalks are built where the need and safety concerns are lower than other locations.

» **Lower-value Projects Do Not Score Well for State Funding:** When complaint-driven projects are brought forward as City priorities through the MPO for the state SPOT (prioritization) process, they often score poorly. Because the projects do not meet the state criteria for addressing safety and improving connectivity, those projects are often not selected for funding through the state (see mock example map graphic below). In addition, residents often request a variety of smaller sidewalk projects, meaning a larger number of projects are occurring, which stretch City staff resources; a shorter list of longer-distance, higher-value, and impactful sidewalks would deliver more “bang for the buck” while providing greater overall connectivity.

**FIGURE 5: CONCEPTUAL SCORING ALTERNATIVES**

**LOWER SCORE ALTERNATIVE**

**HIGHER SCORE ALTERNATIVE**

**Advantages:**

» More destinations connected (and lower distance to them from the project alignment)

» More existing pedestrian facilities connected (with one on each end)

» Connects to a planned pedestrian facility (new scoring criteria being considered for P6.0)

» Connects to high density households

» Greater safety benefit due to crash locations

**Disadvantages:**

» Higher project cost for additional connections (though likely less per linear foot due to economies of scale)
BEST PRACTICES

Data-Driven Prioritization and Project Selection

A data-driven prioritization process provides a defensible justification for allocating resources in accordance with City goals. It also helps to align project selection with funders, improving the opportunity to leverage outside resources. For example, the Greensboro Metropolitan Planning Organization (MPO) used an automated GIS-based model to select local projects for MPO funding. They also created a prioritization scheme aligned with NCDOT’s state prioritization process to identify projects most likely to obtain state-controlled funds. As a result, they obtained more state funding through the process than any other region except Charlotte, beating out higher population areas. The models also improved efficiency and were set up to be used repeatedly for project comparison and selection.¹

This plan provides the basis for a similarly successful pedestrian infrastructure implementation program in Winston-Salem. The prioritization strategy outlined in Chapter 3 provides a data-driven approach for the use of local funding that can be aligned with state prioritization criteria. By doing so, Winston-Salem can maximize its chance of obtaining additional funds.

GIS-Based Example in Winston-Salem

Recently, through bond funding, the City improved dozens of signalized intersections across the City. City staff conducted a GIS analysis evaluating transit, sidewalk, and crash data to determine a justifiable list of improvements across the City. This type of process allowed for the City to make an educated decision on the projects that will make the most difference for the community as a whole.

Bundle Projects By Size and Location for Economies of Scale

Larger projects benefit from economies of scale in cost items like mobilization and materials. Proposed sidewalks have been grouped into longer segments as part of the prioritization process of this plan to take advantage of these economies of scale and provide the City with a list of projects viable for multiple funding options. The additional administrative burden and costs associated with federal funding make it appropriate to reserve the use of these funds for the largest projects—long sidewalks on arterial roadways.

Where short segments of new sidewalk or sidewalk repairs are needed, these can be grouped to gain economies of scale as well. The recommended maintenance approach by Council Ward takes advantage of a mobilized crew to address the highest priority needs in one section of the City at a time. Similarly, small groups of new sidewalks should be grouped geographically and bid as one project to reduce the administrative burden and per linear foot cost of sidewalk construction that occurs with short segments.

RECOMMENDED PEDESTRIAN PROJECT DEVELOPMENT PROCESS

This plan, developed through a stakeholder and public engagement process, includes a comprehensive, recommended pedestrian network. Through the planning process, a prioritization process was developed to rank the projects identified in the overall network (pp. 39-40). The process included a focus on plan goals, such as equity, safety, and connectivity. The resulting priority project table is considered a “living” tool that can be used by the City to organize projects by various funding criteria, geographic areas, type of destinations served, or all of the above. The City should follow this prioritization process as the starting point for project selection.

Following the development of a Priority List, the City should complete a thorough vetting process that includes review by City Management and City Council. In addition, City staff will fully evaluate the project for coordination opportunities, constructibility/feasibility, and stakeholder/public engagement related to the selected projects.

Through the vetting process, an Annual or Current Project List will be developed that should be communicated in a transparent process through the City’s website. City engineering staff will administer the projects, moving them through full design and construction. Following each round of projects, City staff should evaluate them to gather feedback and data related to their successes, challenges, and public use/perception of the new facility.

The graphic on the following page presents the full recommended implementation process (pedestrian project development) for the City of Winston-Salem and includes addressing both sidewalk and intersection improvements. In addition, as described in the policy recommendations of Chapter 3, Complete Street/roadway improvements should also be considered including the consolidation of driveway curb cuts, street trees, and other measures that improve pedestrian safety and the pedestrian experience.
Adopted Pedestrian Plan represents voices and values of hundreds of residents; Update every 5 years

Represents the universe of project need, including hundreds of miles of sidewalk and intersection improvements; Staff update annually

Using the process and table developed for this plan, apply prioritization criteria, such as equity, safety, and connectivity; Align with STI criteria as needed; Apply geographic equity filter as needed (such as by City ward) to develop the Draft Priority List; Staff update annually

High-level scoping to determine magnitude cost/effort and potential funding source(s); engagement of NCDOT for initial projects that fall along state roadway; attach this information to Priority List

• City Management and Elected Official: Review selected projects by Council Ward
• WSDOT:
  » Confirm appropriate funding source (STIP if it meets SPOT criteria vs City-funded) and adjust project(s) slightly if necessary
  » Conduct constructibility audit/Feasibility to account for ROW impacts, environmental constraints, design considerations, detailed cost estimates
  » Coordinate with local agencies, City departments, developers, and NCDOT to ensure there aren’t conflicts or opportunities
  » Collaborate and engage with stakeholders and public during feasibility study

Prepare for design and conduct in-house or select consultant(s); Submit projects intended for state funding through SPOT process (call occurs every two years); Project status tracker on website for transparency with public

• Project Design/Administration - PE, R/W, design, community engagement, construction
• Increase transparency and engagement by publishing the annual project list to a City-maintained website and marketing its release.

Evaluate the project impacts, usage, and resident feedback; continue maintenance as regular part of project development

Restart annually at step 4
FUNDING STRATEGIES

In order to achieve the goals of this plan, the City of Winston-Salem and its local partners will need to fund improvements from a variety of sources. Funding will need to be both consistent and opportunistic in order to maximize success. Given the constant change in funding availability at local, state, and federal levels, it is difficult to know what financial resources will be available at different time frames during implementation of this plan. However, some sources lend themselves to small projects, while others should be reserved for larger projects. Five primary funding sources make up the core funding strategy for this plan, which are outlined below along with their appropriate project size application (see the plan appendix for a full list of potential funding sources).

Primary Funding Sources

» Capital and Department Budgets (small budget)
» Bond Initiatives (large budget)
» New Development (small budget)
» Grants (small or large budget)
» Fundraising Campaigns (small budget)
» Federal Funds (large budget)

CAPITAL AND DEPARTMENT BUDGETS

Current capital and department budgets are limited and focused on maintenance needs. The following allocations were made in the most recent budget:

Internal Staff Capacity and Department Budgets: Respond to resident reports of maintenance needs with internal staff or outside contractors - full street maintenance budget for streets (1,044 miles) and sidewalks was $5,824,180 in FY20-21, which was reduced from the previous year.

Capital Projects: FY20-21 included $141,340 for new sidewalks and sidewalk maintenance, $141,340 for greenway projects, and $141,340 for traffic calming projects. Capital plan shows similar planned amount through 2024.

Recommendation: Present the findings of the Pedestrian Plan to Council in order to make the case for increased City funding to fully cover reactive maintenance needs as well as a proactive rotating maintenance program.
**BOND INITIATIVES**

The City has used bond initiatives previously and should be considered again in the future. The 2018 Bond included $43,700,000 for street and sidewalk projects; $13.8M for bike/ped-related projects

**$6.8M Corridor/streetscape projects:**
- $3.8M Business 40 corridor improvements (to supplement $9M funded by City and Creative Corridors Coalition)
- $2M Fifth Street streetscape (East End Area plan)
- $1M downtown streetscape improvements

**$5.6M Greenway projects**
- $2.3M MUP from Baptist Medical Center to Wake Forest Innovation Quarter
- $1.5M Little Creek Greenway
- $1M Salem Creek Greenway sidepath
- $800,000 misc greenway development

**$1.4M misc bike/ped improvements - Not yet allocated**

**Recommendation:** Put forward a set of highest priority projects from Maps 14-19 (high scoring overlaid with equity areas) for implementation by bond funding.

**NEW DEVELOPMENT**

New development funds the majority of new sidewalks in many communities. While reliance on development can lead to sidewalk gaps, it is a critical component of a sidewalk completion strategy in communities with limited resources.

**Recommendation:** Adopt the policy recommendations of this plan into the Unified Development Ordinance in order to ensure new development builds sidewalks and other pedestrian infrastructure in accordance with best practices.

**GRANTS**

Competitive grants through public agencies or through private or non-profit foundations can generate additional resources for projects and programs. Grant funding may also be used to acquire right-of-way. To increase readiness for grant funding, preliminary plans (30% construction drawings) can be developed for priority projects.

**FUNDRAISING CAMPAIGNS**

Fundraising through neighborhood groups, advocacy groups, or even crowd-funding can help generate additional resources for projects and programs. Fundraising will be most successful when tied to a well-branded project around which a local organization can build excitement, such as a named trail or educational program for kids. Fundraising is most appropriate for small projects, or to generate matching dollars for a larger funding source.
**FEDERAL FUNDS**

Federal funding for sidewalks can come from several federal programs including:

- Transportation Alternatives
- Surface Transportation Program
- Congestion Mitigation and Air Quality Improvement
- Highway Safety Improvement Program

Funding is administered through NCDOT and projects can be submitted by the MPO or NCDOT Division. Winston-Salem currently has a number of federally funded pedestrian projects in the 2020-2029 STIP, as summarized below.

Current Projects in STIP:

- $3.1M FY 20 Construction
- $5.3M FY 21 Construction
- $4.4M FY 22 Construction
- $0.5M FY 24 Construction

TABLE 10: CURRENT PROJECTS IN STIP

<table>
<thead>
<tr>
<th>Project ID</th>
<th>Location</th>
<th>Cost</th>
<th>Construction Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>EB-5840</td>
<td>Salem Parkway MUP</td>
<td>$1,621,000</td>
<td>2020</td>
</tr>
<tr>
<td>EB-4020C</td>
<td>Brushy Fork Greenway</td>
<td>$1,250,000</td>
<td>2020</td>
</tr>
<tr>
<td>EB-5810</td>
<td>Barbara Jane Avenue</td>
<td>$226,000</td>
<td>2020</td>
</tr>
<tr>
<td>EB-5722</td>
<td>Silas Creek Parkway SW</td>
<td>$1,488,000</td>
<td>2021</td>
</tr>
<tr>
<td>EB-5954</td>
<td>Griffith Road SW</td>
<td>$1,622,000</td>
<td>2021</td>
</tr>
<tr>
<td>EB-5955</td>
<td>Robinhood Road SW</td>
<td>$536,000</td>
<td>2021</td>
</tr>
<tr>
<td>EB-5952</td>
<td>Fairlawn Dr</td>
<td>$989,000</td>
<td>2021</td>
</tr>
<tr>
<td>EB-5953</td>
<td>University Parkway</td>
<td>$635,000</td>
<td>2021</td>
</tr>
<tr>
<td>EB-5812</td>
<td>Salem Creek Greenway</td>
<td>$1,650,000</td>
<td>2022</td>
</tr>
<tr>
<td>EB-6008</td>
<td>Salem Parkway MUP</td>
<td>$2,704,000</td>
<td>2022</td>
</tr>
<tr>
<td>EB-5920</td>
<td>Jonestown Road SW</td>
<td>$500,000</td>
<td>2024</td>
</tr>
</tbody>
</table>

**Recommendation:** Analyze the highest scoring projects in this plan via NCDOT’s SPOT scoring tool. Submit projects in the next round of prioritization that score highly in the City’s process and also score well by SPOT criteria.
**PERFORMANCE MEASURES**

Performance measures allow Winston-Salem staff to measure and track progress toward achieving plan goals and objectives, determine if the methods being used to achieve goals are working, and report about progress to the community. Performance measures can include any metric that can be compared year to year and that illustrates progress toward completing an action item or objective.

This plan assigns measures of success to each of the objectives that were identified to meet plan goals. These measures should be evaluated and reported on periodically by the City of Winston-Salem online where members of the public can check in on the progress made as Walkable Winston-Salem is implemented.

**TYPES OF PERFORMANCE MEASURES**

Measuring progress toward Walkable Winston-Salem’s goals will be vital in ensuring that the City is working to implement this plan and improving walkability for the residents of Winston-Salem. The measures used to evaluate success in achieving these goals will be both outcome-based and programmatic. This table summarizes how the key performance measures listed above relate to plan objectives, and includes additional measures to comprehensively track all objectives.
### TABLE 11: WALKABLE WINSTON-SALEM OBJECTIVES, PERFORMANCE MEASURES, AND TARGETS

<table>
<thead>
<tr>
<th>Objective</th>
<th>Performance Measures</th>
<th>Desired Target or Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete and maintain a pedestrian network, providing better connectivity, ensuring accessibility for people of all ages and abilities.</td>
<td>Percentage of the Pedestrian Priority Network with sidewalk gaps and crossing gaps.</td>
<td>Decrease in the percentage of the Pedestrian Priority Network with sidewalk and crossing gaps.</td>
</tr>
<tr>
<td>Prioritize investment in areas with the greatest historic underinvestment in pedestrian infrastructure and with historically under-served populations where need may be higher.</td>
<td>Percentage of the Pedestrian Priority Network with sidewalk and crossing gaps in areas with high concentrations of equity indicators.</td>
<td>Greatest decrease in percentage gaps in areas with high concentrations of equity indicators (relative to other areas of the City).</td>
</tr>
<tr>
<td>Protect the public safety and personal security of people walking.</td>
<td>Pedestrian crashes of all injury types.</td>
<td>Decrease in number of pedestrian crashes of all types per capita.</td>
</tr>
<tr>
<td></td>
<td>Pedestrian crashes resulting in death or serious injury.</td>
<td>Zero pedestrian crashes resulting in death or serious injury.</td>
</tr>
<tr>
<td>Make walking an inviting, attractive, and enjoyable experience through sound design.</td>
<td>Percentage of residents who are satisfied with the walking environment of the City.</td>
<td>Adoption of proposed policy changes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increase in the percentage of residents who are satisfied with the walking environment of the City.</td>
</tr>
<tr>
<td>Establish a strategic prioritization process that commits to funding pedestrian network improvements and existing sidewalk maintenance in the most critical locations.</td>
<td>Percentage of the highest scoring segments in the Pedestrian Priority Network with sidewalk and crossing gaps.</td>
<td>Decrease in the percentage of the highest scoring projects in the Pedestrian Priority Network with sidewalk and crossing gaps.</td>
</tr>
<tr>
<td>Improve the health of residents and the environment by getting more people walking for their transportation, recreation, and daily needs through policies, programs, and projects.</td>
<td>Percent of commuters walking to work (American Community Survey). Annual count of greenway users.</td>
<td>Increase in percent of commuters walking to work. Increase in greenway users.</td>
</tr>
</tbody>
</table>
MAINTENANCE RECOMMENDATIONS

THE EXISTING MAINTENANCE PROGRAM

Overview

The maintenance and replacement of pedestrian infrastructure in Winston-Salem is currently reactive to resident complaints, rather than proactive. The following categories of infrastructure are handled by the agencies noted below:

» Sidewalks and curb ramps - Field Operations Department/Streets Division
» Crosswalk markings and pedestrian signals - Department of Transportation/Traffic Engineering Division
» Greenways and pedestrian facilities in parks - Recreation and Parks Department

Sidewalk Maintenance

There is no existing inventory of sidewalk maintenance needs around the City and the existing staff in the Streets Division do not have the capacity to complete an ongoing evaluation of sidewalk conditions. Sidewalk repairs are currently addressed in two ways:

» Permitting request - Applicant obtains a permit to excavate a sidewalk and either performs the repair or pays additional fees to the City to perform the repair. Streets staff handle these repairs and they are typically completed in a timely manner.
» Resident complaints - Sidewalk issues reported through City Link 311 (online request system) or via phone call are added to a list of projects to be repaired by outside contractor forces. The backlog at the time of writing is 150 projects.

The City Code of Ordinances allows for cost-sharing of sidewalk repairs with property owners via assessment. Currently, City repairs that are not initiated by a permitting request are paid for by the City.

Pedestrian Traffic Control Maintenance

There is no comprehensive inventory of pedestrian signal maintenance needs, but pavement markings are routinely reviewed. The following existing practices are in place for pedestrian traffic control infrastructure:

» Annual Review - The City’s thermoplastic crew reviews markings in quadrants over a 6-month period each year. Repair of markings is seasonal and takes place in the spring through fall.
» Resurfacing - Crosswalk markings are replaced with street resurfacing projects.
» Resident complaints and Permitting requests - Signal or marking repairs reported through City Link 311, phone call, or an emergency response call, or those requested through the permitting process, are handled by traffic maintenance staff.

Greenways and Pedestrian Infrastructure in Parks

In March 2019, the Recreation Department completed an assessment of the facilities and amenities in the park system. This assessment documented deterioration of pedestrian infrastructure, along with other facilities. Funding is not currently available to address all identified maintenance needs, but the Department is transitioning from a reactive to proactive approach. Resident complaints and phone calls or emails currently drive maintenance projects, which are completed with staff resources.

» Deferred Maintenance Assessment - The Recreation Department completed this assessment in March of 2019. Needs are addressed through staff resources when available, or contracted out.

» Resident complaints - Issues reported through City Link 311 (online request system), email, phone call, or from staff are addressed with staff resources when available, or contracted out if needed to complete in a reasonable time frame.

Key Issues

Insufficient Inventory

» There is no comprehensive inventory of sidewalk and curb ramp needs around the City. Staffing is currently insufficient to comprehensively review sidewalk, ramp, and crosswalk conditions. Staffing is also not quite sufficient to fully review markings each year, although this review is more comprehensive than that of sidewalks.

Lack of Resources

» Along with the gaps that prevent a full accounting of needs, funding and staffing is also insufficient to address identified needs. Staff estimated that funding covers approximately 50% of the need to address sidewalk repair requests and 70% of the funding adequate to maintain traffic control infrastructure. This does not include maintenance issues not yet identified because of the lack of inventory. A specific funding gap for parks infrastructure was not available, but Recreation staff confirmed that funding does not cover the identified maintenance backlog and projects compete with other City needs for bond funding every other year.

Prioritization

» For park and traffic control infrastructure complaints, safety concerns are prioritized. There is no current guidance for staff on the prioritization of sidewalk repairs.
REVIEW OF BEST PRACTICES

Cities around the country grapple with extensive and growing needs for sidewalk maintenance and limited resources. The following practices can serve as a model for a systematized approach to pedestrian infrastructure maintenance in Winston-Salem.

Categorize Repairs by Cost and Longevity

The FHWA’s A Guide for Maintaining Pedestrian Facilities for Enhanced Safety (FHWA Guide) categorizes sidewalk repair into three types:

» Temporary Maintenance - Alleviate hazards in the short-term. Examples include wedging and patching.

» Short-Term Maintenance (repairs) - Address hazards with medium-term fixes designed to last 1 - 5 years. Approaches include patching, wedging, grinding and horizontal cutting, mud-jacking, and overlays.

» Long-Term Maintenance (Replacement) - Replacement is the primary long-term form of maintenance. In some cases, short-term maintenance techniques can last as long as ten years and are therefore considered part of this category.

The use of temporary and short-term measures allows cities to respond to resident complaints without allocating the bulk of available resources in a reactive manner. Staff can instead focus sidewalk replacement projects on a comprehensive prioritization of needs that is grouped geographically for efficiency. For more details on the various types of repair, see the FHWA Guide.

Implement Low-Cost Inventory Strategies

Periodic sidewalk inventories can be built into City budgets using low-cost alternatives to full-time staff. These include local volunteers, student interns, or technology tools. The FHWA Guide describes a case study in Hoboken, New Jersey where staff used a mix of volunteers and a smartphone application to review and digitize sidewalk conditions annually. Similarly, students at Georgia Tech developed a crowdsourcing app called SidewalkScout to collect and publish sidewalk conditions efficiently. The ArcGIS Collector App has a configuration called Sidewalk Inventory as part of their Solutions for Local Government, which is another tool that can be quickly deployed and tied back to a City’s database on infrastructure.

While some cities review all sidewalks annually, this is generally only achievable in smaller towns and small cities without sprawling street and sidewalk networks. As an alternative, many cities break cities into zones and inspect one zone each year. This can be tied to grouping repairs by zone, which is a recommended practice in the following section.

Guide available online at: https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa13037/fhwasa13037.pdf
Establish an Annual Revenue Source

Reviewing sidewalk maintenance practices from other cities shows a wide variety of funding approaches. In many cities, property owners are partially or fully responsible for the cost of sidewalk maintenance. In general, however, cities that relied on property owners to repair sidewalks and did not have a local funding source reported extensive backlogs in their maintenance needs.

Charlotte, NC and Austin, TX are two locations where the City government maintains sidewalks in the public right-of-way. Charlotte uses voter-approved bond measures every two years to fund the majority of new sidewalk construction and maintenance, while supplementing with state grants and the general fund. At the time of review, they were spending approximately $2 million annually on sidewalk maintenance and $8 million on new sidewalks. Austin also uses voter-approved bond measures for their sidewalk program, but their primary funding source is a Transportation User Fee (a.k.a. Street Fee) that is included in every residential customer’s electric bill. At the time of view, they were generating $40-50 million a year from the fee, which was used for a variety of transportation needs, and spending more than $10 million annually on sidewalks.

In Atlanta, GA and Syracuse, NY, sidewalk maintenance is the responsibility of the property owner. When complaints are reported, the City sends a crew to repair the sidewalk and bills the property owner or assesses the cost through the property tax bill. A reactive approach like this can open cities to legal liability. Atlanta paid out over $4 million to two injured pedestrians based on lawsuits in 2011 and 2012. Los Angeles, CA adopted Safe Sidewalks LA in 2016, which is a 30-year $1.6 billion program to improve sidewalk accessibility. This was undertaken following a historic 2015 settlement in the class action case of Willitis v. City of Los Angeles, which was intended to improve access for persons with mobility disabilities. Liability varies significantly based on state and local laws. The FHWA guide found that a documented, clear approach to deal with sidewalk maintenance with the resources a City has available, including through enforcement of private responsibilities, can help reduce a City’s liability.

Group Replacement Projects by Zone

Breaking down the sidewalk network by zone is an efficient strategy for sidewalk replacement, along with an inventory of conditions. The City of Minneapolis organizes inventory and repair by ten geographic zones, and allocates resources into one zone each year (FHWA guide). This approach reduces mobilization costs, while still allowing for prioritization of needs within each zone. Rochester, Minnesota varies the
frequency of inspection based on localized user needs. Areas around the Mayo Clinic are inspected monthly and the downtown is inspected annually, while the remainder of the sidewalk network, which is primarily in residential areas, is completed less frequently (FHWA guide).

**Establish a System of Maintenance Prioritization**

While the majority of communities complete sidewalk repairs in response to complaints, the most successful programs also establish a scoring system to prioritize repairs in parallel. This allows the City to proactively consider where sidewalk repairs most align with established goals based on factors like equity and to use limited resources where they will serve key demographics like children and people with disabilities. As part of Safe Sidewalks LA, the City of Los Angeles established a prioritization matrix that includes needs (areas around hospitals, assisted living facilities, transit corridors, and the high injury network), relative damage, and cost effectiveness. The City of Memphis' 2014 Pedestrian and School Safety Action Plan established a prioritization scoring for sidewalk and intersection projects and repairs based on school access, safety, equity, connectivity, activity centers, transit access, and stakeholder input. A set of pilot projects were selected based on the results, and the City has successfully obtained federal grants to implement many of the pilot projects identified in the plan.

**RECOMMENDED MAINTENANCE PROGRAM AND PRIORITIZATION**

In response to the key issues identified, the following practices are recommended for the City of Winston-Salem.

**Adopt a Zone Basis for Inventory and Repair**

Adopt a set of zones as the basis for annual inspection of pedestrian infrastructure and repair. The existing eight council wards can serve as those zones, with inventory and repair focused on one ward each year. In addition, establish a set of high priority areas for accessibility focused around medical centers and senior housing. This ninth zone should be reviewed annually in addition to the rotating council ward.

Use technology to collect sidewalk conditions data digitally and directly tie that data to the GIS database that serves as the basis for prioritization. This will allow efficient prioritization of repair projects, as described in Documentation and Prioritization.
Distinguish Short-term and Long-Term Maintenance

Use staff resources to complete temporary and short-term maintenance as resident complaints are received. Set aside an allocation of staff and funding to handle these requests, with a separate allocation and process for sidewalk replacement. Reserve the use of private contractors to complete sidewalk replacement projects grouped annually by zone for cost efficiency.

Recommendation: Develop a metric assessing sidewalk quality that can be integrated into the prioritization model. Field surveying (walk auditing) sidewalk facilities along PPN corridors in high equity need areas based on quality, in addition to mere presence, could help identify needed improvements and bolster community interest.

Walk Audit Resources:

- NCHPAD
- AARP
- America Walks
- Safe Routes to School

Image source: https://www.nchpad.org/1709/6826/Conducting-a-Walk-Audit

Document and Prioritize Repairs

This plan establishes a consistent pedestrian prioritization scoring system for the entire street network. As sidewalk conditions are collected and added to the street network database, staff can quickly compare priority scores for repair needs to identify the highest priorities for repair that year. Use this scoring basis for sidewalk replacement projects to be completed by outside contractors based on the resources available each year. This scoring will also help direct staff resource to complete temporary and short-term maintenance based on priority when time is available to complete these kinds of low-cost repairs beyond those identified by complaints. Update prioritization scoring approximately every three to five years to account for changes in development and new safety issues as they arise.

Establish an Annual Funding Source

Increase funding for staff to cover infrastructure repairs in response to complaints in-house using temporary and short-term maintenance strategies where possible, and to manage the inventory process. Establish a new funding source to complete annual sidewalk replacements by outside forces based on prioritization and zones.
POLICY RECOMMENDATIONS

One of the most cost-effective implementation strategies for Winston-Salem is to establish land development regulations and street design policies and standards that promote walkable new development and capital projects. As part of a comprehensive approach to developing recommendations for a more walkable Winston-Salem, this plan includes a review of the City’s UDO, infrastructure standards and policies to identify general issues and opportunities impacting the pedestrian environments across the city.

The following land use policy and regulatory audit (building upon Winston-Salem’s Downtown Streetscape Plan recommendations) includes recommendations for policy updates as appropriate to achieve a higher degree of pedestrian-oriented design. The review draws upon model regulatory and policy language from around North Carolina and the U.S. for elements including land use/transportation integration, connectivity, Complete Streets, and bicycle parking, enabling the City to maximize pedestrian and greenway improvements in conjunction with new development, redevelopment, and corridor improvement projects.

The highest priority recommendations for near term changes should be those that relate directly to pedestrian infrastructure and the pedestrian environment (highlighted in green): sidewalk provisions and dimensions, provision of greenways, pedestrian lighting, and street trees. The other recommendations are also critical, but may take longer to have discernible impacts and may require more political capital to change.

NOTE: All references pulled from Winston-Salem/Forsyth County Unified Development Ordinances, Effective 1/1/2020; Winston-Salem Infrastructure Development Standards, updated November 2018, unless otherwise noted. Other referenced planning and regulatory documents are also noted below.
1. DEFINITIONS AND GENERAL ORDINANCES

1.1 Greenway

UDO 11.2.2 - Definitions.
  » Greenway. A linear open space along a natural or constructed corridor, which may be used for pedestrian or bicycle passage. Greenways often link areas of activity, such as parks, cultural features, or historic sites with each other and with populated areas. Existing and proposed community greenways are identified in the Greenway Plan found in Legacy.

1.2 General ordinances Supporting Pedestrian Safety

UDO 6.2.1.B.4 Required landscaping shall not obstruct or impede public pedestrian routes including sidewalks and greenway trails.

UDO 6.5.1.E.11 SANDWICH BOARD SIGN
A sandwich board sign shall meet the following provisions:

a. The sign shall be used in conjunction with a nonresidential use within the CB, PB, NB, and MU-S Districts where the sidewalk is wide enough to allow for at least five (5) feet of width for unrestricted pedestrian movement with the sandwich board sign in place and as per City Code requirements.

The City’s Code of Ordinances also includes useful provisions for pedestrian safety.

2. PEDESTRIAN FACILITY REQUIREMENTS

2.1 Pedestrian accommodations required

7.4 Streets standards governing vehicle and pedestrian circulation

7.4.1 Pedestrian transit and bicycle mobility

A. General:

1. Sidewalk, walkway, on-road improvements, greenway easements, and trail systems sufficient to serve both existing and projected pedestrian, transit, and cyclist needs shall be indicated on all site and subdivision plans approved by the Planning Board or Elected Body.

2. Such systems may include sidewalks along public or private streets, wide outside travel lanes, bike lanes on roadways, and walkways and trails in alternative locations as appropriate.

3. Design, location, dimensions, dedications, easements, and reservations shall conform to applicable jurisdictional policies and adopted plans for sidewalks, bicycle routes, greenways and trails. (emphasis added)

4. Such plans include the Winston-Salem Urban Area Sidewalk and Pedestrian Facilities Plan (W); the Winston-Salem Urban Area Comprehensive Bicycle Master Plan (W); the Greenway Plan, Winston-Salem and Forsyth County; and the Transportation Plan.

B. Sidewalk requirement for planning board or elected body approvals:

Requirements: Unless the Planning Board or Elected Body approves an alternate walkway location (emphasis added), a conventional sidewalk shall be provided within the right-of-way along all new public streets with required curb and gutter as shown in the table below according to the Winston-Salem Infrastructure Development Standards or NCDOT standards as applicable.

Sidewalks shall also be required along existing streets where subdivisions, Planning Board review items, or special use district zoning items abut streets proposed for sidewalks as identified in the adopted Winston-Salem Urban Area Sidewalk and Pedestrian Facilities Plan.

<table>
<thead>
<tr>
<th>TYPE OF STREET</th>
<th>SIDEWALK LOCATION</th>
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</thead>
<tbody>
<tr>
<td>Cul-de-sac</td>
<td>One Side</td>
</tr>
<tr>
<td>Local Street</td>
<td>One Side</td>
</tr>
<tr>
<td>Collector</td>
<td>One side</td>
</tr>
<tr>
<td>Minor thoroughfare</td>
<td>Both sides</td>
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</tbody>
</table>

1. Neither the UDO nor the Infrastructure development standards have specific standards for Major Arterials/Thoroughfares. These street types should have specific minimum standards as well.

2. Consider adding language to require on both sides of more streets based on land use and/or transportation context and purpose. For example, requiring collectors and sub-collectors or local streets to include sidewalks along both sides of the street if one or more of the following conditions exist:

   » (a) The current or projected average daily traffic volume is greater than 2000 vehicles per day.
   » (b) The posted speed limit is greater than 25 miles per hour.
   » (c) The street is identified as a pedestrian route or recommended sidewalk including sidewalk amenities such as street trees and planting strips.
   » (d) Other pedestrian safety, access, or circulation needs are identified.
   » (e) Residential development density is 4 units per acre or greater along the street frontage.

3. Consider adding language clarifying which side of the street should contain the sidewalk in the case of 1-side sidewalks (e.g., sidewalks should be added on the side of the street with more destinations and better/safer connections to the greater pedestrian network).

4. Section C calls for sidewalks only as required in the pedestrian facilities plan. Consider expanding to explicitly require sidewalks in certain circumstances/con-texts (i.e., high-density industrial or where there is an existing gap in the network) or within ½ mile of a transit stop, collector street.
C. Sidewalks shall be required for all nonresidential developments and multifamily developments not subject to approval by the Planning Board or Elected Body and where located along streets identified on the adopted Winston-Salem Urban Area Sidewalk and Pedestrian Facilities Plan (emphasis added), subject to the following criteria or exceptions:

1. Sidewalks shall be required along the entire frontage of the property under the following circumstances:
   - a. New construction sites.
   - b. On existing developed zoning lots, construction of ten thousand (10,000) square feet or more gross square feet in new buildings or additions of ten thousand (10,000) square feet or more gross square feet to existing buildings on existing developed zoning lots.
   - c. In all situations where sidewalks are required the developer shall be obligated to build no more than one linear foot of sidewalk per ten (10) square feet of gross building area.
   - d. The location of sidewalks shall be determined through the construction permitting process in accordance with the adopted Winston-Salem Urban Area Sidewalk and Pedestrian Facilities Plan.

2. Sidewalks shall only be required on streets which have existing curb and gutter paving (emphasis added) or where the subject street is being widened with curb and gutter as required by the approval of a driveway permit.

D. STANDARDS FOR BICYCLE AND PEDESTRIAN FACILITIES FOR PLANNING BOARD OR ELECTED BODY APPROVALS (W)

1. Any required bicycle and pedestrian facilities in accordance with the adopted Winston-Salem Urban Area Sidewalk and Pedestrian Facilities Plan and/or the Winston-Salem Urban Area Comprehensive Bicycle Master Plan shall be clearly marked using NCDOT standard markings, or shall be based on the Manual on Uniform Traffic Control Devices.

2. Adjacent existing public greenways shall be connected to bicycle and pedestrian facilities on the site.

3. Bicycle and pedestrian connections shall be made to any existing or proposed off-site bicycle or pedestrian facilities contiguous to the site.

E. DIMENSIONS AND LOCATIONS

1. SIDEWALKS
   - a. In general, sidewalks shall be a minimum of five (5) feet in width and shall be constructed of concrete as per the City Public Works Department or NCDOT construction standards unless another material is approved by the Assistant City Manager for Public Works or a designee.
   - b. Where street trees are installed between the sidewalk and the curb edge, additional planting strip width shall be required in accordance with City of Winston-Salem infrastructure development standards.
   - c. If a sidewalk must be placed adjacent to the back of curb due to topographic constraints or other hardships as approved by the Assistant City Manager for Public Works, or designee, the width of the sidewalk shall be increased in accordance with City of Winston-Salem Infrastructure Development Standards.
   - d. Sidewalks on nonresidential developments and other multifamily developments not subject to approval by the Planning Board or other approving authority may be installed directly behind the curb if sufficient right-of-way does not exist in accordance with Section 7.4.1E, Dimensions and Locations.

Winston Salem Infrastructure Development Standards document IV.A.b.21: Sidewalks shall be a minimum of 5’-0” wide and 0’-4” thick. The thickness of the sidewalk shall be increased to 6” at all driveways and from tangent to tangent at all intersection radii.
   - This document also includes requirements for sidewalks reflecting the UDO guidelines.
   - The Residential Street Design Guide notes that sidewalks along arterials are required “case by case”
### Recommendations

<table>
<thead>
<tr>
<th>Topic</th>
<th>Existing Regulatory, Standards, or Policy Language (and section found)</th>
<th>Comments</th>
</tr>
</thead>
</table>
| 2.2 Fee-in-Lieu for Sidewalk Installation | 7.4.1.F Payment In-Lieu (W)  
1. When the Engineering Division of the City of Winston-Salem Public Works Department determines that the construction of a required conventional sidewalk or alternative walkway is unfeasible due to special circumstances, including but not limited to: existing ribbon pavement, impending road widening, significant street trees, utility problems, grade problems or other construction difficulties, the City of Winston-Salem shall require either:  
   » a. A payment in-lieu of sidewalk construction;  
   » b. Construction of sidewalks in the general vicinity of the project site; or  
   » c. A combination of a conventional sidewalk, alternative walkway, or payment of a fee in-lieu.  
2. Payment in-lieu shall only be required in cases where a sidewalk is likely to be built within five (5) years from the date of plan approval.  
3. For payment in-lieu, the cost of the sidewalk construction shall be approved by the Engineering Division of the City of Winston-Salem prior to the issuance of occupancy permits or recording of final plats whichever is applicable.  
4. If the sidewalk is not built within five (5) years, the City of Winston-Salem Engineering Division shall determine whether to construct the sidewalk without the planned street improvement, delay installation further to coincide with a scheduled street improvement which has been delayed, or construct the sidewalk in the vicinity of the site where it can be feasibly constructed. | The City’s program is good. Below are fee-in-lieu programs from High Point and Asheville that the City may want to consider to enhance the flexibility and application of Winston-Salem’s program for sidewalk implementation:  
**HIGH POINT FEE IN-LIEU OF REQUIRED SIDEWALK INSTALLATION (UDO Section 6.7)**  
A. Conflict Anticipated: Where the installation of a sidewalk is required, and the Transportation Director determines that installation at the time of development would conflict with a city, state, or federal roadway project or other utility project, the applicant shall be required to submit a fee in lieu of sidewalks in accordance with the following:  
1. Fees shall be in an amount equal to the entire estimated cost of completing the installation, based on current contract unit prices, as approved by the Engineering Services Director.  
2. All fees collected by the City pursuant to this section shall be deposited in the City’s sidewalk revolving fund and used only for construction of sidewalks on the site, or in the street right-of-way abutting the site, for which the fee is collected.  
3. Use of submitted funds to construct sidewalks shall be coordinated with the appropriate phase of the conflicting roadway project.  
B. Conflict Eliminated: In the event that the conflict necessitating the fee in-lieu is eliminated, one of the following shall occur:  
1. If the scheduled project is configured with a different alignment, the in-lieu fee shall be refunded to the applicant.  
2. If the scheduled project is a widening of an existing roadway, in-lieu fees for sidewalks shall be used by the City to construct the sidewalk after the widening. |
<table>
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<tr>
<th>Topic</th>
<th>Recommendations</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2.3 Greenway Requirements</strong></td>
<td><strong>7.6.2 Protection of public rights-of-way and Greenways</strong>&lt;br&gt;1. Before any zoning permit is approved for a lot which lies within fifty (50) feet of a stream identified for a greenway in the adopted Greenway Plan, the Director of Inspections shall notify the County Manager/City Manager.&lt;br&gt;2. The adopting jurisdiction will assess the potential impact of the development on future greenway construction and may then offer to purchase or undertake other action to protect the potential greenway corridor.&lt;br&gt;3. The Director of Inspections shall not approve any permit which would authorize disturbance of the potential greenway corridor, nor shall the property owner or his/her agent disturb the potential greenway corridor, until the County Manager/City Manager formally responds to the Director of Inspections regarding the intent of the adopting jurisdiction.&lt;br&gt;4. If no response is received within fifteen (15) days, the Director of Inspections may issue the requested permit.</td>
<td>Some NC cities go further in requiring construction of greenways where they are part of an adopted plan. Consider adding requirements for greenway corridor construction 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 in an adopted plan. See requirements in Wake Forest, NC UDO, Section 6.8.2 Greenways: “When required by Wake Forest Open Space &amp; Greenways Plan or the Wake Forest Transportation Plan, greenways and multi-use paths shall be provided according to the provisions [that follow in the section cited above].” <a href="http://www.wakeforestnc.gov/udo.aspx">http://www.wakeforestnc.gov/udo.aspx</a></td>
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<td></td>
<td><strong>4.6.6 PB Pedestrian Business District</strong>&lt;br&gt;<strong>4.8.3 MU-S Mixed Use-Special Use district</strong>&lt;br&gt;DISTRICT OBJECTIVES</td>
<td>Needs more explicit language to “pedestrian friendly streetscape design”-sidewalk widths, 6-18 feet depending on use. Districts with storefronts with sidewalk use, such as cafes or outdoor displays, should have sidewalks of 16-18 feet in width. Consider adding language for limiting driveways and drive-through uses in walkable districts. Crosswalks are only outlined for the Entertainment district and school zones. Minimum language is included. Consider including minimum design standards/recommendations for crosswalk placement. Consider including crosswalk requirements in other zones/districts</td>
</tr>
<tr>
<td><strong>2.5 Pedestrian Scale Lighting</strong></td>
<td><strong>7.4.3.3 Street Lights</strong>&lt;br&gt;STREET LIGHTS&lt;br&gt;a. Street lighting, as required for traffic safety and property security, may be required to be installed in conformance with City Public Works Department or NCDOT policies, as applicable.&lt;br&gt;b. The design, materials, location, and installation shall conform to all applicable City Public Works Department or NCDOT standards, and applicable public utility standards, including appropriate separation from street trees.</td>
<td>There are no requirements or provisions for pedestrian-scale or sidewalk lighting along sidewalks or at intersections. The City’s Downtown Streetscape Plan report identifies a need for uniform standards for pedestrian lighting. Consider incorporating pedestrian-scale lighting (&lt;15’ tall) in street rights of way based on transportation and land use contexts of streets.</td>
</tr>
<tr>
<td><strong>2.6 Cross-Access between adjacent land parcels</strong></td>
<td><strong>6.1.3.E.2 Cross-access for new office or commercial buildings, including expansions, along collector, minor thoroughfare, or major thoroughfare streets with incentive.</strong></td>
<td>Excellent provisions for cross access for motor vehicles. Cross-access requirements should be considered for updates to include sidewalk/pedestrian accommodation requirements, as well. To promote connectivity and pedestrian access, block lengths should relate to land use densities and land use typologies. Small block size is important to intersection density and interconnectivity which serve to enhance walking, bicycling, and transit-access opportunities. In more walkable areas, blocks can be as narrow as 200 feet wide. Consider allowing larger blocks where development densities are expected be lower (&lt; 4 duo). See City of Charlotte Subdivision Ordinance, Section 20-23 for example of connectivity requirements and block standards based on land use context. Consider maximum intersection spacing in minimum design standards - reference LEED for Neighborhood Development as a guide.</td>
</tr>
<tr>
<td><strong>2.7 Block size</strong></td>
<td>No existing language on block size within the UDO, however, the Infrastructure Development Standards limit residential blocks to 600 feet in all cases and for all local street types, except cul-de-sacs, which are permitted to be up to 800 feet long.</td>
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</tbody>
</table>
2.8 Street Connectivity

b. Street links and nodes along a minor thoroughfare or higher classification street providing access to a proposed subdivision.

a. The street network for any subdivision with internal roads or access to any public road shall achieve a connectivity index of

1. Limiting the application of cul-de-sacs unless no practical alternative exists
2. Limiting the length of cul-de-sacs to 250 feet or base the maximum length on a context-based requirement related to the land-use and transportation context of the area
3. Requiring provisions of pedestrian connections where a cul-de-sac or permanent dead end must be constructed
4. Allowing provision of pedestrian/bicycle connections to count towards the street connectivity requirements.

See City of Charlotte Subdivision Ordinance, Section 20-23 for example of context-based connectivity requirements and block standards: http://www.charmeck.org/Planning/SubdivisionOrdinanceCity.pdf.

See City of Wilson, NC, Unified Development Ordinance Section 6.4 for excellent connectivity requirements, including bicycle and pedestrian connections.

3. OTHER DESIGN STANDARDS RELATED PEDESTRIAN-ORIENTED COMMUNITY DESIGN

3.1 Street Trees & Planting Strips

STREET TREES FOR NEW RESIDENTIAL SUBDIVISIONS (W)

a. A minimum of one deciduous, Large Variety Tree as specified under Section 6.2.1, Landscaping and Tree Preservation Standards - Winston-Salem, or as otherwise permitted or restricted by the City Director of Vegetation Management, shall be planted per lot prior to the issuance of a Certificate of Occupancy.

b. For cul-de-sacs, local residential, and collector streets having sidewalks, trees may be planted between the curb edge and the sidewalk a minimum distance of four (4') feet away from the back of curb.

c. In all instances required street trees shall be planted in a manner not to conflict with safety or functional operations of the street in accordance with Winston-Salem Infrastructure Development Standards.

d. Required Street Trees shall be a minimum of ten (10') feet high at installation and shall have a caliper of at least two (2) inches measured six (6') inches above ground.

e. This subsection shall not apply to developments approved prior to January 1, 2006 (W), nor to streets approved exclusively by the North Carolina Department of Transportation.

The “Residential Street Design Matrix” in the Infrastructure Development Standards show street trees as not required for development along arterials.

Section 7.4.3.A.7 Cul-de-sac Streets

Except in unusual circumstances such as terrain constrains or other hardships and as provided in this section, cul-de-sac streets shall not be longer than eight hundred (800) feet (one thousand two hundred (1,200) feet for developments approved prior to January 1, 2006 (W)/March 12, 2007 (F) and shall be terminated by a circular right-of-way or an approved alternative turnaround in accordance with Winston-Salem Infrastructure development standards or NCDOT standards as applicable.

a. The length of cul-de-sac streets shall be measured from the centerline of the bulb to the edge of pavement of the nearest through street intersection.

b. Cul-de-sac streets may be longer than eight hundred (800) feet where the number of lots served by a cul-de-sac is fifteen (15) lots or fewer. This subsection shall not apply to developments approved prior to January 1, 2006 (W)/March 12, 2007 (F).

The requirements appear to only apply to residential subdivisions along non-arterial street, so non-residential development and multifamily development and development along arterials appears to be exempt.

The City should consider application of requirements for all new development for the improvement of the pedestrian environment along all roadways.

In addition to their value for improving the air quality, water quality, and beauty of a community, street trees can help slow traffic and improve comfort for pedestrians. Trees add visual interest to streets and narrow the street’s visual corridor, which may cause drivers to slow down. When planted in a planting strip between the sidewalk and the curb, street trees also provide a buffer between the pedestrian zone and the street.

The City should consider application of requirements for all new development for the improvement of the pedestrian environment along all roadways.

Street interconnectivity is critical to successful pedestrian networks. Furthermore, long dead-end streets and cul-de-sacs create challenges for pedestrians, cyclists, and effective transit and other public services. Consider the following revisions to promote pedestrian access:

1. Limiting the application of cul-de-sacs unless no practical alternative exists
2. Limiting the length of cul-de-sacs to 250 feet or base the maximum length on a context-based requirement related to the land-use and transportation context of the area
3. Requiring provisions of pedestrian connections where a cul-de-sac or permanent dead end must be constructed
4. Allowing provision of pedestrian/bicycle connections to count towards the street connectivity requirements.

The “Residential Street Design Matrix” in the Infrastructure Development Standards show street trees as not required for development along arterials.

The requirements appear to only apply to residential subdivisions along non-arterial street, so non-residential development and multifamily development and development along arterials appears to be exempt.

See City of Charlotte Subdivision Ordinance, Section 20-23 for example of context-based connectivity requirements and block standards: http://www.charmeck.org/Planning/SubdivisionOrdinanceCity.pdf.

See City of Wilson, NC, Unified Development Ordinance Section 6.4 for excellent connectivity requirements, including bicycle and pedestrian connections.


See also, Town of Wendell UDO Chapter 8, especially section 8.8, Street Trees.
### Recommendations

#### Existing Regulatory, Standards, or Policy Language (and section found)

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| **3.2 Maximum parking requirements** | 6.1.5.A ALTERNATIVE PARKING IN THE NB, NO, PB, E, AND GB DISTRICTS  
a. AMOUNT REQUIRED  
For any permitted use in the NB, NO, PB, E, and GB District, the required amount of parking may be reduced by thirty percent (30%). This reduction shall not affect the required disabled parking or loading spaces for that use. | Good requirements, although in the City’s most walkable districts, the required parking could be reduced even further or replaced with parking maximums. Parking requirements for walkable, mixed-use districts should be less than required for suburban, auto-oriented districts to promote and incentivize infill development and recognize the reduced parking needs in walkable areas. Requiring parking maximums and reducing the number of required off-street parking spaces for new development creates a more pedestrian friendly environment, prevents overbuilt and unsightly parking lots, and reduces parking construction costs. |
| **3.3 Bicycle parking requirements** | 6.1.2.A.1.2 BICYCLE SPACES  
a. Bicycle parking requirements are only applicable to Growth Management Areas (GMAs) 1, 2, and 3 and are not applicable to GMAs 4 and 5.  
b. Property owners may voluntarily choose to exceed the maximum number of bicycle spaces required by Table 6.1.2A., Motor Vehicle and Bicycle Parking Space Requirements (see Section 6.1.5G.3, Incentives) for possible motor vehicle space reduction incentives.  
6.1.B.5 BICYCLE SPACES  
a. SINGLE RACK  
One bicycle rack (accommodating at least two (2) bicycle spaces) shall be designed and located in accordance with the bicycle rack and bicycle locker details maintained by the Transportation Director, or a designee.  
b. MULTIPLE RACKS  
Multiple bicycle parking racks shall be located in accordance with the Bicycle rack and bicycle locker details maintained by the Transportation Director or a designee.  
6.1.G Bicycle Parking Number of Spaces  
a. Except within the CB and CI Districts, Table 6.1.2.A., Motor Vehicle and Bicycle Parking Space Requirements, contains the minimum parking space requirements for bicycles.  
b. No more than twenty (20) bicycle spaces shall be required.  
2. Location  
a. Bicycle parking stalls and racks shall be located to be highly visible from the street or building entrance from where bicyclists approach.  
b. Bicycle racks shall be located within fifty (50) feet of any primary entrance of the building for which they are intended.  
c. Bicycle racks may be installed on public rights-of-way with prior approval from the Assistant City Manager for Public Works, or a designee. | GMAs provisions are adequate  
(A) City/Town Centers (GMA 1);  
(B) Urban Neighborhoods (GMA 2);  
(C) Suburban Neighborhoods (GMA 3);  
(D) Future Growth Area (GMA 4); and  
(E) Rural Area (GMA 5).  
Some land uses are exempt from bicycle parking minimums.  
3. Consider providing requirements or incentives for commercial uses or multi-family residential uses that provide shower and locker/changing rooms for bike commuters and/or enclosed bike storage for long-term bike parking/storage. Potential model language: Reduction of automobile parking for bicycle parking. The administrator may reduce the required number of off-street parking spaces by one automobile space for every six, or portion thereof, indoor or fully covered and secure bicycle parking spaces provided for employees, students, residents, or long-term visitors.  
4. Bicycle parking design requirements should be made more specific and quantifiable requirements with illustrated design guidance, location should also include guidance for underground or above ground parking structures. |
### Recommendations

**3. INCENTIVES**

- **a. BICYCLE LOCKERS**
  - i. For all uses, if the property owner provides a long-term bicycle locker for two (2) bicycle spaces in accordance with the bicycle rack and bicycle locker details maintained by the Transportation Director, or a designee, then the required number of motor vehicle parking spaces may be reduced up to a maximum of five percent (5%).
  - ii. Other long-term bicycle storage devices may be used if it can be established to the Transportation Director, or a designee, that they are equivalent to any devices on the approved list in the bicycle rack and bicycle locker details in function, quality, and construction.

- **b. DOUBLE THE NUMBER OF REQUIRED BICYCLE SPACES**
  - i. For all uses, if the property owner provides additional bicycle parking spaces in an amount equal to or greater than twice the number of bicycle spaces required by Section 6.1.5G.1, Number of Spaces, above, then the required number of motor vehicle parking spaces may be reduced up to a maximum of five percent (5%).
  - ii. Such bicycle spaces shall be designed in accordance with the dimensions provided in Section 6.1.3B, Dimensional Requirements.

- **c. EXEMPT USES** For all uses in Table 6.1.2A., Motor Vehicle and Bicycle Parking Space Requirements, exempted from providing bicycle spaces, if the property owner provides a minimum of four (4) bicycle parking spaces in accordance with the dimensions provided in Section 6.1.3B, Dimensional Requirements, then the required number of motor vehicle parking spaces may be reduced up to a maximum of five percent (5%).

### 4. SEPARATION FROM MOTOR VEHICLE PARKING

Bicycle parking areas shall be separated from motor vehicle parking areas (automobiles, trucks, motorcycles, etc.) by at least a curb barrier which would prevent vehicles from damaging bicycles.

### 5. BICYCLE RACK SPECIFICATIONS

- **a.** All bicycle parking devices shall be in accordance with the bicycle rack and bicycle locker details maintained by the City of Winston-Salem Department of Transportation.

- **b.** Other bicycle parking devices may be used if it can be established to the Transportation Director, or designee, that they are equivalent to any devices on the approved list in the bicycle rack and bicycle locker details in function, quality, and construction.

### 6. ALTERNATIVE COMPLIANCE FOR BICYCLE PARKING SPACES

- **a.** An applicant may propose a bicycle parking layout plan which varies from the strict application of the provisions of this section in order to accommodate unique characteristics of the site or to utilize innovative design.

- **b.** Application for alternative compliance shall include a site plan following the requirements specified in Section 3.2.11, Site Plan, and shall be approved by the Planning Board only upon a finding that the proposed bicycle parking layout plan fulfills the intent and purposes of this section as well as or better than would strict conformance with the requirements of this section.

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**See also:**

- City of SF Zoning Administrator Bulletin for designs/layout/etc.: The bulletin is in itself a great document that includes limits on hanging racks, how to park family bikes, and various configurations: [http://208.121.200.84/ftp/files/publications_reports/bicycle_parking_reqs/Leg_BicycleParking_ZABulletinNo.9.pdf](http://208.121.200.84/ftp/files/publications_reports/bicycle_parking_reqs/Leg_BicycleParking_ZABulletinNo.9.pdf)
### 4. COMPLETE STREET POLICY

#### 4.1 Complete Streets Policy

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<td>No policy language on Complete Streets found</td>
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<td>The City of Winston Salem could consider developing objective and quantifiable Complete Street policies and objectives and ensuring that provisions for pedestrian, bicycle, and transit access are given as much weight as motor vehicle access in determining which modes are provided for and to what extent in a given corridor. The City should also consider including language that relates to land use/context sensitivity since the development along a street is also part of a complete street. Design guidelines should also include provisions for traffic calming and design for transit services.</td>
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The City of High Point has recently drafted an outstanding Complete Streets Statement of Intent, which includes the following language:

As a standard practice, Complete Streets principles will be applied to all new street construction, substantial retrofits, and reconstruction projects except in unusual or extraordinary circumstances as outlined below. This Statement of Intent may have limited applicability where:

- pedestrians and bicyclists are prohibited by law;
- transit routes do not exist and are not forecast or planned, and there is no convenient and practical means of a logical connection to transit routes or amenities;
- the existing corridor configuration is insufficient to accommodate all users, and the cost of improvements is impractical and/or disproportionate to the need;
- it would be contrary to public safety;
- deemed impractical because of adverse impacts on the environment and/or neighboring land uses; and
- an agency, public or private, is performing ordinary public works or utility capital improvement or maintenance activities (such activities shall not exclusively mandate the necessity for broader measures).

Inasmuch as High Point’s surface transportation network is intertwined with and is co-dependent of that which falls within the jurisdiction and authority of the State of North Carolina, it is appropriate for the City’s policy regarding Complete Streets to meet or exceed the standards and guidelines established by the State Department of Transportation (NCDOT).

To provide for implementation, the Complete Streets Policy needs to have an associated design guide with context-based provisions for all modes of transport, including walking, biking, and transit. The design guidance should be integrated into development standards for new development and processes for corridor, as was done with the Raleigh Street Design Manual and the Charlotte Urban Street Design Guidelines.

The NCDOT Complete Street Planning and Design Guidelines could also be adopted by reference as an excellent local implementation and process guide.

The Smart Growth America provides good guidelines for Complete Streets in their [best practices manual](https://www.smartgrowthamerica.org).