





ACKNOWLEDGEMENTS

PUBLIC PARTICIPANTS

Thank you to the residents of Denmark for their participation in this planning process and their passion for improving the place they call home.

CITY OF DENMARK MAYOR AND TOWN COUNCIL

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DENMARK PEDESTRIAN MASTER PLAN STEERING COMMITTEE

Thank you to the engaged leaders of the Denmark community for their continued participation throughout the planning process and for their commitment to furthering the efforts of this Plan.

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PROJECT CONSULTANTS

Alta Planning + Design 638 East Washington Street Greenville, SC 29601



Designing4Health

Gather Consulting

John Newman Planning

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PROJECT VISION

The City of Denmark will be a place where a connected network of comfortable and convenient pedestrian facilities are provided to people of all ages and abilities; where pedestrianfriendly design is prioritized in all future road, streetscape, and land use projects; where citizens and students enjoy walking as a means of transportation and recreation; where increased walkability benefits the local economy; where all residents can easily access healthy food and recreational areas on foot; and where everyone enjoys a high quality of life.

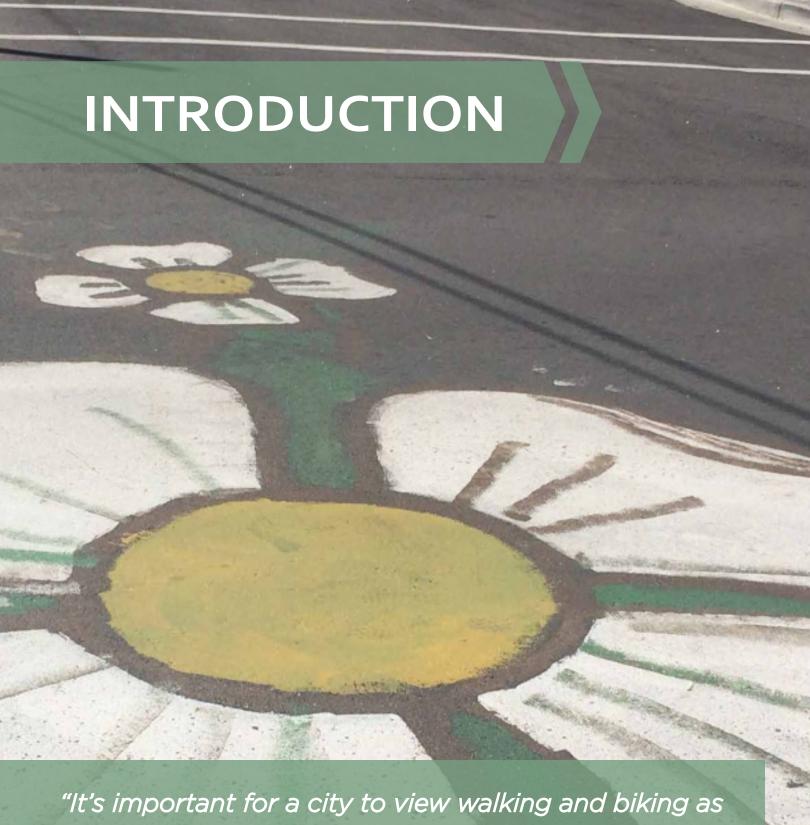


- Improve sidewalk connectivity by filling in gaps in the sidewalk network
- Increase pedestrian safety by improving crossing conditions, especially on major roads near schools
- Increase pedestrian activity downtown, recognizing the indirect benefits of a lively sidewalk and activated storefronts
- Increase the number of events that promote walking as a fun and rewarding activity

- Identify local champions and college students to work with the stakeholder committee on moving recommendations to implementation
- Create synergy through low-cost, easy-to-implement tactical projects that involve students during events like the Dogwood Festival to make fast and fun improvements that enliven the streets
- Increase the percentage of trips that are made by walking



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"It's important for a city to view walking and biking as a basic human right, which should be safe, easy and pleasurable for everyone. Walking adds the spice to a city, and we don't like a spice-less city any more than we like pasta without sauce." - Gil Penalosa

PROJECT BACKGROUND

Through a recent grant from the Centers for Disease Control and Prevention (CDC), the South Carolina Department of Health and Environmental Control (DHEC) is leading an effort to increase pedestrian planning efforts throughout South Carolina. The effort is part of the DHEC South Carolina Prevention and Health Across Systems and Environments (SC PHASE) Pedestrian Planning Project.

SC PHASE Pedestrian Planning is a 3 year project to develop pedestrian plans for 16 communities in specific counties throughout the state. Beyond the basic tenets of walkability and pedestrian safety, key elements of the program initiative are:

- **Equity-based planning**
- Community engagement
- Safe pedestrian access to healthy foods

The City of Denmark is one of the 16 communities to participate in SC PHASE Pedestrian Planning.

A parent and child traverse a parking lot in downtown Denmark on foot. This plan sets out to improve walkability and access to healthy food for all ages and abilities.

Pedestrian plans and policies play a critical role in fostering more walk-friendly communities by establishing the conditions that support and encourage safe walking environments. Such plans provide the basis for new community norms where walking is seen as practical and appealing for people of all ages and abilities by providing for the infrastructure, programs, and amenities to support healthy choices and active transport. With 25.1 percent of South Carolinian adults reporting no leisuretime physical activity, and 56.6 percent of high school students reporting not being physically active on five or more days, finding ways to support more walking as an accessible and convenient form of physical activity will be vital to improving the health of South Carolina's residents.

OVERVIEW

The Town of Denmark is a community of 3,538 people, located 80 miles northwest of Charleston, South Carolina, as the crow flies.¹ The town is home to the main campus for both Denmark Technical College and Voorhees College.

Denmark is part of the Lower Savannah Council of Governments, a regional forum that allows local governments to coordinate transportation planning and decision-making across a sixcounty region, including Aiken, Allendale, Bamberg, Barnwell, Calhoun, and Orangeburg counties.

Started in 1830 as a railroad turnout, Denmark was founded in 1837 under the name, "Graham's Turnout," after the man that sold 17 acres to the South Carolina Railroad. Denmark's economy hinged on this connection to the railroad, especially when it became the crossing of two major railroads -- the South Bound Railroad and the Southern Railway Line.



Reference map of the Town of Denmark within Bamberg County and the state.



Historic photo of Main Street in downtown Denmark before it was paved. This avenue is now Highway 321, which is a major thoroughfare connecting Columbia, SC to Savannah, GA.



Denmark is home to Jim Harrison's gallery, an artist and author whose work focused on preserving Lowcountry and Deep South icons and heritage.

¹ U.S. Census Bureau, 2010 Census.

COMMUNITY PROFILE

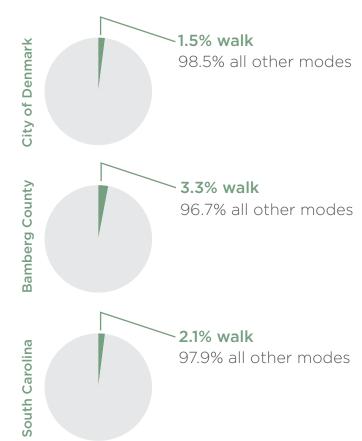
The racial make-up of the Town of Denmark is predominantly Black (or African American) - with 90.1% of residents identifying as such. 8.6% of the remaining 9.9% identify as White. For comparison, Bamberg County is 61% Black (or African American), and South Carolina as a whole is 27.7% Black (or African American).

The median income for households in the Town of Denmark is \$18,227, which is just over half the median income of the county (\$25,495) and well below half of the median income for all of South Carolina (\$45,033).2

One-fifth (21.5%) of the labor force in the Town of Denmark is unemployed, compared to 10.5% and 11.4% for the county and state, respectively. Over half (50.6%) of individuals in Denmark are below the poverty level. For comparison, this is almost three times the statewide poverty rate (18.1%).

Slightly over one percent of residents commute to work via public transportation, which is on par with county and state rates. Since most people walk to transit stops, it is important to ensure that adequate pedestrian facilities are in place in order to support and continue to encourage walking as a healthy and safe mode of travel. Just 1.5% of the working population walk to work compared to 3.3% for Bamberg County and just 2.1% for the state. These statistics are represented graphically in the adjacent figure.

Walking as a percentage of commuting mode share per geography:



⁴ U.S. Census Bureau 2010-2014 American Community Survey 5-Year Estimates

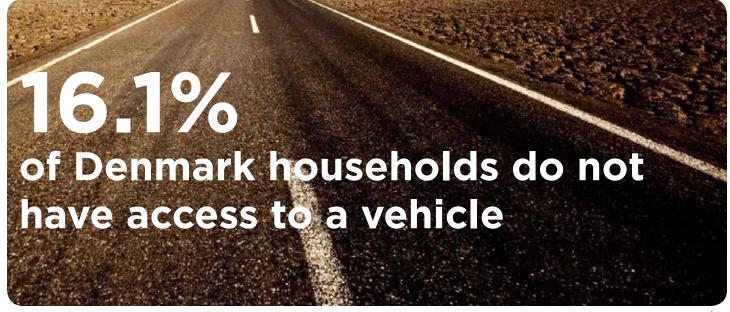
⁵ Dangerous by Design - South Carolina

It is important to note that commute mode share does not paint a full picture of need and demand, however, Mode share data is collected through an American Community Survey question which asks for the "primary" way a resident gets to work. This excludes walking commutes that occur as a secondary mode (for example, walking to a bus) and also excludes trips to destinations other than work, which account for more than 80% of all trips. Moreover, those households in the Town of Denmark who do not have access to vehicles (almost 16.1%) and those households with access to only one vehicle (44.5%) may walk out of necessity, and residents who currently drive might opt to walk to work if a safe and comfortable walking environment with adequate facilities existed.

Safety is key in encouraging and sustaining pedestrian activity. State traffic collision data show that Bamberg County has a pedestrian fatality rate of 0.6 deaths per 100,000 people, compared to a rate of 2.3 per 100,000 people for the state. While lower than the state average, finding ways to draw this rate closer to zero in Bamberg County will still be an important goal for promoting walkability.



Drainage and maintenance issues across the town create hazardous barriers for pedestrians, particularly people with disabilities. Identifying and rectifying these problems will increase access and mobility for Denmark's residents and visitors.



WHAT IS WALKABILITY?

Walkability is more than the ability to walk. It is a holistic approach for evaluating a streetscape or community's design, and a means to understand the factors that influence and encourage pedestrian activity. The goals of a walkable place are multi-faceted and contextspecific but typically strive for the following:

- increase personal mobility by providing alternatives to driving private automobiles
- increase personal mobility with ADAaccessible streetscapes
- stimulate vibrancy in commercial and social realms of a community
- increase access, proximity, and convenience to more destinations through a wellconnected network of sidewalks, crosswalks. and walking trails
- create an attractive place with inviting street orientations, landscaping, street furniture, and architectural design

There is no single, catchall walkability definition or one specific metric for measuring walkability. However, across the various attempts at a comprehensive definition, common themes emerge. Apart from the potentially obvious features that encourage walkability, like sidewalks and frequent, visible crossings, walkable places also incorporate the following key principles:

- human-scaled environment
- strong sense of place
- physical access
- connected walkways and street pattern
- mix of land uses
- density and location of facilities
- managed parking

The City of Denmark is not yet an archetype of a walkable community, however, there is a basis of existing facilities and features that will support and contribute to the City's goal of becoming a more pedestrian-friendly space. This Plan presents opportunities to build off of those existing resources.



"What Makes a Neighborhood Walkable?" graphic from WalkDenver, a pedestrian advocacy group.

WHY PLAN FOR PEDESTRIANS?

Imagine Denmark in 20 years...

as a place where people choose to walk — not out of necessity, but because it is a convenient and enjoyable transportation choice.

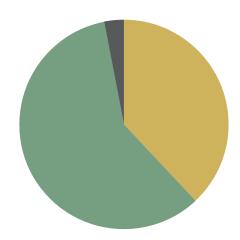
Development is well-designed and accessible so that residents have many of their everyday needs within walking distance. Pedestrianfriendly streets are prevalent throughout the community, and parents feel perfectly safe letting their children walk or bike to school, parks, or other destinations by themselves. or as part of an enjoyable and healthy family outing. Older adults who no longer drive can easily access grocery stores and medical appointments. Because the streets are safer and a growing pedestrian network connects more people to more places, people are walking in record numbers. Obesity rates decline, and families in all parts of the community can easily access healthy food. Serious pedestrian collisions have dropped substantially.

The cumulative result of this environment has resulted in substantial savings for the community and taxpayers. Road maintenance is less expensive as fewer cars are on the roads. and residents save money on gas while the air quality improves for everyone. Downtown attracts more local businesses that want to invest in a vibrant, active community and cater to the growing population.

An increasing number of communities and their leadership are seeing the potential of a future like this one: a future where better active transportation environments are critical parts of transforming and revitalizing our communities, making them more desirable places to live, work, and visit. This movement is a direct result of the nationwide demand for more livable communities and transportation options.

In 2010, Transportation for America conducted a nationwide survey that showed 59% of Americans in rural and urban areas preferred a transportation future that "[improves] public transportation and making it easier to walk and bike over building more roads and expanding existing roads." See Figure 1.1 below. And 73% [of respondents felt] they 'have no choice but to drive as much as they do', with 57% desiring to spend less time in the car."

Figure 1.1 Americans' Preferences for Reducing **Traffic Congestion**



We need to improve public transportation, including trains and buses, to make it easier to walk and bike and to reduce traffic congestion

We need to build more roads and expand existing roads to help reduce traffic congestion

SUMMARY TABLE OF WALKABILITY BENEFITS

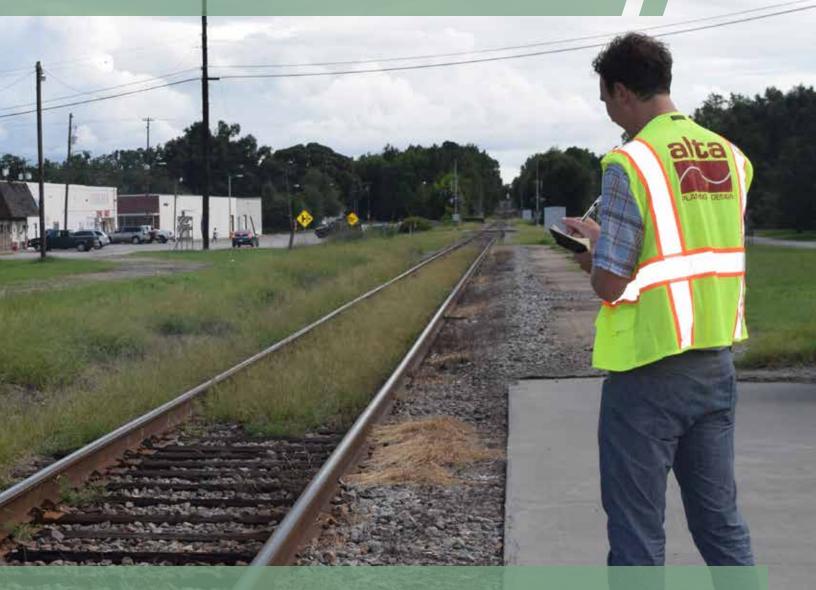
ECONOMIC BENEFITS			
Public infrastructure savings	Compact, walkable communities save costs on road building, maintenance other public infrastructure.		
Attracts businesses	Walkable communities have lower vacancy rates and increasingly attract businesses that want to offer convenient amenities and short commutes.		
Reduces individual transportation costs	Residents of walkable communities save money on costs associated with transportation, including vehicle ownership costs, operating costs, and parking costs.		
Magnet for millennials and baby boomers	Demand for walkable communities is growing, especially among millennials and boomers - both generations that wish to drive less and be able to easily reach destinations on foot.		
Increases housing values	Walkable communities have higher housing values and have higher stability than auto dependent communities during a recession.		
Improves socioeconomic mobility	Walkable areas have concentrated amenities such as jobs that are easily accessible to low-income residents and provide greater opportunities for economic mobility.		
Attracts visitors	Walkable communities attract tourist dollars with lively streets, engaging storefronts, short distances between attractions and a unique sense of place.		
Attracts recreation spending	Walkable communities are great places for outdoor recreation. Multi-use trails and safe streets can attract bicyclists and events such as triathlons that pump money into the local economy.		

HEALTH BENEFITS				
Improves physical health	Places that encourage walking have lower rates of chronic disease related to physical inactivity such as diabetes, heart disease, and osteoporosis. A simple walk improves balance, limits sickness, strengthens muscles and builds bone mass, as well as burns more fat than jogging. People who live in walkable neighborhoods are two times as likely to get enough physical exercise as those who do not.			
Improves mental health	Walkable communities can prevent the onset of cognitive decline and improve mental function. Walking can also prevent and reduce the symptoms of depression and anxiety, stimulating a sense of well-being through released endorphins.			
SAFETY BENEFITS				
Improves safety for all road users	Streets that are designed for pedestrians have safety benefits for all users of the road, including bicyclists and drivers. Sidewalks, medians, and traffic calming have particular direct effects. Safety in numbers - more people walking and biking - has proven to be an indirect safety improvement that reduces the risk of a collision.			
ENVIRONMENTAL BENEFITS				
Improves air quality	By reducing the distance to amenities and increasing the safety of walking to destinations, more trips can be made by walking while reducing emissions and reliance on fossil fuels.			
Preserves open space and greenspace	Compact, walkable development allows for more green space, water sources, and wildlife habitat to			



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"A street that's made safer for an older adult to cross is also safer for a child walking to school, a parent pushing a stroller, a bicyclist, a jogger, a commuter, a shopper. In other words, a walkable community benefits everyone." - Melissa Stanton

OVERVIEW

The Denmark Pedestrian Plan is shaped by data collected from previous plans and the feedback received during public input. The public input process was crucial for understanding Denmark's primary needs and identifying specific programs, projects, and policies that address those needs.

This chapter provides an overview of the major data collection and public input components that shaped the recommendations of this Plan. Each section describes the information gained and the critical outcomes of that process. Sections include:

- Review of Previous Planning Efforts
- Public Input Overview
- Focus Group Summary
- Survey Results Summary
- Visioning Event Summary
- Public Input Meeting Summary

REVIEW OF PREVIOUS PLANNING EFFORTS

This section provides a summary of recent pedestrian and greenway planning-related efforts in the City of Denmark. Two relevant plans exist - the Lower Savannah Council of Governments (LSCOG) Bicycle and Pedestrian Regional Plan and the LSCOG Long Range Transportation Plan. The plans reviewed are listed chronologically in the table below and are described in further detail on the following pages.

LOWER SAVANNAH COUNCIL OF GOVERNMENTS BICYCLE AND PEDESTRIAN REGIONAL PLAN

The LSCOG Bicycle and Pedestrian Regional Plan guides development of a regional pedestrian and bike network in the Lower Savannah region of South Carolina. This region includes six counties in southwestern South Carolina; Aiken, Allendale, Bamberg, Barnwell, Calhoun, and Orangeburg. The plan provides a review of existing facilities, along with an analysis of safety issues and predicted future demand.

Recommendations include policies, programs, and projects to increase active transportation through a 6E approach; engineering, education, encouragement, enforcement, evaluation, and equity. Design guidelines were also established to ensure bicycle and pedestrian facilities are included in all projects programmed through the Lower Savannah Rural Transportation Program.

Key recommendations in the plan that relate to Denmark include:

- Capitalize on the popularity of existing regional trails and state bike tour routes
- Provide facility types for the needs and comfort level of all types of users
- Expand paved shoulders, particularly in rural areas
- Develop a rail trail located on existing abandoned rail corridor

Plan	Agency	Year
Lower Savannah Council of Governments Bicycle and Pedestrian Regional Plan	Lower Savannah Council of Governments (LSCOG)	2012
LSCOG Long Range Transportation Plan	LSCOG	2005

LSCOG LONG RANGE TRANSPORTATION PLAN

The Lower Savannah Council of Governments Long Range Transportation Plan is the first comprehensive approach to a rural long term transportation plan in the Lower Savannah region. This document lays the framework for a future region that maintains a safe, multimodal, and balanced transportation system.

The goals of the plan include improving roadway safety, addressing the needs of the disabled, encouraging bicyclists and pedestrians, and enhancing quality of life by promoting context-sensitive roadway design. Recommendations largely involve inclusion of bicycle and pedestrian facilities on all streets necessary to provide people that choose those modes with safe routes to and from their destination.

Key recommendations in the plan include:

- Commit to providing safer accommodations for bikes and pedestrians
- Place bicycle network on arterial and collector streets
- Create safer crossings for pedestrians

RESULTS OF DATA COLLECTION

A first step in evaluating the existing conditions of the Town of Denmark, is the development of a comprehensive base map. Based on GIS data collected by the project team, a base map was created to illustrate existing sidewalks, as well as key supporting information such as schools, parks, community library, grocery stores, and other food retailers.



PUBLIC INPUT OVERVIEW

As part of the data collection process and during the development of network recommendations, the project team solicited input from Denmark residents, community leaders, and project stakeholders. Feedback was collected in a number of ways in order to be most inclusive and representative of the community make-up. This includes:

- 2 focus group sessions
- 1 youth focus group session
- Survey (online and hard-copy)
- Technical training and visioning walk
- Public Input Meeting

This section summarizes the key findings from each channel of public outreach collected thus far.

FOCUS GROUP SUMMARY

Three focus groups were conducted on Tuesday, May 24, 2016.

Two sessions were held at the Old Train Depot in downtown Denmark and included a mix of community members. stakeholders, and elected officials. One session was held at Voorhees College with students. Twenty-six community members participated in the three focus groups.

Focus group participants were chosen to include a diverse mix of Denmark residents who have a vested interest in improving active transportation, connectivity, and access to active living and healthy eating.

Specific objectives of the focus groups include the following:

- Identify residents' opinions of walkability in Denmark
- Explore residents' perceptions of pedestrian safety issues
- Seek input from residents on priority pedestrian planning projects and destinations
- Seek residents input on the level of accessibility to active living and healthy eating in Denmark

"I'd love to see a strategically located farmers' market and a railroad trail program here in Denmark."

- focus group participant

KEY FINDINGS

Priority Projects and Destinations

Focus group participants were asked to discuss the opportunities that exist to improve walkability, connectivity, and/or pedestrian access in priority areas of the city. Common themes from the discussions are summarized below:

1. Intersection of Church Street and Highway 78

- **Sidewalks** Lack of sidewalks in this area are an obstacle for Denmark-Olar High School students walking to and from school. A sidewalk proposal was submitted during construction of the high school, but right of way was an issue.
- **Traffic light** An initial traffic light request was submitted when the high school was constructed but was denied due to a low traffic count. Community members suggested that a new traffic count may be needed as traffic has increased in that area since the initial construction.
- **Blight** Many homes around the Church Street & Highway 78 area have been abandoned and are in disrepair. Some participants noted that there have been fires recently in some blighted housing.
- Walking path Focus group members said they want a track or walking path developed near the school.
- Pedestrian buffers Denmark-Olar High School was identified as a site in need of traffic buffers and greenery/beautification projects.

2. Highway 78

- Rail trail Adjacent to Highway 78, an abandoned railroad bed exists that extends past the city limits. In two separate focus groups this railroad bed was suggested as a possible project that could be converted into a "rail to trail" walking path. Focus group participants said they believe a trail could transform the community and would be popular if it included adequate lighting for safety and if the landscaping was aesthetically pleasing.
- Access to food Highway 78 is a main thoroughfare for those who walk to the main grocery store (Piggly Wiggly). It is also used by residents walking to fast food restaurants. Sidewalks are available for walking, but several are in disrepair. Community members noted that there was a dangerous curve near the McDonald's, which was a possible barrier to pedestrian activity in the area.

"I'll do whatever I can to assist with these projects. This is important to me." - focus group participant

"Community appearance is the first thing people see. We need to make sure we look good." - focus group participant

3. Voorhees Road Area

- Sidewalks Many students from Denmark-Olar Elementary School and Voorhees College are walking on the road to get to school due to a lack of sidewalks.
- **Sidewalk conditions** Sidewalks are present in some areas, but they are in disrepair. Water/sewage drainage were noted as an issue. Focus group participants said water and sewage often covers sidewalks, creating barriers to walking.
- **Lighting** There is insufficient lighting on Voorhees Road towards Bamberg and in the residential area around Voorhees College. Voorhees students who participate in the focus group said the lighting concerns affected their willingness to walk in the area in the evenings.
- **Speeding drivers** Focus group members said they want to see efforts to slow traffic in the area near Voorhees Road and Frederick Street. They said speeding drivers create an unsafe environment for pedestrians in that area.
- **Litter** Controlling litter in the area is a challenge, focus group participants said.

4. Intersection of Highway 70, 321, and 78

- **Litter** Participants said there is a constant effort to keep the area clean from litter.
- Signage and speeding drivers Highway 70 coming into Denmark was identified as an area in need of traffic buffers and a possible area where signage and beautification/ greenery projects welcoming travelers into the area were needed.

5. Voorhees College

- Walking trails Many students at the college have formed walking and running groups.
 However, students expressed a desire for more active living opportunities in the town.
 They said they want the development of a safe, we-lit trail near the college.
- **Lighting** Students noted that the area around the college was not well lit, creating a barrier to walking.
- Access to healthy food Students want better access to healthy food. They said they would frequent a farmer's market, if there were one available.
- There are many historical churches and other buildings on and around the campus that are in various states of disrepair. Voorhees students want to see improvements made to the historical buildings and walking connections made between them as a means to increase pedestrian activity. The students who participated in the focus group at Voorhees College suggested the following potential community projects to support the pedestrian master planning process:
 - Hold a joint litter cleanup day with college students and community members
 - Hold a community health day that includes health screenings, the sale of fresh produce, and healthy cooking classes where participants eat what they cook
 - Increase college student participation at the Dogwood Festival by including more vendors and activities targeted to various age groups.

6. Additional Priority Areas

- A recent lighting project at the intersection of Highway 321 and Highway 78 was touted as successful. Focus group participants said the project increased walkability in the area. Suggestions were made to extend the lighting project one-or-two blocks in each direction to further improve walkability in the area.
- Progressive Way Road is an area where community members are already walking frequently. There are no sidewalks on one side of the road.
- S. Magnolia/East Hagood/Highway 321 (near the Family Dollar) was proposed as an area in need of sidewalk improvement and additional sidewalk access to increase pedestrian activity. Many focus group members said the Family Dollar was a popular spot for purchasing groceries for those who live in the immediate area and do not have transportation to drive to the grocery store.
- Butler Street Housing, a subsidized housing development, was sited as an area in need of sidewalks in order to improve pedestrian walkability.
- Behind Rome Baptist Church Focus group members said the area behind the church has many large ditches that create a challenge for pedestrians.

"Focus areas should be around where people are already walking like housing authorities and Voorhees College."

- focus group participant

PRIORITY STRATEGIES

Focus group participants identified the following priority strategies for developing a pedestrian plan for the city:

Improve sidewalks and crossings near schools

Many participants spoke at length regarding the need for safer sidewalks and crossings for all schools in Denmark, SC. Focus group members noted that there were well kept sidewalks in the main part of town, but the sidewalks immediately outside of town are in disrepair or non-existent.

Create a community farmers' market

Focus group members said they want to create a farmers' market for the town to improve access to healthy food and to create a gathering space that community members can walk to.

Invest in beautification projects

Community members suggested that measures be put in place that will incorporate a wide range of community members collaborating and assisting with clean up efforts. They desired to see a plan in place to remove blighted homes and buildings and a community-wide focus on litter control. Participants expressed a desire to see more beautification projects centered around the areas that "welcome people to Denmark" and Voorhees College. Focus group participants stated that residents would not be motivated to walk until they see reductions in blight and increased litter enforcement, code enforcement, and beautification projects.



Unhealthy snacks and drinks pervade the isles of Denmark's convenience stores. Offering healthier food options in these locations will encourage a healthier lifestyle.

Add lighting

Focus group members want to see an extension to the lighting project at the intersection of Highway 321 and Highways 78. And they want improved lighting in neighborhoods and areas around Voorhees College. The current lack of lighting is seen as a personal safety issue for those who walk or want to walk at night.

Connect people to destinations

Connect schools and Denmark's historic sites. The pedestrian plan should seek to connect schools, if possible. College students highlighted the city's and the college's history and stated that making repairs to historical sites coupled with creating a connected historical walking plan could increase walkability and possibly active living tourism in the area.

SURVEY RESULTS SUMMARY

The Denmark survey identified community needs and priorities related to walkability, and reinforced findings uncovered during other public outreach efforts. This section highlights key findings. A full report of survey results can be found in the appendix. Though the quantity of responses was limited (19 total), those received represent a diverse age range and helpful information that builds on other forms of input.

KEY FINDINGS

- Few residents rate existing walking conditions as excellent, but more than 94% of respondents believe improving walking conditions is important or very important
- Exercise is the top reason respondents say they walk in their community
- To enjoy nature, to get somewhere, and for recreation were the next most popular responses

- Carolina Highway, Voorhees Road, and Downtown Denmark were described as current popular walking routes
- Respondents expressed a preference to walk to the following key destinations:
 - Grocery stores
 - Downtown Denmark
 - Denmark Public Library
 - City Hall
- To increase walking, respondents said they prefer:
 - Intersection improvements
 - More sidewalks
 - Better accessibility (curb ramps, even surfaces, etc)
- Besides the grocery store, fast food is primarily where respondents get food



DENMARK VISIONING WALK EVENT SUMMARY

During an August visit, Alta Planning + Design led a Visioning Session that included a presentation and a walk from the Old Train Depot in downtown Denmark. The Visioning Session was attended by a mix of community members and citizens. The walk highlighted areas where infrastructure improvements are needed and positive elements that the City of Denmark can build upon. The presentation covered three main parts:

- What makes for a walkable community
- How Denmark can improve walkability
- Ways for Denmark to makes fast, easy improvements to safety and accessibility with a low budget

The Visioning Session also included a "Vacant **Space Transformation"** activity. Denmark has a number of vacant or underutilized spaces downtown, and participants were asked to share their ideas to liven up a space on Carolina Highway next to City Hall. Ideas that emerged included:

- Temporarily transforming the space into a public plaza during a major event, such as the Blues Festival or Dogwood Festival
- Adding an informational kiosk for visitors to easily pick up information or a map showing destinations
- Beautifying the space with murals and greenery
- Developing a wifi hotspot to allow people to access internet in the space



During the Visioning Walk, residents discussed ideas for beautification and popup shops in vacant storefronts.



Alleyways in downtown Denmark present opportunities for creating interesting and unique walkable places.

PUBLIC INPUT MEETING SUMMARY

Following the walk and presentation, Visioning Session participants were asked to vote for their favorite program ideas to encourage walking by placing stickers on a visual preference board showing six options:

- Vacant Space Revitalization
- Student-led Community Gardens
- Community Chalkboard
- Mayor's Walk Challenge
- Trail Beautification and Development
- "You Pick" participants share their own programmatic idea for Denmark

Participants voted for **Student-led Community** Gardens and Vacant Space Revitalization as favored program ideas. "You Pick" was also a popular choice, with ideas that included safety programs for schools and drivers.



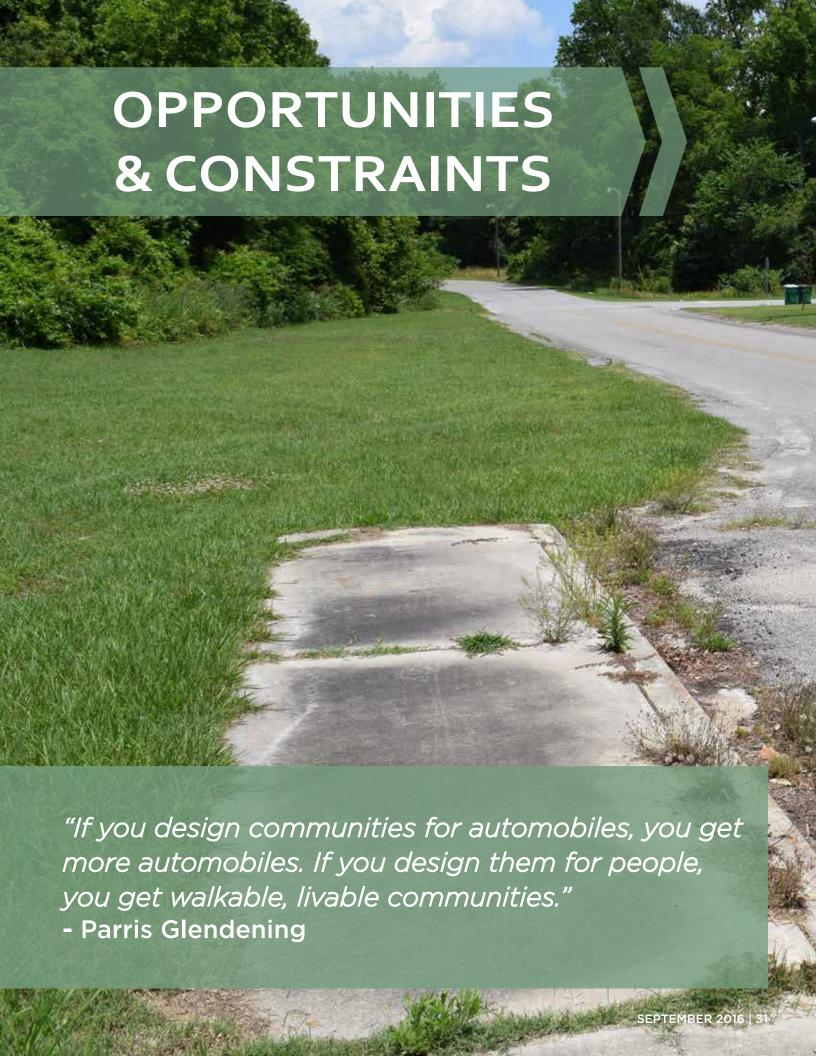
Denmark residents shared ideas and locations for temporary plazas and parklets, such as this underutilized space adjacent to City Hall.



Residents voted for their favorite program recommendations at the Public Input Meeting.



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OVERVIEW

This chapter provides an overview of the existing conditions that impact pedestrian safety and accessibility in Denmark. Fieldwork, in combination with quantitative analysis, create a more complete picture of the pedestrian environment that exists in Denmark, and informs specific recommendations for improving that environment. The following sections describe the information gained and critical outcomes of that process:

- Analysis of Opportunities and Constraints
- Pedestrian Safety Analysis
- Equity Analysis
- Healthy Food Access Analysis
- Active Space Analysis

SUMMARY OF OPPORTUNITIES + CONSTRAINTS

OPPORTUNITIES

Community Leadership





A strong group of community stakeholders and town leaders are working hard to improve quality of life for residents and visitors. Efforts include beautification and cleanup efforts downtown, retaining students from area colleges after graduation, partnerships with arts groups and students for economic development, and revitalization of historic buildings and homes.

Higher Education





Voorhees College and Denmark Technical College are located a mile from downtown Denmark. and offer degrees in liberal arts and the trades. These colleges provide the City of Denmark with intellectual and economic capital, while providing all residents with resources for higher learning. Sports and arts programs create additional attractions for residents. Additionally, students can offer skilled volunteer help for area revitalization efforts and provide ideas for community improvement.

Transformative Streetscape Projects





The City of Denmark has recently completed a successful streetscape renovation project on a portion of Carolina Hwy in downtown Denmark through a partnership with SCDOT and LSCOG. This catalyst project sets a high standard for transforming additional parts of the city into pedestrian-friendly spaces, and is a model for recommending future improvements. The streetscape upgrades include buffered sidewalks, stormwater retention, street trees, crosswalks, and fewer traffic lanes, which makes walking and driving safer and more enjoyable.

Downtown Scale & Walkability





Much of Denmark's downtown is built on a grid network of streets at a walkable scale.

This enables pedestrians to reach key destinations like the public library, City Hall, and the Jim Harrison galleries and plaza. Historic buildings with short setbacks, attractive storefronts, ample sidewalk, curb extensions which shorten crosswalks, street trees and planters, decorative brick pavers, and pedestrian-scale lighting all contribute to a strong sense of place that is inviting and comfortable to walk. Replicating the new Carolina Highway streetscape on surrounding streets with similar engaging features will bolster Denmark's walkability and boost activity downtown.

OPPORTUNITIES (CONTINUED)

Walkable, Accessible Schools





The City is fortunate to have schools, particularly **elementary schools, situated near walkable, residential neighborhoods.** Developing a partnership with Safe Routes to School means increased funding opportunities related to active transportation, and increased physical activity. Neighborhood schools also offer community gathering areas and recreational opportunities for area residents that otherwise might not exist. The school district has shown interest in improving walkability and developing programs that can encourage parents and students to walk to school.

The Dogwood Festival





The popular Dogwood Festival marks the beginning of spring each year and coincides with the arrival of abundant dogwood blossoms across town. The two-day event is held on the Carolina Highway in downtown Denmark, and attracts residents and students with live music, food and drink, and a parade. The event presents a great opportunity to showcase the Denmark Pedestrian Plan and potential demonstration projects due to strong community participation.

Abandoned Rail Corridor





The abandoned rail corridor that connects downtown Denmark with nearby neighborhoods has the potential to improve mobility options for residents and visitors. While much of the corridor is overgrown, portions are kept clear as an existing amenity. Formal marketing and signage for the existing trail and its benefits will increase its use and garner support for developing a paved, extended trail. A complete trail system, particularly one integrated with on-street facilities, will encourage walking not only for recreation purposes but also for transportation.

Revitalized Historic Buildings





Downtown Denmark includes numerous historic buildings, many of which have been rehabbed in recent years into community amenities, such as the Old Train Depot and the Dane Theatre, which now functions as a cultural center and won an Honor Award from The Palmetto Trust for Historic Preservation. The Voorhees College campus also has many buildings on the National Register of Historic Places. Opportunities remain for additional restorations which will improve the vibrancy and walkability of Denmark.

Sidewalk Network Gaps





Walkability diminishes outside of the core due to large gaps in the sidewalk network, **creating significant mobility and accessibility barriers.** Pedestrians are faced with an obstacle course of perils, often having to walk in the road or make their own route. These desire lines express a true need and demand for pedestrian facilities (right). Connectivity of the sidewalk network, as well as linkages to a proposed trail network, will have to be addressed.

Lack of High-Visibility Crosswalks





Denmark has made strides to integrate design features such as dogwood blossom murals in downtown intersections. However, while the murals are aesthetically pleasing, they do little to increase the visibility and safety of pedestrians. Many cross streets downtown lack crosswalks altogether. Some of these intersections already have important pedestrian facilities like push buttons and pedestrian signal heads but lack high-visibility pavement markings which alert drivers to a pedestrian's presence.

Limited Park Access





Denmark lacks walkable parks or recreation facilities. The largest park in the city - Simmons-Davis Park - is on the outskirts of town and access is restricted for much of the year. Additional park or open space opportunities should be identified that are accessible to all residents and integrated in existing neighborhoods. Wayfinding signage can direct residents and visitors with information that will encourage walking to/from area parks.

Inadequate ADA Compliance





ADA accessibility is a systemic issue in Denmark's pedestrian network. The CDC recognizes that walking and wheelchair rolling are rights, not luxuries, that each person should have. As such, Denmark should design and invest in its pedestrian facilities to encourage safe pedestrian activity and integrate walking and wheelchair rolling as a normal part of daily life for people of all ages and abilities.

CONSTRAINTS (CONTINUED)

Wide Roads





Roadway corridors are wider than needed for the traffic volumes they serve, and in some cases, travel lanes are oversized. Along some of these major corridors pedestrians are immediately adjacent to fast-moving traffic. Reducing lane widths and reallocating roadway space, "right-sizing," benefits the pedestrian and can even allow for bicycle facilities. This reconfiguration slows traffic speeds while maintaining throughput, buffers pedestrians, and creates a multimodal corridor.

Poor Connectivity between Town & Colleges





In Denmark there is both a perceived and real chasm between two anchors of the city — the college area and downtown Denmark — due to residential streets with fast-moving traffic and few amenities or destinations to create an interesting walk. Narrow sidewalks, high vehicle speed limits, frequent driveway curb cuts, and the lack of ADA accessibility all creating compounding mobility challenges.

Perception of Safety





Perception of crime and violence prevents many Denmark residents from walking, especially at night. Residents expressed their preference for walking in their neighborhoods on local streets. However, there are few pedestrian-oriented lights to improve their sense of safety so residents and students forego walking altogether. Organizing neighborhood watches and partnering with law enforcement to establish recurring walking routes that are monitored can encourage walking, foster community relationships, and deter crime.

Limited Healthy Food Options





Healthy food options in Denmark are limited to the fresh produce section in Piggly Wiggly and a temporary fresh fruit stand that sets up on Heritage Highway. Neither option is easily accessible on foot due to surrounding roads with high speed traffic and few pedestrian facilities. The development of a Farmer's Market in the core of the city and a mobile market could offer healthy food in places where it is most accessible and most needed.

PEDESTRIAN SAFETY ANALYSIS

Pedestrian fatalities are on the rise.

Between 2003 and 2012, 47,025 pedestrians were killed walking on streets in the U.S. In 2012 alone, 4,743 pedestrians died, an increase of 7% over 2011. Meanwhile, the number of vehicle drivers and passengers who died in traffic crashes declined by a third during this period. The rise in pedestrian fatalities while overall traffic fatalities declined means pedestrians now account for more than 15% of all traffic fatalities.

Pedestrian safety is a growing concern in South Carolina. Pedestrian fatalities in the state rose 23.8% between 2008 and 2012, outpacing national trends. The table below summarizes fatality figures for the state during this time.

South Carolina ranks 45th in the nation for levels of walking mode share, yet ranks 2nd in the nation for walking fatality rates. As previously mentioned, Bamberg County has a pedestrian fatality rate of 0.6 deaths per 100,000 people, compared to the state rate of 2.3 deaths per 100,000 people.

While reasons for the increase in pedestrian crashes are difficult to pinpoint, demographic shifts, more people walking, and higher numbers of pedestrians on dangerous, high-speed arterials all likely play a role. A number of factors impact pedestrian safety. Visibility, driver behavior, time of day/year, access to safe crossings, and traffic volume all play a role. However, key factors such as speed, the number of traffic lanes, and roadway design disproportionately affect safety for vulnerable roadway users.

According to Fatality Analysis Reporting System data, 58.8% of all pedestrian deaths in South Carolina were on arterials — wide, high speed roads rarely built with pedestrian safety in mind. Similarly, 78.8% of South Carolina's pedestrian fatalities occurred on roads with a speed limit of 40 mph or higher.⁶

Pedestrian Fatality Figures for South Carolina:

	2008	2009	2010	2011	2012	% change
Pedestrian Fatalities	101	89	90	113	125	23.76%
Pedestrian Fatality Rate per 100,000 people	2.23	1.94	1.94	2.41	2.65	18.83%
Pedestrians as Percent of all Traffic Fatalities	10.97%	9.96%	11.12%	13.65%	11.6%	5.74%

Some populations are disproportionately affected by unsafe walking conditions. Households without access to vehicles are more reliant on walking, yet often live in areas where suburban street patterns and dangerous arterial roads predominate. Older adults require more time at crossings and are more vulnerable to injury when a collision occurs. Older adults are also more susceptible to other non-collision events which do not involve a motor vehicle but which can cause injury. These "pedestrian only" events such as tripping on sidewalks and slipping on curbs, are not typically captured when discussing pedestrian safety but are important considerations in this plan.⁷

Children are also disproportionately affected by unsafe walking conditions. Children often walk to schools built along unsafe arterial or major roads, putting them at higher risk. Children also use neighborhood streets as areas to ride bikes and play games. They often go unseen by drivers though.

Nearly one-third of all Americans do not drive.

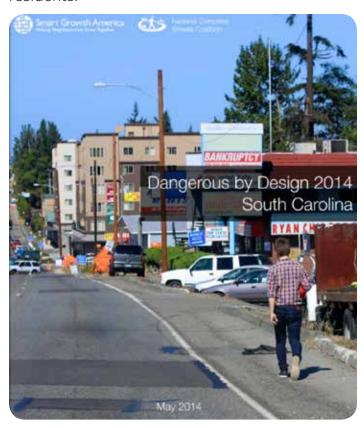
This includes all children and adolescents who are not of age, 21% of all seniors over 65 years-old, people with disabilities, and those who cannot afford to drive.⁸

Pedestrian injuries occur at a higher rate than pedestrian fatalities. Official crash statistics, however, do not capture a significant portion of these collisions. Collisions that go unreported and near miss incidents are not reflected in most collision statistics, and thus may not be fully representative of safe walking conditions. This is especially true when accounting for whether a pedestrian injury occurred in the

⁶ Dangerous by Design - South Carolina

roadway (1.7 times more likely to report than non-roadway locations), the severity of the injury (1.3 times more likely to report when hospitalized), and the age of the pedestrian (ages 15-24 are significantly less likely to report a collision even after controlling for location and severity).⁷

In recent years, a series of successful national campaigns have targeted drunk driving, seat belt use, and distracted driving. For people in vehicles, the resources and focus dedicated to safety has saved thousands of lives. A similar dedication to creating safe streets for pedestrians will encourage walkability, improve health outcomes, and improve livability for all residents.



Dangerous by Design is a report issued by Smart Growth America's National Complete Streets Coalition. The Smart Growth organization also issues state-specific versions with nuanced relevant data. The report documents preventable pedestrian fatalities and details measures that can be taken to make streets safer for all road users.

⁷ Federal Highway Administration Office of Safety - Bike/Ped Documents Police-reporting of Pedestrians and Bicyclists Treated in Hospital Emergency Rooms

⁸ Smart Growth America Senate Fact Sheet

PEDESTRIAN COLLISION MAP

In addition to collecting base map data, the project team and partners created a pedestrian collision map to show where two injuries occurred between 2010 and 2014.

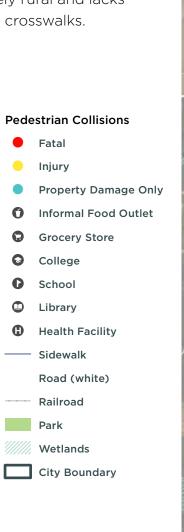
The two reported pedestrian injuries both occurred on rural highways just outside Denmark. One injury occurred to the east of Denmark on Heritage Highway (Route 78) near College Road. This is a rural area with no sidewalks and fast-moving vehicle traffic.

The other reported injury occurred at the intersection of State Highway 70 and Guess Road, just north of downtown Denmark. This intersection is skewed with wide turn radii that allows for fast moving turns off of Highway 70. The area is predominately rural and lacks sidewalks, street lights, and crosswalks.

> Fatal Injury

0

Park





EQUITY ANALYSIS

OVERVIEW

An equity analysis provides insight about the areas of Denmark that have higher concentrations of vulnerable populations. This information, coupled with an overlay of healthy food outlet locations and active space locations, can also distinguish which neighborhoods may need improvements the most.

Thus, this quantitative analysis gave the project team a starting point for identified priority areas, however, ultimately recommendations were based on a synthesis of factors, including the equity analysis results, current best practices, public input, existing conditions analysis, and the pedestrian collision analysis,

This section describes the equity analysis process in more detail, and includes the following:

- Equity Analysis Methodology
- Equity Analysis Results
- Healthy Food Access Analysis
- Active Space Access Analysis

METHODOLOGY

The equity analysis incorporated the following seven socioeconomic criteria:

- seniors
- children
- non-white populations
- low-income households
- vehicle access
- linguistic isolation
- SNAP recipients

The measure and rationale for each criteria are further described below.

Seniors

<u>Metric</u>: senior citizens are defined as those who are 65 years old and older. This follows the *2010 Census Brief - The Older Population*.

Rationale: Walkable neighborhoods help seniors remain active, healthy, social and free to move around. Older adults socialize more when living in walkable neighborhoods, because regular social interaction is possible, convenient and more frequent. In a walkable neighborhood the senior citizens are more likely to know their neighbors, participate in politics, engage socially and even trust people.

According to Center for Disease Control and Prevention survey, 32.5 percent of Americans over the age of 65 don't have regular physical activity. There are many health benefits of walking, especially for people older than 50. Elderly adults who walk are less likely to suffer mental deterioration or dementia and physical activity may actually add years to their life. Therefore, living in a walkable neighborhood gives options for walking right out your front door.

A survey by AARP Public Policy Institute found that people over age 50 listed lack of walkability part of barriers to walking.

"Older adults perceive poor sidewalks, the absence of resting places and dangerous intersections as barriers to walking."

Thus, walkable environment benefits seniors, keeping mind and body healthy through their surroundings and neighborhoods.

Children

Metric: children are defined as individuals 14 years old and younger. This threshold was determined based on the legal age for driving in South Carolina. At age 15, young adults are eligible for a learner's permit, and after 180 days young adults are eligible for a provisional driver's license. While conditional, even a permit and provisional driver's license broaden a young person's mode of choice, and significantly increase their mobility.

Rationale: As parents, physicians and policy makers look for ways to curb childhood obesity, they may need to look no further than a child's own backyard. Studies show that children are less likely to be obese if they live in a neighborhood that is safe and within walking distance of parks and retail services.

The U.S. has been experiencing a growing trend in overweight and obesity among youth and children and recent evidence shows that approximately 32 percent of youth are overweight or obese. Physical inactivity impacts weight and in an effort to curb the growing obesity epidemic there is an increasing research that has examined associations between local

area environmental factors and physical activity among youth. Greater availability of outdoor play/sports areas and parks, and access to commercial physical activity-related facilities have been associated with higher levels of youth and children physical activity.

Neighborhood design can also influence physical activity levels in youth and children. However, perceived environmental barriers, such as lack of access to these types of settings such as low connectivity street networks, have been associated with lower income neighborhoods. Whereas, high walkability (grid street network) neighborhoods have shown to have more physical activity and hence, less obesity among youth and children.

Non-White Populations

Metric: non-white is measured as the percentage of all races, excluding those that identified as white. This includes Black or African American, American Indian and Alaska Native. Asian. Native Hawaiian and Other Pacific Islander, or some other race.

Rationale: Communities with more racial and ethnic minorities and lower-income residents often lack specific features that support walking, such as clean and well-maintained sidewalks, trees and nice scenery and safety. Such deficits may undermine the generally favorable effects of walkable neighborhood design. The presence of parks, open space and other recreational facilities is consistently linked with higher physical activity levels among children and adolescents. However, many studies show that lower-income groups and racial and ethnic minorities have limited

access to well-maintained or safe parks and recreational facilities, and more crime and traffic.

The low leisure-time physical activity rates and high risk of obesity among racial or ethnic minority children, and those living in lowerincome areas, can be partially explained by their generally poor access to parks and private recreation facilities. In light of this growing evidence, policy makers should pursue strategies that improve walkability, access to parks, green space and recreational facilities, and neighborhood safety.

Low-Income Households

Metric: low-income is measured as the percent of the population living below two times the federal poverty level. 2015 Federal Poverty Guidelines identified \$48,500 as the threshold for a four-person household. American Community Survey (ACS) data groups income by increments of \$4,999 so this analysis captures all household incomes at or below \$49,999.

Rationale: The U.S. Department of Housing and Urban Development (HUD) defines low income households as households earning less than 80% of the Area Median Income (AMI). Very low income households earn less than 50% of AMI.

These groups of people are the least likely to have access to a car and may depend on walking to reach work, school, public transportation, or other destinations. People with lower incomes are more likely to live in areas with high crime rates, perceive their neighborhoods as less safe, and report physical and social disorder in their neighborhoods, such as broken windows, litter, graffiti, loitering and public drinking. These environmental variables may be why, in some cases, a higher proportion of lower-income children tend to be less active than their peers, overweight or obese. Walkable and safe access to healthy food outlets would support both nutrition and physical activity needs of low-income populations.

Vehicle Access

Metric: Vehicle access is measured from a question on the American Community Survey about whether a household has access to a car, truck, or van of 1-ton capacity or less.

Rationale: Access to private vehicles can be an indicator of mobility and access, particularly access to healthy food options and active spaces.

Linguistic Isolation

Metric: Linguistic isolation is measured as percentage of households in which those over the age of 5 speak English "not well" or "not at all".

Rationale: Households that are linguistically isolated may have greater difficulty accessing services that are available to fluent English speakers, such as transportation services and social services.

SNAP Recipient

Metric: SNAP recipients measures the percentage of households who have received SNAP assistance in the past 12 months..

Rationale: Current regulations require food retailers who accept SNAP to stock three varieties of foods in each of the following four food groups: fruits and vegetables, dairy, breads and cereals, and meat, poultry and fish. While a new rule requiring seven varieties in each food group was proposed in February of 2016, SNAP recipients still travel farther to access their food and are more likely to be affected by diet-related diseases, Additionally, only 0.02% of SNAP funds are redeemed at farmers markets indicating limited outreach and education efforts aimed at attracting households that receive SNAP assistance.



COMPOSITE EQUITY MAP

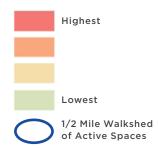
The adjacent map reflect the areas of Denmark with greater than average concentrations of the seven vulnerable populations.

The red equity tier represents areas with the highest concentration of vulnerable populations. These areas have the highest need and are priorities for infrastructure improvements. This area spans most of the city south of Highway 78 and west of Frederick Street.

Denmarx Technica College Athletic Fields

LEGEND

Concentration of Vulnerable Populations



HEALTHY FOOD ACCESS ANALYSIS

OVERVIEW

Walkable and safe access to supermarkets, grocery stores, farmers markets, and specialty markets is important, because they give consumers access to a variety of fruits and vegetables. Diets rich in fruits and vegetables offer a number of health benefits and have been linked to a lower prevalence of obesity.

Most Americans, especially those with a low income, consume far fewer fruits and vegetables than recommended by current dietary guidance. Communities with limitations in resources, disposable income, language proficiency, and transportation often have restricted access to, and knowledge about, a variety of healthy food options.

While there is general agreement that consumption of fresh, healthy foods such as fruits, vegetables, and whole grains are necessary for health and nutritional well-being, many communities across the region have negative health and economic consequences caused by a lack of access to high-quality food. Grocery stores, farmers markets, and community gardens tend not to be as readily available to people in low-income, low-access communities. The result is an over-dependence on neighborhood convenience stores with limited offerings of fresh foods sold, frequently for a high price,. This leads to myriad health and nutritional and long-term sustainability implications.

Therefore, creation of active transportation routes such as sidewalks, pedestrian malls, and bicycle paths between all neighborhoods and grocery stores, farmers markets, or other healthy food outlets can ease this disparity in accessibility, and help lower rates of chronic disease and lower levels of obesity.



HEALTH RISKS

Specific health risk data at the town level does not exist, however, county level data show that:

- Although 40% of residents have reasonable access to exercise opportunities, about 34% of residents do not engage in regular physical activity.
- 41% of adults in Bamberg County are obese. This is 9 percent higher than the state rate of 32%. (Obesity is measured as a Body Mass Index [BMI] greater than 30.)
- 41.9% of adults consume less than one serving of fruit or vegetables per day in Bamberg County.
- Over 20% of adults have type 2 diabetes in Bamberg County.
- 22.6% of Bamberg children are obese. This is 6% higher than the state rate of 16.7%. (Children are defined as those individuals between the ages of 2 and 17.)

Bamberg County is considered one of the CDC's (CDC) "Diabetes Belt" counties.

According to the CDC:

People who live in the diabetes belt

are more likely to have type 2 diabetes

than people who live in other parts of

the United States. People who do not

already have diabetes can reduce their

risk by being physically active and, if

they are overweight, losing weight.

Obesity and inactivity account for

nearly a third of the increased risk for

type 2 diabetes that scientists noticed

in people living in the diabetes belt.

FOOD RETAIL ENVIRONMENT

Food security addresses the affordability, availability, and accessibility of healthy foods, and is thus directly related to health status. In Bamberg, nearly a fourth of residents are food insecure, and almost half get less than one serving of fruits or vegetables a day. Poor diet significantly contributes to heart disease, obesity, diabetes, some cancers, strokes, and more generally a lower quality of life and decreased life expectancy.

Denmark has one full-service option for groceries, Piggly Wiggly. Besides a community garden that is no longer in operation and the potential for vegetable gardens on the Voorhees College Campus, Denmark has no other sources of food. Thus, one grocery store serves the entire town's population, which equates to a very low Healthy Food Outlet Density of 0.27.

The adjacent table details the local food retail environment.

Summary Table of Denmark's Food Retail Environment:

Number of Food Retail Establishments (FRE)	1 (1 year round)			
Number of People/FRE	3,467			
Square Miles/ FRE	3.8			
Number of Grocery Stores	1			
Number of People/Grocery Stores	3,467			
Square Miles/ Grocery Stores	3.8			
Healthy Food Outlet Density	0.27 (year round)			



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HEALTHY FOOD ACCESS ANALYSIS MAP

The results of the Composite Equity Analysis are combined with a mapping study of the locations and walkability of healthy food outlets. Healthy food outlets are defined to include all grocery stores, farmers markets, and community gardens.

A half-mile walkshed is a widely accepted catchment area for pedestrian analyses. A half-mile is about a ten minute walk for most pedestrians. This distance also serves as the Federal Transit Authority's (FTA's) designated catchment area for pedestrian improvements that are eligible for transit enhancement funds. This diameter presumes that, barring barriers to mobility and accessibility, individuals within the catchment area would be willing to walk to these activities and destinations. Walksheds, in combination with equity data, assess the connectivity and reveal opportunities where infrastructure improvements may have the greatest impact.

The only grocery store in Denmark is situated in the Northeastern corner of Denmark along the US 78 corridor. The half-mile catchment circle indicates that very few of Denmark's residents have walking access to the Piggly Wiggly, and only a tiny fraction of the most vulnerable populations have such access. Furthermore, the portion of town with the least vehicle access, south of US 78 and west of US 321, is coincidentally the portion of town that is the farthest away from this healthy food outlet.

LEGEND

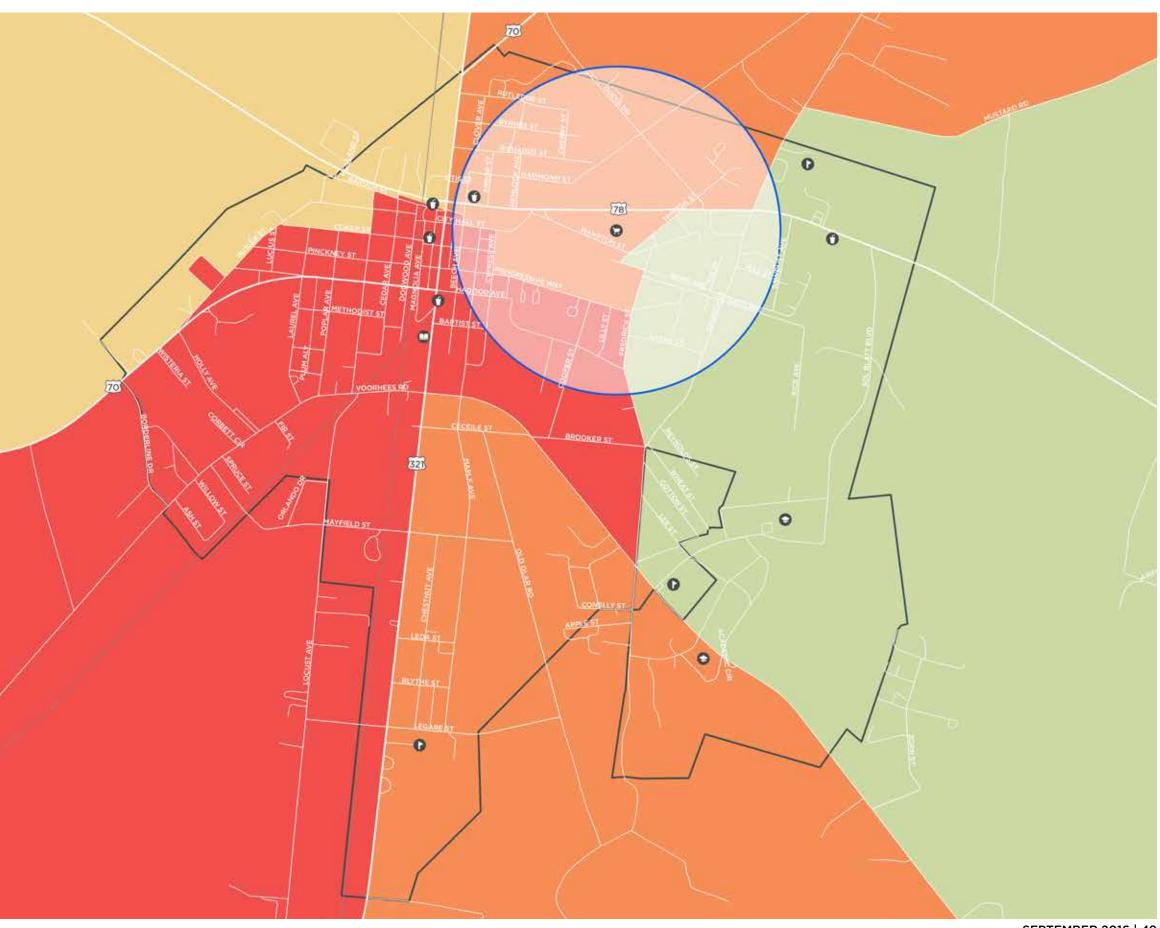
Concentration of Vulnerable Populations

Highest

Lowest

1/2 Mile Walkshed

of Active Spaces



ACTIVE SPACE ACCESS ANALYSIS MAP

The results of the Composite Equity Analysis were also combined with a mapping study of the locations and walkability of active spaces. Active spaces are defined to include all existing parks and greenspace. In communities where more resources exist, trails, YMCA's, or community recreation centers are typically included.

This analysis again uses a half-mile walkshed or 10 minute walk for most pedestrians.

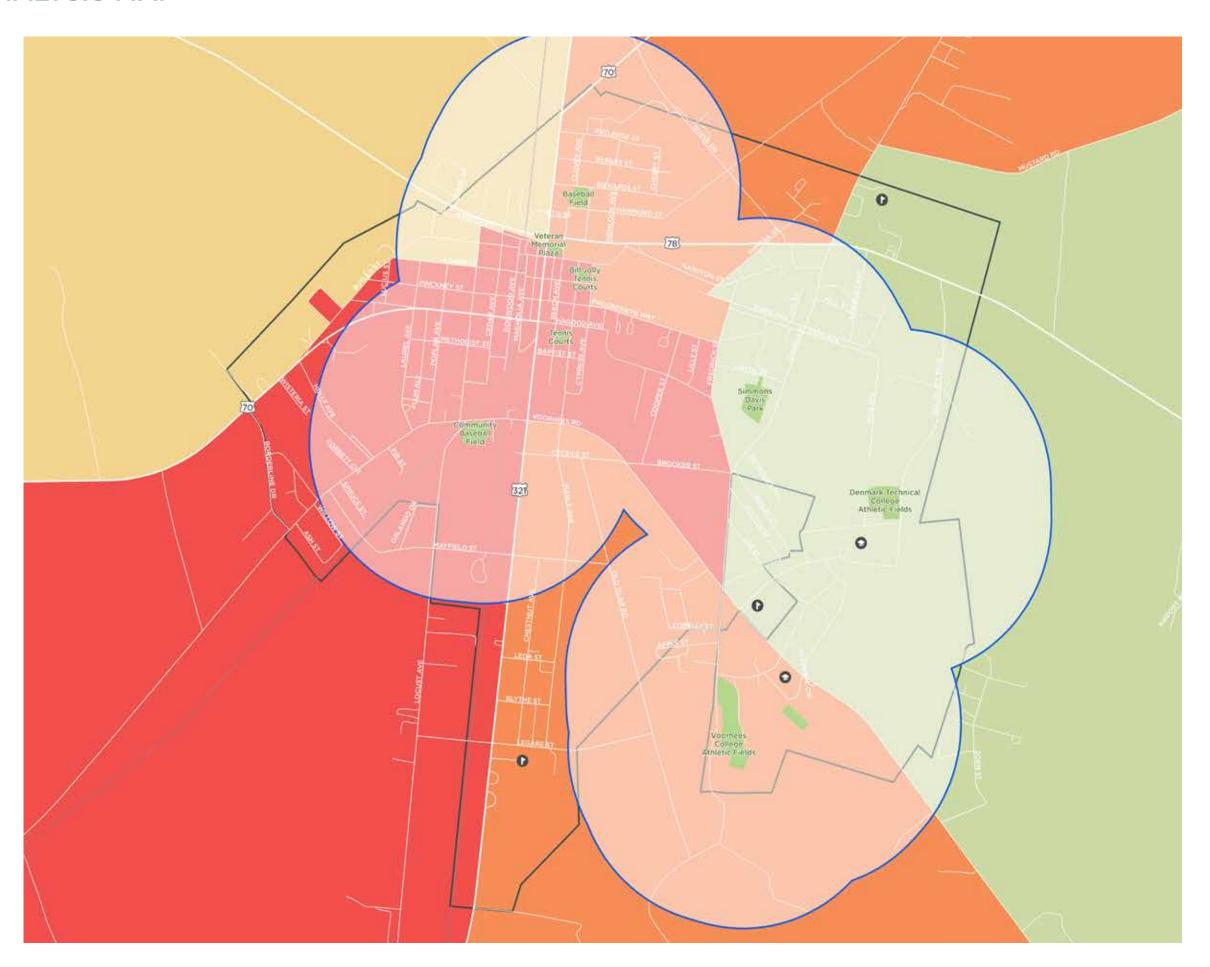
The resulting map is a starting point for understanding how to link areas in need to active space destinations through pedestrian infrastructure improvements.

The potential walkability and active space access covers much of the town, focusing around downtown and parts in the east. However, these are merely opportunities for active space.

Currently, the majority of places shown on the map are insufficient for recreational use or lack

map are insufficient for recreational use or lack public access. There are nine potential locations for physical activity access. Park spaces include the Denmark Technical College's athletic fields and the Voorhees College athletic fields, which have limited public access. Park space is limited to Simmons-Davis Park, which is disconnected from downtown and has poor access from nearby neighborhoods. The city owns the abandoned railroad property that crosses through the heart of Denmark, which presents a rail-to-trail opportunity.

Concentration of Vulnerable Populations Highest Lowest



of Active Spaces

ACTIVE SPACE ACCESS ANALYSIS

OVERVIEW

Walking can be a critical form of transportation, particularly for older adults who no longer drive, young people who cannot yet drive, and for people who do not have access to a vehicle. Apart from walking as a means for transportation, however, walking serves a vital role in maintaining and improving one's health.

The CDC recommends 60 minutes of physical activity for children per day, 150 minutes of physical activity for adults per week, and 150 minutes of aerobic and muscle-strengthening activity per week. Access to exercise opportunities in Bamberg County are limited.

County-level physical activity data show that:

- Women report being less physically active than men.
- 34% of all Bamberg County residents do not engage in regular exercise. This is 8 percent higher than the state rate of 26%.
- 60% of residents do not have reasonable access to exercise opportunities

Additionally, data on youth physical activity show that:

- The percent of households living below the poverty line is 45% in Bamberg County, compared to 18% for the state as a whole. This is significant because children living below the poverty line are 159% more likely to be deprived of recess.
- Students who walk to school every day had
 24 more minutes of physical activity per day.

Providing the freedom to walk to places in Denmark through safe and comfortable pedestrian facilities supports a healthy lifestyle. In turn, this boosts not only the town's physical activity level, but also increases mobility, accessibility, and quality of life for all citizens.





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OVERVIEW

The following sections detail priority pedestrian infrastructure recommendations for the City of Denmark. The intent of these recommendations is to present a vision of walkability priorities, ensuring citywide accessibility and mobility for pedestrians of all ages and abilities. Improvements focus on making walking safer and a more enjoyable experience to increase the overall quality of life for residents of and visitors to Denmark. To achieve such a vision, the recommendations are organized as follows:

- Photo Glossary of Improvements Agallery of general improvements tailored to Denmark that will build a pleasant pedestrian experience.
- **Crossing Recommendations** A general explanation of improvement types, a list of proposed spot improvement locations, and a map.
- **Corridor Recommendations** A general explanation of improvement types, a list of 5.8 miles of proposed corridor improvements, and a map.
- **Project Cutsheets** These spreads are intended to convey what recommendations can look like to residents and stakeholders. as well as assist in applying for implementation funds. The project cutsheets identify corridors that are crucial catalysts for economic development and quality of life.
- **Summary Table** A list of recommended corridor projects, with mileage and a description of improvement type.

While these infrastructure recommendations are considered priorities for Denmark, the City should remain opportunistic and flexible. New developments, roadway reconstruction projects, and regularly programmed maintenance programs should not preclude other improvements from happening.

The recommended facility types described herein are based on national best practices for pedestrian and bicycle design and are compliant with state and national design guidelines.

PHOTO GLOSSARY OF IMPROVEMENTS



CROSSING RECOMMENDATIONS

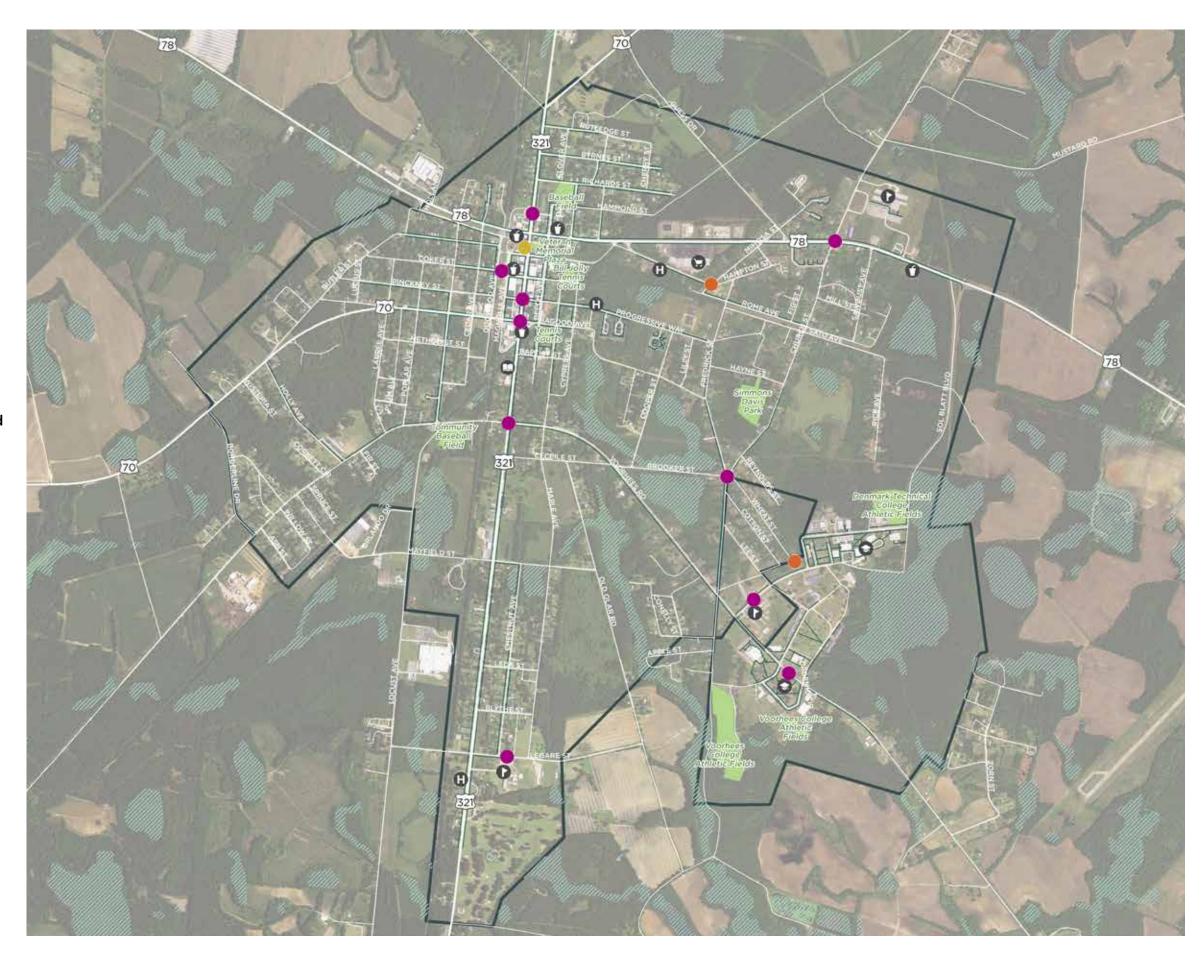
Crossing improvement recommendations are listed here to address pedestrian safety, comfort, and convenience by targeting specific areas with high foot traffic and problem areas. The Vacant Space Revitalization location is also identified here. Each identified crossing recommendation will have a host of improvements that are typical of a well-designed crossing. These improvements include:

- high-visibility crosswalk
- pedestrian push buttons
- pedestrian countdown signals
- ADA compliant curb ramps
- pedestrian warning signs
- median refuge islands for long crossings
- traffic calming

The following intersections have been identified as priority locations for crossing improvements:

- Carolina Highway & Pickney Street
- Carolina Highway & East Hammond Street
- Carolina Highway & Voorhees Road
- Carolina Highway & East Hagood Street
- West Coker Street & the Railroad
- Railroad Drive & East Hampton Street
- Heritage Highway & Church Street
- Church, Frederick, and Brooker Streets
- Soloman Blatt Boulevard (Denmark-Olar Elementary School)
- East Clark Street (Denmark-Olar Middle School)
- Voorhees Road (between Porter Drive and Academic Circle)





CORRIDOR RECOMMENDATIONS

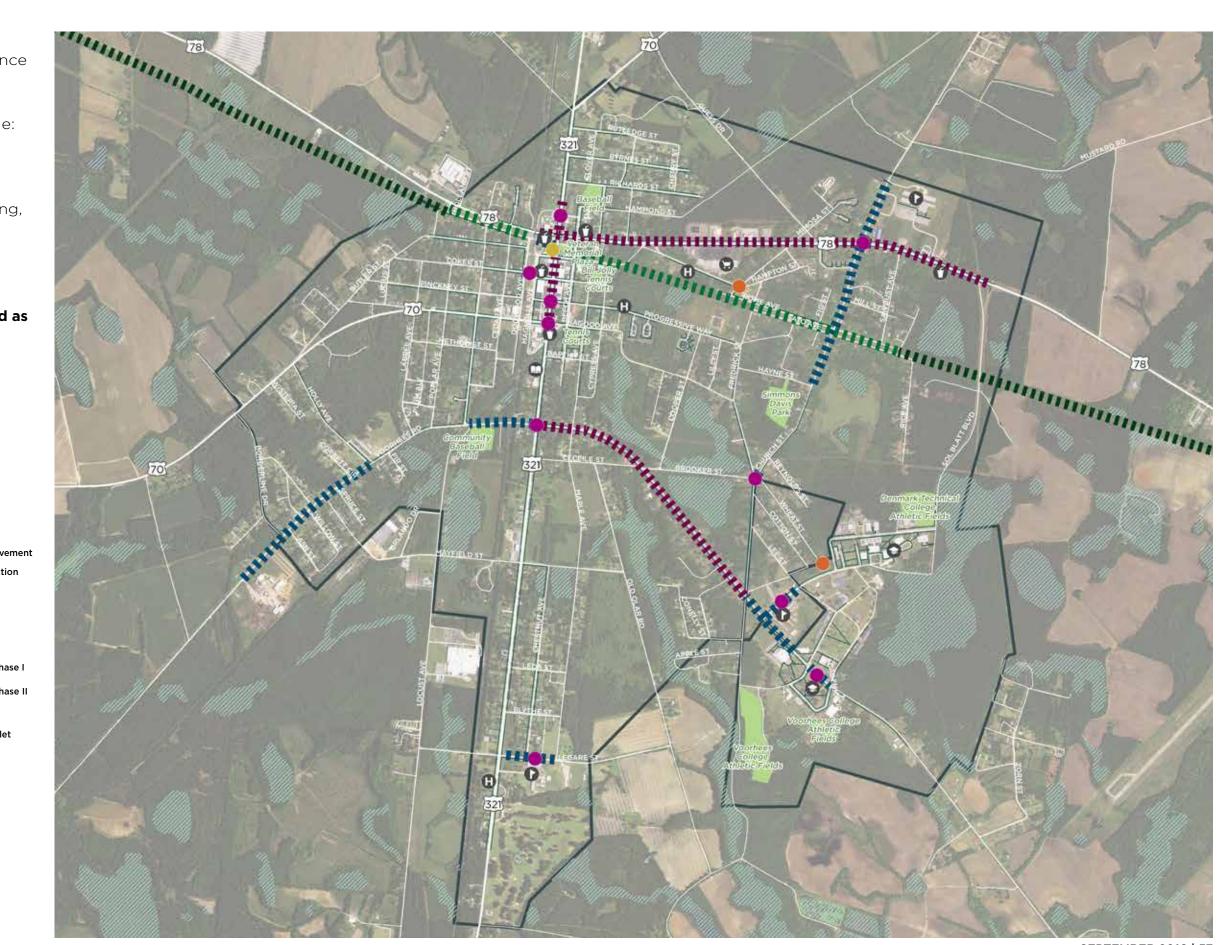
Corridor recommendations also address pedestrian safety, comfort, and convenience by looking holistically at the pedestrian experience along a stretch of the road.

Typical corridor recommendations include:

- ADA compliance
- filling sidewalk network gaps
- streetscape design elements such as landscaping, street furniture, wayfinding, and pedestrian-scale lighting
- "right-sizing" the road or road diet
- traffic calming

The following corridors have been identified as priorities:

- Carolina Highway
- Heritage Highway
- Voorhees Road
- Church Street
- Izlar Street
- Soloman Blatt Boulevard

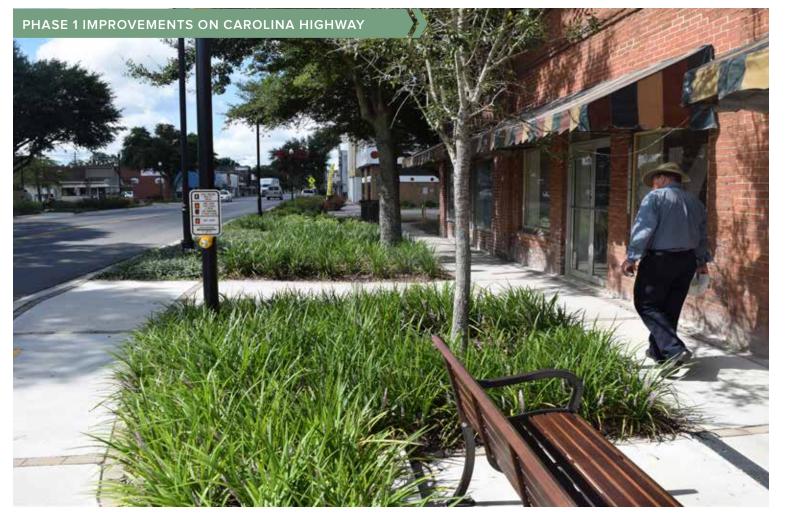




Priority Project: Carolina Highway Streetscape

AT A GLANCE > The Carolina Highway (Highway 321) functions as 'Main Street' through historic downtown Denmark. The recent first phase of streetscape improvements at the intersection of Carolina Highway and Heritage Highway (Highway 78) have transformed the area up to City Hall Street into a safe, accessible, inviting, and comfortable destination for walking.

Continuing the success of Phase 1 by extending streetscape improvements along Carolina Highway to Coker Street is imperative for improving pedestrian safety and accessibility. Current conditions, detailed in the graphic at right, demonstrate a need for streetscape enhancements that balance pedestrian mobility with vehicular throughput. Specific recommendations, also detailed at right, will not only address the corridor's major accessibility and safety issues, but also enliven the local economy and beautify this beloved place. As a priority project, the City should proactively develop an implementation strategy and pursue funding for implementation.



CAROLINA HIGHWAY EXISTING CONDITIONS

Wide travel lanes create long crossing distances for pedestrians and a high number of conflict points



Wide lanes encourage speeding and make walking unsafe



Narrow sidewalks lack street furniture. including pedestrian lighting, shade trees, and benches

Curb-less streets encourage parking on sidewalks



Lack of pedestrian crossing signals and ADA push buttons make crossing unsafe



RECOMMENDED STREETSCAPE IMPROVEMENTS FOR PHASE 2

- ▶ ADA compliant sidewalks and curb ramps → Pedestrian crossing signal heads
- ▶ Wide sidewalks (8'+)
- **▶** Landscaped sidewalk buffer from traffic
- ▶ Pedestrian scale lighting

- Seating areas
- ▶ Reduce traffic lanes from 4 to 2
- Visible and safe street crossings







Voorhees Road

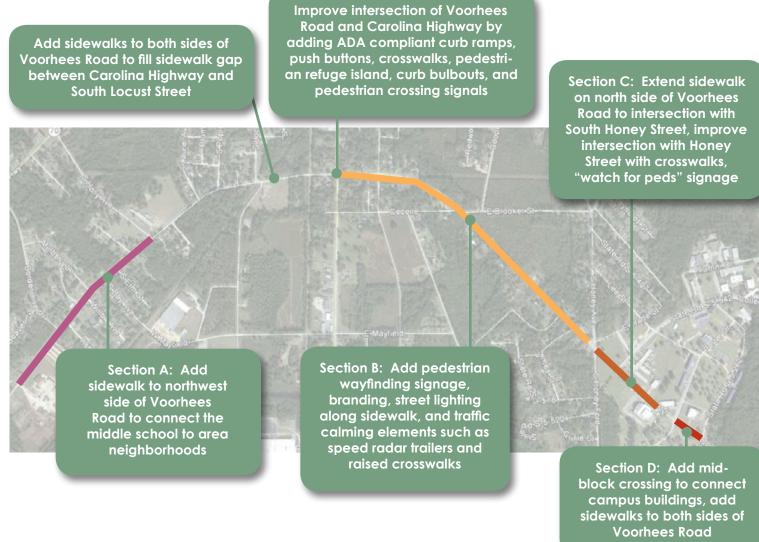
AT A GLANCE > This important street provides a direct connection from Voorhees College and Denmark Technical College to downtown Denmark. The corridor also functions as an important pedestrian link between the Denmark-Olar Elementary School and nearby neighborhoods.

Key Issues > There is a perceived divide between downtown and the colleges in Denmark that discourages residents and students from walking between these two local anchors. Fast-moving cars, few crossings and limited sidewalks make this an unsafe space for pedestrians and bicyclists. A lack of lighting makes the area particularly uninviting at night.

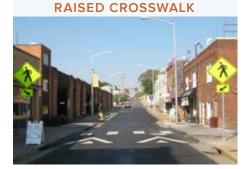
Implementation Strategy > Coordinate with the local colleges for a corridor improvement project. Phase 1 may include interim traffic calming solutions like lane narrowing, temporary bulbouts, raised crosswalks, and speed trailers. Phase 2 of improving this corridor should include reduced speed limits, permanent installations and further enhance accessibility for pedestrians.

PROPOSED CORRIDOR IMPROVEMENTS

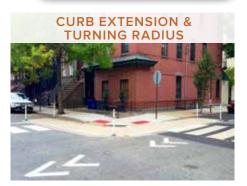




TRAFFIC CALMING EXAMPLES







RECOMMENDED IMPROVEMENTS

- **▶** Traffic Calming
- ▶ Curb Extensions
- ▶ Wayfinding Signage
- **▶** Sidewalk Maintenance
- **▶** Pedestrian-Scale Lighting
- ▶ Street Furniture
- **▶** ADA Compliance

Heritage Highway/Highway 78

AT A GLANCE ▶ Highway 78 is the town's main east-west thoroughfare, connecting neighborhood residents to the High School and local grocery store.

Key Issues ▶ Walking on Highway 78 between downtown, the Piggly Wiggly Grocery Store, and Denmark-Olar High School can be a perilous venture. Pedestrians are exposed to wide travel lanes with heavy truck traffic and fast-moving cars because the existing sidewalk is immediately adjacent to the road. Apart from sidewalk placement, sidewalk conditions and a lack of maintenance create additional hazards and barriers for those on foot. Highway 78 has more traffic lanes than are needed based on traffic counts, which provides an opportunity to provide landscaped medians and pedestrian refuge islands at crossings.

Implementation Strategy ▶ "Right-size" the road by reallocating pavement spa to include one travel lane in each direction, a landscaped median, a planting strip buffer between the sidewalk and road, and additional crossing locations, particularly at the High School and Piggly Wiggly. Continue the streetscape design of Carolina Highway/Highway 321 to create a welcoming corridor with a consistent identity.

RECOMMENDED IMPROVEMENTS

- ▶ Road Diet
- **▶** Landscaped Median
- ▶ Sidewalk Maintenance
- **▶** Continue Streetscape
- **▶** Pedestrian-Scale Lighting
- **▶** Litter Management
- **▶** ADA Compliance
- **▶** Crossing Improvements







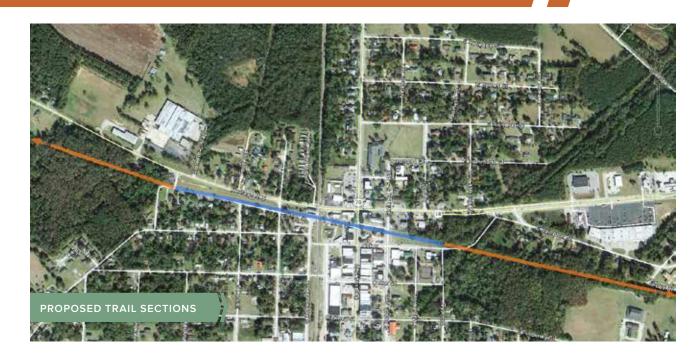
ATAGLANCE ▶ The abandoned railway corridor adjacent to Highway 78 creates an opportunity for a shared-use path that functions as the primary transportation and recreation corridor for Denmark. The "Heritage Trail" would directly connect downtown Denmark, many neighborhoods, recreation areas, and the Piggly Wiggly.

The Idea Denmark currently lacks trails, paths, parks, and greenspace downtown and in adjacent neighborhoods. By converting the abandoned rail corridor into a shared-use path, Denmark will ad a recreation and transportation amenity for area residents. The trail may include abundant open space, community gathering areas, and connections to area schools, parks, and healthy food outlets.

Implementation Strategy Develop the Heritage Trail in phases, with Phase 1 occurring in the core of Denmark by extending the existing Harrison Plaza to the Old Train Depot along Izlar Street. This will provide a beautiful and enjoyable connection to downtown and the Jim Harrison galleries from the Depot. Phase 1 would also parallel Heritage Highway, extending west from the Depot along abandoned railroad right-of-way to Dogwood Street. Phase 2 would extend along the railroad right-of-way east from Beech Avenue downtown to Sawdust Avenue at the outer edge of Denmark. On-street connections would connect to key destinations such as the Piggly Wiggly, the colleges, high school, and Simon-Davis Park.

RECOMMENDED TRAIL AMENITIES

- ▶ 12 Foot Shared-use Path
- Native Landscaping
- **▶** Connections to downtown
- **▶** Pedestrian Scale Lighting
- Neighborhood Access Points
- Seating Areas
- ▶ Direct Access to Piggly Wiggly
- ▶ Safe Street Crossings







SUMMARY TABLE

CORRIDOR	MILEAGE	SIDEWALK EXTENSION	NEW SIDEWALK	SIGNAGE	TRAIL/PATH ADDITION	STREETSCAPE IMPROVEMENTS	ROAD DIET	NOTES
IZLAR STREET	0.06		V	~				From Railroad tracks to Carolina Hwy
N. CHURCH STREET	0.20		V					Both sides, from Hwy 78 to High School access road
S. CHURCH STREET	0.46		~					Both sides, from E Haynes Rd to Hwy 78
S. CHURCH STREET	0.05	V						Fill sidewalk gap between State Rd 407 and Reynolds St.
CAROLINA HIGHWAY	0.20	V	V			~	V	Coker to E Hagood St
CAROLINA HIGHWAY	0.10					~	V	From E Hammond north, until road narrows to 1 lane each direction
HERITAGE HIGHWAY	1.43						~	From Beach Ave to College Rd 4 -> 3 : Middle + Bike Lanes 3 : Convert outer travel to bike lane
VORHEES ROAD (A)	0.09		~					Add sidewalks to both sides between Academic Cir and Porter Dr
VOORHEES ROAD (B)	0.22	V						Add sidewalk to north side, from Porter Dr to Honey Ave
VOORHEES ROAD (C)	0.87			V				"College Mile" connection from Honey Ave to Carolina Hwy
VOORHEES ROAD (D)	0.53		~					Add sidewalk to northwest side, from S Holly Ave to just past Border Line Dr
SOLOMAN BLATT BOULEVARD	0.15		~					Add sidewalk to south side from Faculty Grove to Voorhees Rd
E. CLARK STREET	0.17	~	~					Add sidewalk near school from Carolina Hwy to S. Maple
PROPOSED TRAIL								
HERITAGE TRAIL PART 1	0.25				V			Trail on old RR Right of Way along Butler from Baruch to Dogwood
HERITAGE TRAIL PART 2	1.04				V			Shared Use Path from S Beech Ave to S Rice Ave

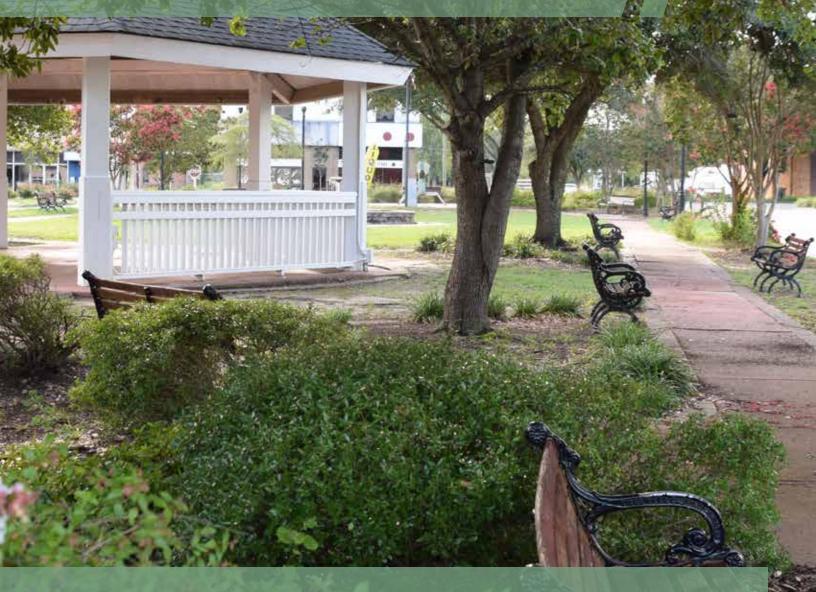


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"Always have a plan, and believe in it. Nothing happens by accident." - Chuck Knox

OVERVIEW

Programs can leverage Denmark's creativity, existing resources, leadership, and community spirit to build interest in walking. Program recommendations can be implemented quickly and with minimal investment. Additionally, programs provide a clear direction for the Denmark Stakeholder Group to generate immediate progress and short-term goals. While the City and its agency and jurisdictional partners (namely SCDOT, the County, and LSCOG) are responsible for infrastructure projects and policy development, community programs can and should be supported and championed by outside partners such as nonprofits, advocacy groups, foundations, private sector businesses, and interested citizens. Successful programmatic efforts are flexible and can demonstrate sustainable longterm infrastructure improvements.

Research has shown that a comprehensive approach to walk- and bicycle-friendliness is more effective than a singular approach that would address infrastructure issues only.

Recognizing this, the national the Walk Friendly Community program, administered by the National Center for Walking and Bicycling, recommends a multi-faceted approach based on the following five 'E's: Engineering, Education, Encouragement, Enforcement, and Evaluation. Also, a sixth 'E', Equity, is often included in order to ensure equal consideration for those whom pedestrian improvements may benefit the most.

The programmatic recommendations outlined in this chapter are organized according to distinct categories but represent and incorporate the education, encouragement, enforcement, and equity components of this multi-faceted approach. Infrastructure recommendations, described in the following chapter, represent the "engineering" element. The appendix provides a summary of recommended strategies for remaining "Es" through policy concepts.















Activating Citizens & Spaces

To prevent "planning fatigue," temporary installations or pop-up projects can make use of Denmark's creativity to demonstrate walkability improvements, while engaging residents and students in the design and build process. These temporary demonstration projects can vary greatly in scope, cost, and number of volunteers required. Examples include temporary wayfinding signs, community chalkboards, and pop-up plazas, parks, or parklets.

These outlets provide Denmark citizens and students an effective means of communicating their needs and coming together for community improvement. Part of this 'activation' effort includes disseminating local news and information in accessible online and printed formats so that residents and students know the who, what, where, and when of getting involved and creating change.

Vacant Space Revitalization

Reinventing downtown Denmark's vacant lots, empty buildings, and underutilized spaces can be challenging without significant investment. However, these spaces present abundant opportunities for temporary improvements using existing resources, creativity, and volunteer labor.

A Vacant Space Revitalization Program can transform these spaces into exciting destinations. Existing events such as the Blues Festival and Dogwood Festival provide an excellent backdrop for temporary demonstration projects. The example vision, at right, depicts the feedback received during the Denmark Technical Training. Residents want a clean, green, and vibrant space that extends street life activity and is pleasant and enjoyable for all ages. The table outlines initial pieces of the vision that could help bring the space to life. As support for this program grows, the community can continue to invest in long-term needs by establishing a wifi hotspot and repaving the space.



ITEMS TO TEMPORARILY ACTIVATE A SPACE FOR 2 DAYS	ESTIMATED COST	ESTIMATED TOTAL LABOR TIME TO CREATE
Temporary chalkboard 5'x10' and chalk to last 2 days during event	\$200	3 hours
20 rental chairs	\$50	3 hours
10 small rental tables	\$50	3 hours
4 shade umbrellas	\$250	3 hours
10 planters with plants to demarcate and beautify space	\$200	6 hours
Projector and 10' screen to show movies	\$200	2 hours
Mural by local artist	varies	varies
TOTAL	~ \$950	20+ hours

HOW TO:

Implementation Strategy

- » Form a diverse group of people to identify spaces to revitalize and organize volunteers
- » Develop a vision for those spaces with community input
- » Convey the vision to property owners to get approval
- » Organize an action plan and list of materials
- » Set a date for the transformation and invite the community!

Potential Partners

- » Area College
- » Downtown businesses
- » Places of worship

Resources

» The Tactical Urbanism Materials Guide



Public Safety

Public safety events that unite residents and law enforcement can foster an environment where people feel safe walking during the day and at night in Denmark. The purpose of public safety events is not only to reduce crime, but to improve perceptions of public safety, to increase enforcement, particularly of right-of-way laws, and to create an ongoing dialogue between law enforcement and community members.

Specific event ideas include walk vigils that recognize and show support for crime victims, and festivals that involve police officers and community members in fun activities. At these events, police can share information about local crimes and inform residents on how to be vigilant. Residents can also share their concerns and identify where more police presence is needed.

Issues addressed

- + Neighborhood crime
- + Pedestrian safety concerns
- + Trust and information sharing





'Open Streets' Event

Open street initiatives temporarily close the streets to automobiles so people may use them for various activities like walking, bicycling, dancing and other social activities. These events are great at bringing the community together and promoting transportation options, placemaking, and public health.

Estimated Cost

\$\$\$

Timeframe

Monthly



HOW TO:

Implementation Strategy

- »Work with the Denmark
 Police department
 and neighborhoods to
 determine best streets to
 close
- »Contact community partners, businesses, or interested citizens to host activities (like a bike safety rodeo or dance party) as part of the Open Streets event
- »Promote the event through social media, websites, and campus communications

Potential Partners

- »Neighborhood Associations
- » Denmark PoliceDepartment

Resources

- »National Night Out
- »Safe Routes to School Resource Center



The Heritage Trail Coalition

The abandoned rail corridor crosses the core of Denmark and presents an excellent opportunity for a Rail-to-Trail conversion. Currently the idea for the shared-use path is only a vision. However, a coalition of area stakeholders can make the vision a reality through a five step process that includes:

- 1) Information sharing with nearby communities that have implemented a Rail Trail
- 2) Organizing a timeline to plan, design, and construct the Denmark Rail Trail
- 3) Creating a vision for the trail system
- 4) Building community support and awareness of the vision through community events and activities
- 5) Identifying funding sources

Issues addressed

- + Information sharing
- + Capacity building
- + Creates excitement around a shared vision





Trail Building Activities

The success of the trail vision will rely on community feedback and participation. Activities at existing events can spur interest in the Rail Trail and ensure that citizens feel connected and invested in the vision. Information booths and demonstration projects at the Dogwood Festival and Blues Festival can build awareness.

Frequent volunteer events such as organized cleanups, clearing invasive species, and adding temporary wayfinding can encourage residents to take ownership and pride in the trail.

Estimated Cost



Timeframe

Monthly



HOW TO:

Implementation Strategy

- » Organize a group of coalition members representing the city, neighborhoods, universities, businesses, and students
- »Arrange monthly coalition meetings that have clear tasks and champions to lead each task

Potential Partners

- » The Rails-to-Trails Conservancy
- » The South Carolina State Trails Program
- » Area Schools & Colleges
- » Bamberg County Parks Department
- » Williston and Barnwell County, SC

Resources

» <u>The Rails-to-Trails</u> <u>Conservancy</u>



Youth-Led Community Garden

A community garden located in a walkable area provides area students an opportunity to belong, supports positive relationships and gives both students and residents something to be proud of through their hard work. Partnerships can be created between the garden and area markets to sell fresh, locally grown produce.

A youth-organized garden also presents an opportunity to post information on local events and causes, and to find volunteers for projects and programs related to walkability in Denmark. Gardens also present an opportunity to reinvest and beatify abandoned or underutilized spaces.

Issues addressed

- + Brings energy and positive use to derelict spaces
- + Improves health outcomes for Denmark's youth
- + Brings a mix of ages together
- + Allows students to have a stake in Denmark's revitalization
- + Creates opportunities for beautification





Gardening Mentorship Program

Many older adults in Denmark have gardening experience that can be shared with younger residents. Intergenerational efforts to build community gardens can combine the energy and skills of younger adults with the resources and wisdom of older adults.

As an example, students at Voorhees or Denmark Technical College can build senior-friendly gardens with raised beds and provide labor in exchange for tools and space to establish a garden.

Estimated Cost



Timeframe

3 - 6 months



HOW TO:

Implementation Strategy

- » Build on existing efforts to start a garden at Voorhees College
- Identify a garden liaison to coordinate a student committee
- » Identify sites and local sources of information
- » Find sponsors to donate tools, seeds, or money
- » Prepare the garden and develop rules
- Create a weather proof
 bulletin-board to help
 gardeners stay in touch

Potential Partners

- » Bamberg County Health Department
- » Area colleges and places of worship
- » South CarolinaDepartment of Health and Environmental Control



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"People make cities, and it is to them, not buildings, that we must fit our plans." - Jane Jacobs

Now that priority programs and projects have been identified, what are our next steps?

The implementation of the Denmark Pedestrian Plan recommendations will require a comprehensive approach that includes multiple sources of funding, partnerships, design, construction, and management. It will also require the dedication of town staff and a commitment to the vision established by the steering committee and this plan.

As best practices for pedestrian facility design is a rapidly-evolving field, the recommendations in this plan should be re-evaluated at least every five years to ensure that these still constitute best-practices and still reflect Denmark's longterm vision for an active, walkable community.

Achieving the vision that is defined within this plan requires a stable and recurring source of funding. Communities across the country that have successfully implemented pedestrian programs have relied on multiple funding sources to achieve their goals. No single source of funding will meet the recommendations identified in this plan. Stakeholders will need to work cooperatively across a range of private sector, municipality, state, and federal partners to generate funds sufficient to implement this network. A descriptive list of potential funding sources can be found in the appendix.

The resources provided herein — the pedestrian safety analysis, the access to healthy foods assessment, program and infrastructure recommendations, coupled with the following appendices resources — can serve as a daily reference material for the City of Denmark and its implementing partners.

The City of Denmark should strive to follow the priority recommendations, as each program, project, and policy was selected based on public input, need, and potential impact. However, the town should also look for opportunities to coordinate pedestrian enhancements with regularly-programmed maintenance activities, new developments, and large roadway construction projects, regardless of whether enhancements occur on priority corridors or intersections.

The following steps provide direction to ensure the Denmark Pedestrian Plan serves as a valuable and accessible resource for the community.

CONTINUE THE STAKEHOLDER COMMITTEE

A team effort is required to move the plan forward. The stakeholder committee process includes citizens and community leaders that can partner to make programs and projects a reality. Capitalize on this momentum, and formalize the committee as a Denmark Walkability Commission that meets quarterly, at a minimum.

PRIORITIZE FUNDING FOR INFRASTRUCTURE PROJECTS

To kickstart the funding conversation, partner with the Lower Savannah Council of Governments to identify eligible TAP projects and matching funds. Continue the Plan's momentum by sharing project priorities directly with the region's funding partners. This includes LSCOG, SCDOT, City and County Councils, Voorhees College, Denmark Technical College, and private sector partners. The funding analysis included in this plan (see, appendix) provides a resource for matching grants with programs and projects.

3 DEVELOP AND IMPLEMENT ONE PROGRAM AT A TIME

Programs have a big impact on walkability and are easy to accomplish without a major investment. A variety of community partners can assist by funding efforts or volunteering their time. Convene "Program Champions" as part a steering committee meeting to develop a list of communications strategies to promote each program and attract volunteers. Make a goal to implement each program within six months of announcing the program.

4

BUILD ON EXISTING EVENTS

Events like the Dogwood Festival and the Blues Festival present excellent opportunities to build community interest and showcase plan and demonstration projects. This is also a great time to gather public feedback and register volunteers due to the large and diverse audience at community events.

5

SHARE THE PLAN

Continue to share the Plan with Denmark residents and affiliated groups and organizations. Spread the word about proposed improvements and program opportunities that directly respond to residents' concerns and ideas for improving their community.

6

KEEP COLLABORATING

A multi-jurisdictional effort will ensure projects are implemented. The City, County, local colleges, and LSCOG have forged a strong working relationship through this project and other cross-jurisdictional efforts. Continue this collaboration and information-sharing to ensure an efficient use of time and resources for both entities.



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POLICY RECOMMENDATIONS

This section highlights recommended policies related to walkability, as well as existing design standards to inform decision-making about designing and implementing pedestrian infrastructure in the City of Denmark. Local policies may serve to strengthen existing state policies. Policy recommendations also reinforce the program and project recommendations in this plan, while establishing a sustainable foundation for walkable development.

The following practices and policies demonstrate how promoting walkability helps achieve the goals of major focus areas as outlined in the plan Vision Statement.

COMPLETE STREETS POLICY

In 2003, SCDOT adopted a state-wide Complete Streets policy affirming that active transportation should be a integral to the design and function of its transportation system. This policy guides decision-making about the planning, design, operation, and maintenance of public streets to enable safe. convenient, and comfortable travel and access for users of all ages and abilities regardless of their mode of transportation. A Complete Street is one that considers the needs of pedestrians. bicyclists, transit riders, and motorists.

The City of Denmark should adopt a Complete Streets policy to bolster walkability, express public support for pedestrian-related efforts. and also to broaden funding streams and spur funding-seeking activity for pedestrian and streetscape projects.

The SCDOT Complete Streets policy should be referenced for transportation projects along state roadways in all jurisdictions.

Bird's-eye view example of a complete street in a small town. Image courtesy of the National Complete Streets Coalition Flickr account.



ON-STREET PARKING

Wide intersections and the placement of sidewalks adjacent to travel lanes make negotiation by pedestrians and cyclists difficult. On-street parking integrated into Complete Streets design can greatly improve pedestrian and bicycle crossings at intersections and serve as a buffer between traffic and bike lanes and sidewalks. On-street parking also encourages downtown visitors to park once and walk, greatly increasing the exposure of business storefronts to potential shoppers.

RESIDENTIAL MIXED-USE

High concentrations of pedestrians are the critical ingredient in downtown revitalization efforts. Areas of high pedestrian concentrations justify intense pedestrian infrastructure. Therefore, prompting more people to live in the core commercial district should be an objective.

Vacant and underutilized core commercial district buildings should be allowed to be repurposed as single family units, apartments, condominiums, townhouses, etc. Where vacant lots exist or dilapidated structures are torn down, consider the construction of new residential units designed in scale and form to blend in with the historic context of downtown. Bringing people back to downtown living greatly adds to the vibrancy of the downtown, supports downtown merchants and restaurants, and increases the opportunity for walking and bicycling to work, shopping, and entertainment.

Once a critical mass of people is approached, shops, restaurants, and offices will begin to flourish; thus drawing in more nonresidents into the downtown for shopping. dining, entertainment, etc. This process of repopulating the core commercial district has proven successful in Greenville, Charleston, and Columbia. Mixed-use downtown development conserves energy, produces less air pollution, promotes active living and good health, and encourages social interaction.

COMMERCIAL CORRIDOR DEVELOPMENT

Sensible development practices encourage people to use alternative modes of travel biking, walking or using transit - by providing safe routes to destinations. Interconnected streets reduce distances between points and make destinations easily accessible by multiple methods of travel. Although the option of driving to a destination still exists, better connections make the choice of an alternative mode for shorter trips much more appealing. In some commercial areas, connections between adjacent buildings can be so poor that patrons are forced to return to their cars, drive back out to an arterial road, travel a few hundred feet to the adjacent parking lot, and park again to reach a neighboring building.

Plan for bike/pedestrian connections between commercial corridors and residential developments and redevelopments. For corridor developments where there are no current connection opportunities to off-site development, include dedication of right of way for installation of facilities to facilitate future connections. Bicycle and pedestrian connections between parcels should be offstreet where practicable to enable pedestrian and bicycle access among the commercial establishments without having to reenter the street. Parking for commercial uses should include a pedestrian circulation pattern that allows customers to park once and visit several locations on foot. As with downtown redevelopment, making shopping strips and other commercial corridor development safely and easily accessible to pedestrian customers makes a far more pleasant shopping, dining, or entertaining experience and increases sales volumes.

NEIGHBORHOOD REVITALIZATION AND COMMUNITY DESIGN

The current development pattern of residential subdivisions results in housing units isolated from work, shops, schools, and services with no means of safe and efficient transportation available other than by automobile. Those without or with limited access to an automobile are often limited in their access to healthy foods, health care, and other essentials. The lack of pedestrian and bicycle facilities also discourages active lifestyles. Pedestrian access is key to the healthy independence of the elderly. There is a clear link between the development and design of the built environment and public health; and this link is particularly evident in the consequences of residential sprawl.

Newer residential developments throughout the region, state, and nation, are much different from older neighborhoods built prior the dominance of the automobile as the primary mode of transportation. More recent developments tend to segregate land uses, while Denmark's older residential neighborhoods included a mixture of residential, commercial and industrial land uses. along with public space for churches, parks, and community buildings. Older mixed-use developments encouraged residents to walk or bike to work, to social and recreational activities, and to visit their neighbors. When residents did travel by car, distances and travel times to essential services were relatively short. And when compared with newer developments, these older, mixed-use developments conserved energy, produced less air pollution, promoted good health, and encouraged social interaction between neighbors.

To achieve similar benefits in new developments, small-scale commercial businesses as well as churches and schools should be encouraged to locate within or near newly developed residential areas.

Small-scale commercial uses in this case are defined as businesses or offices that are manned during business hours, do not require large-scale deliveries, and do not produce excessive levels of light or noise. Examples include shops, cafes, bakeries, and other types of service businesses. Integration of such service-oriented businesses can provide community members the option of walking rather than depending on an automobile, and can result in reduced automobile traffic on the Town and County road system. Such smallscale commercial businesses also generate light daytime activity in neighborhoods, which can help to reduce crime during the hours when many homeowners are typically at work. The promotion of small-scale neighborhood commercial establishments, such as corner grocery stores easily accessed by walking or biking, can also help increase access to healthy foods where otherwise an automobile trip to a supermarket would be required. Many Denmark citizens do not own automobiles.

Similar to new development projects, redevelopment plans for older neighborhoods should include zoning allowances for the continuation and/or reestablishment of such small-scale neighborhood commercial uses. Design standards for both new and revitalized residential developments should provide for bicycle and pedestrian amenities such as sidewalks, paths, and bike lanes that will

facilitate safe and enjoyable walking or biking commutes to these neighborhood commercial establishments, as well as encourage physical activity.

New residential or redevelopment plans should provide for transportation connections between the development and adjacent residential and commercial developments. Bicycle and pedestrian connections between parcels within commercial developments should be off-street where practicable.

RESIDENTIAL COMMUNITY RECREATION

Community organizations must recognize their specified needs for recreational areas. For future residential neighborhoods, it is important to determine the community's desire to include park areas within newly developed subdivisions for the use of the homeowners. Savvy residential developers recognize the value of including qualities to their development that would enhance home or lot sales.

Fifteen years ago, Market Perspectives, Inc., conducted a national survey of home owner preferences. The survey found that walking paths, bike paths, parks and nature preserves were rated as "extremely important" to home buyers and ranked higher in importance than the traditional golf courses, tennis courts, and swimming pools which are costlier for homeowners' associations to maintain. Their most recent consumer surveys and focus group interviews show that walking and biking paths remain the #1 amenity preferred by home owners followed by pocket parks, wellness programs, and fitness centers in clubhouses (should a project have a clubhouse). There has been more interest in community garden patches in the last 10 years.

In 2015, the National Association of Realtors found that 57% of people would choose a home close to a park over one that was not, and 50% of people would pay 10% more for a home located near a park.

Development incentives should be used to encourage developers to include community parks and open spaces for a win-win situation for themselves and potential home buyers. Many surveys reveal that the majority of homeowners feel that more land should be set aside for natural areas such as parks, open spaces, and forests. Such amenities promote active lifestyles that result in demonstrated health benefits. Residential development standards should be considered for all new residential developments that provide for: open space, a connected network of sidewalks, trails, paths, etc., that are accessible to all residents, and bicycle/pedestrian connection to nearby schools, services, or commercial areas.

COMMUNITY OPEN USE AND JOINT USE POLICIES

One means of providing for needed park facilities are joint use and open use agreements. Joint use agreements are formal agreements between two agencies or organizations for shared use of facilities. Open use policies are an organization's guidelines for the use of their facilities by the general public.

The Town of Allendale and Allendale County should explore entering into agreements with the Allendale County School District for open use and/or joint use of the District's sports, playground, and recreational facilities. Such agreements have been successfully used throughout the country and model joint use agreements are available through the Eat Smart Move More South Carolina website: http://www.publichealthlawcenter.org/sites/default/files/resources/phlc-fs-shareduse-samplestatute-language-2012.pdf

The SC School Board Association has developed a model policy for Open Community Use of School Recreation Areas that has successfully been used by school districts throughout South Carolina: http://scsba.org/policy-services/policy-and-legal-updates/

Such agreements would allow for a more equitable distribution of facilities throughout the county and aid in achieving availability to all citizens. An equitable system includes both a geographically-equitable distribution of facilities to serve all areas of the County, and assurance that the underserved, lower social-economic communities have equitable access to recreation facilities.

FUNDING MATRIX

Funder	Grant Name	Funding Description	Funding Amount	Open Date	Close Date	Funding Cycle	Notes
Aetna	Cultivating Healthy Communities	"The Cultivating Healthy Communities program will support projects that benefit underserved, low-income, and minority communities. We are interested in projects that address the social determinants of health and participants' physical, mental, social, and emotional well-being."	up to \$100,000	20-Mar-16	April 15, 2016 (Stage 1)	N/A	Stage 1 application is due Apri 15 and if invited stage 2 application is due June 10
W.K. Kellogg Foundation		"Focus areas include: Educated Kids, Healthy Kids, Secure Families, Communtiy and Civic Engagement, Racial Equity. We work alongside communities – especially those facing health inequities – to support community-based approaches in four key areas: maternal and child health, oral health, breastfeeding (breast milk as the optimal first food), and continued access to good food and active living throughout a child's early development. In our national grantmaking and investments in priority places, WKKF supports efforts to improve the health of mothers and families; to increase breastfeeding rates; to provide innovative, community-based oral health care and to transform food systems so children and families have healthier foods in child care settings, in schools and in their communities."	high: \$8,000,000; low: \$600			The Kellogg Foundation does not have any submission deadlines. Grant applications are accepted throughout the year and are reviewed at our headquarters in Battle Creek, Michigan, or in our regional office in Mexico (for submissions focused within their region).	"Once we receive your completed online application, an automated response, which includes your WKKF reference number, will be sent to you acknowledging its receipt. Our goal is to review your application and email our initial response to you within 45 days. Your grant may be declined or it may be selected for further development. As part of review process you may be asked to submit your organization's financial reports and/or IRS Form 990. While this information may be required, it is not intended to be the overall determining factor for any funding. You will not be asked to provide any financial reports or detailed budget information during this initial submission. We will only request this information later if needed as part of the proposal development."
SunTrust Foundation		The foundation supports programs designed to help generations achieve their full potential; promote job growth and financial education that leads to stability; help people get access to the care they need to live healthier lives; and advance the arts and culture in the communities.					Will need to contact someone with SunTrust; the website gives minimal information.

Funder	Grant Name	Funding Description	Funding Amount	Open Date	Close Date	Funding Cycle	Notes
Michael and Susan Dell Foundation		"Childhood Health in the US The program is working to reverse the trend of children suffering from obesity and early onset of Type 2 diabetes through its childhood obesity prevention and wellness programs that promote healthy eating behaviors, and better access to both healthy foods and safe environments for exercise. Other U.S. health initiatives focus on: 1) Applied pediatric research into the origins of chronic diseases that are a leading cause of premature death; 2) Basic health services for under- and uninsured children; and 3) Childhood safety for neglected and abused children."	high: \$1,800,000; low: \$5,000			Appears to be year around	"Important: Please be prepared to furnish us with contact and financial information (including total revenue and fiscal operating expenses) for your organization, as well as a detailed description of the project for which you are seeking support. To complete the application, you will also need: - amount you are requesting - project budget - the number of children your project will reach - problem statement (500 character limit) - project description (1500 character limit) - brief description of how the requested funding will be used (500 character limit) - brief description of proposed success metrics (500 character limit)" http://www.msdf.org/assets/grant-planning-worksheet-2-7-2008.pdf
Anthem Foundation	Healthy Generations Program	The foundation supports programs designed to create a healthier generation of Americans. Special emphasis is directed toward healthy hearts, including preventative initiatives that minimize controllable cardiovascular diseases and strokes, smoking, obesity, hypertension, and stressful and sedentary lifestyles; healthy cancer prevention, including lifesaving cancer-prevention and early-detection; healthy maternal practices, including initiatives that encourage first trimester prenatal care and help at-risk mothers commit to reduce the numbers of low birth-weight babies; healthy diabetes prevention, including programs that stem the spread of diabetes through lifestyle changes and physical activity; and healthy active lifestyles, including initiatives that raise awareness, education, and encourage new behaviors.			"Cycle One 2016: Applications are due no later than Friday, February 19, 2016. Cycle Two 2016: Applications are due no later than Friday, August 19, 2016.	Applications are reviewed twice a year.	"You must submit your grant proposal online; no exceptions will be made. All applicants will be notified of the Foundation's receipt of grant proposals via e-mail. Typically, our review process lasts four to six months. Please do not call the Foundation for status updates. Due to the high volume of requests we receive, we cannot respond to such phone calls. CONTACT US anthem.foundation@anthem.com"

Funder	Grant Name	Funding Description	Funding Amount	Open Date	Close Date	Funding Cycle	Notes
Robert Wood Johnson Foundation (www.rwjf.org)	Culture of Health	"Health Systems Catalyzing fundamental changes in health and health care systems to achieve measurably better outcomes for all. Healthy Kids, Healthy Weight Enabling all children to attain their optimal physical, social and emotional well-being, including growing up at a healthy weight. Healthy Communities Creating the conditions that allow communities and their residents to reach their greatest health potential. Health Leadership Engaging a diverse array of leaders in all sectors with the vision, experience, and drive to help build a Culture of Health."	Varies by grant program	varies by grant program		Check website for Call for Proposals	
Blue Cross Blue Shield of South Carolina Foundation		Access to Care: Support adult safety net providers to provide primary physical and mental health care. Implement evidence-based or innovative delivery models to improve health Improving Health and Health Care Quality and Value: Support quality improvement projects that yield cost and resource efficiencies through innovative approaches that develop solutions in the health care delivery system Investing in SC Children: Improve health through innovative collaborations. Support projects that target childhood obesity risk factors. Increase access to mental health services. Support easily accessible health care services to meet the health care needs of at-risk children and adolescents Research/Special Projects: Projects to inform, influence and support our investment strategies and/or our mission. These projects may fall outside of an established area of focus, yet would generate value-added information and data relevant to our mission and vision.				Fall Cycle begins July 1, 2016	"Apply for a Grant We have developed a two-phase approach to make the review process more effective and efficient. This approach lets us determine which programs are potentially the best matches for our investment strategies and preferred areas of focus. If you are interested in receiving funding from the Foundation, your first step is to submit the two-page Letter of Intent form. We will review it carefully. If we decide your organization is a good match, you will be able to complete the second phase. We will invite you to submit a full application."



LSCOG Bicycle and Pedestrian Regional Plan

Design Guidelines

April 2012

PREPARED BY: **Alta Planning + Design**108 S. Main Street, Suite B
Davidson NC 28036
(704) 255-6200





Introduction

This technical handbook is intended to assist LSCOG in the selection and design of pedestrian and bicycle facilities. The following chapters pull together best practices by facility type from public agencies and municipalities nationwide. Within the design chapters, treatments are covered within a single sheet tabular format relaying important design information and discussion, example photos, schematics (if applicable), and existing summary guidance from current or upcoming draft standards. Existing standards are referenced throughout and should be the first source of information when seeking to implement any of the treatments featured here.

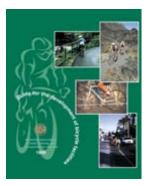
Guiding Principles

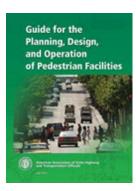
The following are guiding principles for these bicycle and pedestrian design guidelines:

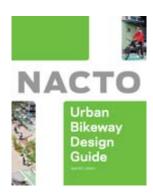
- The walking and bicycling environment should be safe. All bicycling and walking routes should be physically safe and perceived as safe by all users. Safe means minimal conflicts with external factors, such as noise, vehicular traffic and protruding architectural elements. Safe also means routes are clear and well marked with appropriate pavement markings and directional signage.
- The pedestrian and bicycle network should be accessible. Sidewalks, Shared-use paths, bike routes and crosswalks should permit the mobility of residents of all ages and abilities. The pedestrian and bicycle network should employ principles of universal design. Bicyclists have a range of skill levels, and facilities should be designed with a goal of providing for inexperienced/recreational bicyclists (especially children and seniors) to the greatest extent possible.
- Pedestrian and bicycle network improvements should be economical. Bicycle improvements should achieve the maximum benefit for their cost, including initial cost and maintenance cost, as well as a reduced reliance on more expensive modes of transportation. Where possible, improvements in the right-of-way should stimulate, reinforce and connect with adjacent private improvements.
- The pedestrian and bicycle network should connect to places people want to go. The pedestrian and bicycle network should provide continuous direct routes and convenient connections between destinations such as homes, schools, shopping areas, public services, recreational opportunities and transit. A complete network of on-street bicycling facilities should connect seamlessly to existing and proposed multi-use trails to complete recreational and commuting routes.
- The walking and bicycling environment should be clear and easy to use. Sidewalks Shared-use paths and crossings should allow all people to easily find a direct route to a destination with minimal delays, regardless of whether these persons have mobility, sensory, or cognitive disability impairments. All roads are legal for the use of bicyclists (except those roads designated as limited access facilities, which prohibit bicyclists). This means that most streets are bicycle facilities and should be designed, marked and maintained accordingly.
- The walking and bicycling environment should be attractive enhance community livability. Good design should integrate with and support the development of complementary uses and should encourage preservation and construction of art, landscaping and other items that add value to communities. These components might include open spaces such as plazas, courtyards and squares, and amenities like street furniture, banners, art, plantings and special paving. These along with historical elements and cultural references, should promote a sense of place. Public activities should be encouraged and the municipal code should permit commercial activities such as dining, vending and advertising when they do not interfere with safety and accessibility.
- Design guidelines are flexible and should be applied using professional judgment. This document references specific national guidelines for bicycle and pedestrian facility design, as well as a number of design treatments not specifically covered under current guidelines. Statutory and regulatory guidance may change. For this reason, the guidance and recommendations in this document function to complement other resources considered during a design process, and in all cases sound engineering judgment should be used.

National Standards









The Federal Highway Administration's Manual of Uniform Traffic Control Devices (MUTCD) defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public traffic. The MUTCD is the primary source for guidance on lane striping requirements, signal warrants, and recommended signage and pavement markings.

To further clarify the MUTCD, the FHWA created a table of contemporary bicycle facilities that lists various bicycle-related signs, markings, signals, and other treatments and identifies their official status (e.g., can be implemented, currently experimental). See Bicycle Facilities and the Manual on Uniform Traffic Control Devices.

Bikeway treatments not explicitly covered by the MUTCD are often subject to experiments, interpretations and official rulings by the FHWA. The MUTCD Official Rulings is a resource that allows website visitors to obtain information these supplementary materials. Copies of various documents (such as incoming request letters, response letters from the FHWA, progress reports, and final reports) are available on this website.2

American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities last updated in 1999 provides detailed guidance on dimensions, use, and layout of specific facilities.

The standards and quidelines presented by AASHTO provide basic information about the design of bicycle and pedestrian facilities, such as minimum sidewalk widths, bicycle lane dimensions, more detailed striping requirements and recommended signage and pavement markings. An update to this guide is in progress, and is likely to provide revised guidance on standard facilities and new information on more contemporary bikeway designs.

Offering similar guidance for pedestrian design, the 2004 AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities provides comprehensive guidance on planning and designing for people on foot.

The National Association of City Transportation Officials' (NACTO) 2011 Urban Bikeway Design Guide³ is the newest publication of nationally recognized bikeway design standards, and offers guidance on the current state of the practice designs. The NACTO Urban Bikeway Design Guide is based on current practices in the best cycling cities in the world. The intent of the guide is to offer substantive guidance for cities seeking to improve bicycle transportation in places where competing demands for the use of the right of way present unique challenges. All of the NACTO Urban Bikeway Design Guide treatments are in use internationally and in many cities around the US.

Some of these treatments are not directly referenced in the current versions of the AASHTO Guide to Bikeway Facilities or the Manual on Uniform Traffic Control Devices (MUTCD), although many of the elements of these treatments are found within these documents. In all cases, engineering judgment is recommended to ensure that the application makes sense for the context of each treatment, given the many complexities of urban streets.

¹ Bicycle Facilities and the Manual on Uniform Traffic Control Devices. (2011). FHWA. http://www.fhwa.dot.gov/environment/bikeped/mutcd_bike.htm

² MUTCD Official Rulings. FHWA. http://mutcd.fhwa.dot.gov/orsearch.asp

³ http://nacto.org/cities-for-cycling/design-guide/

Local Standards

The South Carolina Department of Transportation (SCDOT) offers additional local guidance regarding the design of non-motorized transportation facilities. The primary source of state level guidane is the SCDOT Highway Design Manual, which provides department criteria and practices for roadway construction. This guidance includes information on sidewalks and on-street bike lanes. Engineering level guidance can be found in the SCDOT Standard Drawings. These documents contain typical striping and construction plans for bike lanes and curb ramps.

Additional quidance can be found in SCDOT Engineering Directive Memorandums (EDM) covering specific topics. The EDMs most relevant to the content in this guide are listed below:

SCDOT EDM 22: Considerations for Bicycle Facilities addresses shared roadways and bike lanes/paved shoulders and provides guidance on design requirements for new projects. In addition, typical sections for both the design of bicycle facilities on new projects and restriping of existing five-lane sections to accommodate bicycle facilities are attached. Other design considerations for bicycle accommodations are also discussed.

SCDOT EDM 53: Installation of Rumble Strips provides guidance on the installation of rumble strips on SCDOT's state highway system. They are used to alert drivers of land departures by providing an audible and vibratory warning. On bicycle touring routes with a high percentage of road departure crashes, rumble strips may be considered for use. In these cases the Traffic Safety Office shall coordinate with the Office of the Pedestrian and Bicycle Engineer and applicable shareholders for input on designated bike routes where paved shoulders are less than 4 feet in width.

Additional References

In addition to the previously described national standards, the basic bicycle and pedestrian design principals outlined in this chapter are derived from the documents listed below. Many of these documents are available online and provide a wealth of public information and resources.

Additional U.S. Federal Guidelines

- American Association of State Highway and Transportation Officials. (2001). AASHTO Policy on Geometric Design of Streets and Highways. Washington, DC. www.transportation.org
- United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG). Washington, D.C. http://www. access-board.gov/PROWAC/alterations/guide.htm
- United States Access Board. (2002). Accessibility Guidelines for Buildings and Facilities. Washington, D.C. http://www.accessboard.gov/adaag/html/adaag.htm

Best Practice Documents

- Association of Pedestrian and Bicycle Professionals (APBP). (2010). Bicycle Parking Design Guidelines, 2nd Edition.
- City of Portland Bureau of Transportation. (2010). Portland Bicycle Master Plan for 2030. http://www.portlandonline.com/ transportation/index.cfm?c=44597
- Federal Highway Administration. (2005). BIKESAFE: Bicycle Countermeasure Selection System. http://www.bicyclinginfo.org/ bikesafe/index.cfm
- Federal Highway Administration. (2005). PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. http:// www.walkinginfo.org/pedsafe/
- Federal Highway Administration. (2005). Report HRT-04-100, Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations. http://www.tfhrc.gov/safety/pubs/04100/
- Federal Highway Administration. (2001). Designing Sidewalks and Trails for Access. http://www.fhwa.dot.gov/environment/ sidewalk2/contents.htm
- Oregon Department of Transportation. (1995). Oregon Bicycle and Pedestrian Plan. http://www.oregon.gov/ODOT/HWY/ BIKEPED/planproc.shtml
- Rosales, Jennifer. (2006). Road Diet Handbook: Setting Trends for Livable Streets.

LSCOG Regional Bicycle and Pedestrian Study

Glossary

The following list is comprised of common terms, acronyms and concepts used in bicycle transportation planning, design and operation.

AASHTO – American Association of State Highway and Transportation Officials

Accessible route – in the ADA, a continuous route on private property that is accessible to persons with disabilities. There must be at least one accessible route linking the public sidewalk to each accessible building.

Actuated signal – a signal where the length of the phases for different traffic movements is adjusted for demand by a signal controller using information from detectors.

ADA – Americans with Disabilities Act of 1990; broad legislation mandating provision of access to employment, services, and the built environment to those with disabilities.

At-grade crossing – A junction where bicycle path or sidewalk users cross a roadway over the same surface as motor vehicle traffic, as opposed to a grade-separated crossing where users cross over or under the roadway using a bridge or tunnel.

Audible pedestrian signals – pedestrian signal indicators that provide an audible signal to assist visually impaired pedestrians in crossing the street.

BAFUL - Bicycles Allowed Full Use of Lane

Bicycle boulevard - See neighborhood greenway. Streets designed to give bicyclists priority by limiting or prohibiting motor vehicle through traffic by using barriers or other design elements, in order to enhance bicycle safety and enjoyment.

Bicycle facilities - A general term used to describe all types of bicycle-related infrastructure including linear bikeways and other provisions to accommodate or encourage bicycling, including bike racks and lockers, bikeways, and showers at employment destinations.

Bike lane - A striped lane for one-way bike travel on a street or highway.

Bicycle level of service (BLOS) – Indication of bicyclist comfort level for specific roadway geometries and traffic conditions. Roadways with a better (lower) score are more attractive (and usually safer) for bicyclists.

Bike path – A paved pathway separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent alignment. Bike paths may be used by pedestrians, bicyclists, skaters, wheelchair users, runners, and other non-motorized users.

Bike route - A shared roadway specifically identified for use by bicyclists, providing a superior route based on traffic volumes and speeds, street width, directness, and/or cross-street priority; designated by signs only.

Bikeway – A generic term for any road, street, path or way that in some manner is specifically designed for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Bollard – Post used to restrict motor vehicle use of bicycle paths.

Clearance interval – the length of time that the DON'T WALK indication is flashing on a pedestrian signal indication. Clearance, lateral - Width required for safe passage of bicycle path users as measured on a horizontal plane.

Clearance, vertical – Height required for safe passage of bicycle path users as measured on a vertical plane.

Crosswalk – any portion of a roadway at an intersection or elsewhere that is distinctly indicated for pedestrian crossing. Where there are no pavement markings, there is a crosswalk at each leg of every intersection, defined by law as the prolongation or connection of the lateral lines of the sidewalks.

Curb extension – an area where the sidewalk and curb are extended into the parking lane, usually in order to shorten pedestrian crossing distance. Also called "bulb-out" or "curb bulb."

Curb ramp - a combined ramp and landing to accomplish a change of level at a curb in order to provide access to pedestrians using wheelchairs.

Directional signs - Signs typically placed at road and bicycle path junctions (decision points) to guide bicycle path users toward a destination or experience.

Geometry - The vertical and horizontal characteristics of a transportation facility, typically defined in terms of gradient, degrees,

and super elevation.

Grade separation - Vertical separation of travelways through use of a bridge or tunnel so that traffic conflicts are minimized.

Grade-separated crossing – A bridge or tunnel allowing bicycle path users to cross a major roadway without conflict.

HCM - Highway Capacity Manual

HDM – Highway Design Manual

Level of service (LOS) - Term for the measurement of how well traffic "flows" on a roadway system or how well an intersection functions.

Loop detector - A device placed under the pavement at intersections to detect a vehicle or bicycle and subsequently trigger a signal to turn green.

Medians – Area in the center of the roadway that separates directional traffic; may provide a striped crossing and halfway point for pedestrians (also can be effective traffic calming design). Medians may be level with the surrounding roadway or "raised" using curb and gutter. Medians may include landscaping, concrete, paint/striping or any combination thereof.

Multi-use path – A trail that permits more than one type of user, such as a trail designated for use by both pedestrians and bicyclists.

MUTCD – Federal Manual of Uniform Traffic Control Devices

Neighborhood Greenways – Streets designed to give bicyclists priority by limiting or prohibiting motor vehicle through traffic by using barriers or other design elements, in order to enhance bicycle safety and enjoyment. See bicycle boulevard.

Paved shoulder – The edge of the roadway beyond the outer stripe edge that provides a place for bicyclists; functions as this only when it is wide enough (4-5 feet), free of debris, and does not contain rumble strips or other obstructions.

Pavement marking – An assortment of markings on the surface of the pavement that provide directions to motorists and other road users as to the proper use of the road (the "Manual on Uniform Traffic Control Devices" determines these standard markings).

Pedestrian – a person afoot; a person operating a pushcart; a person riding on, or pulling a coaster wagon, sled, scooter, tricycle, bicycle with wheels less than 14 inches in diameter, or a similar conveyance, or on roller skates, skateboard, wheelchair or a baby in a carriage.

Pedestrian signal indication – the lighted WALK/DON'T WALK (or walking man/hand) signal that indicates the pedestrian phase.

Refuge islands - Corner raised triangles or medians, used by pedestrians and bicyclists at intersections or mid-block crossings for assistance with crossing wide streets, especially where motor vehicle right turn lanes exist.

Right-of-way (ROW) - The right of one vehicle, bicycle or pedestrian to proceed in a lawful manner in preference to another vehicle, bicycle, or pedestrian. Also the strip of property in which a transportation facility or other facility is built.

Shared lane marking (SLM) or Sharrow – Shared Lane Pavement Marking

Shared roadway - A roadway where bicyclists and motor vehicles share the same space with no striped bike lane. Any roadway where bicycles are not prohibited by law (i.e. interstate highways or freeways) is a shared roadway.

Sidewalk – an improved facility intended to provide for pedestrian movement; usually, but not always, located in the public right-of-way adjacent to a roadway. Typically constructed of concrete.

Sight distance - The distance a person can see along an unobstructed line of sight.

Traffic calming - Changes in street alignment, installation of barrier, and other physical measures to reduce traffic speeds and/or cut-through traffic volume in the interest of street safety, livability, and other public purposes.

Traffic control devices - Signs, signals or other fixtures, whether permanent or temporary, placed on or adjacent to a travelway by authority of a public body having jurisdiction to regulate, warn, or guide traffic.

Traffic volume - The number of vehicles that pass a specific point in a specific amount of time (hour, day, year).

Wide curb lane – A 14 foot (or greater) wide outside lane adjacent to the curb of a roadway that provides space for bicyclists to ride next to (to the right of) motor vehicles. Also referred to as a "wide outside lane". If adjacent to parking, 22 foot wide pavement may also be considered a wide curb lane.



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Design Needs of Pedestrians

Types of Pedestrians

Similar to bicyclists, pedestrians have a variety of characteristics and the transportation network should accommodate a variety of needs, abilities, and possible impairments. Age is one major factor that affects pedestrians' physical characteristics, walking speed, and environmental perception. Children have low eye height and walk at slower speeds than adults walk. They also perceive the environment differently at various stages of their cognitive development. Older adults walk more slowly and may require assistive devices for walking stability, sight, and hearing. Table 3-1 summarizes common pedestrian characteristics for various age groups.

The MUTCD recommends a normal walking speed of three and a half feet per second when calculating the pedestrian clearance interval at traffic signals. The walking speed can drop to three feet per second for areas with older populations and persons with mobility impairments. While the type and degree of mobility impairment varies greatly across the population, the transportation system should accommodate these users to the greatest reasonable extent.

Table 3-1 Pedestrian Characteristics by Age

Age	Characteristics
0-4	Learning to walk
	Requires constant adult supervision
	Developing peripheral vision and depth perception
5-8	Increasing independence, but still requires supervision
	Poor depth perception
9-13	Susceptible to "dart out" intersection dash
	Poor judgment
	Sense of invulnerability
14-18	Improved awareness of traffic environment
	Poor judgment
19-40	Active, fully aware of traffic environment
41-65	Slowing of reflexes
65+	Difficulty crossing street
	Vision loss
	Difficulty hearing vehicles approaching from behind

Source: AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (July 2004), Exhibit 2-1.

Table 3 2 summarizes common physical and cognitive impairments, how they affect personal mobility, and recommendations for improved pedestrian-friendly design.

Table 3-2 Disabled Pedestrian Design Considerations

Impairment	Effect on Mobility	Design Solution	
Wheelchair and Scooter	Difficulty propelling over uneven or soft surfaces.	Firm, stable surfaces and structures, including ramps or beveled edges.	
Users	Cross-slopes cause wheelchairs to veer downhill.	Cross-slopes to less than two percent.	
	Require wider path of travel.	Sufficient width and maneuvering space	
Walking Aid Users	Difficulty negotiating steep grades and cross slopes; decreased stability.	Smooth, non-slipperly travel surface.	
	Slower walking speed and reduced endurance; reduced ability to react.	Longer pedestrian signal cycles, shorter crossing distances, median refuges, and street furniture.	
Hearing Impairment	Less able to detect oncoming hazards at locations with limited sight lines (e.g. driveways, angled intersections, right-turn slip lanes) and complex intersections.	Longer pedestrian signal cycles, clear sight distances, highly visible pedestrian signals and markings.	
Vision Impairment	Limited perception of path ahead and obstacles	Accessible text (larger print and raised text), accessible pedestrian signals (APS), guide strips and detectable warning surfaces, safety barriers, and lighting.	
	Reliance on memory		
	Reliance on non-visual indicators (e.g. sound and texture)		
Cognitive Impairment	Varies greatly. Can affect ability to perceive, recognize, understand, interpret, and respond to information.	Signs with pictures, universal symbols, and colors, rather than text.	

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel that is separated from vehicle traffic. Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped planting strip area. Sidewalks are a common application in both urban and suburban environments.

Attributes of well-designed sidewalks include the following:

Accessibility: A network of sidewalks should be accessible to all users.

Adequate width: Two people should be able to walk side-by-side and pass a third comfortably. Different walking speeds should be possible. In areas of intense pedestrian use, sidewalks should accommodate the high volume of walkers.

Safety: Design features of the sidewalk should allow pedestrians to have a sense of security and predictability. Sidewalk users should not feel they are at risk due to the presence of adjacent traffic.

Continuity: Walking routes should be obvious and should not require pedestrians to travel out of their way unnecessarily.

Landscaping: Plantings and street trees should contribute to the overall psychological and visual comfort of sidewalk users, and be designed in a manner that contributes to the safety of people.

Drainage: Sidewalks should be well graded to minimize standing water.

Social space: There should be places for standing, visiting, and sitting. The sidewalk area should be a place where adults and children can safely participate in public life.

Quality of place: Sidewalks should contribute to the character of neighborhoods and business districts.

Zones in the Sidewalk Corridor





This Section Includes:

- Zones in the Sidewalk Corridor
- Sidewalk Widths
- Sidewalk Obstructions and Driveway Ramps

Zones in the Sidewalk Corridor

Description

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel separated from vehicle traffic. A variety of considerations are important in sidewalk design. Providing adequate and accessible facilities can lead to increased numbers of people walking, improved safety, and the creation of social space.



Parking Lane/Enhancement Zone

The parking lane can act as a flexible space to further buffer the sidewalk from moving traffic. Curb extensions, and bike corrals may occupy this space where appropriate.

In the edge zone there should be a 6 inch wide curb.

Furnishing Zone

The furnishing zone buffers pedestrians from the adjacent roadway, and is also the area where elements such as street trees, signal poles, signs, and other street furniture are properly located.

Pedestrian Through Zone

The through zone is the area intended for pedestrian travel. This zone should be entirely free of permanent and temporary objects.

Wide through zones are needed in downtown areas or where pedestrian flows are high.

Frontage Zone

The Frontage Zone allows pedestrians a comfortable "shy" distance from the building fronts. It provides opportunities for window shopping, to place signs, planters, or chairs.

Not applicable if adjacent to a landscaped space.

Discussion

Sidewalks should be more than areas to travel; they should provide places for people to interact. There should be places for standing, visiting, and sitting. Sidewalks should contribute to the character of neighborhoods and business districts, strengthen their identity, and be an area where adults and children can safely participate in public life.

Additional References and Guidelines

United States Access Board. (2002). Accessibility Guidelines for **Buildings and Facilities.**

United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG).

AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities

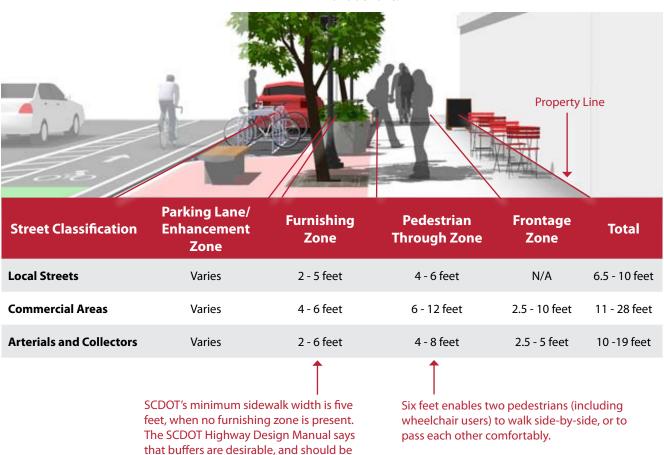
Materials and Maintenance

Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped boulevard. Colored, patterned, or stamped concrete can add distinctive visual appeal.

Sidewalk Widths

Description

The width and design of sidewalks will vary depending on street context, functional classification, and pedestrian demand. Below are preferred widths of each sidewalk zone according to general street type. Standardizing sidewalk guidelines for different areas of the city, dependent on the above listed factors, ensures a minimum level of quality for all sidewalks.



Discussion

It is important to provide adequate width along a sidewalk corridor. Two people should be able to walk side-by-side and pass a third comfortably. In areas of high demand sidewalks should contain adequate width to accommodate the high volumes and different walking speeds of pedestrians. The Americans with Disabilities Act requires a 4 foot clear width in the pedestrian zone plus 5 foot passing areas every 200 feet.

Additional References and Guidelines

SCDOT. (2003). Highway Design Manual.

United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG).

2 foot wide at a minimum.

AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

Materials and Maintenance

Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped boulevard. Surfaces must be firm, stable, and slip resistant. Colored, patterned, or stamped concrete can add distinctive visual appeal.

Sidewalk Obstructions and Driveway Ramps

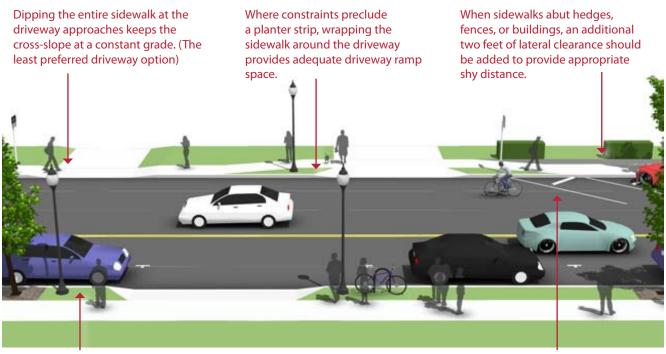
Guidance

Reducing the number of accesses reduces the need for special provisions. This strategy should be pursued first.

Obstructions should be placed between the sidewalk and the roadway to create a buffer for increased pedestrian comfort.

Description

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



Planter strips allow sidewalks to remain level, with the driveway grade change occurring within the planter strip.

When sidewalks abut angled on-street parking, wheel stops should be used to prevent vehicles from overhanging in the sidewalk.

Discussion

Driveways are a common sidewalk obstruction, especially for wheelchair users. When constraints only allow curb-tight sidewalks, dipping the entire sidewalk at the driveway approaches keeps the cross-slope at a constant grade. However, this may be uncomfortable for pedestrians and could create drainage problems behind the sidewalk.

Additional References and Guidelines

United States Access Board. (2002). Accessibility Guidelines for Buildings and Facilities.

United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG).

AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities

Materials and Maintenance

Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped boulevard. Surfaces must be firm, stable, and slip resistant.

Pedestrians at Intersections

Attributes of pedestrian-friendly intersection design include:

Clear Space: Corners should be clear of obstructions. They should also have enough room for curb ramps, for transit stops where appropriate, and for street conversations where pedestrians might congregate.

Visibility: It is critical that pedestrians on the corner have a good view of vehicle travel lanes and that motorists in the travel lanes can easily see waiting pedestrians.

Legibility: Symbols, markings, and signs used at corners should clearly indicate what actions the pedestrian should take.

Accessibility: All corner features, such as curb ramps, landings, call buttons, signs, symbols, markings, and textures, should meet accessibility standards and follow universal design principles.

Separation from Traffic: Corner design and construction should be effective in discouraging turning vehicles from driving over the pedestrian area. Crossing distances should be minimized.

Lighting: Adequate lighting is an important aspect of visibility, legibility, and accessibility.

These attributes will vary with context but should be considered in all design processes. For example, suburban and rural intersections may have limited or no signing. However, legibility regarding appropriate pedestrian movements should still be taken into account during design.

See **Crossing Beacons** for a discussion of crossing enhancements.

This Section Includes:

- Marked Crosswalks
- Raised Crosswalks
- **Reducing Crossing Distance**
 - Median Refuge Islands
 - Minimizing Curb Radii
 - **Curb Extensions**
- Minimizing Conflict with Automobiles
 - **Advance Stop Bars**
 - **Parking Control**
- **ADA Compliant Curb Ramps**













Marked Crosswalks

Marked Crosswalks

Guidance

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

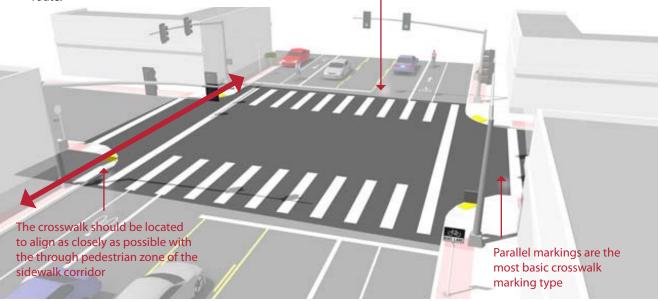
- At a complex intersection, to orient pedestrians in finding their way across.
- At an offset intersection, to show pedestrians the shortest route across traffic with the least exposure to vehicular traffic and traffic conflicts.
- At an intersection with visibility constraints, to position pedestrians where they can best be seen by oncoming traffic.
- At an intersection within a school zone on a walking route.

Description

A marked crosswalk signals to motorists that they must stop for pedestrians and encourages pedestrians to cross at designated locations. Installing crosswalks alone will not necessarily make crossings safer especially on multi-lane roadways.

At mid-block locations, crosswalks can be marked where there is a demand for crossing and there are no nearby marked crosswalks.

Continental markings provide additional visibility



Discussion

Continental crosswalk markings should be used at crossings with high pedestrian use or where vulnerable pedestrians are expected, including: School crossings, across arterial streets for pedestrian-only signals, at mid-block crosswalks, at intersections where there is expected high pedestrian use and the crossing is not controlled by signals or stop signs.

See **Crossing Beacons** for a discussion of enhancing pedestrian crossings.

Additional References and Guidelines

FHWA. (2009). Manual of Uniform Traffic Control Devices. (3B.18) AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

FHWA. (2005). Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations.

FHWA. (2010). Crosswalk Marking Field Visibility Study.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority. Thermoplastic markings offer increased durability than conventional paint.

Marked Crosswalks

Raised Crosswalks

Guidance

- 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.
- Raised crosswalks can also be used as a traffic calming treatment.

Description

A raised crosswalk or intersection can eliminate grade changes from the pedestrian path and give pedestrians greater prominence as they cross the street. Raised crosswalks should be used only in very limited cases where a special emphasis on pedestrians is desired; review on case-by-case basis.



Discussion

Like a speed hump, raised crosswalks have a traffic slowing effect which may be unsuitable on emergency response routes.

Additional References and Guidelines

FHWA. (2009). Manual of Uniform Traffic Control Devices. (3B.18) AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

USDOJ. (2010). ADA Standards for Accessible Design.

Materials and Maintenance

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

Reducing Crossing Distance

Median Refuge Islands

Guidance

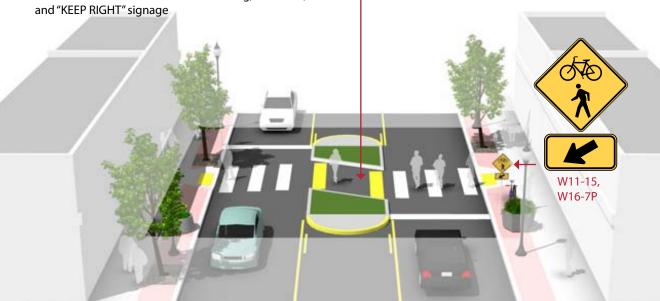
- Can be applied on any roadway with more than two lanes of traffic.
- · Appropriate at signalized or unsignalized crosswalks
- The refuge island must be accessible, preferably with an at-grade passage through the island rather than ramps and landings.
- The island should be at least 6' wide between travel lanes and at least 20' long
- The refuge area should be wide enough (> 6') to accommodate bikes with trailers and wheelchair users

 On streets with speeds higher than 25 mph there should also be double centerline marking, reflectors,

Description

Median refuge islands are located at the mid-point of a marked crossing and help improve pedestrian safety by allowing pedestrians to cross one direction of traffic at a time. Refuge islands minimize pedestrian exposure by shortening crossing distance and increasing the number of available gaps for crossing.

Cur through median islands are preferred over curb ramps, to better accommodate bicyclists.



Discussion

If a refuge island is landscaped, the landscaping should not compromise the visibility of pedestrians crossing in the crosswalk. Shrubs and ground plantings should be no higher than 1 ft 6 in.

On multi-lane roadways, consider configuration with active warning beacons for improved yielding compliance.

Additional References and Guidelines

FHWA. (2009). Manual of Uniform Traffic Control Devices.
AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

NACTO. (2011). Urban Bikeway Design Guide.

Materials and Maintenance

Refuge islands may collect road debris and may require somewhat frequent maintenance. Refuge islands should be visible to snow plow crews and should be kept free of snow berms that block access.

Reducing Crossing Distance

Minimizing Curb Radii

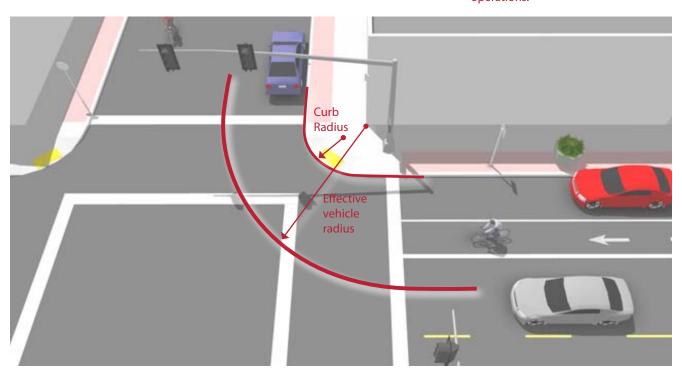
Guidance

The radius may be as small as 3 ft where there are no turning movements, or 5 ft where there are turning movements and there is adequate street width and a larger effective curb radius created by parking or bike lanes.

Description

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.

> A small curb radius is also beneficial for street sweeping operations.



Discussion

Several factors govern the choice of curb radius in any given location. These include the desired pedestrian area of the corner, traffic turning movements, the turning radius of the design vehicle, the geometry of the intersection, the street classifications, and whether there is parking or a bike lane (or both) between the travel lane and the curb.

Additional References and Guidelines

AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

AASHTO. (2004). A Policy on Geometric Design of Highways and

Materials and Maintenance

A small curb radius is also beneficial for street sweeping operations.

Reducing Crossing Distance

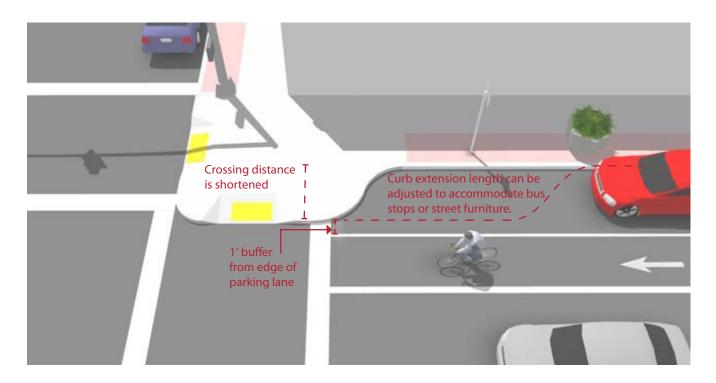
Curb Extensions

Guidance

- In most cases, the curb extensions should be designed to transition between the extended curb and the running curb in the shortest practicable distance.
- 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
- Curb extensions should terminate one foot short of the parking lane to maximize bicyclist safety.

Description

Curb extensions minimize pedestrian exposure during crossing by shortening crossing distance and give pedestrians a better chance to see and be seen before committing to crossing. They are appropriate for any crosswalk where it is desirable to shorten the crossing distance and there is a parking lane adjacent to the curb.



Discussion

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

If a refuge island is landscaped, the landscaping should not compromise the visibility of pedestrians crossing in the crosswalk. Shrubs and ground plantings should be no higher than 1 ft 6 in.

Additional References and Guidelines

AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

Materials and Maintenance

Planted curb extensions may be designed as a bioswale, a vegetated system for stormwater management.

Minimizing Conflict with Automobiles

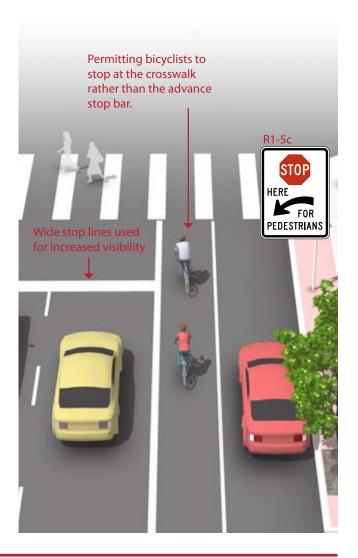
Advance Stop Bar

Description

Advance stop bars increase pedestrian comfort and safety by stopping motor vehicles well in advance of marked crosswalks, allowing vehicle operators a better line of sight of pedestrians and giving inner lane motor vehicle traffic time to stop for pedestrians.

Guidance

- On streets with at least two travel lanes in each direction.
- Prior to a marked crosswalk
- In one or both directions of motor vehicle travel
- Recommended 15-50 feet in advance of the crosswalk
- A "Stop Here for Pedestrians" sign should accompany the advance stop bar



Discussion

If a bicycle lane is present, mark the advance stop bar to permit bicyclists to stop at the crosswalk ahead of the stop bar.

If the State law requires drivers to YIELD to pedestrians in crosswalks, a Yield Line marking must be used rather than a stop line in these cases.

Additional References and Guidelines

FHWA. (2009). Manual of Uniform Traffic Control Devices.

Materials and Maintenance

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

Minimizing Conflict with Automobiles

Parking Control

Guidance

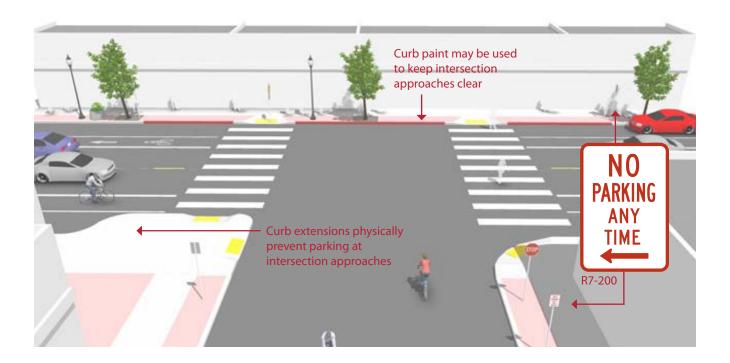
Curb extensions, 'No Parking' signage, or curb paint can be used to keep the approach to intersections clear of parked vehicles.

At "T" and offset intersections, where the boundaries of the intersection may not be obvious, this prohibition should be made clear with signage.

Parking shall not be allowed within any type of intersection adjacent to schools, school crosswalks, and parks. This includes "T" and offset intersections.

Description

Parking control involves restricting or reducing on-street parking near intersections with high pedestrian activity. Locating parking away from the intersection improves motorist's visibility on the approach to the intersection and crosswalk. Improved sight lines at intersections reduces conflicts between motorists and pedestrians.



Discussion

In areas where there is high parking demand parking compact vehicles may be allowed within "T" or offset intersections and on either side of the crosswalk. At these locations, signs will be placed to prohibit parking within the designated crosswalk areas, and additional enforcement should be provided, particularly when the treatment is new.

Additional References and Guidelines

AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

Materials and Maintenance

Signage and striping require routine maintenance.

ADA Compliant Curb Ramps

ADA Compliant Curb Ramps

Guidance

- The landing at the top of a ramp shall be at least 4 feet long and at least the same width as the ramp itself.
- The ramp shall slope no more than 1:50 (2.0%) in any direction.
- If the ramp runs directly into a crosswalk, the landing at the bottom will be in the roadway.
- If the ramp lands on a dropped landing within the sidewalk or corner area where someone in a wheelchair may have to change direction, the landing must be a minimum of 5'-0" long and at least as wide as the ramp, although a width of 5'-0" is preferred.

Description

Curb ramps are the design elements that allow all users to make the transition from the street to the sidewalk. There are a number of factors to be considered in the design and placement of curb ramps at corners. Properly designed curb ramps ensure that the sidewalk is accessible from the roadway. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access.

Although diagonal curb ramps might save money, they create potential safety and mobility problems for pedestrians, including reduced maneuverability and increased interaction with turning vehicles, particularly in areas with high traffic volumes. Diagonal curb ramp configurations are the least preferred of all options.

> Diagonal ramps shall include a clear space of at least 48" within the crosswalk for user maneuverability

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 below.



Crosswalk spacing not to scale. For illustration purposes only.

Discussion

The edge of an ADA compliant curb ramp will be marked with a tactile warning device (also known as truncated domes) to alert people with visual impairments to changes in the pedestrian environment. Color contrast between the raised tactile device and the surrounding infrastructure is important so that the change is readily evident.

Additional References and Guidelines

United States Access Board. (2002). Accessibility Guidelines for **Buildings and Facilities.**

United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG).

USDOJ. (2010). ADA Standards for Accessible Design.

Materials and Maintenance

It is critical that the interface between a curb ramp and the street be maintained adequately. Asphalt street sections can develop potholes in the at the foot of the ramp, which can catch the front wheels of a wheelchair.

Crossing Beacons

Crossing beacons facilitate crossings of roadways for pedestrians and bicyclists. Beacons make crossing intersections safer by clarifying when to enter an intersection and by alerting motorists to the presence of pedestrians in the crosswalk.

Flashing amber warning beacons can be utilized at unsignalized intersection crossings. Push buttons, signage, and pavement markings may be used to highlight these facilities for pedestrians, bicyclists and motorists.

Determining which type of signal or beacon to use for a particular intersection depends on a variety of factors. These include speed limits, Average Daily Traffic (ADT), and the anticipated levels of pedestrian and bicycle crossing traffic.

An intersection with crossing beacons may reduce stress and delays for a crossing users, and discourage illegal and unsafe crossing maneuvers.





This Section Includes:

- Active Warning Beacons
- Hybrid Beacon for Mid-Block Crossing

Crossing Beacons

Active Warning Beacons

Guidance

- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic signals.
- Warning beacons shall initiate operation based on pedestrian or bicyclist actuation and shall cease operation at a predetermined time after actuation or, with passive detection, after the pedestrian or bicyclist clears the crosswalk.

Description

Active warning beacons are user actuated illuminated devices designed to increase motor vehicle yielding compliance at crossings of multi lane or high volume roadways.

Types of active warning beacons include conventional circular yellow flashing beacons, in-roadway warning lights, or Rectangular Rapid Flash Beacons (RRFB).



Discussion

Rectangular rapid flash beacons have the most increased 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 percent. Additional studies over long term installations show little to no decrease in yielding behavior over time.

Additional References and Guidelines

NACTO. (2011). Urban Bikeway Design Guide. FHWA. (2009). Manual of Uniform Traffic Control Devices. FHWA. (2008). MUTCD - Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11)

Materials and Maintenance

Depending on power supply, maintenance can be minimal. If solar power is used, RRFBs should run for years without issue.

Crossing Beacons

Hybrid Beacon for Mid-Block Crossing

Guidance

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

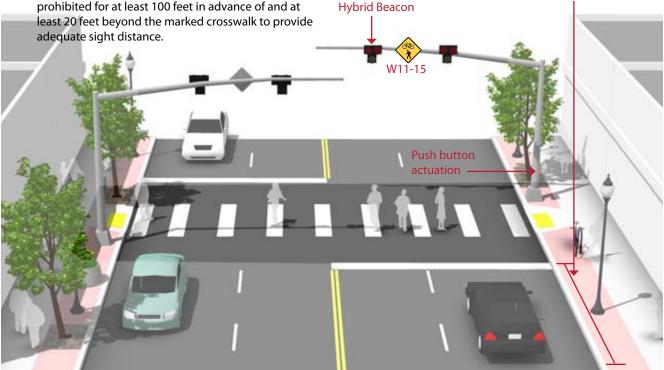
If installed within a signal system, signal engineers should evaluate the need for the hybrid signal to be coordinated with other signals.

Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at

Description

Hybrid beacons 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

> Should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs



Discussion

Hybrid beacon signals are normally activated by push buttons, but may also be triggered by infrared, microwave or video detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street.

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

Additional References and Guidelines

FHWA. (2009). Manual of Uniform Traffic Control Devices. NACTO. (2011). Urban Bikeway Design Guide.

Materials and Maintenance

Hybrid beacons are subject to the same maintenance needs and requirements as standard traffic signals. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

