City of Dunn

Pedestrian Plan

December 9, 2008 ● **FINAL** ● Dunn, North Carolina

NCDOT Division of Bicycle & Pedestrian Transportation ● The Louis Berger Group, Inc.

Division of Bicycle & Pedestrian Transportation

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The City of Dunn's Comprehensive Pedestrian Plan makes recommendations for policies, programs and projects that - when implemented - will improve walkability and help make Dunn a more pedestrian-friendly community.

Executive Summary

The intent of the Dunn Comprehensive Pedestrian Plan is to provide guidance for making the City of Dunn a more pedestrian-friendly community. Partially funded by a grant from NCDOT and matching funds from the City of Dunn, the Pedestrian Plan serves several purposes, including:

- To promote a better understanding of the measures that can be taken to create more and safer walking trips in Dunn;
- To identify in the Plan a clear schedule of projects, programs, and policies that Dunn and partnering agencies can complete to improve the walking environment; and
- During the planning process and afterwards, to create a better awareness of walking as a viable mode of transportation that can serve as a reliable substitute for some trips being made by private auto now; contribute to a healthier lifestyle; and reduce carbon and other emissions associated with motorized travel.

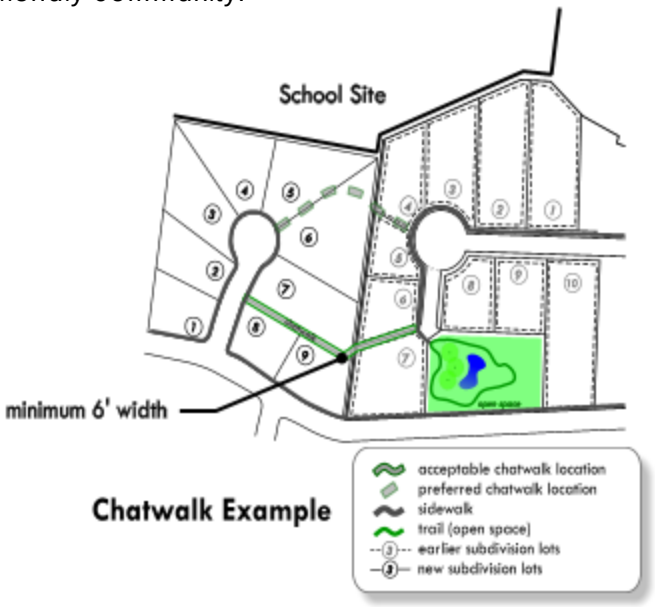
The Pedestrian Plan offers guidance for future pedestrian-related projects and improvements in the City, as well as recommended programs and policies that will improve local walking conditions. The results of the Plan will be a safe, accessible pedestrian system, as well as programs and policies that encourage residents and visitors alike to walk, rather than drive, around town.

VISION: "The City of Dunn is a safe, easy, and attractive environment for all of its citizens and visitors to traverse on foot, an increasingly popular way of transportation that is created through many partnerships."

Using this plan as a guide, the City of Dunn should be able to create a better, safer network of sidewalks, greenway trails and crossings for pedestrians. The City's next steps should begin to immediately address the short-term priority program, policy, and project recommendations. At the same time, the City should also start to lay the groundwork for the longer term recommendations by developing relationships with potential partners such as the Dunn Chamber of Commerce, the Harnett County Health Department, the North Carolina Department of Transportation and the Betsy Johnson Hospital, and by starting to

budget for future projects. Most importantly, the City should continue its efforts to raise awareness about the importance of making a community more walkable in order to continue to cultivate support for more pedestrian improvements and programs. Residents, visitors, and local leaders should be familiar with the economic, health, and environmental benefits of a community in which there is less dependence on automobiles and more reliance on foot travel as not only a form of recreation, but also as a form of transportation.

As a small city anticipating significant growth and development, Dunn is in an ideal situation to develop a more walkable community. The City should capitalize on its location and its attractions, such as the Dunn-Erwin Trail, to reinforce its existing pedestrian infrastructure with new projects and improvements. With careful planning, deliberate steps and persistence, Dunn can become a more pedestrian-friendly community.



The Pedestrian Plan's recommendations include many projects, policies and programs to improve walking conditions around schools, parks and neighborhoods. For instance, one policy recommends that Dunn require short greenway or "chatwalk" connections between new cul-de-sac developments and adjacent parks, schools or residential uses, where appropriate. This can greatly shorten walking distances and enhance the local pedestrian network by providing short, safe links between neighborhoods and commercial centers.

BENEFITS OF A WALKABLE COMMUNITY

- More people walking means **fewer cars on the road** and **less pollution**
- Walkable communities offer more **mobility independence for youth and elderly residents**, as well as those who are physically-disabled
- Not of all Dunn's residents drive – walkability means more **transportation choices** for everyone
- More active communities are healthier communities; walking for recreation or transportation **improves health and well-being** for all residents who choose to do so
- Improved health results in **decreased health care costs**
- Less pollution, multiple transportation choices and more recreational facilities lead to a **higher quality of life** for residents
- More "liveable" communities with greenway trails and other pedestrian amenities **attract residents, businesses and tourists**, according to national research, which leads to citywide economic benefits.

Short-term Recommendations (1 – 5 years)

SIDEWALK PROJECTS				
Proposed Sidewalk Location	**From**	**To**	**Length (Feet)**	**Est. Project Cost**
Cumberland 1 (US421)	General Lee	Broad	2527	$126,329
Clinton (US301)	Cleveland	Granville	1721	$86,071
Johnson	Railroad	Magnolia	1077	$80,757
Divine	Canterbury	General Lee	1354	$67,709
Pearsall 1	Watauga	Railroad	4031	$130,550*
Granville 1 (US301)	King	Johnson	2787	$139,348
Magnolia	Edgerton	Johnson	1774	$133,067

POLICIES	
Description	**Type**
Adopt Minimum Sidewalk Requirements	Ordinance
Adopt ROW Dedication Requirement	Ordinance
Adopt Sidewalk and Greenway Connection Requirement	Ordinance
Adopt Street Tree Ordinance	Ordinance
Establish Parking Lot Design and Setback Standards	Ordinance
School Zone Designation	Internal Policy
Establish a Bicycle/Pedestrian Advisory Committee	Planning Effort
Develop a Citywide Bicycle Plan	Planning Effort
Establish Payment In-lieu Policy	Internal Policy/ Ordinance
Signage, Pedestrian Signals and Signal Timing	Internal Policy
Develop a Downtown Streetscape Plan	Planning Effort

PROGRAMS		
Description	**Type**	**Potential Partners**
Safe Routes to School Program	Education	Harnett County Schools
Walk to School Day	Encouragement	Harnett County Schools
DuWalk Signed Route	Encouragement	Chamber of Commerce
Pedestrian Safety Campaign	Education	Dunn Police Department

** 3-blocks (1,420 ft) of existing sidewalk deducted from total estimated cost for Pearsall 1 corridor project*

Mid-term Recommendations (6 - 10 years)

SIDEWALK PROJECTS				
Proposed Sidewalk Location	**From**	**To**	**Length (Feet)**	**Est. Project Cost**
Broad	General Lee	Cumberland	2525	$126,250
McKay 1	Broad	Granville	3217	$241,304
Granville 2 (US301)	Morris	King	2045	$122,657
Edgerton 1	Fayetteville	Wilmington	2714	$135,718
Washington	Hodges	Cleveland	5074	$380,521
Erwin	Tilghman	Cumberland	2534	$126,705
Cumberland 2 (US421)	Broad	Powell	2008	$150,608
Pearsall 2	Elm	Sampson	2475	$185,649
Sampson	Pearsall	Codrington Park	2464	$184,766
Meadowlark	Fairground	Chelsea	3086	$231,473
Elm	Duke	Jackson	3042	$228,181

POLICIES	
Description	**Type**
Curb Ramp Retrofit Program	Internal Policy
Establish Overlay Districts	Ordinance
Parks & Open Space Planning	Planning Effort
Traffic Calming Toolbox	Planning Effort
Establish Sidewalk Petition Process	Internal Policy
Participate in the N.C. Main Streets Program	Planning Effort

PROGRAMS		
Description	**Type**	**Potential Partners**
Healthy Dunn Program	Encouragement	Betsy Johnson Hospital, Harnett Co. Health Dept
Weekly Walking Tours	Encouragement	Dunn-Erwin Trail Committee; Local Boy/Girl Scout Troops
Dunn 5K Walk/Run Event	Encouragement	Chamber of Commerce
Pace Car Program	Enforcement	Dunn Police Department

Long-term Recommendations (11+ years)

SIDEWALK PROJECTS				
Proposed Sidewalk Location	**From**	**To**	**Length (Feet)**	**Est. Project Cost**
Wilson	Edgerton	Granville	2839	$212,908
Spring Branch	Pope	Jackson	4600	$229,991
Friendly	Powell	Fairground	6812	$510,878
McKay 2	Susan Tart	Broad	3678	$275,854
Edgerton 2	Wilmington	Holland	2148	$161,119
Susan Tart	Tilghman	McKay	3613	$271,005
Cumberland 4 (US421)	Sampson	Winterlochen	3860	$289,491
Fairground	US301	Beale	4834	$362,579
Duke	McKay	Hodges	2777	$208,268
Cumberland 3 (US421)	Powell	ETJ (Black River)	3861	$289,563
Tilghman	Susan Tart	Erwin	3275	$245,603
Jackson	Hodges	Spring Branch	2709	$203,188

POLICIES	
Description	**Type**
Develop and Adopt Street Design Criteria	Planning Effort/Ordinance

PROGRAMS		
Description	**Type**	**Potential Partners**
Commuter Challenge Event	Encouragement	Chamber of Commerce
Traffic Enforcement	Enforcement	Dunn Police Department

Other Physical Improvements

In addition to the proposed sidewalk improvements listed in the implementation schedules above, a number of other recommendations have been made throughout the Plan to produce beneficial changes in Dunn's pedestrian environment. These include several "spot improvement" projects that should be considered opportunity-based projects, as well as construction of several new

greenway trails which will produce a valuable recreational and transportation asset to Dunn. These recommendations are listed below.

Spot Improvement Priorities for Dunn's sidewalk network

Proposed Spot Improvement	From	To	Proposed Action	Length (Feet)	Estimated Cost
Carr	Clinton	Washington	2-block sidewalk gap project	789	$ 59,211
Cumberland	Washington	Wilmington	1-block sidewalk gap project	450	$ 22,500
General Lee	Pearsall	Broad	3-block sidewalk gap project	1118	$ 55,900
Guy*	Granville	Friendly	3-block sidewalk gap project	1160	$ 87,000
Johnson	Burke	Granville	1-block sidewalk gap project	305	$ 22,872
Orange	Surles	Barrington	2.5-block sidewalk gap project	1064	$ 53,183
Pope	Fayetteville	Clinton	3-block sidewalk gap project	1175	$ 58,727
Powell*	Ashe	Friendly	2-block sidewalk gap project	1607	$ 120,525
Vance	Washington	Codrington Park	2-block sidewalk gap project	1337	$100,240

** Indicates added cost for curb & gutter ($25/LF for C&G plus $50/LF for sidewalk)*

Final Greenway Trail Recommendations (in priority order)

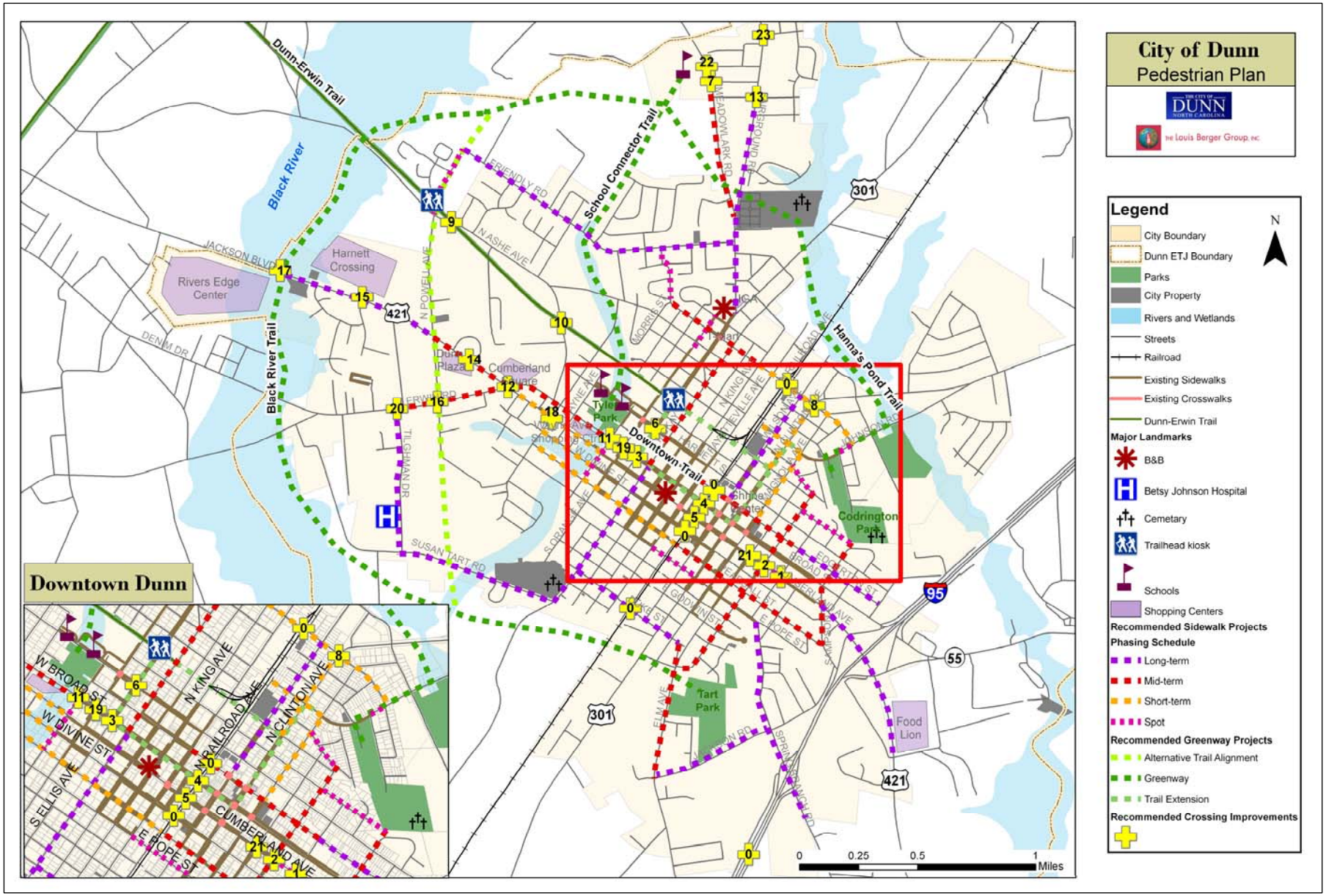
Phase	Proposed Greenway Trail	Total Trail Length	Estimated Cost (Paved Trail)	Estimated Cost (Unpaved Trail)
Short-term	**Downtown Trail**	9,191ft* (1.74 miles) *6,600ft existing sidewalk on Ellis, Broad and Clinton Streets plus 2,591ft new trail along the railroad easement from Ellis to Clinton Streets for a downtown "loop"	$ 343,000 (new trail) + signage	$ 49,000 (new trail) + signage
Mid-term	**School Connector Trail**	8,010 ft (1.52 miles)	$ 1,164,000	$ 152,000
Long-term	**Hanna's Pond Trail**	11,150 ft (2.11 miles)	$ 1,477,000	$ 211,000
Long-term	**Black River Trail**	26,000 ft (4.92 miles)	$ 3,444,000	$ 492,000

Crossing improvements have been recommended to enhance pedestrian safety at local intersections and key pedestrian crossings. The proposed crossing improvements, categorized into implementation phases (based on priority) are included in the table below.

Final Crossing Improvement Recommendations

Phase	Priority	Crossing Location	Recommended Treatments	Estimated Cost
Short	*1*	**Cumberland St & Wilmington St**	New traffic signal with pedestrian signals and high-visibility crosswalks	$101,200
Short	*2*	**Cumberland St & Washington St**	Standard crosswalks for north-south crossings (Washington St legs)	$200
Short	*3*	**Broad St & Ellis St**	Add crosswalks and pedestrian signals to existing signalized intersection	$5,000
Short	*4*	**Broad St & RR**	Create sidewalk connections; add transition over tracks	$3,200
Short	*5*	**Cumberland St & RR**	Create sidewalk connections; add transition over tracks.	$3,200
Short	*6*	**Harnett St & Ellis St**	Crosswalks and pedestrian signals; "No Right on Red" signage (4 legs)	$5,360
Short	*7*	**Meadowlark Rd & Chelsea St**	Add mobile in-street "Yield to Peds" sign during school hours	$250
Short	*8*	**Granville St & Clinton Ave**	Add crosswalks and pedestrian signals to existing signalized intersection	$5,000
Mid	*9*	**Ashe St & Dunn-Erwin Trail (south)**	Install flashers, crosswalks & advanced "Ped Xing" pavement marking	$5,700
Mid	*10*	**Ashe St & Dunn-Erwin Trail (north)**	Install flashers, crosswalks & advanced "Ped Xing" pavement marking	$5,700
Mid	*11*	**Broad St & General Lee St**	Install high-visibility crosswalks and in-street "Yield to Peds" sign	$2,200
Mid	*12*	**Cumberland St & Broad St**	Tighten curb radii; install median refuge islands, crosswalks, ped signals	$35,000
Mid	*13*	**Fairground Rd & Beale St**	New traffic signal with pedestrian signals and high-visibility crosswalks	$101,200
Mid	*14*	**Cumberland St & Commerce Dr**	Extend median refuge; install crosswalks and pedestrian signals	$9,000
Mid	*15*	**Cumberland St & Briarcliff Rd**	Crosswalks & pedestrian signals; extend median refuge; tighten radii	$35,000
Mid	*16*	**Erwin Rd & Powell Rd**	Add crosswalks and pedestrian signals to existing signalized intersection	$5,000
Mid	*17*	**Cumberland St & Black River Bridge**	Add sidewalks & pedestrian railing to existing bridge	N/A
Mid	*18*	**Cumberland St & Canterbury St**	Further study needed	N/A
Mid	*19*	**Broad St & Orange St**	Install high-visibility crosswalks	$ 1,200
Long	*20*	**Erwin Rd & Tilghman Rd**	New traffic signal with crosswalk & pedestrian signals; tighten curb radii	$121,200
Long	*21*	**Cumberland St & Elm St**	Further study needed	N/A
Long	*22*	**Meadowlark Rd & Beasley St**	Further study needed	N/A
Long	*23*	**Fairground Rd & Sycamore St**	Further study needed	N/A
Long	*NR*	**Granville St & RR**	Transition over tracks when/if sidewalk installed	$3,200
Long	*NR*	**Divine St & RR**	Transition over tracks when/if sidewalk installed	$3,200
Long	*NR*	**Duke St & RR**	Transition over tracks when/if sidewalk installed	$3,200
Long	*NR*	**Edgerton & RR**	Transition over tracks when/if sidewalk installed	$3,200
Long	*NR*	**I-95 Underpass**	Construct pedestrian underpass during future I-95 construction	$4 million

This map illustrates the overall proposed pedestrian network for Dunn, including new sidewalks, greenway trails and intersection improvements.



This section introduces the key concepts behind the Dunn Comprehensive Pedestrian Plan, as well as the goals and objectives set by the Steering Committee.

Figure 1-1. Pedestrian Destinations. *People without access to automobiles – the elderly, handicapped, lower-income populations and youth – are immediate market segments that benefit from pedestrian improvements to connect playgrounds (above), schools, shopping, and social destinations with homes.*

Section 1. Goals & Objectives

1.1 Introduction

The intent of the Dunn Comprehensive Pedestrian Plan is to provide guidance for making the City of Dunn a more pedestrian-friendly community. Partially funded by a grant from NCDOT and matching funds from the City of Dunn, the Pedestrian Plan serves several purposes, including:

- To promote a better understanding of the measures that can be taken to create more and safer walking trips in Dunn;
- To identify in the Plan a clear schedule of projects, programs, and policies that Dunn and partnering agencies can complete to improve the walking environment; and
- During the planning process and afterwards, to create a better awareness of walking as a viable mode of transportation that can serve as a reliable substitute for some trips being made by private auto now; contribute to a healthier lifestyle; and reduce carbon and other emissions associated with motorized travel.

The Pedestrian Plan offers guidance for future pedestrian-related projects and improvements in the City, as well as recommended programs and policies that will improve local walking conditions. The results of the Plan will be a safe, accessible pedestrian system that includes sidewalks, greenways and safe intersections, as well as programs and policies that encourage residents and visitors alike to walk, rather than drive, around town.

The Plan attempts to capture and address the needs of Dunn's varied population, including those of current and future residents, visitors, and tourists. The benefits of the Plan are as varied as the population it serves, including improved air quality, a healthier and more physically active population, reduced traffic congestion, and improved pedestrian safety for children and the elderly. All of these benefits amount to an overall improvement in quality of life which can make a city very attractive to newcomers and visitors, thus boosting the city's economy and vitality.

The following chapters of the Plan provide recommendations for projects, programs, and policies that will help to improve the pedestrian conditions in Dunn and encourage walking. The Plan also provides design guidelines that are

tailored to the specific needs of Dunn. Finally, the Plan presents a list of priorities and a recommended schedule, as well as cost estimates and potential funding sources, to assist with implementation of the Plan's recommendations.

1.2 Plan Process

The Dunn Pedestrian Plan was begun in December 2007 and completed in the fall of 2008. Dunn contracted with a professional consulting firm, The Louis Berger Group, Inc., to help the City prepare the plan, conduct public engagement exercises, and assist with managing a Steering Committee comprised of citizens, businesses, City staff and pedestrian advocates. The City also helped to conduct two public "Open House" meetings and a city-wide survey to gather feedback from residents on the vision for the future of Dunn's pedestrian environment. In addition to thorough public outreach, the planning process included a field inventory of pedestrian facilities in Dunn, which combined with public feedback, led to the development of two "working papers" reviewed in full by the Steering Committee. A draft of the Plan was presented for public comment at the August Open House and the final Plan was approved by City Council on December 9, 2008.

1.3 Vision and Goals

At the project onset, a Steering Committee was created to serve a guiding role for the Plan and represent a wide array of citizen and business interests in Dunn. Members of the Steering Committee included Harnett County staff, Dunn City Staff, citizens and elected leaders. On January 17, 2008 the first meeting of the Dunn Comprehensive Pedestrian Plan was conducted, in part to capture the opinions of the Steering Committee about important guiding principles for the Plan. These principles are captured as a vision statement, a series of goals, and implementation strategies.

The following are the direct comments from the Steering Committee when asked what their goals were for the pedestrians of Dunn:

- It is safe and easy to walk in Dunn, and everyone walks and has an active lifestyle.
- Children can walk to school safely.
- The Plan ties existing facilities to proposed facilities and shows connectivity.
- Dunn has comfortable and pedestrian-friendly walking facilities.

Name	Affiliation / Representation
Steve Neuschafer	Planning Department
Byron Tyndall	Police Department
Chuck Turnage	City Council
Joel Strickland	Rural Transportation Planner
Denise Newkirk	County Health Department
Brandy Hall	Community Marketing Director
Theresa Stephenson	Resident
John Archie	Resident
Granville Tilghman	Resident
Zada McLamb	Resident
Blaine Everhart	Dunn Planning Board
Stan Williams	Dunn Middle School
Vincent Washington	Dunn Public Works Department
Perry Hudson	Parks and Recreation Department
John Vine-Hodge	NCDOT Bike/Ped Division

Table 1-1. Pedestrian Plan Steering Committee

Steering Committee Statement	Goal			
	1. Safe	2. Easy	3. Access	4. Progress
It is safe and easy to walk in Dunn, and everyone walks and has an active lifestyle.	●	●		
Children can walk to school safely.	●		●	
The Plan ties existing facilities to proposed facilities and shows connectivity.		●	●	
Dunn has comfortable and pedestrian-friendly walking facilities.		●		
The Plan addresses beautification and aesthetics, incorporates bike lanes as buffers.		●		
The Plan addresses mobility and transportation alternatives.			●	
There is pedestrian access to all City parks for both adults/kids.			●	
Pedestrian facilities have smooth surfaces that give better access to bikers and skaters, as well.			●	
The Plan addresses trail loop opportunities to connect exiting Dunn-Erwin end points.			●	●
The Plan has long-term design recommendations that encourage more walking through successes and implementation over time.				●
Existing facilities are well-maintained and safety is increased through enforcement.	●		●	
There is improved bike/ped access to commercial areas through trail connections.			●	●
New sidewalks are built where needed with funding through the City's budget.				●
The Plan identifies and builds upon public/private partnerships to make Dunn more pedestrian-friendly.				●
The Plan addresses and improves access on trails for EMS and maintenance vehicles (e.g., better design on knock-down barriers/bollards).			●	
There are more education/encouragement programs and activities to promote walking.		●		
The crossing at US 421 and Wilmington, and all along Wilmington, are improved so that they are no longer barriers for pedestrian access.			●	●
There is better bicycle access and access for wheelchair-bound and disabled populations.			●	

Table 1-2. Pedestrian Plan Steering Committee Comments and How They Relate to the Goal Statements

- The Plan addresses beautification and aesthetics, incorporates bike lanes as buffers.
- The Plan addresses mobility and transportation alternatives.
- There is pedestrian access to all City parks for both adults/kids.
- Pedestrian facilities have smooth surfaces that give better access to bikers and skaters, as well.
- The Plan addresses trail loop opportunities to connect exiting Dunn-Erwin end points.
- The Plan has long-term design recommendations that encourage more walking through successes and implementation over time.
- Existing facilities are well-maintained and safety is increased through enforcement.
- There is improved bike and pedestrian access to commercial areas (e.g., rail-trail connection to Belk's) through trail connections.
- New sidewalks are built where needed with funding through the City's budget.
- The Plan identifies and builds upon public/private partnerships to make Dunn more pedestrian-friendly.
- The Plan addresses and improves access on trails for EMS and maintenance vehicles (e.g., better design on knock-down barriers/bollards).
- There are more education/encouragement programs and activities to promote walking as a transportation mode and/or recreation (e.g., maps, marketing via TV ads or PSAs).
- The crossing at US 421 and Wilmington, and all along Wilmington, are improved so that they are no longer barriers for pedestrian access.
- There is better bicycle access and access for wheelchair-bound and disabled populations.

From these basic statements, the following goals and implementation strategies were created. Each goal is accompanied by an issue statement that further describes the impetus behind that goal, and provides a connection to the implementation strategies.

Goal #1: It is safe to walk in Dunn.

Issue Statement – Having higher-than-average populations living below the national poverty threshold, Dunn has a large number of residents that

may need to walk for transportation purposes. Dunn may also have many residents who choose to walk, perhaps for recreation or exercise, to many of the City's primary destinations, such as schools, shopping centers and the hospital. Streets and intersections in the City need to be improved so that they are safe for pedestrians no matter what their motivation for walking. To create a safer walking environment in Dunn, both motorists and pedestrians should be educated about proper walking and driving behavior, as well.

Goal #2: It is easy, convenient and pleasant to walk in Dunn.
Issue Statement – This simple Goal conveys many of the complex thoughts of the Steering Committee: connectivity between developed parts of the City; beautiful aesthetics to compliment not only walking and biking, but enhance everyday living for citizens and promote a vibrant, attractive atmosphere for businesses and tourists; and the desire to promote more walking for transportation and recreational purposes. To accomplish this Goal, funding and regulatory practices must pay attention to new facilities, continual improvements should be made in design standards for new developments, and ongoing safety-education and encouragement programs should promote walking in the City.

Goal #3: Popular destinations in Dunn are pedestrian accessible for people of all abilities.
Issue Statement – Dunn has a proud history of individualism, and people want to conduct their daily lives on their own terms, including making trips on foot, in a wheelchair, or in the face of common physical barriers. Dunn's population includes people of differing physical abilities, from youth to seniors to visually/physically disabled residents. To accommodate all Dunn residents and visitors, the pedestrian system must be well-connected and accessible. In making these improvements, the local pedestrian system can be safer and more accessible for everyone.

Goal #4: The City of Dunn makes steady progress to implement its pedestrian recommendations.
Issue Statement – Dunn will not immediately have all the resources it needs to construct new facilities or create and maintain programs, but will have to rely on partnerships with the private sector, developers, education officials, health agencies, the North Carolina Department of Transportation, and others to make better pedestrian transportation a reality. To do so may require the development of ongoing improvement programs, as well as policy changes such as ordinance

modifications that guide growth, and increases in the amount of limited capital dedicated to pedestrian improvements.

From these four broad goals, a succinct vision of the Dunn pedestrian environment was created:

"The City of Dunn is a safe, easy, and attractive environment for all of its citizens and visitors to traverse on foot, an increasingly popular way of transportation that is created through many partnerships."

This is the vision for how the City will be viewed during and after implementation of the Comprehensive Pedestrian Plan, in years to come. The recommendations of the following chapters identify succinct strategies for achieving this vision through engineering, education, enforcement and encouragement projects and programs.

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Section 2. Existing Conditions

This section describes factors that contribute to current pedestrian transportation mode shares in Dunn, as well as the physical landscape that affects how Dunn looks today to the average pedestrian.

2.1 Introduction

The City of Dunn began in the late 1800's as a logging town buried in the pine forests of North Carolina. Incorporated in February of 1887, Dunn, like many small towns in the Piedmont area of North Carolina, received early momentum from a railroad line, which was completed in March of 1892. Broad Street and, later, Cumberland Avenue, became the young town's first streets. Interstate 95 picked up where the declining volume of passenger and freight rail traffic tapered off, providing a convenient connection to Fayetteville and Raleigh. Betsy Johnson Regional Hospital opened in 1968, and has remained a top employer in the City and surrounding region.

Today, Dunn still bears many marks of its early days, with a tight grid pattern and a mix of medium-density land uses defining the core downtown area and preeminent place to walk. However, the rest of the City has not developed in the same way, exhibiting much of the disconnected street systems and homogeneous land uses that have defined the growth patterns of the mid- to late 20th century in the U.S. The February 2006 zoning map of the City indicates the low-density ring of two-unit-per-acre housing at the edge of the City, which is bisected by I-95 as well as railroad lines. One of these rail lines has been converted to a five-mile, crushed stone surface trail (the Dunn-Erwin Rail Trail), the popularity of which has been focused primarily on recreation. Three public schools, an active Chamber of Commerce, health-related businesses, and manufacturing, numerous civic clubs like Kiwanis, MLK Committee, Lions, and Rotary, and the Betsy Johnson Regional Medical Center are potential partners in developing programs, educational opportunities, and amenities for pedestrians.

Figure 2-2 on the following page illustrates the position of the City relative to the surrounding region, including nearby Erwin, important local/regional rail lines, and major roadways. I-40, I-95, US 321and US 421 provide excellent highway accessibility from other areas of the State, and the Seaboard System Railroad continues to connect the area with national access to freight shipping as it has done since the earliest days of the City's formation. The CSX rail line in Dunn accommodates as many as 40 trains per day.

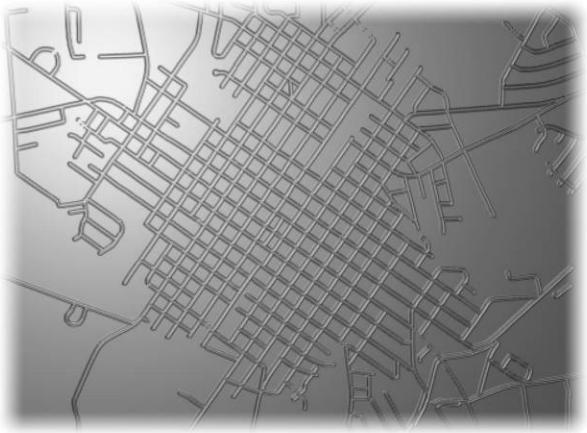
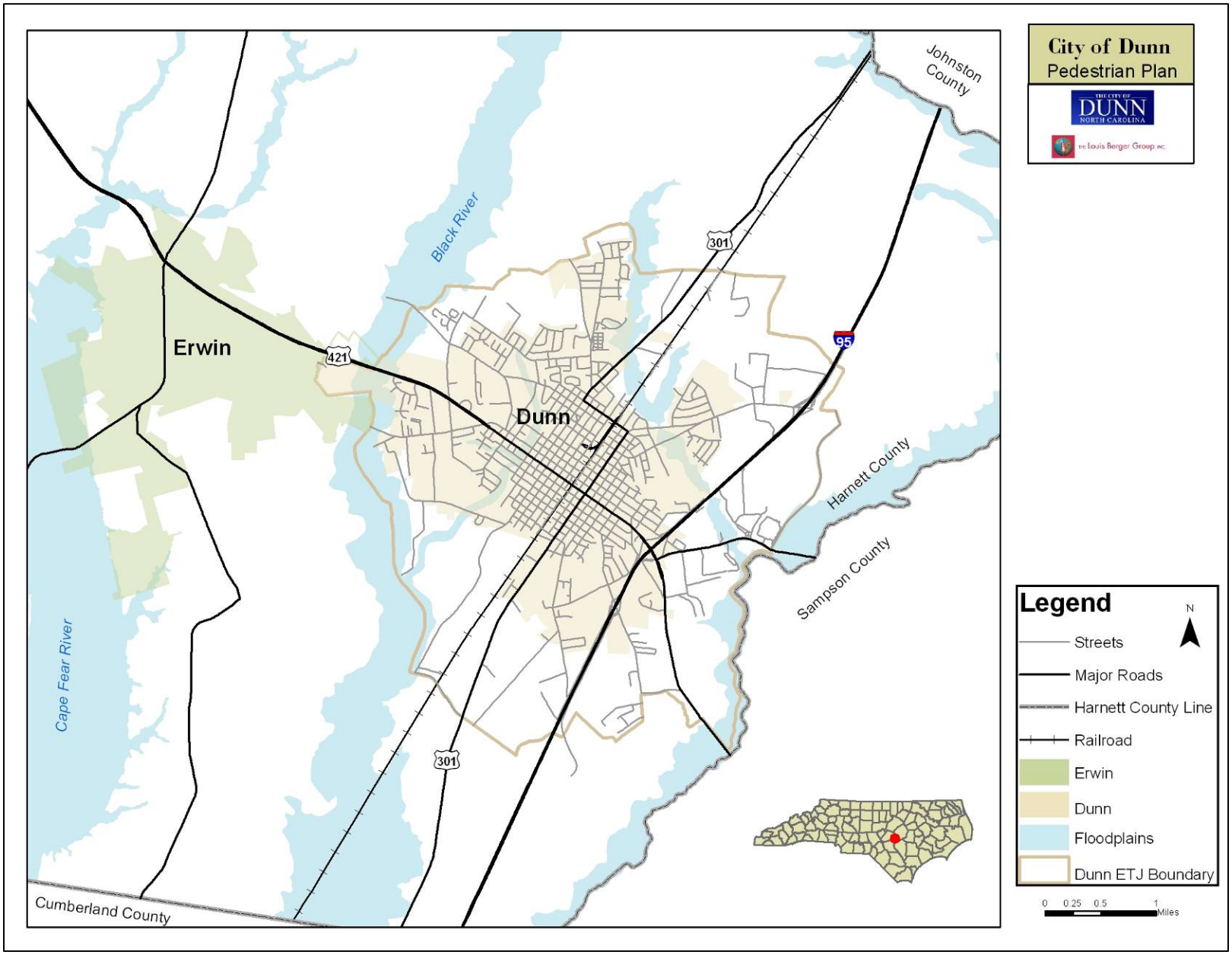


Figure 2-1. The Grid Pattern of Streets in Dunn
The obvious grid pattern of the central parts of the City, combined with the natural constraints of wetland areas and favorable climate, make the City a good long-term candidate for making walking a viable form of transportation.

Figure 2-2. Location of Dunn, North Carolina



2.2 Demographic Analysis

In order to provide full and adequate services to all the residents of Dunn, the City of Dunn Comprehensive Pedestrian Plan must address all of the needs of the people it serves, residents and visitors alike. To this end, the city's demographic information provides valuable clues about citizen travel behavior and preferences. Characteristics such as age, income, vehicle ownership, and commute time can suggest a population's potential for accepting walking as a mode of transportation. The following paragraphs provide a summary of the demographic analysis for the City of Dunn and explain the implications of the analysis for the recommendations made in the Pedestrian Plan. The complete demographic analysis can be found in Appendix C.

According to the U.S. Census, the estimated 2006 total population for the City of Dunn is 9,972. Based on the 2000 Census results, this overall population is racially balanced between Caucasian and African-Americans, and is also relatively low income with nearly one-quarter of the population below poverty-level. Age-distribution patterns in Dunn reflect an interesting pattern compared to state and national averages. Though there is a similar percentage of youth below 19 years of age in Dunn, the population of age group 20-44 is significantly less than state and national averages, while age groups 55+ are larger than state and national averages. This could indicate that younger workers are moving away to find job opportunities, or that Dunn may not be attracting young workers (age 20-44).

The City's household vehicle availability statistics are congruent with the City's somewhat low income levels and high poverty rate; Dunn has a higher percentage of households with 0 or 1 car available and a lower percentage of households with 2 or more cars available than both the state and nation. Roughly 19 percent of Dunn households do not have access to a vehicle. Despite this, only 7 percent of all workers do not commute by automobile. It is also interesting to note that the City has no bicycle commuters, but 3.7 percent of commuters walk to work, which is significantly higher than the State and national percentages, respectively. The demographic analysis also reveals that Dunn has a higher percentage of work commuters who travel less than 14 minutes to work, as well as those who travel over 35 minutes to work, than both the state and national percentages. However, Dunn has a lower percentage of work commuters who travel between 14 and 34 minutes to work. The data indicates that most Dunn residents (over 58%) live within 14 minutes from work, suggesting

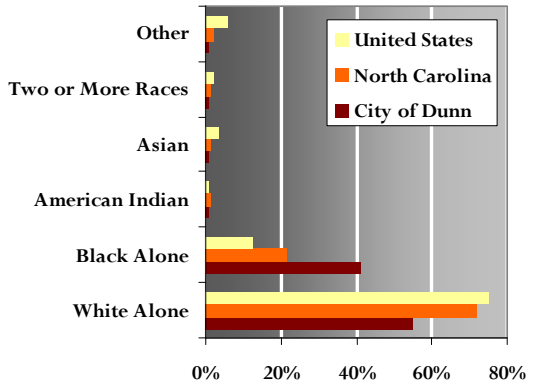
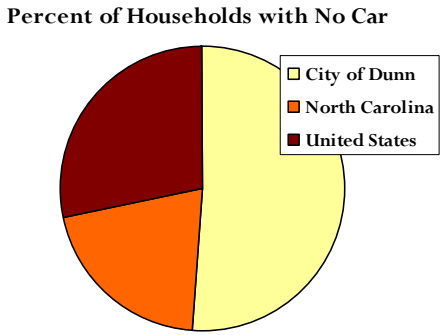


Figure 2-3. Key Demographic Statistics *Dunn is both more racially diverse (above) and more dependent on non-auto travel than North Carolina or the U.S.*



In some places, walking takes place even where there are no facilities for it. Poorly lit, an isolated feel, no hard surface or adjacent attraction – but walking still takes place on this important trail connection.

In other places, lighting may be adequate and a feeling of good security may abound, but a lack of nearby sidewalk connections may inhibit direct pedestrian access.

An obvious and easier-to-fix example is shown here. Cracked and "popped-up" sidewalks happen, but too little maintenance over time will contribute to an environment that is unappealing to all pedestrians, and impassable to those with mobility limitations.

Figure 2-4. Getting There from Here *In order to achieve our Goals, diverse situations like these must be addressed first.*

that many people who work in the City also live within the City, which means that increasing the number of pedestrian commutes can be a realistic goal. There will be more people to enjoy the walking in Dunn, too: the *2030 Land Use Plan* suggests that there will be nearly 17,000 citizens added in the next two decades.

Overall, the results of the demographic analysis suggest that the City's population would be amenable to walking for transportation purposes. Based on the income levels, poverty rate, and household vehicle availability, commuting on foot seems to be a potentially practical option for many workers. Therefore, the Dunn Pedestrian Plan should make recommendations that focus on improving pedestrian facilities to encourage people to travel to work by foot, as well as make recommendations to promote walking for recreational or non-work trip purposes. In addition to the environmental and air quality benefits of increased walking and decreased automobile use, the effects of adopting these pedestrian improvements will also ease vehicle traffic congestion while potentially improving the overall health and wellness of the residents of Dunn.

2.3 Existing Facilities Analysis

Part of the answer as to why many people walk in Dunn – and why more people don't walk – can be found in the level of accommodation for pedestrians. It is tempting to limit the observations of pedestrian accommodations to sidewalks or pathways alone, but the way that intersections are designed; the way that the shops, businesses and homes of Dunn are located and developed; and the policy environment in the City, County, and State are all important considerations as well.

Figure 2-5 on page 13 illustrates a number of important destinations for pedestrians in Dunn, as well as an inventory of existing sidewalk facilities, most of which are concentrated in the downtown area. The sidewalk inventory reveals the history of Dunn's development and the impact of the city's development ordinances (discussed in Section 3) on walkability. As in most North Carolina cities, sidewalks were constructed in many of Dunn's historic neighborhoods when automobiles were less prominent in the transportation network, but outside of the downtown area sidewalks are less frequent, reflecting the post 1950's era jump in automobile ownership across America. Interestingly, many of Dunn's older sidewalks are completely overgrown with grass and weeds, being nearly

undetectable to passers-by. The Dunn walking environment could be enhanced quickly by making a "clean sweep" of these sidewalks: clearing overlying weeds, grass and debris, then power-washing the surface of the sidewalks (depending on drought conditions). The individual condition and depth of overgrowth would determine if these sidewalks are salvageable, or if new installation is required.

In addition to sidewalk facilities, Figure 2-5 illustrates major destinations in Dunn. The City has a number of parks and schools that should be considered pedestrian generators and given special attention when prioritizing local pedestrian projects. Tart Park and Codrington Park are especially important facilities in Dunn. Though Tart Park is located toward the edge of town and away from the most walkable area in Dunn – the central business district – it is a major destination for pedestrians, especially as a recreational opportunity. The P. K. Vyas Recreation Center (located in Tart Park) serves as a comprehensive activity center for the City, and includes an indoor walking loop that is well used by residents, especially Dunn's senior citizens. The outdoor walking trail at Tart Park is also widely used for fitness walking, but currently many City residents drive to the facility to use these trails. Codrington Park is located closer to downtown Dunn, but is not well-connected to surrounding neighborhoods or downtown commercial district. Being home to the Dunn Senior Enrichment Center, the City swimming pool and a large playground, Codrington Park is a pedestrian attractor that could be well-served by better sidewalk and/or trail connections. Other Dunn parks, such as Tart and Tyler, should also be connected to nearby neighborhoods, trails, schools and commercial areas.

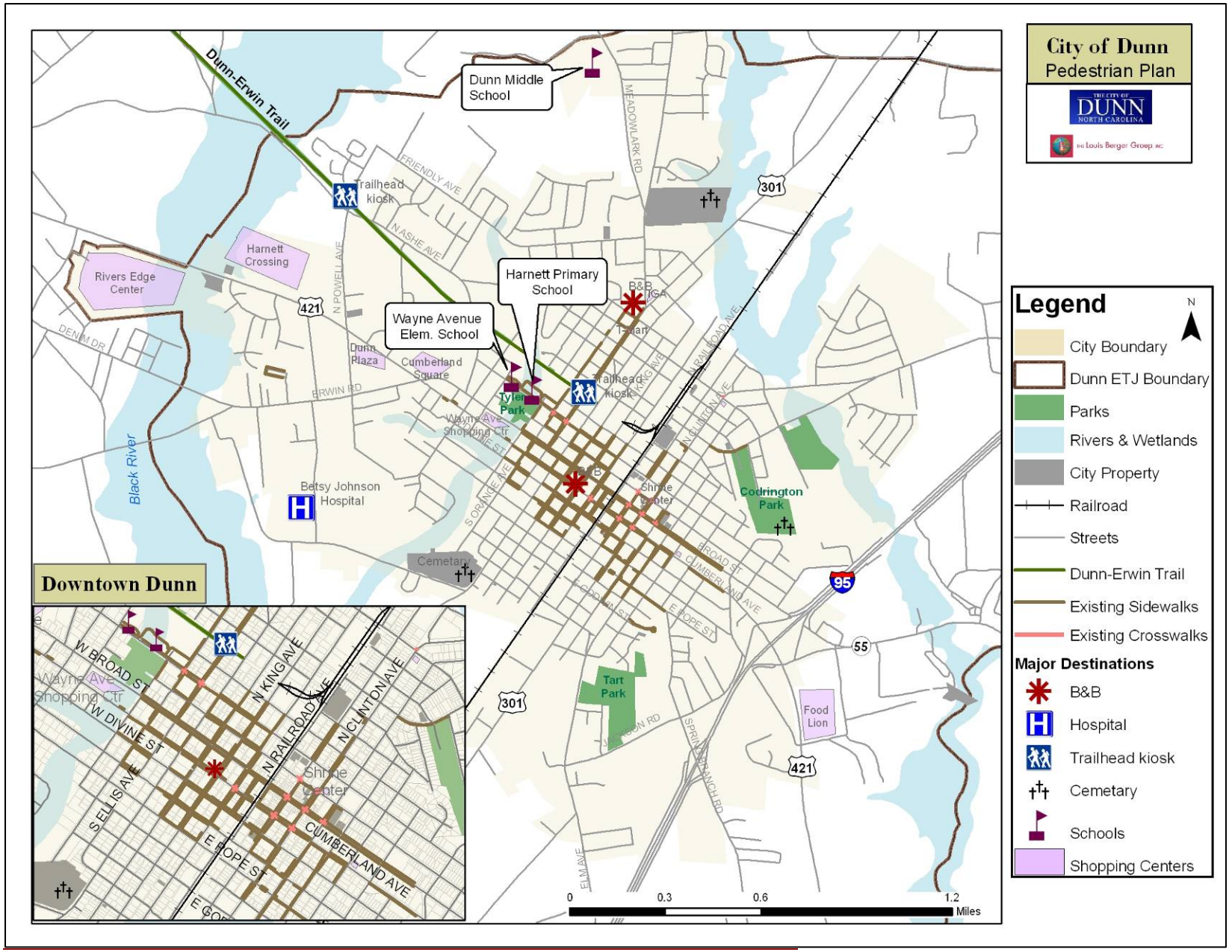
Important recognition should be made of the Dunn-Erwin Rail-Trail, a greenway trail that runs from downtown Erwin to downtown Dunn. The trail was constructed with state and city funds, and is maintained by the City of Dunn Public Works Department. Access points are provided at multiple cross-streets including the Ashe and Powell Avenue trail parking area. The trail provides a major throughway for bicyclists and pedestrians to safely traverse the western half of Dunn, and should be considered a major pedestrian attractor. Not only is the trail a tourism opportunity for visitors and recreational opportunity for residents, it also provides a valuable transportation route for pedestrians to/from downtown Dunn. Planned and potential connections to this trail from local parks and neighborhoods will be considered in the Comprehensive Pedestrian Plan, especially the potential link to Codrington Park through city-owned property northeast of downtown. Other connections to and extensions of the trail could increase its use and utility, and should be prioritized; enhancements such as

trailheads, lighting, wayfinding signage, kiosk maps and park furniture (e.g. benches, water fountains and trash cans) could also be considered.

In addition to parks and trails, local schools are major pedestrian generators and top priority should be given to creating connections between Dunn's residential areas and schools. Wayne Avenue Elementary and Harnett Primary School are on the same land and are fairly well-served by sidewalks and the Dunn-Erwin trail (which runs alongside the back of the school property); however traffic calming and intersection improvements could be made in the school area to improve pedestrian safety and create "safe routes to school." The local middle school is located on the edge of town and is not at all served by pedestrian facilities, though many students do walk in the shoulder along Meadowlark Road. Safety is a serious concern for students who walk to and from the middle school, and could be improved drastically with the provision of a sidewalk along Meadowlark Rd.

Finally, connections to major employment destinations and retail areas should be considered further in creating a complete pedestrian network for Dunn. The Betsy Johnson Hospital is Dunn's largest employer, and local shopping centers (especially those along Cumberland Street) also employ and attract significant numbers of Dunn residents. Finally, local organizations like the Downtown Development Corporation (DDC) are focused on revitalizing downtown Dunn. The DDC is developing a plan for a streetscaping project anticipated to begin in late 2010. This planned streetscaping project and similar initiatives funded by the Municipal Tax District downtown should include pedestrian improvements to enhance the walking environment of the City's central business district.

Figure 2-5. Pedestrian Destinations and Facilities Map

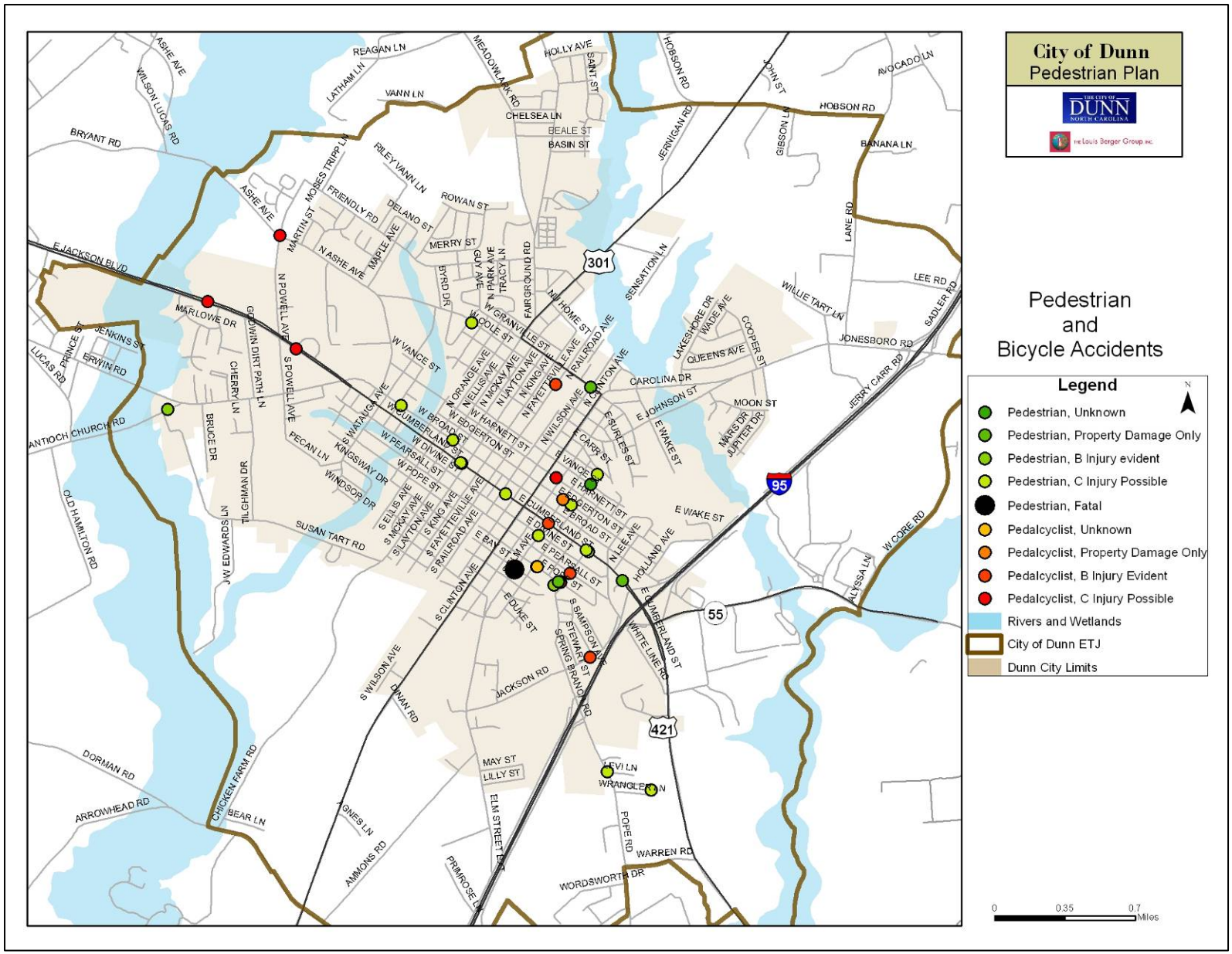


2.4 Pedestrian Crash Analysis

A pedestrian crash analysis is useful because it can be an indicator of the pedestrian-friendliness of a community, and can also provide information on key locations or educational outreach areas where improvements could be made to enhance safety. A crash analysis can often indicate popular walking routes, and sometimes illustrate conflict areas between pedestrians and cyclists. Crash data for Dunn was available from the North Carolina Department of Transportation (NCDOT) for 2003 - 2007. Overall, this data reinforces the comments of the Steering Committee members and City staff regarding pedestrian "hot spots" throughout Dunn, particularly at intersections and in the near-east downtown neighborhoods. The Cumberland Avenue corridor has quite a high concentration of incidents over the total time period between 2003 and 2007, particularly at intersections near popular shopping destinations, such as that of Cumberland Avenue and Elm Street or Cumberland Avenue and Commerce Drive. Many of these crashes were severe with evident and/or disabling injury incurred by the pedestrian, with one pedestrian fatality at the Elm Street and Bay Street intersection. The number of pedestrian crashes occurring at local intersections could indicate that one of Dunn's strongest needs is to make safety improvements such as pedestrian signalization, crosswalk improvements, traffic calming and signage. These crash types also reinforce the notion that educational outreach could be used to encourage pedestrians to obey traffic signs and signals and use caution when crossing busy streets.

Figure 2-6 provides a summary of crashes in Dunn from 2003 to 2007.

Figure 2-6. Pedestrian Crash History in Dunn, 2003-2007



2.5 Community Concerns and Needs

Public input has played a critical role in the City of Dunn Pedestrian Plan, helping to guide the development of a project list, identify program and policy recommendations, and assist with prioritization (see Sections 5 and 6). The process to gather public input has included multiple elements, incorporated into the Pedestrian Plan throughout the planning process. A Steering Committee was created at the beginning of the process to serve a guiding role for the Plan, and met regularly to discuss and review the plan and related documents. Simultaneous public outreach activities included a regularly-updated project website, a "warm line", a city-wide survey and two Open Houses - one on April 29, 2008 and one on August 21, 2008. At the two Open Houses, participants were provided an opportunity to speak directly with City staff and their consultants about the Plan. Maps were available for participants to indicate the locations of pedestrian-related issues and desired improvements, and flyers and surveys were available for distribution. In total, there were approximately 15 participants at the April 29, 2008 Open House and 15 participants at the August 21, 2008 Open House. Copies of the Open House flyers, survey and other public outreach materials are available in Appendix A.

All of the comments and feedback received during public outreach activities of the Plan were used to develop the project, program and policy recommendations outlined in Sections 5 and 6 of the Plan.

2.5.1 Steering Committee Feedback

At the first two Steering Committee meetings on January 17 and March 27, 2008, stakeholders were given the opportunity to provide input on walking conditions in Dunn. Specifically, Steering Committee members identified areas where they would like to see sidewalk improvements, greenway connections and crossing upgrades. Committee members highlighted major "hot spots" or problem areas for pedestrians, the top two of which were the IGA grocery store on Cumberland Avenue and Dunn Middle School on Meadowlark Road. Committee members also strongly suggested a "downtown trail" connection to/from the Dunn-Erwin Trail and downtown Dunn, by way of a signed walking route and complementary map. In addition to specific project ideas, Steering Committee members identified some general "priority" areas for pedestrian improvements, including schools, parks, major employment centers (e.g. the hospital) and the Dunn-Erwin trail. Other needs/concerns highlighted by the Steering Committee included:

- Wide pedestrian crossing distances at major intersections;
- Wide roadways in need of road diets or traffic calming to reduce traffic speed and improve the pedestrian environment;
- Pedestrians walking in the roadway in certain areas of the City. Pedestrian safety concerns could be addressed with better sidewalk connections, and safety-education and enforcement should be part of the solution;
- Current policy language, which does not require sidewalk construction, even as many residents want to travel by foot within and between residential developments;
- General lack of sidewalks in areas with heavy foot traffic, especially in low-income areas where many residents are walking for transportation even without adequate pedestrian facilities;
- General lack of pedestrian, or "walk," signals at intersections throughout Dunn.

All of these concerns and/or project ideas were taken into consideration and helped to formulate the recommendations of Sections 5 and 6 of the Plan. Many of the recommended crossing improvements, greenway trails and/or sidewalk installations suggested by the committee are listed as specific project recommendations in Section 5 of the Plan. Recommendations to develop more pedestrian-friendly policies and programs are included in Section 6. Section 4 of the Plan covers facility design options for standard projects, such as sidewalk or crosswalk installation, as well options for more complex traffic calming or road diet treatments. Many roadways in Dunn identified as in need of pedestrian improvements may have right-of-way constraints or other challenges which will make retrofits difficult and/or expensive to construct. For instance, right-of-way limitations exist along Cumberland Avenue, Friendly Road, Erwin Road and Granville Street. In such cases, a road diet (reducing the number or width of existing travel lanes to make room for other accommodations) may be considered to most cost-effectively create "complete streets" for Dunn.

Figure 2-7. Wide crossing distances at intersections, such as on Cumberland Street at River's Edge Center (above), were a top concern of Steering Committee members and other stakeholders. The use of crosswalks, median refuge islands and pedestrian signals at intersections with a designated "walk" phase could all help improve pedestrian access and safety along major thoroughfares throughout the City. Section 4 of the Pedestrian Plan recommends design standards for common intersection treatments.

2.5.2 Survey Results

The Pedestrian Plan survey was distributed in hardcopy format by Steering Committee members and City staff to local neighborhood groups, the Middle School PTA, shoppers at both Dunn IGA grocery stores, and at City Hall. The

survey was also available at the April 29, 2008 and August 21, 2008 Open Houses, as well as online from April 1 – August 21, 2008 via the project website at http://dunnpedplan.pbwiki.com. The survey had 76 total responses. Full results of the Pedestrian Plan survey can be found in Appendix B of the Plan.

The majority of survey participants indicated that they currently walk for recreation (65%) or to walk the dog (43%) over transportation (18%). However, survey responses strongly indicate that a lack of sidewalks in Dunn contributes to the decision not to walk more, in addition to fear of traffic and concerns over distance or time. Based on survey responses, many Dunn residents are currently walking to visit family and friends living nearby (57% of survey respondents), with walking trips to local parks and recreation centers ranking second in favorite pedestrian destinations. Many survey respondents indicated that they would like to walk more for leisurely activities, such as to visit friends, local parks, the library, church and entertainment venues.

When asked about the level of comfort or security residents feel about walking in Dunn, most indicated that they felt most comfortable in their own neighborhoods (85%). Seventy percent (70%) of respondents feel comfortable walking downtown and in the areas around their workplace, while local intersections were rated as the least comfortable pedestrian environment. In addition to information on these valuable indicators, survey respondents also recommended sidewalk and greenway projects, as well as intersection improvements, which have been incorporated into the project recommendation section of the Plan. The majority of survey respondents (82%) expressed a strong desire for funds to be directed toward sidewalk projects along existing roads rather than toward greenways along natural areas (see Appendix B). This response indicates the perceived public need and desire for more sidewalk connectivity throughout the City.

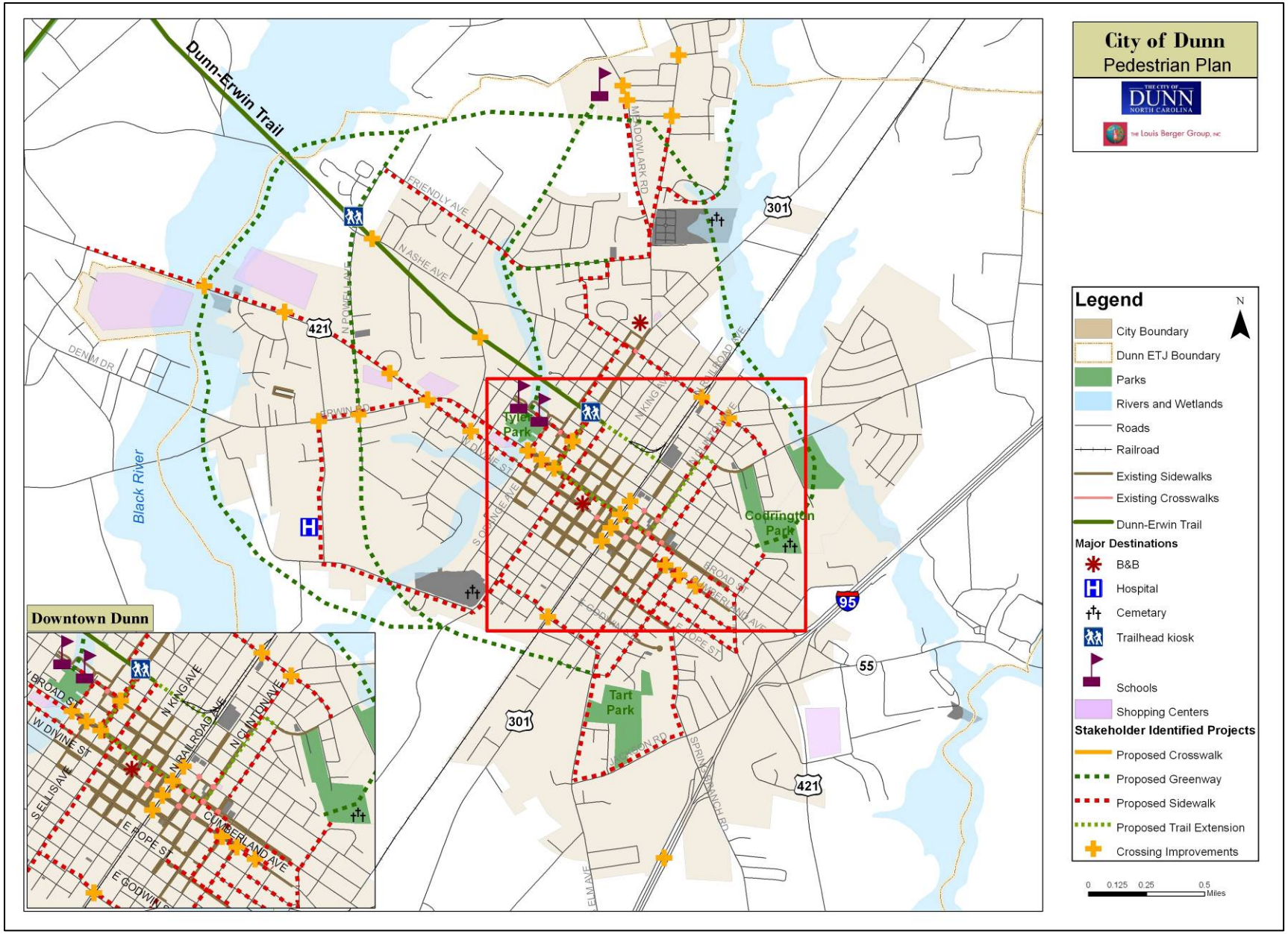
2.5.3 Open House and Other Feedback

In addition to regular Steering Committee meetings and public outreach through the website and survey mechanism, an initial Open House was held on April 29, 2008. The first Open House was a casual forum, where participants could fill out a survey, speak with City staff and planning consultants, and participate in a mapping exercise to identify projects for the Pedestrian Plan. Since it was an intimate group of 14 (not including the hosts), the participants divided up into two

groups per table and worked on project and program ideas. Suggestions that arose during the April Open House were based on the unique perspectives, interests and needs of Dunn's citizens, public sector staff, business leaders, advocates and elected officials. A second Open House on August 21, 2008 resulted in additional feedback used to help refine project, program and policy recommendations.

Figure 2-8 illustrates sidewalk needs, greenway connections and crossing improvements identified by the Steering Committee and other stakeholders (e.g. survey respondents and participants of the Open House). These initial ideas were filtered into the project recommendations outlined in Section 5 of the Plan.

Figure 2-8. Pedestrian Needs Initially Identified by the Stakeholders (May 2008)



Resources and Citations

1. National Civic League, All-America City Award. (www.ncl.org) accessed March, 2008.
2. N.C. Division of Community Assistance, *City of Dunn 2030 Land Use Plan*, June, 2005, 91 pages.
3. U.S. Bureau of the Census, 2000 Decennial Census and Census Estimates, accessed January, 2008.

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Section 3. Plan & Policy Review

This section reviews current planning documents and policies in Dunn that shape the day-to-day experiences of those who walk for recreation and transportation.

The decisions that shape the quality of pedestrians' experience are made every day, every time a new shopping center is built, an intersection is widened, a street paved. In turn, the City of Dunn makes decisions about how streets are designed, the way that new private developments are constructed, the priorities given to various kinds of improvements. The decisions enacted by these plans, programs, and policies are just as important as physical infrastructure in creating a pedestrian-friendly community because they create and encourage an atmosphere of acceptance towards pedestrians and a perspective of walkability.

The following section includes an assessment of the various policies, plans and regulations that directly or indirectly affect walking in Dunn:

- Code of Ordinances;
- Zoning Ordinance;
- Landscape Ordinance;
- City of Dunn 2030 Land Use Plan; and
- Dunn-Erwin Long Range Transportation Plan.

It is important to recognize here that the North Carolina Department of Transportation (NCDOT) plays a preeminent role in the financing, operation, and design of the streets and other transportation elements in our State. However, NCDOT has become more amenable in recent years to looking at non-traditional street design standards; integrating context sensitive design and land use objectives into their practices; managing roadway access; planning for and funding pedestrian improvements; and actively seeking out new partnerships to help improve secondary road systems across the State.

Detailed recommendations for updates to these policies and plans, as well as for new policies, ordinances or plans are included in *Section 6: Program & Policy Recommendations*.

Figure 3-1. Pedestrians Welcome *A busy street with parked cars and ample sidewalk width, and some visual interest "under glass" at eye-level contribute to the pleasant walking environment of this downtown sidewalk – as does the simple addition of a decorative planter.*

3.1 Dunn Policies and Ordinances

Code of Ordinances

The City of Dunn maintains its ordinances on the Municode website (www.municode.com). A city adopts and modifies its ordinances under the

regulatory powers granted by the State of North Carolina to guide development, identify the appropriate uses for land in the municipal boundary and extra-territorial jurisdiction (ETJ), and provide guidance on appropriate actions for its citizens to protect their health and well-being. Important considerations for pedestrians in the Dunn Code of Ordinances include the following:

- The City of Dunn may choose to order private development to include street improvements as well as sidewalk improvements;
- The City can also construct sidewalks, without petition, and assess the total costs to abutting property owners;
- Vehicles cannot be parked on a sidewalk (Sec. 12-95);
- No one is allowed to play games or skate on a sidewalk (Sec. 19-7) or spit on a sidewalk (Sec. 19-8);
- Bicycles are not allowed on City of Dunn sidewalks, as they are held to the same accountability as motor vehicles (Sec. 12-3) although this is not stated explicitly in the ordinances;
- The minimum construction standard for sidewalks is four feet in width (Sec. 20-73 (r)), which is less than the typical five-foot width;
- Overhead passageways are required where construction may injure a pedestrian below (Sec. 19-42) but there are not provisions for pedestrians where sidewalks are obstructed by construction activities;
- Maximum cul-de-sac length is 800 feet (Sec. 20-73(o));
- Sidewalks are only required on streets where the Planning Board deems them to be necessary (Sec. 20-73(t)), which could be strengthened to include sidewalks on all constructed/widened streets on at least one side of the street;
- Greenways are not required to connect to exterior pedestrian paths, nor is a dedication of right-of-way required by a developer, although a small incentive reducing the amount open space required by half is allowed (Sec. 22-59.8); and
- Vehicles are not allowed into an intersection to block the movement of pedestrians (Sec. 12-34).

The Zoning Ordinance

A special section of the Code of Ordinances is the Zoning Ordinance (Chapter 22), which divides Dunn into 13 separate zoning categories. The zoning of a parcel of land controls its range of allowed "by right" uses, permitted variances under certain conditions, and design specifics, especially parking requirements.

The purpose of this review is not to be wholly critical of the Zoning Ordinance, but to indicate areas where improvements could be realized that would affect the ongoing quality of the pedestrian environment for a long time to come.

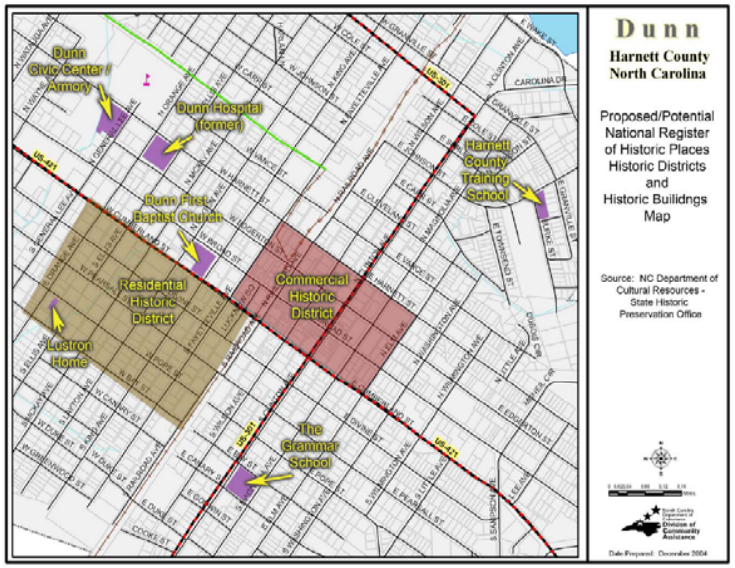
The Dunn Zoning Ordinance does not require a specific location for parking in relationship to commercial buildings, for example, which might encourage more parking to the rear of structures and present a more pleasing "face" to pedestrians walking by (and get the door a little closer to the sidewalk). The range of conditional uses (land uses that might be allowed under certain circumstances) is tightly proscribed, as it is in most towns in North Carolina. By separating these different uses, property owners are more reassured that the value of their properties will not decline, but the lack of proximity between compatible land uses (e.g., neighborhood shopping and the neighborhoods they serve) combined with no provisions ensuring pedestrian connectivity, rear accessibility, lighting, etc. can create a sterile pedestrian environment that requires a lot of effort to traverse. An option that municipalities have begun to explore is to protect the value of properties by ensuring appropriate design standards regarding visual, material, and mass elements of the built landscape. For example, a small convenience store can be designed to fit in comfortably with nearby homes, provided the parking, exterior lighting, and construction materials are well-designed and context sensitive.

Revised Landscaping Ordinance

Section 22-59 of the Code of Ordinances is a fairly recent addition, and provides requirements for landscaping for new developments. Some language in the Landscaping Ordinance that may affect the pedestrian environment is as follows:

- Section 22-59.2(d) indicates that pedestrian walkways will intrude minimally into the buffer yard (the landscaped area between two properties);
- The Landscaping Ordinance helps to preserve shade trees (Sec. 22-59.3) that markedly improve the pedestrian experience;
- Trash containment screening is also required (Sec. 22-59.10 (b)) that improves the quality of visual aesthetics for pedestrians; and
- Berms and walls or fences are allowed in buffer areas, which may prohibit or discourage some pedestrian movements or contribute to a "blankness" of scenery in the pedestrian environment.

Figure 3-2. Images of the *Dunn 2030 Land Use Plan***.** *Clockwise, from top-left: Dunn Land Uses; the north area land use inventory; tree-lined residential street; new, hard-to-access shopping center; wide neighborhood streets like this promote fast vehicle travel and discourage walking; and vacant retail uses posted on the frontier of a "sea" of lightly-used parking creates poor pedestrian elements and unnecessary stormwater runoff issues as well.*



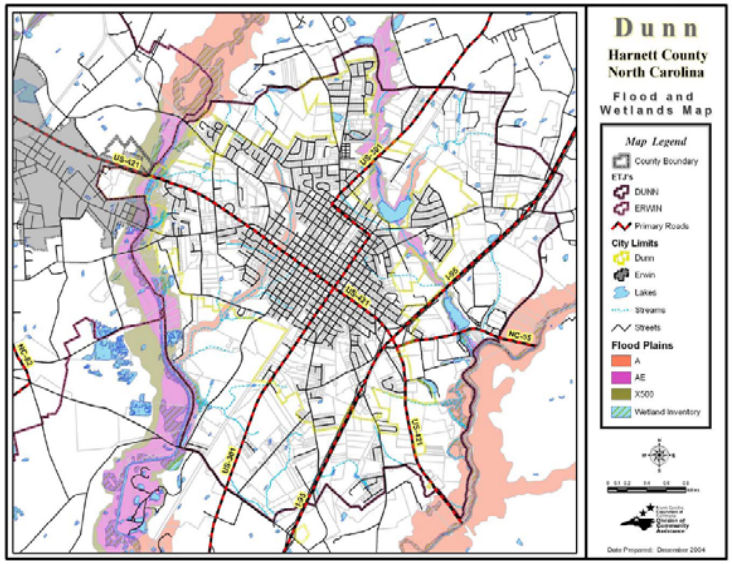


Figure 3-3. Location of Proposed Commercial and Residential Historic Districts (top) and Wetlands Map (below).
source: Division of Community Assistance, Dunn 2030 Land Use Plan, 2005.

3.2 Dunn Plans and Reports

City of Dunn 2030 Land Use Plan (June, 2005)

After reviewing the demographics, housing, and employment characteristics of the City, the 2030 Land Use Plan illustrates the City as being bisected twice by US 421 and the railroad. While the Plan states that this is only for the purpose of managing the photographic inventory done as part of the planning process, the reality is that these two facilities do indicate dividing lines, at least perceptually, to the citizens – and pedestrians – of Dunn.

The Plan also notes that nearly 60% of the land area – over 5,000 acres – is classified as rural/agricultural, indicating that the City still has a lot of potential for more intensive growth patterns, and more opportunities to practice connectivity. Multi-family land use is less than 2% of the total area, but is typically disproportionately important in terms of providing good walking access since multi-family is sometimes used as a "buffer" between more intensive land uses that are good walking destinations, for example shopping and commercial areas.

The Plan also has the following to say about the 5.3-mile-long Dunn-Erwin Rail-Trail, which is shown verbatim as it indicates recognition of walking and biking as a potential economic stimulus for the City:

> *The 5.3-mile DUNN ERWIN RAIL TRAIL is a major recreational asset to the community as well as an economic development tool that can potentially bring in tourist dollars from bicycle and hiking enthusiasts alike. The trail follows an abandoned rail corridor from Downtown Dunn to Downtown Erwin. The two downtowns should work together to see how they might market their areas and the trail. For example, similar business can locate on each end of the trail that rent bikes. The bikes could be dropped off and picked up at either location.*

Also, the Plan recommends adding more parkland, citing the National Recreation and Parks Association (1990) rule of thumb that roughly six to 10 acres of park should be in place for every 1,000 residents. Unfortunately, the Plan does not specifically call out a certain (linear) amount of trail or sidewalk density for the City, only citing that a regional trail system is "Not Applicable" to the case of Dunn (page 44).

The Plan identified two potential historic districts, one commercial in the vicinity of Cumberland Street and Fayetteville Avenue; and the other a residential district around South Ellis Avenue and West Pope Street. These were approved for study by the National Register of Historic Places.

The transportation (thoroughfare) plan illustrated in the Plan does not indicate or suggest any pedestrian improvements. This is in spite of the fact that a lack of good or inconsistent sidewalk facilities was the second-highest rated weakness cited in a citizen's poll (page 62). Vacant, dilapidated buildings and a lack of aesthetic quality at the entrances to the City were also cited as weaknesses, and also contribute to weakening the pedestrian climate. Infill development and building reuse, as well as the potential for rapid residential growth to serve the expanding population of Fort Bragg, were cited as opportunities and could be used to also promote better walking conditions if executed with pedestrian amenities in mind. The area east of I-95 was particularly well-suited for greenways due to a historical lack of development in that sector of the City. More street trees, sidewalks, landscaping, lighting, access control off of streets, and connections with the Dunn-Erwin Rail-Trail were also repeatedly cited as desirable future actions (pages 65-68).

Specific recommendations stemming from the Plan that relate to pedestrian activity include the following (shown verbatim):

- "Growing Greener" and Conservation subdivision options should be developed and adopted;
- Encourage development that is mixed use and integrated at centralized nodes of development;
- Construct additional bike and nature trails in Dunn that interconnect with the Dunn-Erwin Rail Trail where possible;
- Create a greenway system that connects Dunn's parks with other city greenways;
- Enhance recreational and open space lands that improve quality of life and marketability for new business;
- Improve traffic control devises [sic] and enforce existing speed limits;
- Improve the parking areas with better layouts, landscaping areas, and new paving surfaces;
- Development at the nodes should be integrated with residential and other uses to encourage better traffic movement and promote well-designed street patterns with preserved open space where applicable (page 79); and

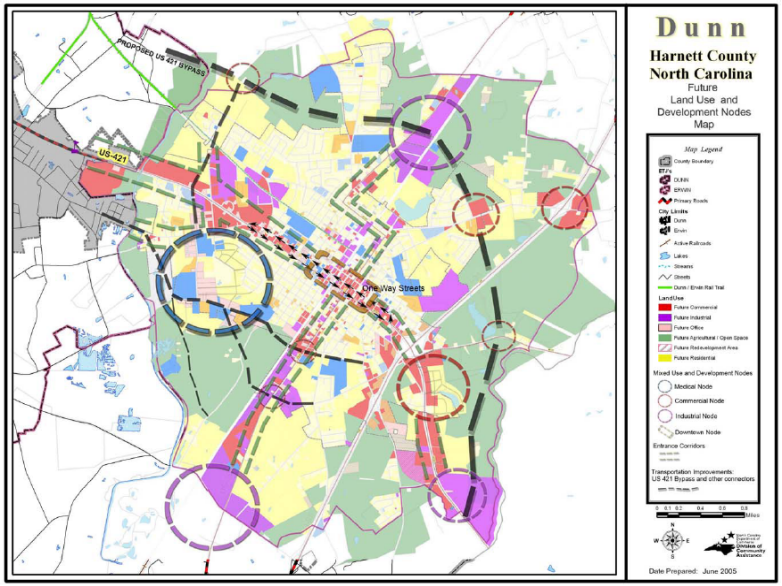


Figure 3-4. Development Nodes Proposed for Dunn
source: Division of Community Assistance, Dunn 2030 Land Use Plan, 2005.

- By 2030, the City should develop 106 to 177 acres of area parkland. A thorough parks and recreation plan should be completed to determine locations and the types of activities that will occur. In addition a bicycle and pedestrian plan should be completed that incorporates new trails with the existing trails. An opportunity exists to create a joint recreation center at the old industrial site near the new hospital. The site could be developed as a regional Health-Plex or YMCA serving both Dunn and Erwin. Finally the overall parks plan should be considered when developing "conservation subdivisions" to allow for community parks, open space, and trails.

Also of interest is the call for "Node Development" to promote clustering of land uses, smoother/safer vehicular traffic flows, and the promotion of walking to destinations (page 80). The Medical Mixed-Use and Downtown Nodes are particularly emphasized as having the potential for pedestrian connectivity. The latter includes a recommendation for a downtown revitalization plan (page 89).

Dunn-Erwin Long Range Transportation Plan

The Long Range Transportation Plan (LRTP) is a joint venture between the City of Dunn, Town of Erwin and the North Carolina Department of Transportation. The LRTP was adopted by the City of Dunn in 1999 and includes a number of proposed roadway changes, as well as new road alignments. New roadway projects proposed in the LRTP that fall within Dunn city limits include the following:

- US 421 Bypass (from Hwy 55 to Samson County)
- US 301 Grade Separation and Relocation (from Wake Street at Clinton Road to US 301 south of Candy Kitchen Road)
- Ellis Avenue Extension (from Pearsall Street to Chicken Farm Road)
- Little Avenue Extension (from Cumberland Street at Little Avenue to Clayton Street and East Granville Street)
- Masonic Road Extension (from Erwin-Denim Road at Masonic Road to Old Post Road)
- McKay Avenue Extension (from McKay Avenue to Ellis Avenue)
- Northern Erwin Connector
- Powell Avenue Extension (from Ashe Avenue at Powell Avenue to Meadowlark Road north of Ann Street)
- Jackson Road Extension (from Jackson Road at South Elm Street to Susan Tart Road west of Chicken Farm Road)

- Tilghman Drive Extension (from Erwin-Denim Road at Tilghman Drive to Powell Avenue north of US421)
- Watauga Avenue Extension (from Kingsway Drive to Tilghman Drive north of Susan Tart Road)
- West Granville Street Extension (from Morris Circle at Granville Street to Cole Street at Watauga Avenue)

It is recommended that all of these proposed new roadway and road widening projects not designated as limited access freeways should include sidewalks no less than five feet wide along both sides of the roadway. A minimum 3ft planting strip or buffer should be included between the back of curb and sidewalk, in order for sidewalks to safely and comfortably accommodate two-way pedestrian traffic. If a planting strip is undesirable due to maintenance reasons, an additional 3ft of concrete sidewalk could be used as a buffer. Additionally, all roadway crossings should include appropriate pedestrian crossing features, such as countdown pedestrian signals and marked crosswalks. Pedestrians should be considered during intersection design such that medians include a pedestrian refuge island and all turning radii are tight enough as to not create unsafe wide crossing distances for pedestrians at intersections.

Proposed road widening projects include the following roads. Each of these widening projects should adhere to the recommendations above for minimum 5ft sidewalks with a 3ft buffer and include safe pedestrian crossing features including countdown pedestrian signals and marked crosswalks at a minimum.

- Widening US 421 east of Dunn to the eastern city limits (proposed 4-lane divided cross-section);
- Widening US 301 from Fairground Road to the proposed US 421 Bypass (proposed 5-lane cross-section with paved shoulders, with some 4-lane divided);
- Widening of Erwin Road from Tilghman Drive to Masonic Road (proposed 4-lane curb and gutter cross-section with raised median)

Proposed intersection improvements include closure of several I-95 interchanges. Additionally, the LRTP includes a proposal to convert Broad Street and Cumberland Street, as well as Ellis Avenue and McKay Avenue, into respective one-way pairs. It is recommended that the City work with the Mid-Carolina Council of Government (RPO) and NCDOT staff to re-evaluate these original proposals. Existing I-95 interchanges should be improved for pedestrian safety,

but closure of multiple interchanges may result in heavier traffic on Cumberland Avenue and Broad Street – two heavily trafficked pedestrian thoroughfares. Additionally, respective planning agencies might reconsider the proposed one-way pair cross-sections, as many cities and towns across the state and country are now converting previous one-way pairs back to two-way streets for safety reasons. Often, one-way pairs can lead to increased traffic speeds which result in an uncomfortable if not unsafe pedestrian environment. Any changes or improvements to these roadways should include continuous sidewalk facilities as part of the project scope, as well as appropriate intersection treatments as discussed above.

Any new bridges or bridge replacements included in the proposed projects above should include pedestrian access via sidewalks on both sides of the road. All bridges should be designed with pedestrian safe railings with a minimum height of 42 feet. Any tunnels or stream culverts under I-95 should also include an adjacent pedestrian facility, in order to mitigate the barrier effect of the interstate through the community. Finally, a designated pedestrian tunnel should be provided at the location proposed in *Section 5: Project Recommendations* to allow for continued pedestrian access between these two growing residential areas.

3.3 NCDOT Policies and Program

2009-2015 Transportation Improvement Program (TIP)

The NC Transportation Improvement Program (TIP) is a seven-year plan for funding and constructing major transportation projects on State roadways. The TIP covers projects in each of the 14 Division offices across the State. Dunn falls within Division 6, and works with the region's Rural Planning Organization (RPO), the Mid-Carolina Council of Governments, to submit projects for inclusion in the TIP based on local and regional priorities.

The 2009-2015 TIP for the City of Dunn includes the projects listed in Table 3-1.

TIP #	Project Name	Project Description	Project Status
I-5010	Interstate 95	Reconfigure interchange ramp at NC-55	Right of Way in Progress and Construction in FY 2009
I-4745	Interstate 95	Rehabilitate pavement and structures, widen and upgrade interchanges and add additional lanes from north of Fayetteville to north of Benson	Right of Way and Construction in FY 2013, FY 2014, FY 2015 and Unfunded
R-4736	Interstate 95	Realign I-95 northbound off ramp and service road	Under Construction

Table 3-1. 2007-2015 TIP Projects within the City of Dunn

North Carolina Department of Transportation Policies

The North Carolina Department of Transportation (NCDOT) has adopted a number of policies addressing routine accommodation for bicycles and pedestrians on state maintained roadways. These policies and guidelines should be applied when new construction or resurfacing projects impact the bicycling environment in Wilson and include the following:

- **Board of Transportation Resolution on Mainstreaming Non-motorized Transportation** – This policy reaffirms the importance of bicycle and pedestrian facilities as an integral part of the overall statewide transportation system, and states that "bicycling and walking accommodations shall be a routine part of the North Carolina Department of Transportation's planning, design, construction, and operations activities." (http://www.ncdot.org/transit/bicycle/laws/laws_resolution.html)

- **NCDOT Pedestrian Policy** – This policy offers guidance providing pedestrian accommodations on state maintained roadways, and details standards for planning, design, construction, maintenance, and operations pertaining to pedestrian facilities and accommodations. (http://ncdot.org/transit/bicycle/laws/laws_pedpolicy.html)

- **NCDOT Guidelines for Accommodating Greenways with Road Improvement Projects** – This policy addresses the intent of NCDOT to accommodate planned greenways, existing greenways, and greenway crossings in all highway planning and construction projects. The policy states that it "was incorporated so that critical corridors which have been adopted by localities for future greenways will not be severed by highway construction." (http://www.ncdot.org/transit/bicycle/laws/laws_greenway_admin.html)

3.4 Federal Highway Administration (FHWA) Policy

Since the 1990's, significant changes have been made to Federal transportation policy and programs to improve bicycle and pedestrian safety and access. The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) and the 1998 Transportation Equity Act for the 21st Century (TEA-21) were the basis for these changes. Each of these federal transportation bills extended the consideration of non-motorized users in all roadway projects, and TEA-21 mandated an FHWA policy for mainstreaming non-motorized transportation (http://www.fhwa.dot.gov/environment/bikeped/bp-guid.htm).

The most recent version of the federal transportation bill, SAFETEA-LU, "confirms and continues the principle that the safe accommodation of non-motorized users shall be considered during the planning, development, and construction of all Federal-aid transportation projects and programs. To varying extents, bicyclists and pedestrians will be present on all highways and transportation facilities where they are permitted and it is clearly the intent of SAFETEA-LU that all new and improved transportation facilities be planned, designed, and constructed with this fact in mind."

"While these sections stop short of requiring specific bicycle and pedestrian accommodation in every transportation project, Congress clearly intends for bicyclists and pedestrians to have safe, convenient access to the transportation system and sees every transportation improvement as an opportunity to enhance the safety and convenience of the two modes. 'Due consideration' of bicycle and pedestrian needs should include, at a minimum, a presumption that bicyclists and pedestrians will be accommodated in the design of new and improved transportation facilities. In the planning, design, and operation of transportation facilities, bicyclists and pedestrians should be included as a matter of routine, and

the decision to not accommodate them should be the exception rather than the rule. There must be exceptional circumstances for denying bicycle and pedestrian access either by prohibition or by designing highways that are incompatible with safe, convenient walking and bicycling."

Resources and Citations

1. City of Dunn Code of Ordinances, Municode (www.municode.com), accessed March, 2008.
2. City of Dunn website (www.dunn-nc.org), accessed March, 2008.
3. Lancaster, R.A. (Ed.). *Recreation, Park, and Open Space Standards and Guidelines.* Ashburn, VA: National Recreation and Park Association. 1990.
4. Dunn Area Chamber of Commerce (www.dunnchamber.com), accessed March, 2008.
5. Dunn Area Tourism Authority (www.visitdunn.com), accessed March, 2008.

This section provides a set of standards for the design of pedestrian facilities recommended as part of the City's Comprehensive Pedestrian Plan.

Section 4. Design Guidelines

4.1 Introduction

This section provides guidance for the City of Dunn as they, private developers, and the State Department of Transportation (NCDOT) construct new pedestrian facilities and reconstruct existing pedestrian facilities to meet better standards. This section is divided into the following topics:

- legal rights of pedestrians
- pedestrian facilities and their design
  - sidewalks
  - crossings: signalized or unsignalized
  - greenways
- ADA requirements
- downtown area standards
- school standards
- sidewalk construction policy and maintenance
- parking lots
- railroad crossings

Currently, the City has few standards for pedestrian facilities – sidewalks, crosswalks, and other pedestrian-related amenities are constructed on an ad-hoc, as-needed basis. This section of the Plan is important because it provides a consistent set of guidelines within the City to help create a uniform appearance to Dunn's sidewalks and a more connected system.

4.2 Legal Rights of Pedestrians

It is important to understand the legal rights of pedestrians because these guide and define how pedestrian facilities are constructed and provided. Some of the legal rights of pedestrians are defined in Sections 20-172 through 20-175.2 of the North Carolina General Statutes.

More information can also be found in the NC Bike/Pedestrian Laws Guidebook, available at the NCDOT's Division of Bicycle and Pedestrian Transportation webpage:

http://www.ncdot.org/transit/bicycle/laws/resources/BikePedLawsGuidebook-Part-1.pdf.

Specific items which should be considered are the following:

- Drivers must yield to pedestrians (or cyclists) crossing a driveway, alley exit, or parking garage exit on a sidewalk. (§20-173)
- Vehicles should yield right-of-way to pedestrians at all marked and unmarked crosswalks, unless at a traffic signal the car is given exclusive right-of-way. (§20-173)
- If sidewalks are available, pedestrians are not to walk in the roadway. Where sidewalks are not provided, any pedestrian walking along the roadway should walk to the extreme left, facing in the direction of approaching traffic. (§20-174d)
- Every driver must consider pedestrians at all times, especially exercising care in the presence of children or incapacitated persons on the roadway. (§20-174)
- Special emphasis on leaving adequate crossing room at intersections is noted for visually handicapped persons. (§20-175.2)

In addition, pedestrian access is also governed by the requirements of the American Disabilities Act of 1990, a civil rights law which prohibits discrimination against people with disabilities in all aspects of life. As done throughout the US, the City of Dunn must provide transportation facilities, including sidewalks and other pedestrian facilities, which comply with the guidelines set forth in the ADA Accessibility Guidelines (ADAAG) in order to meet the standards of the American Disabilities Act. Some of the major items related to pedestrian facilities that are addressed by ADAAG include curb ramps and cross-slopes. The following bullets describe ADAAG-compliant design for these items:

- **Curb ramps: design and placement.**

DESIGN: Curb ramps are a significant and required feature of accessible pedestrian transportation systems, and must be designed carefully to fulfill their function and the requirements of the Americans with Disabilities Act. Curb ramps should not have a slope greater than 1:12, meaning that for every foot of travel, the slope should not rise more than one inch. To provide a tactile warning to the visually impaired, raised truncated domes with a color contrast to the background material (typically concrete) should be used, with measurements shown in Figure 4-1.i The *ADA Accessibility Guidelines for Buildings and Facilities* (http://www.access-board.gov/adaag/html/adaag.htm#A4.29.2) has an easy-

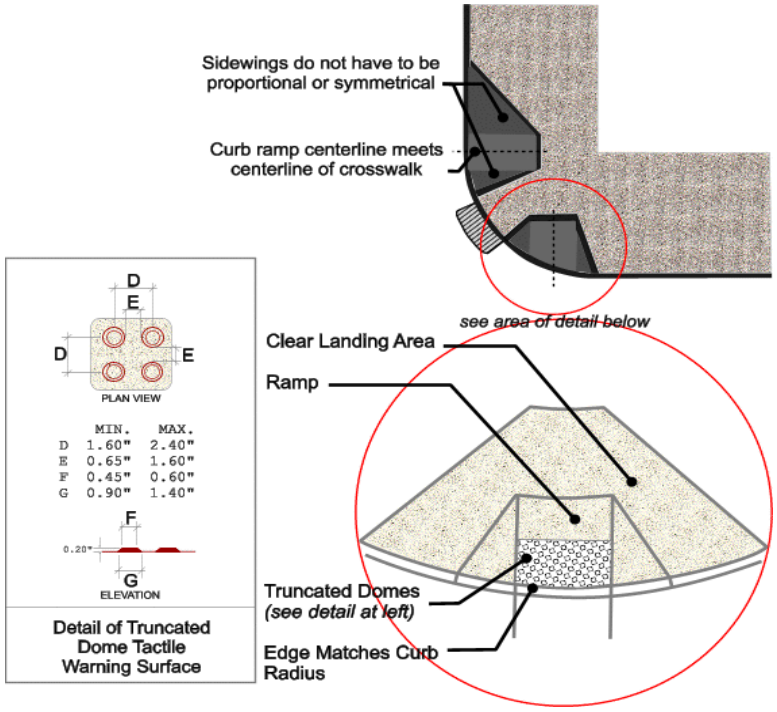


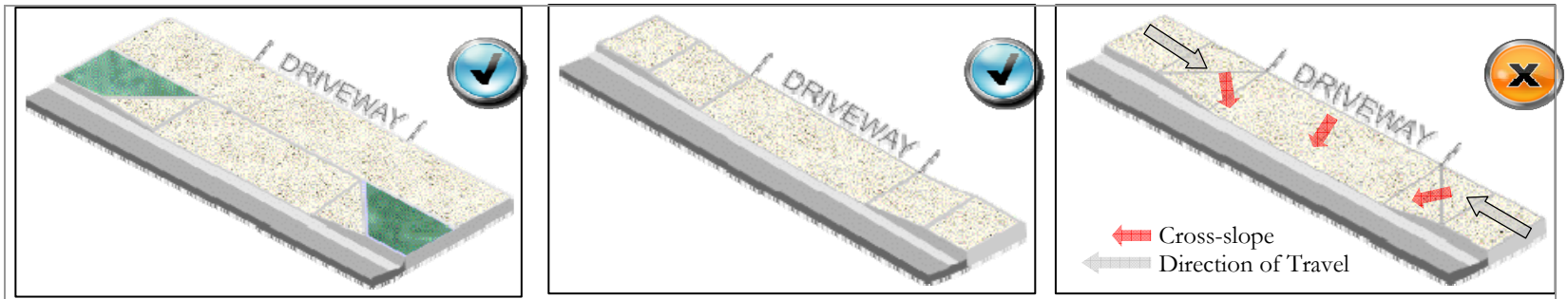
Figure 4-1 . Detail of an ADA-complaint curb ramp design with truncated dome measurements.

Figure 4-2. Appropriate curb ramp placement *(above) directs pedestrians into the crosswalks. Detectable warning strips (left) should be used in all curb ramps for compliance with ADA standards for the visually-impaired.*

to-use format for locating specific design criteria related to curb ramps, rise/run restrictions on ramps, and figures illustrating basic concepts.[ii]

PLACEMENT: Curb ramps should be placed entirely within the area of a marked crosswalk, so that a pedestrian can enter the ramp space at an angle perpendicular to the direction of travel. Generally, the standard is to have separate curb ramps on each corner; if a shared (sometimes called corner or diagonal) curb ramp is constructed, then the width and radius should accommodate the user so that entry onto the ramp is parallel to the direction of travel. Figure 4-2 provides examples of well-constructed curb ramps and placement of detectable warning strips.

- **Cross-Slopes.** Cross-slopes, or a slope along the travelway surface which is perpendicular to the direction of travel, can often make it very difficult for wheelchair travel. In addition, it can also make for treacherous walking conditions for individuals with problems with their balance and coordination. Cross-sloping most frequently occurs in conditions in which a driveway meets a sidewalk, but can also occur in other situations. In order to minimize the risk of a dangerous and difficult travel condition for some, cross-slope is regulated by ADAAG such that cross-slopes should not exceed two percent, and preferably not exceed 1.5 percent where possible. Figure 4-3 indicates the preferred (left), conditionally acceptable (middle), and unacceptable (right) design solutions for new driveways as they interface with sidewalks.



Preferred – *The sidewalk is set behind the driveway apron and planting strip.*

Conditionally Acceptable – *The "dip" at the driveway apron allows for safer passage with no cross-slope.*

Not Acceptable – *The cross-slope at the driveway apron provides a difficult challenge for a person using a wheelchair or cane*

Figure 4-3. *Examples of acceptable and unacceptable design solutions for minimizing cross-sloping at a driveway-sidewalk interface.*

For a complete guide to ADA requirements please see the National Access Board's website: www.access-board.gov.

4.3 Pedestrian Facilities and their Design

There are a variety of sources for design guidance for pedestrian facilities, including the following:

- NCDOT Highway Design Manual (2002)
- NCDOT Traditional Neighborhood Street Design Guidelines (2002)
- The American Association of State Highway and Transportation Officials' *Guide for the Planning, Design, and Operation of Pedestrian Facilities* (AASHTO, 2004)
- Manual on Uniform Traffic Control Devices (MUTCD), frequently updated
- Federal Highway Administration (FHWA)

The North Carolina Department of Transportation adheres to the design guidelines provided in the AASHTO and MUTCD guidebooks. In general, pedestrian facilities can be described in the following categories:

- sidewalks
- crossings
- greenways

The City currently does not have its own standards for pedestrian facilities. The following paragraphs provide national standards and best practices for pedestrian facilities by category.

4.3.1 Sidewalks

A standard sidewalk is usually five feet minimum in width, concrete, and is often placed along roadways with curb and gutter. In general, the width of sidewalks should accommodate two persons walking past one another, which is generally perceived to be five feet at minimum. Other circumstances that may require additional sidewalk width are: (1) to accommodate the overhang of parked vehicles from off-street or angled on-street parking areas; (2) to accommodate a larger number of pedestrians in high-use zones such as central business districts; and (3) to create an additional buffer from traffic when a planting strip cannot be installed.

Additional design considerations for on-street sidewalk facilities include the following:

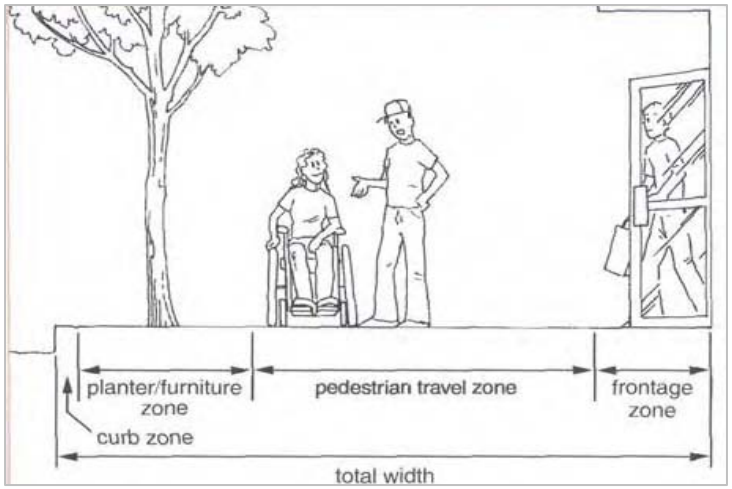


Figure 4-4. Horizontal clearance "zones" for a sidewalk, most typically found in a central business district.
Source: FHWA/USDOT "Accessible Sidewalks and Street Crossings" Informational Guide.

Figure 4-5. Examples of pedestrian- activated, signalized, mid-block crossings.

Top: An example of a pedestrian-activated signalized mid-block crossing.

Bottom-right: Guide for pedestrians to assist them in understanding the meaning of the push-button signals.

- Sidewalk should be clear of vertical and horizontal obstructions at both high and low contact points; tree branches, mast-arm signs, and/or overhanging signs should offer a 7ft minimum overhead clearance. Street furniture and other amenities should be installed outside of the 5ft pedestrian travel zone or "clear zone" (see Figure 4-4).
- Sidewalk should have a running grade of 5% or less.
- All street furniture and other stationary objects should consider "detectability" for visually-impaired white cane users, and amenities such as water fountains, bus stops or benches should provide wheelchair accessibility for physically-disabled pedestrians.
- A planting strip or "buffer" space of at least 5ft is preferrable for sidewalks adjacent to busy streets with curb-and-gutter cross-sections. In downtown areas, a 2-3ft buffer may be most feasible. This space can be used for street trees or other landscaping and improves aesthetics as well as the comfort level of pedestrians using the sidewalk. On roadways with ditch or shoulder cross-sections, the swale separation from roadway provides an adequate buffer. A wider sidewalk can be used as a replacement for a planted buffer, such as in the case of a central business district. A planting strip of 4-10ft is typically necessary to permit healthy tree growth.

Table 4-1. Typical minimum sidewalk and buffer widths.

Land Use – Street Type	Minimum	Planting Strip
Central Business District or Pedestrian Activity Center	8ft	variable
Commercial/Industrial	5ft	2ft
Arterial or Major Streets*	5-6ft	3ft
Local or Collector Streets (Residential)*	5ft	2ft

** Source: AASHTO Guide of the Planning, Design, and Operation of Pedestrian Facilities*

In general, standard sidewalks should be concrete, which is more durable than asphalt. A more flexible material, such as rubberized paving, can be considered in situations in which there is the potential for tree roots to crack and lift the concrete. Using these types of materials can reduce the risk of a tripping hazard, and also lower maintenance costs. More permeable materials, such as porous concrete or pavers, can also be considered for walkways, and are often used for greenways near streams, in order to reduce run-off from storm events.

4.3.2 Crossings

Pedestrian-friendly crossings are a critical feature in a well-connected pedestrian system because they provide the linkages between one segment of sidewalk to another as a pedestrian may cross a street, connect to another existing piece of sidewalk, or pass to a new development. A well-placed crossing can dramatically reduce pedestrian travel time and improve pedestrian safety – greatly increasing the convenience of walking as a mode of travel. Pedestrian crossings can be signalized or unsignalized, and located at intersections or at mid-block locations. The City of Dunn has several signalized and unsignalized crossings at various intersections throughout the City.

The most basic crossing is an unsignalized intersection with standard, continental or zebra crosswalk markings. Other potential treatments for unsignalized crossings include raised crosswalks and/or signage. In-street or overhead "yield to pedestrian" signs are an effective treatment for unsignalized intersections, encouraging motorists to stop for pedestrians as they cross the street. These signs offer a visual cue and instill some friction in the roadway, as they are typically placed in the middle of a bi-directional, two-lane road. Additional treatments can be added for crosswalk visibility at unsignalized and signalized locations, including decorative brick, textured crosswalks or experimental paint colors.

All signalized intersections should be outfitted with countdown pedestrian signals and crosswalks, per NCDOT and MUTCD standards. MUTCD recommends that signals are operated on a 4ft/second pedestrian travel speed. In some cases, the built environment or user context may require audible pedestrian signals or special treatments like a High Intensity Activated Crosswalk (HAWK) Signal. Marked crosswalks (at signalized and unsignalized locations) should not be less than 6 ft in width, with 10 ft or greater for downtown areas and locations of high pedestrian traffic. Advance stop bars should be placed 4 - 10 ft from the pedestrian crosswalk (with 6 - 15 ft recommended in uncontrolled locations or multilane roads). Pedestrian push buttons should accompany pedestrian signals that are not phased into the regular traffic signal cycle; push buttons should be placed in a convenient and wheelchair accessible location. Pedestrian-activated signals should be used for roadways with long traffic signal cycles where pedestrians are to be given preference when present, and/or for signals where the pedestrian cue is not phased into the traffic cycle unless a button is activated. Pedestrian-activated signalization can also be used to provide lead

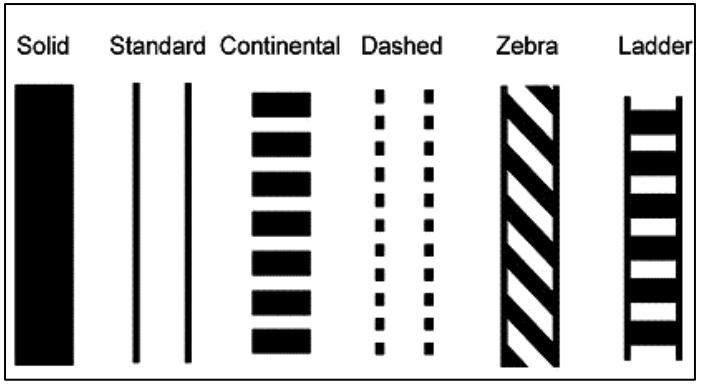


Figure 4-6. Typical styles for marked crosswalks.
Source: Federal Highway Administration.

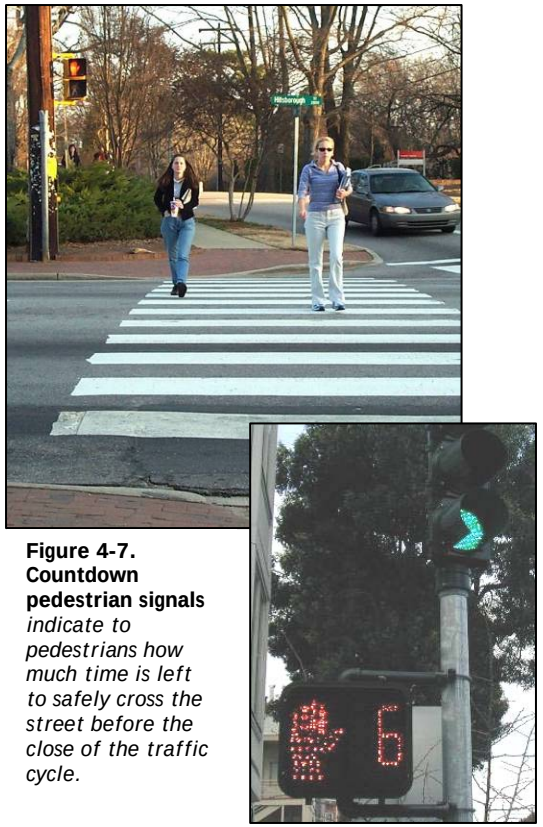
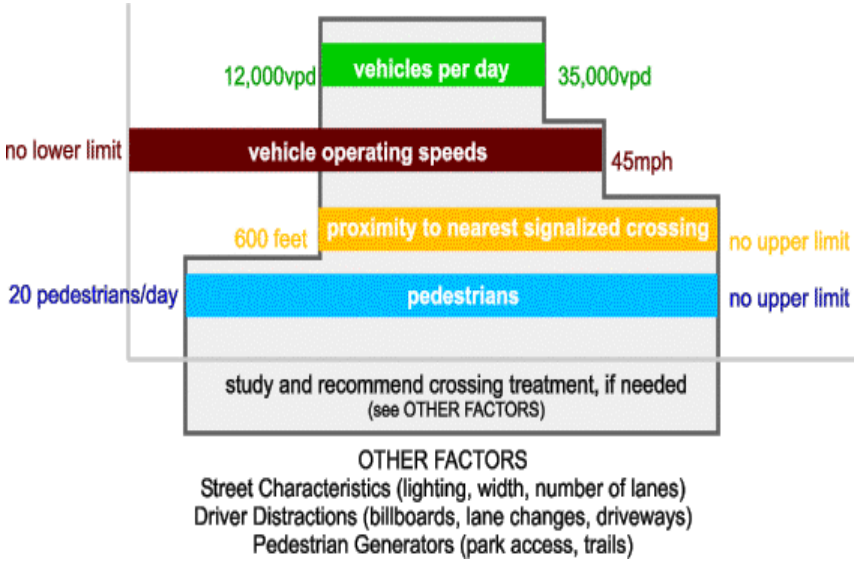


Figure 4-7. Countdown pedestrian signals *indicate to pedestrians how much time is left to safely cross the street before the close of the traffic cycle.*

Figure 4-8. *Textured crosswalk gives sensory and visual cues to motorists in a pedestrian zone.*

pedestrian intervals in high-conflict areas, in order to give pedestrians a few seconds of full use of the intersection or crosswalk prior to allowing right or left turning movements for motorists. These options reinforce pedestrian safety at high-conflict intersection locations with significant crash history.

Mid-block crossings are typically unsignalized crossings, but can also utilize pedestrian-activated signalization. There is still no national consensus for when a crossing should be created mid-block, and when the mid-block crossing should be signalized. The City of Charlotte Department of Transportation has created a set of guidelines for assessing mid-block crossings, based in part on the work of FHWA and Charles Zegeer of the Pedestrian and Bicycle Information Center. In addition to numbers of pedestrians, vehicle speed, and vehicle volume on the roadway, there are a variety of other considerations which must be accounted for when determining whether to construct a mid-block crossing. These considerations include: lighting conditions, sight distance, numbers of lanes, and roadway width. Figure 4-9 shows the "solution space" identified by the City of Charlotte for considering a mid-block crossing. Table 4-2 shows the decision matrix created by the City of Charlotte for determining when to construct a mid-block crossing and identifying appropriate treatments.



Given the sensitive nature of mid-block crossings, every new mid-block crossing treatment will require a specific investigation by the City and NCDOT (on State-maintained streets) prior to initiating design and construction. Nevertheless, mid-block treatments can be useful in improving safety in areas with fairly high pedestrian crossings and low numbers of vehicles and vehicle speeds, if located and designed properly. All mid-block crossings will require advance warning signage and good visibility for both pedestrians and vehicles. On State-maintained roadways, mid-block crossings are not permitted within 300 ft of another signalized crossing point. Though NCDOT does not have established guidelines for the placement of pedestrian signals, they generally use MUTCD and AASHTO warrants for the installation of traffic signals.

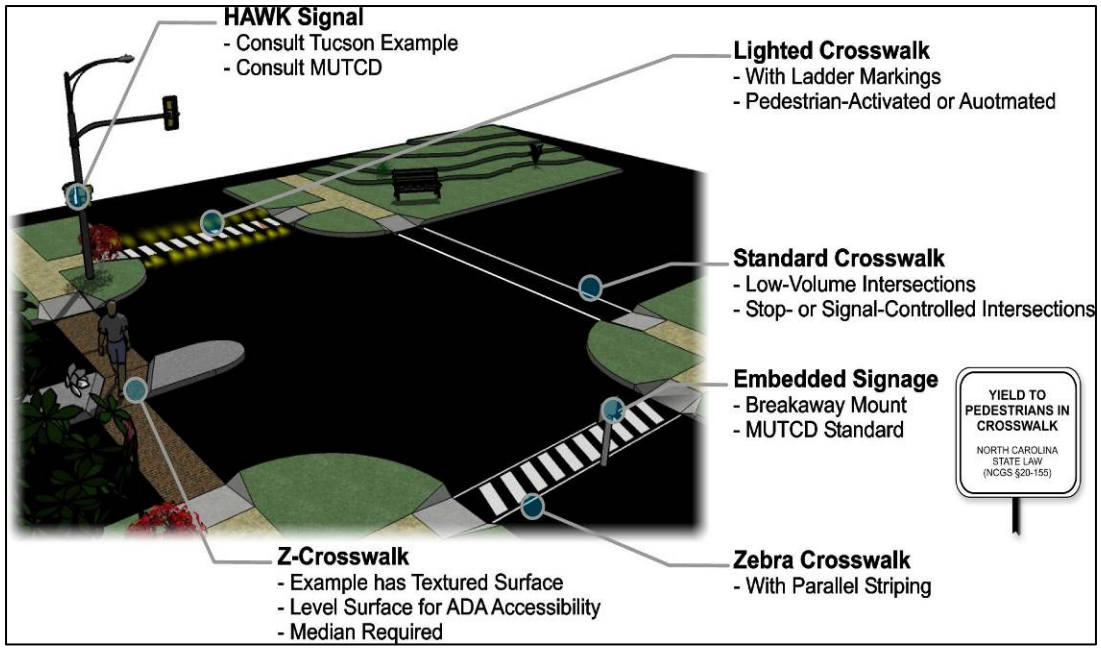
Figure 4-9. *The City of Charlotte's solution space for considering when to apply signalized mid-block pedestrian crossings.*

Table 4-2. Mid-Block Crossing Treatment Design Criteria (Charlotte DOT, 2005).

Pedestrian Mid-block Crossing Treatment	AADT	Operating Speed	Approx. Cost
Signs (including in-street Yield Sign)	5,000 – 35,000	Less than 45 mph	$250 - 350
High-Visibility Markings	5,000 – 12,000	Less than 35 mph	$500 – 1,500
Colored and Textured Markings	5,000 – 12,000	Less than 35 mph	$5,000+
Curb Extensions	5,000 – 12,000	Less than 35 mph	$5,000 – 25,000
Raised Crosswalks* **	5,000 – 15,000	Less than 30 mph	$2,000 – 15,000
Refuge Island	12,000 – 30,000	Less than 40 mph	$10,000 – 40,000
Median	15,000 – 35,000	35 - 45 mph	Varies greatly
In-Pavement Illumination	5,000 – 15,000	Less than 35 mph	$40,000
Pedestrian-Only Signal*	15,000 – 35,000	35 – 45 mph	$40,000 – 75,000
HAWK Signal**	15,000 – 35,000	35 – 45 mph	$35,000 – 60,000

**Note: MUTCD recommends pedestrian volumes of at least 400 for a four-hour period. **A HAWK (High-Intensity Activated Crosswalk) signal is a pedestrian-activated system used for high-volume crossings found to be useful in increasing the rate of driver responses to pedestrian crossings, especially in Tucson, AZ where they have been utilized extensively.[1] ***Raised crosswalks are most applicable on two-lane streets with a speed limit of 35 mph or less.*

Figure 4-10. *A diagram of various crossing treatments Dunn might consider improving pedestrian accessibility and safety crossing the street.*



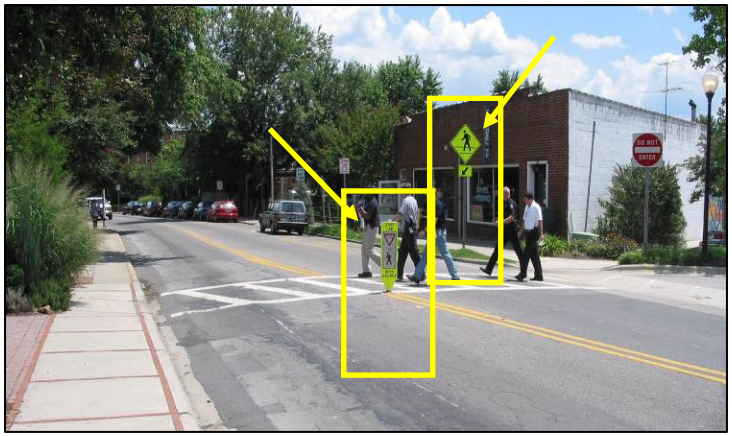


Figure 4-11. *An example of two types of signs used to notify motorists of a pedestrian crossing.*

4.3.3 Signage

In addition to sidewalks and crossings, pedestrian facilities also include signage along major pedestrian routes. Regulatory and warning signs serve primarily to reinforce traffic laws and rules of the road, and notify motorists and others of the presence of pedestrians. Often, the intended effect is to instruct motorists to drive more cautiously and reduce their speeds, thereby improving the safety for pedestrians in the given area.

Regulatory and warning signs can be used in a variety of places, including at crosswalks, at intersections, in-street, and near schools. National standards for sign placement and use can be found in the Manual for Uniform Traffic Control Devices (MUTCD). The MUTCD provides guidance for warning signs which can be used at both crosswalks, or along the roadway:

> "Non-vehicular signs may be used to alert road users in advance of locations where unexpected entries into the roadway or shared use of the roadway by ***pedestrians*****,** animals, and other crossing activities might occur." (Page 2C – 21, 2003 Edition)

The following are some recommended regulatory and warning signs which Dunn should consider installing. For more signs and more detailed guidelines for sign installation and use, Dunn should consult the MUTCD.

Figure 4-12. Example standard pedestrian warning signs. *The first sign (far left) is usually installed within the street to warn motorists to yield to pedestrians in a crosswalk - it does not have to be near a school. The second and third signs are common general pedestrian warning signs, while the fourth and fifth signs notify motorists of specific instances to watch for pedestrians. The fourth sign, "Turning Traffic", is usually placed at intersections to warn motorists that are turning right or left to yield to pedestrians in crosswalks. For the fifth sign, the top sign can either be combined with the smaller "ahead" sign or the arrow symbol to indicate the presence of a crosswalk to motorists in a school zone.*

In addition to regulatory and warning signs, many communities are adding non-traditional wayfinding signage to their public streets as an added amenity to pedestrians, cyclists and motorists. Pedestrian wayfinding signs typically give directional cues to pedestrians navigating a dense central business district or downtown area by foot. These signs include general directional information to major cultural, civic, institutional or historic landmarks, and sometimes include distances to those destinations (by mile or by block). Wayfinding signs can also indicate local "districts" or neighborhoods via specialized color-schemes or other symbolic gateway décor. Pedestrian wayfinding signs can be in the form of gateway banners, kiosks or maps, placed in the "furniture zone" of the walkway, out of the way of pedestrian traffic and at a height of 7ft or more for appropriate clearance but within legible distance of the reader. Associate hardcopy maps are often used to complement these signs. Figure 4-13 is an example of pedestrian wayfinding signage in Charlotte, NC's central business district.

4.3.4 Greenway Trails

Greenway trails, sometimes called multi-use trails or simply "greenways," are one of the most popular pedestrian facilities, especially for recreation. Greenway trails can be paved or unpaved paths, often unassociated with a roadway. They can be used by pedestrians, cyclists, and other non-motorized users. Greenways are typically no less than 10 feet wide with minimum 2 feet wide graded shoulders on each side of the trail. Surface options include paving with standard or permeable asphalt or concrete, or using pea gravel or granite screenings (like the Dunn-Erwin trail). Trail design and maintenance should provide for an 8 ft minimum vertical clearance from obstructions, including tree canopy. Proper pedestrian-scale lighting is essential if the trail will be open to commuters or recreational users in the early morning or late evenings. Bushes, trees and undergrowth should be well-maintained to ensure user safety. Often, additional amenities are added to greenways for user convenience, such as benches, water fountains, interpretative trail signs, map kiosks with distance and landmark information, and even emergency telephones if crime is considered a problem. Additional guidance on greenway design and standards can be found at: www.ncdot.org/transit/bicycle/projects/project_types/Multi_Use_Pathways2.pdf.

An example greenway cross-section is provided in Figures 4-14 and 4-15.

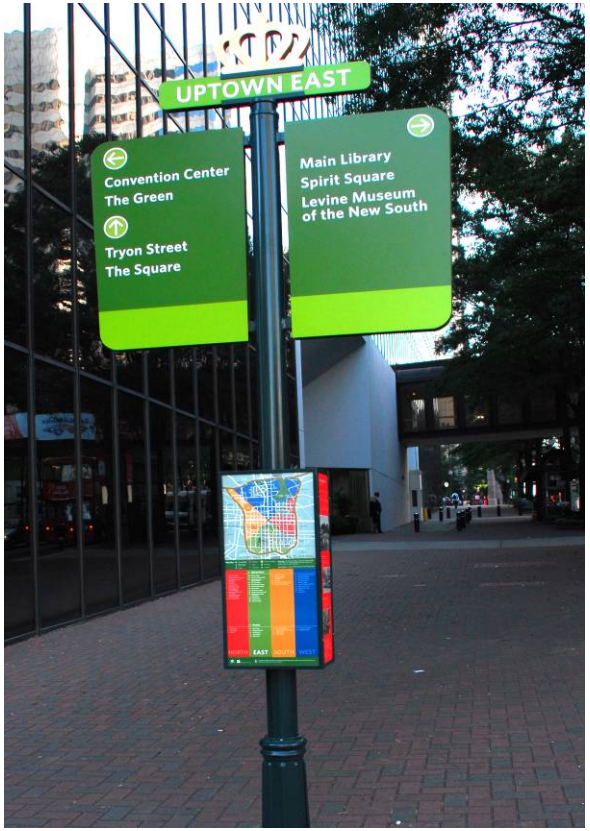


Figure 4-13. *Example of a wayfinding sign in Charlotte, North Carolina's central business district. This sign provides directional information to local landmarks, a transit map and gateway logo to indicate to the reader which district he/she is travelling in.*

Figure 4-14. *Example cross-section for a typical greenway.*

Figure 4-15. Typical greenway cross-section with bollard treatments at roadway crossing.
Source: www.pedbikeimages.com

Trail crossings should be carefully designed for pedestrian, bicycle and motorist safety. All trail crossings of roadways should be highlighted with a marked crosswalk and advanced warning signs for motorists, stop or yield signs for trail users, and overhead flashing beacons to alert motorists of the trail crossing where poor site distance warrants added safety measures. At signalized crossings, trail users should be provided with a pedestrian-activated signal so that the green light or "walk" signal is given to the trail only when in use. Other important considerations for placement and design of trail crossings include the following:

- Crossings should be a safe distance from neighboring intersections so to not interfere with or be negatively impacted by traffic flow.
- Roadway crossing placement should consider topography and roadway alignment for optimal motorist visibility of the path crossing.
- Motorists and trail users should be warned, such as with signage (including trail stop signs), changes in pavement texture, flashing beacons, raised crossings, striping and other treatments.
- A refuge is needed where crossing distance is excessive and in conditions exhibiting high volumes/speeds or where the primary user group crossing the roadway requires additional time, such as school children and the elderly.
- The crossing should occur as close to perpendicular (90 degrees) to the roadway as possible.
- If possible, it may be desirable to bring the path crossing up to a nearby signalized crossing in situations with high speeds/ADT and design and/or physical constraints.
- Signalized crossings may be necessary on trails with significant usage when intersecting with high-traffic roadways; MUTCD warrants must be met for the installation of a signalized crossing.

4.3.5 Pedestrian Underpasses

It is often desirable to provide a grade-separated crossing of a major street or freeway (such as I-95) with an existing or planned greenway or other walkway. In many cases, such pedestrian access can be provided in conjunction with a stream crossing at the same location. Pedestrians are sensitive to uninviting interiors of such crossings, and will not use them if they perceive them to be threatening due to especially long traverses in poorly lit conditions. If the roadway is not elevated, then the openings of the underpass should be flared out to provide clear lines of sight. Minimum widths are 10'-14' for traverses less than 60' in length. Wider widths are suggested for urban areas or longer traverses. Vertical clearances should be a minimum of 8', but 10' is more desirable, particularly if the trail permits equestrian use.

AASHTO provides guidance for lighting in underpasses in their *Roadway Lighting Design Guide*[iii]. Providing below-grade crossings must also be dependent on the proximity to floodways: pedestrians should not be put into a situation where they are at risk from rapidly rising flood waters.

Figure 4-16. *Pedestrian tunnels can be used to provide pedestrian connections under major roadways, active rail beds or other barriers. Effective lighting and visibility are essential to comfortable use by pedestrians and cyclists.*

Photos courtesy of Steven Neuschafer, City of Dunn.

4.4 Downtown Area Standards

Many municipalities consider the Downtown their starting point and standard for creating a pedestrian-friendly City. Downtowns were typically constructed, as is the case with Dunn, in a time period where walking was a much more functional mode of transportation, not an amenity or form of optional exercise. In order to maintain its pedestrian-oriented nature, and also to enhance the area's attractiveness and visual appeal, the Downtown area should have certain standards which may or may not be required beyond the downtown area. Some of these recommendations are as follows:

- **Build on the Downtown.** Already, the Downtown Area has good height-to-width (of street) ratios, architectural detailing, and wide sidewalks that are the foundation of a good walking environment. Figure 4-17 illustrates these features and describes how both expensive and more costly treatments could improve the streetscape.
- **Provide wide sidewalk.** Currently, the sidewalk in the Downtown area is approximately 8 to 10 feet wide. New or reconstructed sidewalk should be kept at a minimum of 10 feet, if not wider, in the Downtown. Pedestrians need space to window shop, stroll, walk side-by-side with their families,

Figure 4-17. *Wide sidewalk in downtown Dunn. More street-level windows, burying overhead utilities, and adding textured pavements could add aesthetic value for pedestrians in the CBD. Lower cost treatments like street planters, repainting/restriping markings, and street furniture could act as initial supplements to the larger cost streetscaping items. Many of the latter items could be sponsored in part by downtown merchants.*

and even stop for a rest in the sidewalk space. The City should also consider accommodating restaurants or cafes interested in creating outdoor, on-street seating, which is often a major booster to making a street look more popular and pedestrian-friendly. It also attracts even more visitors and potential shoppers and diners.

- **Provide many pedestrian amenities.** In addition to sidewalk width, the City should also provide pedestrian amenities such as benches, trash cans, and water fountains to make walking in downtown more comfortable for the visitors that come to the Downtown. The City should consider adding street trees and allowing a few street vendors (through a permitting process) to add life to the street. The more pedestrian amenities available in a particular area, the more inviting the area for pedestrians and visitors.
- **Provide frequent pedestrian crossings.** The Downtown area also already has many crosswalks and pedestrian crossings. In order to maintain the accessibility of the downtown area, crosswalks should be required at various intervals along major streets that are uninterrupted by intersections.
- **Require countdown pedestrian signals with audible cues at all intersections.** Countdown pedestrian signals should be required at all intersections in the Downtown area, and automatically cycle through the signal phases without pedestrian activation. In order to automatic visual cues, the City may wish to consider use of audible pedestrian cues as needed for visually-impaired residents.

4.5 Schools

In addition to Downtown, another area in Dunn that merits special treatment is the area around schools. Schools require special treatment because of the presence of both children and very high levels of traffic during drop-off and pick-up. Especially during drop-off and pick-up, traffic near schools can be incredible varied - consisting of small and large personal vehicles, school and other activity buses, pedestrians, and cyclists. Specific design features should be required around schools to improve safety within a ½-mile radius of the school, emphasizing higher-density residential areas first. Some of these design features include:

- Providing “school zone” pavement markings and reduced speed limit signs to delineate this zone;
- Requiring sidewalks on both sides of the street;

- Placing crosswalks and pedestrian signals at all intersections near the school;
- Installing school crossing signs at intersections to warn drivers of the school's presence and the potential for children in the street; and
- Reducing speed limits along adjacent streets.

4.6 Construction Zones

It is important that during construction of any kind, convenient and safe pedestrian access to destinations remain open and accessible. During the construction or expansion of private development, roadways or utilities, the entity responsible for the construction is also responsible for providing adequate pedestrian access through or around the site as well as signage that provides advance warning to pedestrians and motorists of the closure. Both the MUTCD (Manual on Uniform Traffic Control Devices)[iv], NCDOT's Planning and Designing Local Pedestrian Facilities[v], and the ADA (Americans with Disabilities Act)[vi] stipulate that safe passage should be maintained throughout a temporary closure unless it occurs during an extreme situation such as a natural or man-made emergency. During private construction within City limits, it is the responsibility of the City of Dunn to ensure compliance with these rules by regular monitoring.

The following should be considered whenever a sidewalk or trail will be closed temporarily:

- *Accessibility for Mobility Impaired Citizens.* At least one accessible route should be provided to transportation or transit facilities; accessible parking areas/spaces; public streets/sidewalks; and public parking areas to an accessible entrance of the building. This route(s) will comply with all other accessibility provisions contained in the ADA regardless of whether they are temporary or permanent. A barrier shall be placed across the full width of the sidewalk or trail to be detectable by a visually impaired person using a cane. An audible information device may be needed in cases where there are especially high traffic volumes challenging a visually impaired person making a street crossing.
- *Temporary Obstructions.* Parked construction equipment, erosion control fencing, storage of materials/construction debris, and other potential

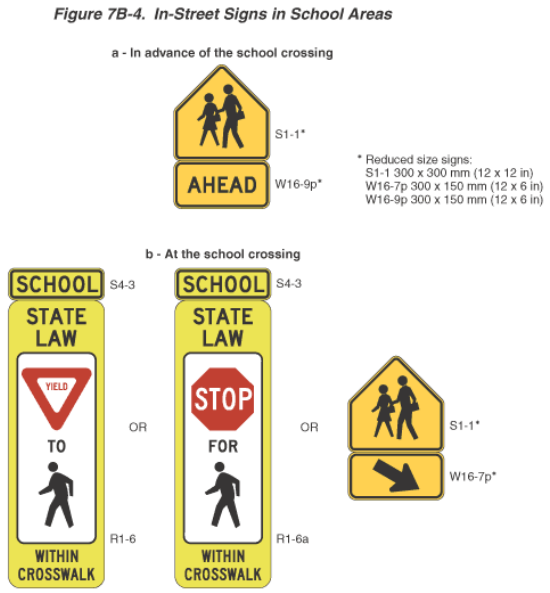


Figure 4-18. Sample School Area Signage.

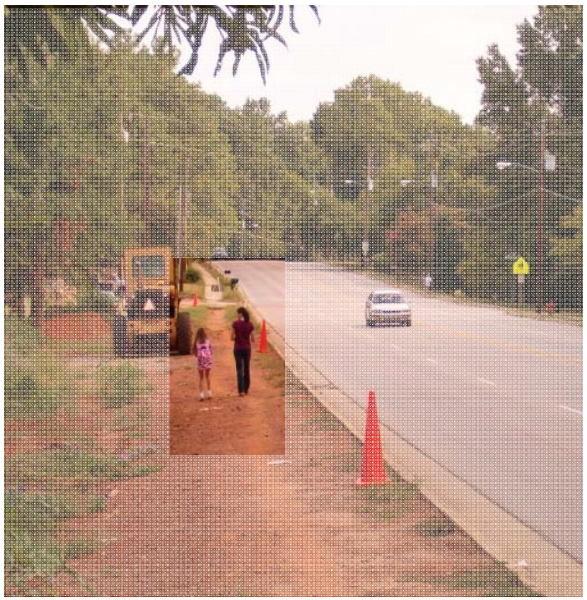
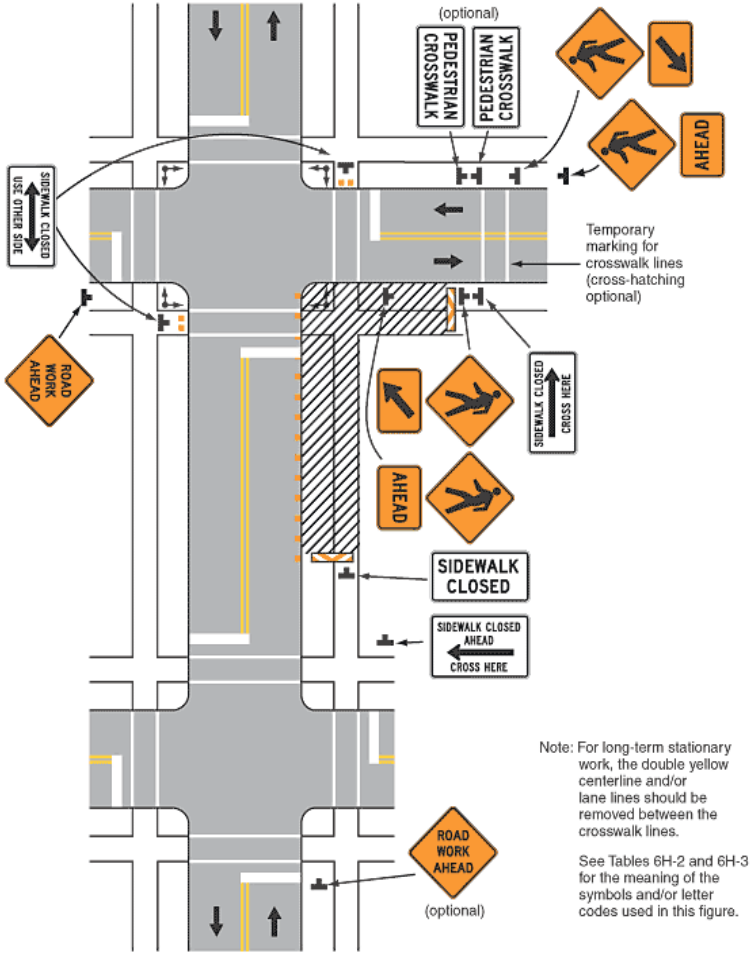


Figure 4-19. *Poor pedestrian access at a construction site in Cary, NC.*

Figure 4-20. Sample Signage Plan for Temporary Sidewalk Closure and Re-routed Pedestrian Crossing.
Source: MUTCD, Figure 6H-29.



Typical Application 29

obstructions should be kept away from roadside pedestrian access and pedestrian or multi-use trails so as to keep a permanent passageway open for pedestrians crossing the site. Signs and other devices should not protrude more than 4" into the pedestrian passageway and 7' or less above a sidewalk (8' min. preferred).

- *Advance Warning and Signage.* Advance warning may consist of a single sign to a flashing strobe, depending on the nature of the construction or context (such as vehicular volumes) of the work area. Advance signage should be placed so that pedestrians have an opportunity to read the sign and make a safe crossing at a street intersection to the opposite side of the roadway. Smaller, mid-block closures will require fewer treatments, but will still retain the "Sidewalk Closed Ahead Cross Street" advance warning at an appropriate and safe crossing point in advance of the closure, at a minimum.
- *Route Design.* Temporary traffic barriers like jersey barriers (although not intermittent short sections of jersey barriers) and breakaway bollards should be considered as tools to help delineate a buffer from moving vehicles in areas with high pedestrian traffic volumes and/or to help ensure worker safety.

4.7 Parking Lot Design

Everyone becomes a pedestrian once they park their car, but there are many examples of poor parking lot design. Poor parking lot design at the least will deter customers that may be walking or riding transit to a store, and at the most can create a dangerous safety hazard by increasing pedestrian-vehicle interaction. The most common design issue is that the primary carriageway for vehicles in the parking lot happens to coincide with where the greatest number of pedestrians cross: directly in front of the main entrance. Other issues include poor sight lines to spot pedestrians; bad transition areas from the public domain (e.g., streets) to the private parking area; and inconvenient pedestrian access between parking areas, shops, and adjacent communities. Figure 4-21 indicates a preferred set of suggestions to overcome these common problems. The larger the parking lot, the more vehicles and pedestrians, therefore the more important it is to carefully design treatments to minimize vehicle-pedestrian interaction. Some suggested treatments:

1. **Parking in the rear and sides.** One way to attract pedestrians to a store and to reduce pedestrian-vehicle interaction is to minimize the amount of parking lot that a pedestrian must walk through to get to the store entrance. This can be done by placing parking in the rear or sideyards of a building, which will reduce travel time for pedestrians approaching the store from the street-front and sidewalk. It will also minimize pedestrian-vehicle interaction by keeping pedestrian customers separate from vehicles by allowing the pedestrian customers to access the store directly from the sidewalk rather than through a parking lot. Parking lots in the rear also create a more attractive streetscape – something that encourages pedestrian use.
2. **Create safe "landing areas".** Provide continuous transitions from the street into a safe "landing" area in the parking lot; don't just "dump" pedestrians into the throat of a driveway.
3. **Maintain good sight lines** at major turning points inside the parking area.
4. **Provide well-marked pedestrian access perpendicular to store fronts.** Whenever possible, provide perpendicular pedestrian access into the front of a high volume land use such as major retail uses. The final crossing to the store entrance(s) should be well-marked, preferably with a raised crosswalk and/or colored demarcations to provide good visual cues to the driver. Moving the main parking aisle away from the principal entrance is another option.
5. **Supply adequate, pedestrian-scale lighting.** Adequate lighting is often perceived as a personal security issue in many large parking areas, and should be provided while avoiding disabling glare (looking into a direct light source and being partially blinded) or causing light pollution to adjoining properties. In order to make customers and pedestrians feel more comfortable, lighting should also be provided at a pedestrian scale. This means lowering the height of some light poles and providing lighting at key locations, such as the entrances and exits to stores, and not just in the parking lots.
6. **Provide awnings.** Especially for some "big box" stores, it is important that the transition for customers from inside the store to the outside be gradual and protected as much as possible from conflicts with vehicles. By providing awnings, a store protects its customers from the rain while allowing for a more comfortable pedestrian environment for customers to window shop and wait for rides or a bus to arrive. This can make a store seem much more comfortable while encouraging customers to remain within the protected awning area and out of conflict with vehicles in the travelway.

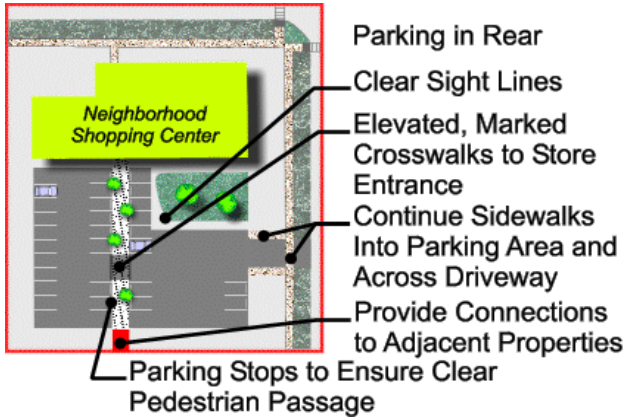


Figure 4-21. *An example of pedestrian-friendly parking lot design*

Figure 4-22. *Pedestrian access was successfully incorporated into the parking lot design of this downtown lot in New Bern, NC.*

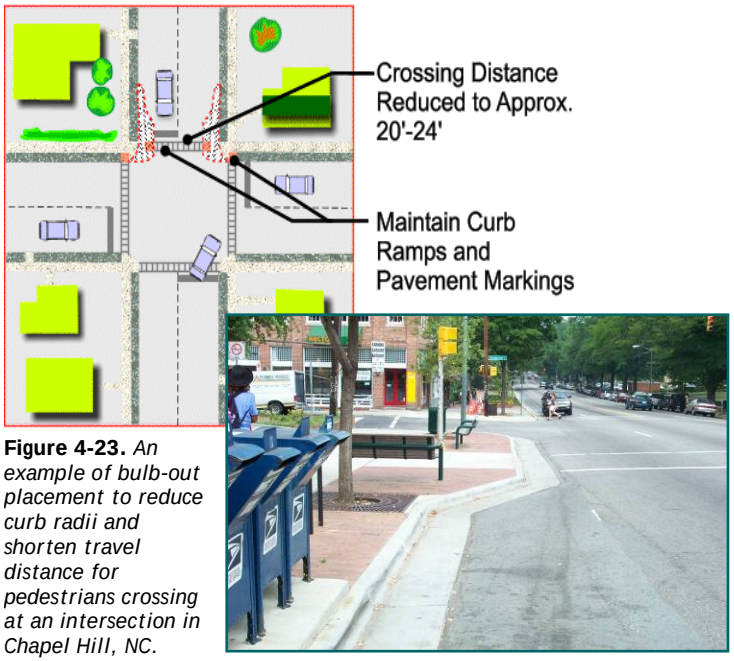


Figure 4-23. *An example of bulb-out placement to reduce curb radii and shorten travel distance for pedestrians crossing at an intersection in Chapel Hill, NC.*

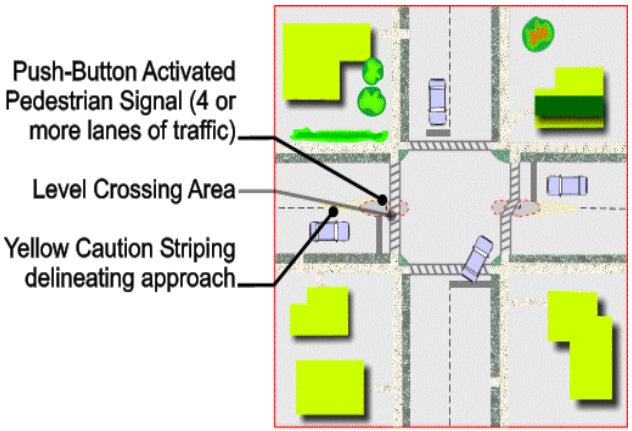


Figure 4-24. *An example of well-designed median and refuge islands*

Dunn has several shopping centers and areas with large parking lots, and others may be on the way. It is important that the City keep the pedestrian's access and safety in mind when reviewing development proposals. Through better design and better design review, the City will be able to create parking lots that are both convenient for a car and comfortable for a pedestrian.

4.8 Traffic Calming Considerations

Traffic calming is the term used to describe a toolbox of improvements that can be used to "calm," or slow, traffic along a street, usually in a neighborhood or similar area with low signed traffic speeds and relatively lower traffic volumes. Although not directly pedestrian-related, traffic calming efforts can help to create a safer, more comfortable pedestrian environment by reducing vehicle speeding. Traffic calming comes in a variety of forms. Some of the most common techniques are described in the paragraphs below.

4.8.1 Curb Extensions (Bulb-Outs) and Curb Radii

The primary purpose of bulb-outs is to shorten the distance that pedestrians must travel to cross a street at an intersection or mid-block crossing. In addition, they may encourage motorists to drive slower by narrowing the travel lane and reducing vehicular speeds during turning movements at intersections. Motorists will travel more slowly around corners with smaller curb radii even without the use of curb extensions. Landscaping and other aesthetic treatments such as special paving textures should be carefully designed to avoid hazards to drivers and visually-impaired citizens while minimizing maintenance costs. Figure 4-23 shows an example of a bulb-out placement to reduce curb radii and make an intersection more pedestrian-friendly.

Table 4-3. Maximum Desired Speed and Curb Radii.

Desired Max. Speed (mph)	Maximum Curve Radius*
15	43
20	88
25	167
30	273

** Maximum Curve Radius refers to the angle of each corner at an intersection.*

4.8.2 Medians and Refuge Islands

Figure 4-24 and 4-25 illustrate the design and markings associated with median refuge islands. Note that pavement markings delineate the approach to the islands; that the islands are "split" to allow for a level platform for wheelchair use; and that in cases where there are wide roads and high traffic volumes, a push-button pedestrian signal may be mounted in the refuge area to allow a pedestrian to split their trip into two halves as they cross the street. Note that the crosswalk on the right side of the diagram is configured at a skewed angle as it crosses the median. This allows pedestrians to have a better angle of sight as they approach and cross each side of the street. In all cases, a minimum 10-foot travel lane is maintained. Sensitivity to large vehicles (buses, trucks and fire equipment) dictates some elements of the median design, curb style, and placement. Median crossings should be at least 6 ft wide with 8 ft recommended in locations of high usage by pedestrians and bicyclists. Median-controlled roadways reduce the number of turning conflicts and are generally preferred for both pedestrians and cyclists over a two-way, left-turn lane (TWLTL) roadway.

Figure 4-25. Example of a median refuge island in use.
Source: www.pedbikeimages.com

4.8.3 Roundabouts

Traffic circles and roundabouts are also an increasingly popular traffic calming technique, used instead of a stop control or traffic signal installation at an intersection. No roundabout is expressly recommended in the Pedestrian Plan, but may be considered for future intersection designs in Dunn. Federal design guidance for roundabouts is available at http://www.tfhrc.gov/safety/00068.htm and should be consulted when necessary to ensure compliance with the Americans with Disabilities Act (ADA).

4.9 Road Diets

Many roadways across the United States have been built over the years with future [car] traffic capacity in mind to the detriment of other roadway users. This has led to a number of unnecessarily wide roadways that encourage speeding and create unsafe circumstances for pedestrians. As more and more people are turning to bicycles, transit and walking for increasing cost-effective and healthy travel modes, many cities are re-thinking the old paradigm and looking for new opportunities to add bicycle lanes, sidewalks, traffic calming treatments and transit access. A growing trend nationwide is to shrink travel lane or effective street widths through "road diets." Road diets trim down unnecessary width of existing roadways to create safer, more multi-modal access along those streets.

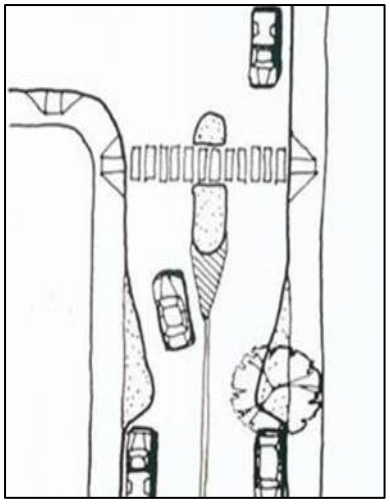


Figure 4-26. Example of a travel lane diet for the retrofit installation of a pedestrian refuge island and neckdowns.
Source: www.pedbikeimages.com

Figure 4-27. Existing Railroad Crossing Example in downtown Dunn. *Poor pavement condition (top) and poor design complicate crossings here. Design issues include placing the gate in front of (instead of behind) the sidewalk, constructing the ADA ramp, and extending the concrete pads across the sidewalk path would have been low-cost and a better long-term maintenance solution.*

Often, road diets are used on four and five-lane roads with a traffic capacity that could be served more safely and effectively with fewer lanes. By taking a four-lane roadway to a three-lane facility, there is an "extra" 10-12 feet of space in which to fit sidewalks, bike lanes or other multi-modal accommodations. Similarly, a four-lane roadway with 12ft travel lanes may be dieted and remain a four-lane roadway but with 10ft travel lanes; the additional 4ft in each direction could then be used for bicycle or pedestrian facilities. Finally, some road diets are more appropriately termed travel "lane diets" because they essentially shrink wide travel lanes in order to install traffic calming and other pedestrian facilities.

In Dunn, there are a number of arterial and non-arterial roadways that are particularly wide and may be eligible for road diets to help reduce speeding and intersection conflicts, as well as provide sidewalks. Many of these streets have curb and gutter that was installed without sidewalks and without leaving sufficient space for future sidewalks. Such roadways include Cumberland Avenue, Friendly Road, Erwin Road and Granville Street. In the case of these and other streets in Dunn, right-of-way constraints make sidewalk retrofits quite expensive. However, if road diets are possible, existing road right-of-way could be converted to sidewalk facilities and/or other pedestrian-friendly features, such as planting strips or stormwater treatment swales. In the case of Granville Street, for instance, it may be possible to shrink existing travel lanes to 10 or 11 feet and utilize the extra width to add sidewalks, which are built as extensions of the current curb line onto the existing asphalt travel lane. This would eliminate the need to acquire expensive right-of-way, while still providing a much-needed pedestrian facility. In this and all cases, further study will be required on a case-by-case basis to evaluate a range of complex issues including cost, pedestrian facility type, right-of-way, stormwater management, etc.

4.10 Railroad Crossing Treatments

The City of Dunn has a special interest ensuring that pedestrian crossings of railroads is handled safely, since the CSX railroad bisects the City and separates potential origins and destinations. Perception of the barrier effect is even stronger on the part of long-time residents, furthering the need to provide connectivity to both sides of the tracks. Working with railroad companies, which typically have ownership of their rights-of-way in fee simple arrangements and closely guard the frequency and width of crossings of any sort ("encroachments"), has proved to be time consuming in many cases. However, ideas that improve safety, stem from

published FRA (Federal Railroad Administration) sources, and can reduce liability are more likely to receive a favorable reception from the railroad. Treatments can be thought of in three broad categories:

- Crossings adjacent to an existing or planned roadway;
- Crossings independent of an existing or planned roadway (e.g., greenways); and
- Education and Enforcement techniques (discussed in Section 6).

Additionally, railroad crossing safety devices can be thought of as either active and change their appearance and/or position in the event of an oncoming train (e.g. gates and flashing signals), or passive, such as the familiar "crossbuck" sign.

It is interesting to note that the Federal Railroad Administration, a normally conservative agency, in recent guidance has stated that "a guiding principle in the design and development of pedestrian crossing facilities should be to cause as little deviation as is practical from a direct pathway."[vii] It is also important to note that several of these devices or treatments are not in widespread use at this time, and are not incorporated into the Manual on Uniform Traffic Control Devices (MUTCD) at this point in time. Hence, the application of any such device cannot be required, and would need to be coordinated with appropriate state and federal transportation agencies.

Innovation is warranted in preventing train-pedestrian collisions, however, since the potential for serious injuries in any collision with a moving train is very high. The amount of dynamic energy that even a slow-moving train possesses is enormous, with the result that collisions are frequently fatal. Additionally, the CSX Railroad line in Dunn is quite active, seeing around 40 trains per day, which includes several Amtrak passenger trains. It is worth noting that suicides are often the cause behind many fatalities involving trains, and that these attempts are obviously impervious to warning devices.

The standard crossbuck warning sign (passive) is illustrated in Figure 4-28). The "Look" sign can be used below the crossbuck sign to reinforce this message to the eye-height of most pedestrians. The Number of Tracks signage (MUTCD R15-2) supplements the crossbuck when there is more than one set of tracks to cross.

There has also been a recommendation by FHWA to allow the standard crossbuck sign to be supplemented with a Yield or Stop sign for motorists

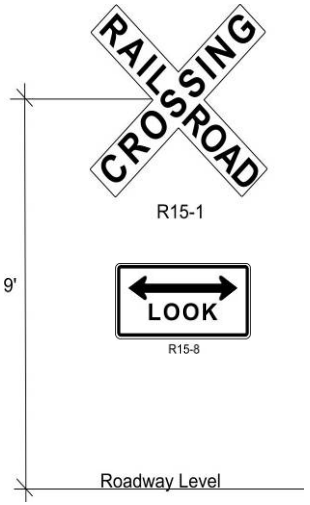


Figure 4-28.Crossbuck and "Look" Signs
Source: MUTCD

Figure 4-29. "Low-Rise" Pedestrian signal in use in Portland, Oregon.
Source: FRA Compilation of Pedestrian Safety Devices in Use at Grade Crossings.

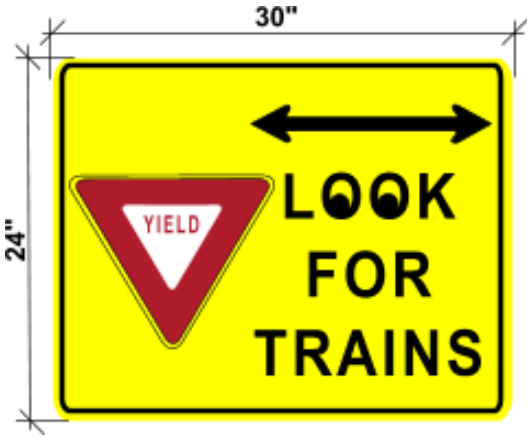


Figure 4-30. "Look for Trains" Warning Sign
Source: FRA Compilation of Pedestrian Safety Devices in Use at Grade Crossings.

Figure 4-31. Pavement Marking and Counterweight-Mounted Warning Sign
Source: FRA Compilation of Pedestrian Safety Devices in Use at Grade Crossings.

immediately below the crossbuck on the same post[viii]. However, this has not yet been adopted in the MUTCD. Further, the Yield option may send an inaccurate message to the driver, who is used to different operating characteristics associated with cars at a Yield control on cross-streets, and is therefore not recommended here.[ix]

An active, low-rise pedestrian signal design has been put into place in Portland, Oregon (Figure 4-29). The flashing signal is accompanied by a warning sign cautioning pedestrians to look in both directions. Again, this device is not mentioned in the MUTCD, and would need special attention in terms of its design, placement, and allowance at any location.

A second active signalization type (not shown) for combination roadway – pedestrian crossings is when the crossing gate arm is mounted behind the sidewalk, so that when horizontal the arm crosses both the sidewalk (and, potentially, the bike lane, if present) and the roadway. A more eye-catching – although non-regulatory – sign is shown in Figure 4-30.

A combination of passive (pavement markings) and active (sign mounted to counterweight of crossing arm) is shown in Figure 4-31. This installation is near the light rail line in Salt Lake City, Utah.

It is worthwhile to note here that the American Railroad Engineering and Maintenance-of-Way Association (AREMA) is considering crossing treatments for pedestrian and cycling paths (e.g., greenways) that are not adjacent to a roadway. At the time of this writing, new standards or design recommendations have not been promulgated. Another useful reference is (www.fhwa.dot.gov/environment/sidewalk2), especially Chapter 8.11 on railroad-pedestrian crossings. Figure 4-32 illustrates an important safety consideration for both cyclists and wheelchair or cane users: the flangeway filler to close the gaps that often exist in older crossings between the rail and adjacent asphalt or concrete surfaces.[x] Such a filler, sometimes using wood in older rail corridors which deteriorates fairly quickly (see photograph at right), helps to create a smoother ride for wheelchair users particularly, although there are similar benefits for road bikes (skinny tires) as well.

Figure 4-33 shows an amalgam of typical railroad crossing treatments. Minimum standards, such as the 18' minimum distance between railroad centerline and gate crossing or the 38' maximum gate length, will also influence the placement of warning devices. Note how landscaping allows for current and future sight distances to the warning devices; the fencing style ensures adequate sight through it; and painted stop bars and advance warning signals in addition to stop controls (not shown) reinforce safe stopping distances. The standard crossbuck sign/flasher/audible warning (with or without gate) may also be supplemented with a YIELD or STOP control; however, NCDOT is reviewing the appropriate design situations where these controls may be used, based in part on a 2006 Federal Highway Administration (FHWA) memorandum describing their usage.[xi]

The audible signal on these devices ties to the signalization of the train, and is typically a minimum of 85 decibels. Continuous bell warnings are warranted in select cases, but the level of noise intrusion, especially in sensitive areas such as churches, cemeteries, schools, health facilities, and residential areas often produce conflicts with audible warning devices.

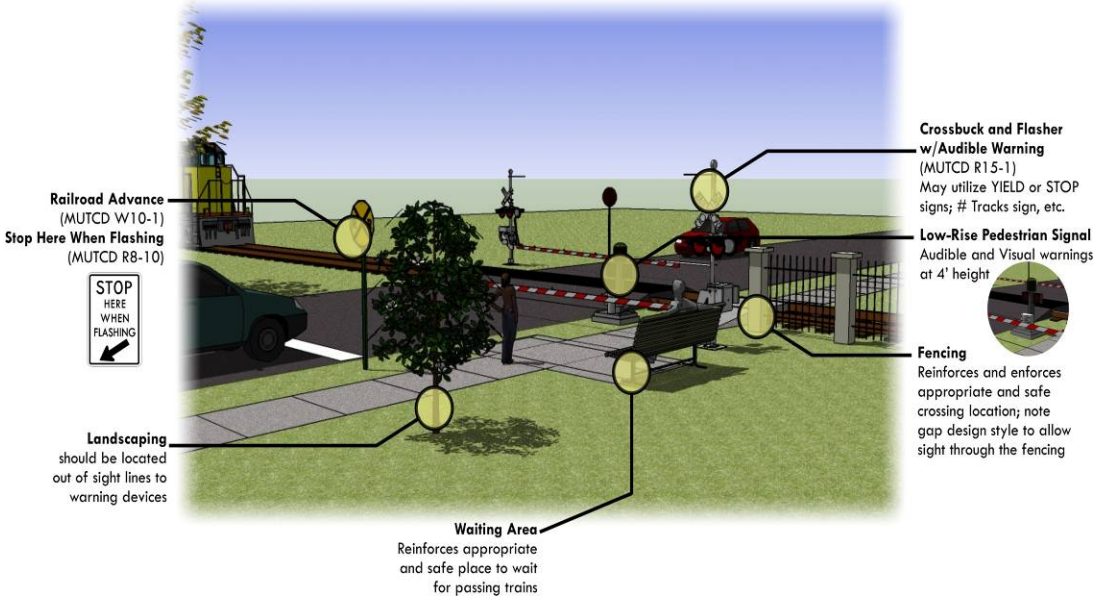


Figure 4-33. Typical Railroad Crossing Treatments
Source: FRA Compilation of Pedestrian Safety Devices in Use at Grade Crossings; Manual on Uniform Traffic Control Devices; The Louis Berger Group, Inc.

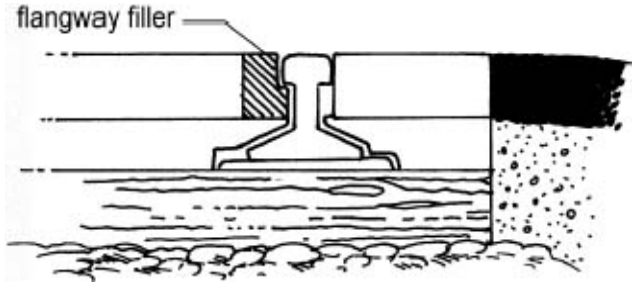


Figure 4-32. Diagram of Flangeway Filler
Source: Designing Sidewalks and Trails for Access Part II of II: Best Practices Design Guide, Chapter 8.11.

I.I. = [(PF)*(ADT)*(TV)*(TSF)*(TF)]/160 + (70*A/Y)² + SDF

Where: **PF** = **P**rotection **F**actor

No Warning Devices =1.0
Crossbuck Signs = 1.0
Traffic Signal Preemption Only = 0.5
Flashing Light Signals = 0.2
Flashing Light Signals with Gates = 0.1

ADT = **A**verage **D**aily **T**raffic

When school buses use crossing:
Add (No. of School Bus Passengers/1.2) to ADT
*When passenger trains use crossing: Multiply ADT*1.2*

TV = **T**rain **V**olume

TSF = **T**rain **S**peed **F**actor (Max. Allowable Train Speed, MPH)/50+0.8)

TF = **T**rack **F**actor

No. of Tracks	• No. of Through Tracks				
	0	1	2	3	4
1	1.00	1.00	--	--	--
2	1.50	1.75	2.00	--	--
3	1.60	1.85	2.25	2.50	--
4	1.75	2.00	2.50	2.75	3.00

A/Y = Train-Vehicle **A**ccidents per **Y**ear

Note: Model uses a 10-year history of crashes; therefore, input is normally in tenths. This input can calculate a value for any given number of crashes within a given period of time in years.

SDF = **S**ight **D**istance **F**actor

*SDF = [sum(SDF_n)/4]*16*
Where SDF_n = Sight Distance Factor for Quadrant n
SDF = 0 when Sight Distance is Open/Clear

Figure 4-34. NCDOT Investigative Index (I.I.) Formula
The NCDOT I.I. uses train frequencies and speeds, as well as sight distance, existing crossing treatments and accident histories, to determine an objective measure of the hazard potential for every rail – roadway crossing in North Carolina.

More expensive devices, such as fencing, waiting areas, and low-rise pedestrian signals, would be used only in situations where there is a high exposure of trains and pedestrians (for example, at rail stations, event areas, and so forth). The choice of each device is dependent on the number of pedestrians, speed/frequency of trains, sight distances, and so forth. Generally, the following questions should be considered when considering the type, design, and placement of devices.

- What is the accident history involving pedestrians?
- What is the sight distance and crossing distance for pedestrians? Are the pedestrians crossing at a "skewed" angle?
- How many pedestrians are crossing the tracks?
- What are the numbers of trains and speeds at a crossing?

The last two bullets (number of pedestrians and number of trains crossing in a day), when combined, can produce an exposure index that indicates a relative prioritization method for pedestrian crossings. Even when exact pedestrian counts are not available, a Likert-scale rating system can be employed to produce priority locations for improvements. The second bullet impacts the design and treatment placing characteristics. Putting these factors together results in a typical priority index that is easily represented by the formula:

Px = Tx * Px
Where:
Px = Priority of Crossing X
Tx = Number of Trains / Day at Crossing X
Px = Number of Pedestrians / Day at Crossing X

NCDOT uses a similar index, the Investigative Index (I.I.), to prioritize every rail crossing in the State. As funds have become available, safety improvements are installed. Figure 4-34 indicates how this index is calculated.[xii] Even if a particular crossing ranks highly on the index, availability of funds and the costs associated with modifying the safety treatments at a particular location will influence how quickly these improvements can be implemented. The use of this index is primarily oriented towards vehicular crossing traffic.

In terms of policy, the Nevada DOT has adopted the following policies for pedestrian crossings at railroad tracks, which is worthy of reprinting here nearly verbatim.[xiii]

- Grade crossing design features follow all national standards including the FHWA *Designing Sidewalks and Trails for Access Part II*.
- All signals are to be set behind the sidewalk, to provide the same level of warning for pedestrians as motor vehicles. If this cannot be done, add pedestrian gates. With signals set in back of the sidewalks, Nevada has found that they do not run into conflicts with the ADA prohibition of protrusions over the walkway.
- Crossing surface panels must be at least one foot wider than the sidewalk or edge or roadway, if there is no sidewalk.
- There must be a level turn-around area (for wheelchair users) next to the rail that is five feet by five feet wide, on both sides of the track. The sidewalk slope can not increase more than 1 in 12 after that.
- The walkways can be no less than 36" wide but Nevada encourages the use of walkways that are six feet wide.
- "RxR" pavement markings are applied in bicycle lanes and W10-1 Advance Warning signs are placed next to the pavement markings. This is in addition to the W10-1 signs placed further back for motorists.

The diagnostic tool that Nevada DOT uses is also useful for considering alternative treatments for cyclists, pedestrians, and persons falling under the Americans with Disabilities Act (ADA). The full spreadsheet used by NVDOT is included as Appendix E of the Plan. A portion of the diagnostic in Figure 4-35 deals with pedestrian/cyclist and mobility impaired crossing considerations. In contrast to the NCDOT Investigative Index, the Nevada diagnostic relates to pedestrians, cyclists, and ADA public segments more directly.

4.10 Pedestrian-Friendly Street Design

In addition to all the treatments noted above, it is often important to consider pedestrians as part of the built environment from roadway design to architectural standards. Including pedestrian-friendly elements throughout a roadway or development project - from the creation of conceptual alternatives to construction and maintenance phases – can greatly impact the long-term walkability of an area. In recognition of this fact, NCDOT has developed a set of Traditional Neighborhood Development Street Design Guidelines (http://www.ncdot.org/doh/preconstruct/altern/value/manuals/tnd.pdf). These guidelines are available for proposed TND developments and permit localities and developers to design certain roadways according to TND guidelines rather

ADA

Are there curb cuts at nearby intersections and a clear path present to curb cuts at nearby intersections?	☐ Yes	☐ No
Are detectable warnings advised?	☐ Yes	☐ No
Is the path width adequate (36" is minimum)?	☐ Yes	☐ No
Are there vertical obstructions (standard: none between 27" to 80" above ground or within path)?	☐ Yes	☐ No
Slope of path transition (standard is 12:1 or less).	☐ Yes	☐ No
Landing platform (standard is level and 5' x 5' or more).	☐ Yes	☐ No
Is surface smooth (standard: passable by a wheelchair, no broken or buckled asphalt, edges < ½")?	☐ Yes	☐ No
Panel length (crossing surface panel needs to extend 1' behind back of path to be standard).	☐ Yes	☐ No
Are there flange gaps 2½", or less, or flange fillers?	☐ Yes	☐ No
Can full flange fillers be used in low speed applications?	☐ Yes	☐ No
Is grade 5% or less? If grade is over 5%, how long is grade? '	☐ Yes	☐ No
If grade is 8% and 200', 10% and 30' or 12.5% and 10', are there rest areas?	☐ Yes	☐ No
Are there 43" handrails for grades over 5%?	☐ Yes	☐ No
Is widening proposed? How wide? '. When? Consider in project?	☐ Yes	☐ No
Mitigation:		

AWARENESS OF XING

Overall awareness of railroad crossing, including visibility and effectiveness of possible signs, signals and markings.	☐ Acceptable	
Horizontal and vertical alignment considerations.	☐ Acceptable	
Pedestrian Sight Distance: Clearing sight distance of _____ ' from 17' from rail needed. North/East Side of Xing _____ ' South/West Side of Xing _____ '	☐ Acceptable	
Bicycle Sight Distance 1: *Distance where crossing can be identified.* North/East Side of Xing _____ feet South/West Side of Xing _____ feet	☐ Acceptable	
Bicycle Sight Distance 2: *Need _____ ' down tracks from _____ ' down path.* North/East Side Looking East/North _____ ' West/South _____ ' South/West Side Looking East/North _____ ' West/South _____ '	☐ Acceptable ☐ Recommend Improvement	
Bicycle Sight Distance 3: *Distance down path to see _____ ' down tracks if #2 not acceptable.* North/East Side Looking East/North _____ ' West/South _____ ' South/West Side Looking East/North _____ ' West/South _____ '	☐ Acceptable ☐ Recommend Improvement	
Bicycle Sight Distance 4: Stopped 17' *from rail, need _____ ' down tracks.* North/East Side Looking East/North _____ ' West/South _____ ' South/West Side Looking East/North _____ ' West/South _____ '	☐ Acceptable ☐ Recommend Improvement	
Nighttime visibility, including ambient lighting.	☐ Acceptable	
Skew of Xing: ____ ° Does skew limit perception?	☐ Yes	☐ No
Are there simultaneous train movements on multiple tracks? Can standing boxcars block the view?	☐ Yes	☐ No ☐
Do Pedestrians and bicycles violate warning devices?	☐ Yes	☐ No
Mitigation of inadequate perception: ☐ Additional Signage ☐ Luminaires & Where ☐ Multiple Track Removal		

Figure 4-35. ADA Evaluation (bottom) and Pedestrian/Cyclist Evaluation (top)
Source: Nevada DOT Railroad Safety Diagnostic Review Form

than the conventional subdivision street standards. The guidelines recognize that in TND developments, mixed uses are encouraged and pedestrians and bicyclists are accommodated on multi-mode/shared streets.

4.11 Summary

Pedestrian facility use is a function of a variety of factors, including the connectivity of the facilities, their safety, their convenience, and their comfort. For this reason, pedestrian facility design should be thoughtful and sensitive to the needs of its users. By following the guidelines provided in this section for sidewalk, crossing, and trail design, as well as other items associated with pedestrian facilities, Dunn should be able to create a built environment that will promote walking and increase the number of pedestrians in the City.

Resources and Citations

[i] Vanguard Company, accessed November, 2005 (http://www.vanguardonline.com/downloads.asp)

[ii] United States Access Board, ADA Accessibility Guidelines Homepage, accessed November, 2005. (http://www.access-board.gov/adaag/html/adaag.htm#A4.29.2)

[iii] AASHTO, "Roadway Lighting Design Guide." American Association of State Highway Officials, 2005.

[iv] *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2003 Edition. Federal Highway Administration, 2003. Especially Sections 6B-1, 6D, 7, and Figures 6H-28, 6H-29, 7A-1, and 7B-4.

[v] *Planning and Designing Local Pedestrian Facilities*, North Carolina Department of Transportation Office of Bicycle and Pedestrian Transportation. February, 1997, Chapter 10.

[vi] Americans with Disabilities Act, US Code 28 CFR Part 36: ADA Standards for Accessible Design. Page 496 (www.usdoj.gov/crt/ada/adastd94.pdf).

[vii] Office of Safety, Federal Railroad Administration, "A Compilation of Pedestrian Safety Devices in Use at Grade Crossings." January, 2008.

[viii] Jeffrey Pamatti, "MUTCD - Guidance for Use of YIELD or STOP Signs with the Crossbuck Sign at Passive Highway-Rail Grade Crossings." Federal Highway Administration Memorandum dated March 17, 2006.

[ix] Saylor, Scott M., President, North Carolina Railroad Company, discussion on rail crossing treatments, April 25, 2008.

[x] Federal Highway Administration. "Designing Sidewalks and Trails for Access Part II of II: Best Practices Design Guide." Barbara McMillan, Program Manager. Chapter 8.11. 2001. (www.fhwa.dot.gov/environment/sidewalk2/ accessed on 4.11.2008).

[xi] Thomas, Drew, PE. NCDOT Rail Division Engineering and Safety Branch, Crossing Safety Engineering Manager, discussion on rail crossing treatments, April 1, 2008.

[xii] Thomas, Drew, PE. NCDOT Rail Division Engineering and Safety Branch, Crossing Safety Engineering Manager. "Draft Railroad Crossing Guidance." E-mail to Scott Lane. April 8, 2008.

[xiii] Office of Safety, Federal Railroad Administration, "A Compilation of Pedestrian Safety Devices in Use at Grade Crossings." Appendix A. January, 2008.

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Section 5. Project Recommendations

This section provides a set of project recommendations to improve pedestrian conditions in Dunn, as well as suggestions for phased implementation of the Plan.

5.1 Introduction

This section identifies potential future projects that will improve pedestrian conditions in Dunn, and outlines a prioritization methodology for these projects. The projects in this section were developed based upon input from City staff, the Steering Committee, and public input through surveys, a project hotline and the April 29, 2008 Open House.

5.2 Project Recommendations

Pedestrian facilities can include sidewalks, greenways, and intersection improvements, as well as streetscaping projects and traffic calming efforts. Such facilities can be built "incidentally" as part of a roadway construction project, or independently. The Dunn Comprehensive Pedestrian Plan identifies a number of proposed pedestrian facilities that can help make Dunn a more walkable community. Project recommendations for the Pedestrian Plan are broken out into three distinct categories: Sidewalks, Greenway Connections and Crossing Improvements. These projects were identified through the public involvement process, survey results, discussions with staff and Steering Committee members, as well as field and data reviews by the consultants.

Recommended locations and treatments for each project type are summarized, respectively, in Sections 5.2.1 (sidewalks), 5.2.2 (greenways) and 5.2.3 (crossing improvements). Tables in each section show the project and proposed action. The sidewalk projects recommended in Table 5-1 include a number of short segments that will only need "spot improvements" to create continuous sidewalk connections to nearby pedestrian destinations. These projects should be considered "short-term" recommendations and constructed as opportunities arise and/or through new construction programs like the sidewalk petition process or payment in-lieu funding recommended in Section 6. Table 5-2 includes more significant "corridor" projects that may be longer, more costly and/or more difficult to construct. Projects in Table 5-2 were prioritized based on criteria set by the Steering Committee at their March 27, 2008 meeting, which included proximity to local schools, parks, shopping venues and the Dunn-Erwin trail, as well as factors such as average daily traffic (ADT) on adjacent streets and the presence of existence sidewalk connections. Sidewalk project prioritization and

phasing recommendations are discussed in Section 5.3 and summarized in Tables 5-5 and 5-6.

In addition to sidewalk recommendations, the proposed greenway trails in Table 5-3 are intended to offer safe, scenic connections between key pedestrian destinations, such as schools and parks, as well as create tourism and economic development opportunities for Dunn. Finally, the crossing improvements recommended in Table 5-3 recognize the need for important safety improvements at key intersections and crossings, including the installation of crosswalks, signage, and/or pedestrian signals.

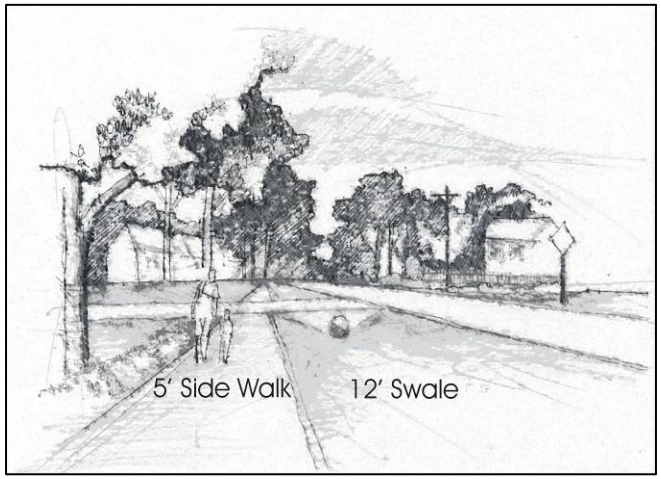


Figure 5-1. *Hand-drawn sketch of proposed future sidewalk facility for Meadowlark Road or other roadways with similar cross-section. This type of sidewalk installation fills the pedestrian needs of the area, while respecting the rural character of the roadway and preserving the existing drainage infrastructure. Though right-of-way costs may be high, depending on the location, this design would eliminate the need to install expensive curb and gutter treatments and related drainage systems.*

5.2.1 Sidewalk Recommendations

At the time of the Pedestrian Plan effort, there are approximately 14 miles of sidewalk in Dunn. The bulk of these existing sidewalks lie along the older downtown streets, while newer developments in the outskirts of the urban core have been constructed in the post 1950's era when automobiles became the primary mode of transportation for most people and the pedestrian was forgotten. Now that environmental, economic and health concerns have highlighted the many benefits of walking for transportation and recreation, many cities and towns across the state are looking at sidewalk retrofits to help complete the gaps in their existing sidewalk network.

Many of the proposed sidewalks for Dunn follow fairly major thoroughfares and help connect existing sidewalks, in addition to providing links between significant pedestrian destinations such as schools, shopping centers, parks and the downtown area. Many of the routes currently see a high rate of pedestrian use, but do not provide a safe pedestrian environment due to the lack of sidewalks, heavy traffic and/or high travel speeds, such as along Cumberland Street. These roads were chosen because of these factors, and because they ultimately will serve the most number of Dunn residents by connecting residential areas with major pedestrian generators.

Tables 5-1 and 5-2 below highlight sidewalk projects identified through field analysis and public feedback throughout the planning process. The "spot improvement" projects listed in Table 5-1 are short sidewalk segments that will fill gaps in the existing sidewalk network and create continuous pedestrian facilities to nearby destinations. These projects should all be considered short-term priorities and constructed as opportunity presents, such as during roadway

projects, new development or with new sidewalk program funds that become available. It should be noted that the cost estimates are for sidewalk installation on one side of the road only. Cost assumptions for these calculations are explained in Section 5.3.1.

Proposed Spot Improvement	From	To	Proposed Action	Length (Feet)	Estimated Cost
Carr	Clinton	Washington	2-block sidewalk gap project	789	$ 59,211
Cumberland	Washington	Wilmington	1-block sidewalk gap project	450	$ 22,500
General Lee	Pearsall	Broad	3-block sidewalk gap project	1118	$ 55,900
Guy*	Granville	Friendly	3-block sidewalk gap project	1160	$ 87,000
Johnson	Burke	Granville	1-block sidewalk gap project	305	$ 22,872
Orange	Surles	Barrington	2.5-block sidewalk gap project	1064	$ 53,183
Pope	Fayetteville	Clinton	3-block sidewalk gap project	1175	$ 58,727
Powell*	Ashe	Friendly	2-block sidewalk gap project	1607	$ 120,525
Vance	Washington	Codrington Park	2-block sidewalk gap project	1337	$100,240
TOTAL				**9005**	**$580,158**

Table 5-1. Proposed Spot Improvements in Alphabetical Order

** Indicates added cost for curb & gutter ($25/LF for C&G plus $50/LF for sidewalk)*

The more significant sidewalk projects identified through the public process are listed in Table 5-2 (below) and are further ranked into project "priorities" and a phased implementation schedule in Section 5.3. These projects represent longer sidewalk projects or "corridor" projects that create access to major local destinations. Prior to implementation, some of these sidewalks may require further study to address right-of-way constraints, drainage and grating issues, or other engineering concerns. Constructability will be impacted greatly by such constraints, so all innovative options should be considered including road diets instead of right-of-way purchase or the use of vegetated swales instead of curb-and-gutter.

Priority Rating	Proposed Sidewalk Location	From	To	Proposed Action
4	**Broad**	General Lee	Cumberland	Spot improvements and new sidewalk, near downtown.
5	**Clinton (US301)**	Cleveland	Granville	Sidewalk connection from downtown to major shopping.
2	**Cumberland 1 (US421)**	General Lee	Broad	New sidewalk, connecting downtown to Cumberland Square
16	**Cumberland 2 (US421)**	Broad	Powell	New sidewalk, connecting major shopping areas along US421.
28	**Cumberland 3 (US421)**	Powell	ETJ (Black River)	New sidewalk, connecting major shopping areas along US42.
24	**Cumberland 4 (US421)**	Sampson	Winterlochen	New sidewalk connecting over I-95 to new SE developments.
13	**Divine**	Canterbury	General Lee	Sidewalk connection in residential area near primary schools.
27	**Duke**	McKay	Hodges	New sidewalk, connects residents with Tart Park and Cemetery.
10	**Edgerton 1**	Fayetteville	Wilmington	Sidewalk connection from downtown/residential to shopping.
22	**Edgerton 2**	Wilmington	Holland	New sidewalk, near Codrington Park, shopping.
26	**Elm**	Duke	Jackson	New sidewalk, connect residential area with Tart Park.
15	**Erwin**	Tilghman	Cumberland	New sidewalk, connects Hospital area with commercial and residential.
25	**Fairground**	US301	Beale	New sidewalk, near Dunn Middle School.
17	**Friendly**	Powell	Fairground	New sidewalk, connects residential with Meadowlark and future trail.
21	**Granville 1 (US301)**	King	Johnson	New sidewalk connecting downtown/residential with park.
9	**Granville 2 (US301)**	Morris	King	New sidewalk connecting to downtown and shopping on US301.
30	**Jackson**	Hodges	Spring Branch	New sidewalk connecting to Tart Park.
6	**Johnson**	Railroad	Magnolia	Short 3-block sidewalk to connect downtown/residential area with park.
3	**Magnolia**	Edgerton	Johnson	New sidewalk; possible alternative for downtown trail.
7	**McKay 1**	Broad	Granville	New sidewalk connecting downtown/residential with Hospital area.
20	**McKay 2**	Susan Tart	Broad	New sidewalk in downtown/residential area.
*1**	**Meadowlark**	Fairground	Chelsea	New sidewalk connecting residential area with Dunn Middle School.
14	**Pearsall 1**	Watauga	Railroad	New sidewalk, near shopping area on US421.
18	**Pearsall 2**	Elm	Sampson	Spot improvement; creates continuous access in downtown residential
19	**Sampson**	Pearsall	Codrington Park	New sidewalk; future connection b/w residential area and Codrington
12	**Spring Branch**	Pope	Jackson	New sidewalk; connects near downtown residential to Tart Park.
23	**Susan Tart**	Tilghman	McKay	New sidewalk; connects to Hospital area.
29	**Tilghman**	Susan Tart	Erwin	New sidewalk; connects to Hospital area.
11	**Washington**	Hodges	Cleveland	New sidewalk; critical N-S link between residential and
8	**Wilson**	Edgerton	Granville	New sidewalk along 5 blocks to connect Granville area with downtown.

Table 5-2. Proposed sidewalk corridor projects in alphabetical order.

** NOTE: Meadowlark Road was moved up in priority by the Steering Committee to address student access to Dunn Middle School.*

Figure 5-2. Map of Existing Sidewalks and Final Sidewalk Recommendations

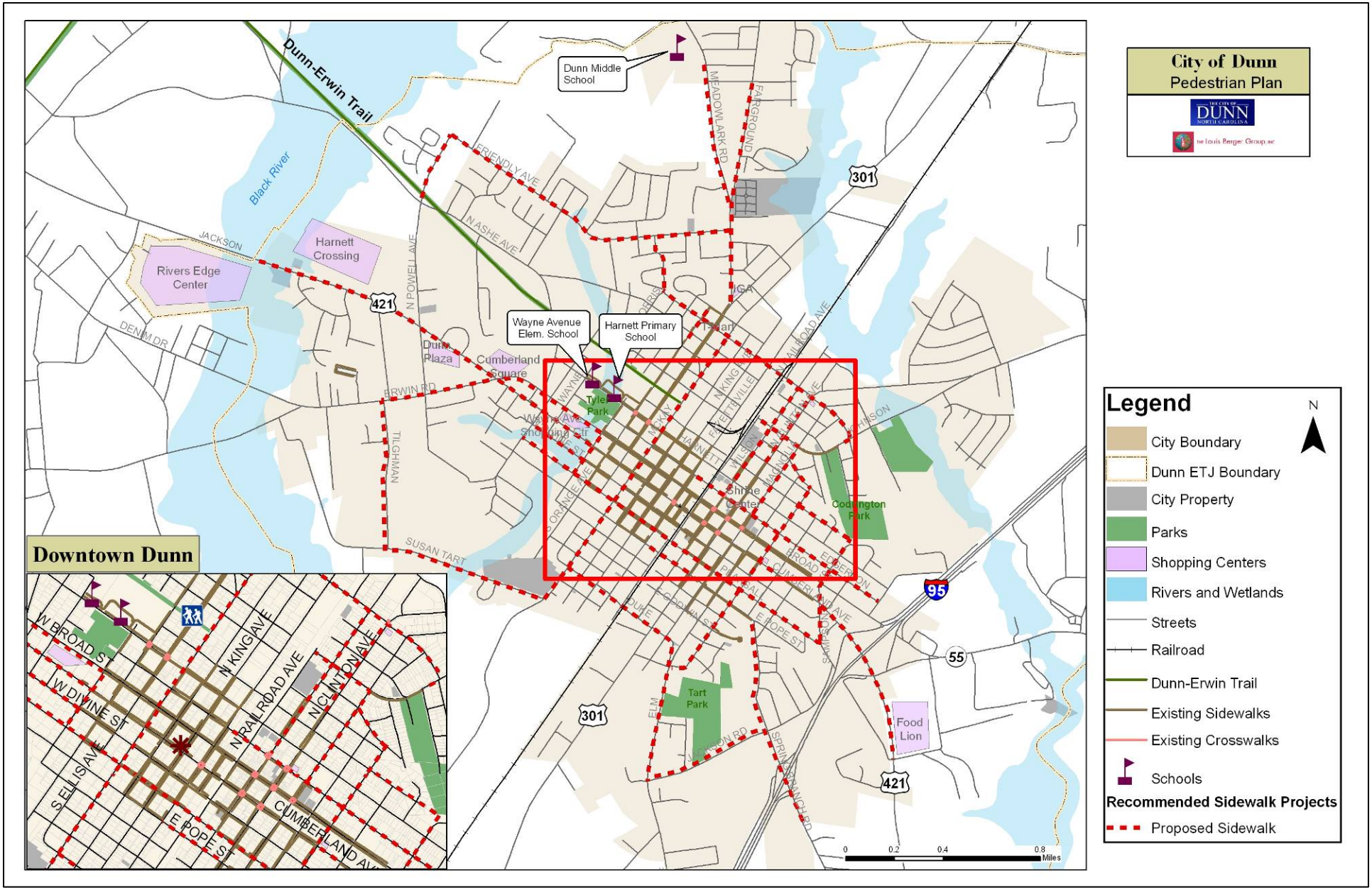


Figure 5-3. Greenway trail.
Source: www.pedbikeimages.org

The greenway cross-section provides two-way bicycle and pedestrian traffic. Bollards and markings (below) help ensure that only pedestrians and cyclists use the trail; the bollards can be of the lock-down variety to help emergency vehicles to gain access to the trail.

5.2.2 Greenway Recommendations

Shared-use paths, greenways and trails are among the terms used to describe off-road facilities for pedestrians, bicyclists, skaters and other non-motorized users. Such facilities are often along linear parks, stream buffers or green space corridors, and are favored by recreational and beginner cyclists for their scenic qualities. Dunn's seven mile rail-trail, the Dunn-Erwin trail, is widely favored and used by residents and visitors alike. The trail provides a popular connector between downtown Dunn and the neighboring town of Erwin, but also offers residents a transportation route to/from local neighborhoods and major local destinations such as Tyler Park, Harnett Primary School and Wayne Avenue Elementary School. The City has a wonderful opportunity to create additional greenways throughout the community to connect to the existing Dunn-Erwin trail, highlight local natural resources such as the Black River, and provide a convenient and accessible alternative for child and senior pedestrians.

Several trails are recommended in the Dunn Pedestrian Plan, including a "downtown trail" extension of the Dunn-Erwin rail-trail into historic downtown Dunn. Following existing sidewalks in the Central Business District, the downtown trail can be easily accomplished through the installation of signage and creation of a trail map. For other proposed trails, it may take years for the City to acquire contiguous easements through future development and right-of-way purchase for trail construction, but with the proper ordinances and policies in place, the City of Dunn is in a unique position to achieve a beautiful trail network through future development. These facilities can be a worthwhile investment and valuable asset for any community; in addition to providing transportation and recreational options for residents, greenway trails can be an economic development tool to attract tourists and newcomers, and have also been known to raise property values for adjacent landowners. The City of Dunn should consider policy changes and new ordinance language that requires dedication of trail easements for future construction and/or construction of connector trails to proposed and existing greenways during all new development.

Minimum easements for a greenway trail include width for a 10-14 foot trail surface, in addition to a minimum 4 foot buffer (2 foot on each side) with a recommended 10-20 foot buffer, depending on the nature of the corridor. Typically, a wider buffer provides a more scenic greenway. The City should consider inclusion of the recommended greenway trails into any future Open Space and Trails or Parks and Recreation Plans, and may also consider educating

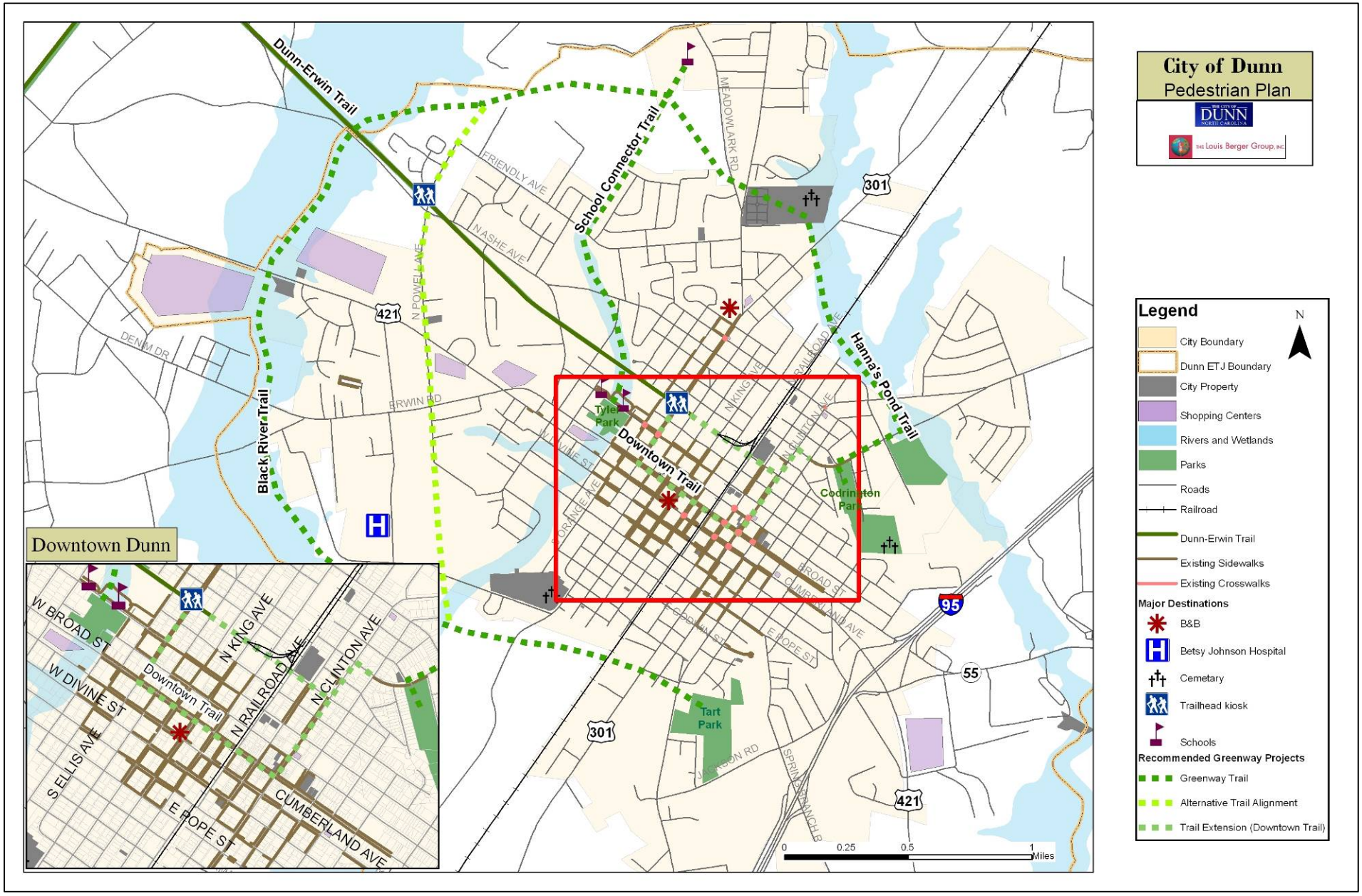
development review staff and developers on any new requirements for trail easements to ensure appropriate right-of-way dedication. Additionally, the City might work with the proposed Bicycle and Pedestrian Advisory Committee on concept development for the proposed greenway trails and related amenities.

Table 5-3 and Figure 5-4 describe proposed greenway locations.

Proposed Greenway Trail	From	To	Details	Alignment Details
Downtown Trail	Ellis Ave (Dunn-Erwin Trail)	Johnson Rd (Codrington Park)	The Downtown Trail will create an attractive walking route from the Dunn-Erwin trail through downtown Dunn, highlighting history, local shops and restaurants, as well as City landmarks. Total length = 9191ft (2,591ft new; 6,600ft existing sidewalk).	Suggested alignment is along sidewalk connections from Dunn-Erwin trailhead on Ellis Ave, along Broad St, up Clinton Ave, then over on Johnson Rd to Codrington Park.
School Connector Trail	Tyler Park	Dunn Middle School	The School Connector Trail provides safe off-road access between Dunn's two primary schools and the Middle School, as well as a recreational walking route from the northern part of the City to downtown and Tyler Park. Total length = 8,010 ft.	The suggested alignment is along a creek/wetland; alternative alignment part of the way is to construct a shared-use trail along Watauga Ave (between creek and roadway) from the school property, then connect to creek alignment up to Middle School.
Hanna's Pond Trail	Codrington Park	Dunn Middle School	Hanna's Pond Trail provides a scenic multi-use path along a wooded wetland area and provides an off-road walking route from Codrington Park to the middle school. Total length = 11,150 ft.	This trail creates an eastern portion of a loop trail for Dunn; this segment would connect to the "Black River Trail" below, creating a complete loop.
Black River Trail	Dunn Middle School	Tart Park	The Black River Trail offers a scenic recreational route for joggers, walkers and bicyclists to enjoy Dunn's riverfront, and also provides access to/from various destinations such as the middle school, Dunn-Erwin trail, Cumberland Avenue shopping centers, the Hospital and Tart Park. Total length = 26,000 ft.	This trail creates the western portion of a loop trail for Dunn and would connect to the "Swamp Trail" above. The proposed alignment is along the river's edge; an alternative is to use a multi-use trail connection along Powell St to create the north-south connection, bringing the loop closer to town but away from river.

Table 5-3. Proposed Multi-use Greenway Trails

Figure 5-4. Map of final greenway project recommendations



5.2.3 Recommended Crossing Improvements

Throughout the planning process, many of Dunn's intersections have been continuously highlighted by stakeholders as major barriers to pedestrian travel. Dunn has two United States highways that bisect the town (US 301 and US 421), each creating wide crossing distances for pedestrians attempting to access adjacent land uses, especially commercial centers that include grocery stores, convenient stores, pharmacies and restaurants. Additionally, the downtown area is bisected by active Norfolk-Southern railroad tracks and receives as many as 40 trains per day. This creates a major barrier for Dunn's walkable downtown, especially for physically-disabled pedestrians who will have difficulties crossing the tracks due to poor pavement condition, unsmooth surfaces and other unsafe conditions such as a lack of detectable warning strips (for the blind). Finally, the presence of I-95 in the eastern section of the City creates a barrier by preventing east-west pedestrian movement throughout the corridor, as well as by increasing traffic flow and speeds near the four interstate exits in the City.

Many intersections in Dunn can be greatly improved by adding crosswalks and, in the case of signalized intersections, countdown pedestrian signals (or "walk signals"). Other intersections may require crosswalks and pedestrian signals, as well as additional safety features such as pedestrian refuge islands or curb extensions. These additional treatments are often referred to as "traffic calming tools," and can be more expensive than paint of signals, but will greatly improve a wide intersection that creates an unsafe crossing situation for pedestrians. Pedestrian refuge islands are essentially medians wide enough to accommodate pedestrians who need a half-way point when crossing an intersection; medians allow a refuge where pedestrians can wait for traffic to slow or stop before attempting to cross. Curb extensions are used to tighten curb radii at intersections and make the intersection approaches closer to 90 degrees, so as to prevent fast-moving cars from treating wide turn angles as "slip lanes," which can be dangerous for pedestrians. Still other intersections may call for features such as special signage or innovative rail crossing treatments. These and other proposed treatment types are described in *Section 4: Design Guidelines* of the Plan.

Table 5-4 and Figure 5-7 describe proposed crossing treatments for Dunn. These crossing treatments were ranked based on input of the Steering Committee and stakeholders through various public meetings and involvement efforts, such as the pedestrian survey. Prioritization of crossings also took into account pedestrian

Figure 5-5 (above) Intersection of Commerce Drive and Cumberland Street. *The use of common intersection treatments such as crosswalks and pedestrian signals at signalized intersections, could greatly improve pedestrian safety at major intersections in Dunn.*

Figure 5-6 (below) Intersection of Erwin Road and Tilghman Road. *Wide corners or "curb radii" at intersections can encourage high-speed right-turning movements and create wider crossing distances for pedestrians at intersections. Intersection treatments called "curb extensions" can help create a safer environment for pedestrians in these instances.*

crash rates and severity, empirical safety concerns noted during various field visits by the consultant, and proximity of the crossing to schools, parks, shopping centers and other major attractors. The intersections of Cumberland Avenue with Wilmington Street and Washington Road, for instance, ranked as priorities number one and two, respectively. Pedestrians at these intersections were observed darting between traffic to cross the 5-lane section of Cumberland between a lower-income residential area and major commercial shopping district. These intersections should be evaluated for traffic light warrants (at one of the two cross streets) and/or pedestrian-activated countdown signals for safe pedestrian crossings. Other key intersections requiring safety improvements include busy railroad crossings, especially in the Central Business District. Intersections providing key connections to local schools are also ranked high, such as that of Ellis Avenue and Broad Street, which provides access between a sizeable neighborhood and Dunn's two elementary schools, or Meadowlark Road and Chelsea Street in front on Dunn Middle School.

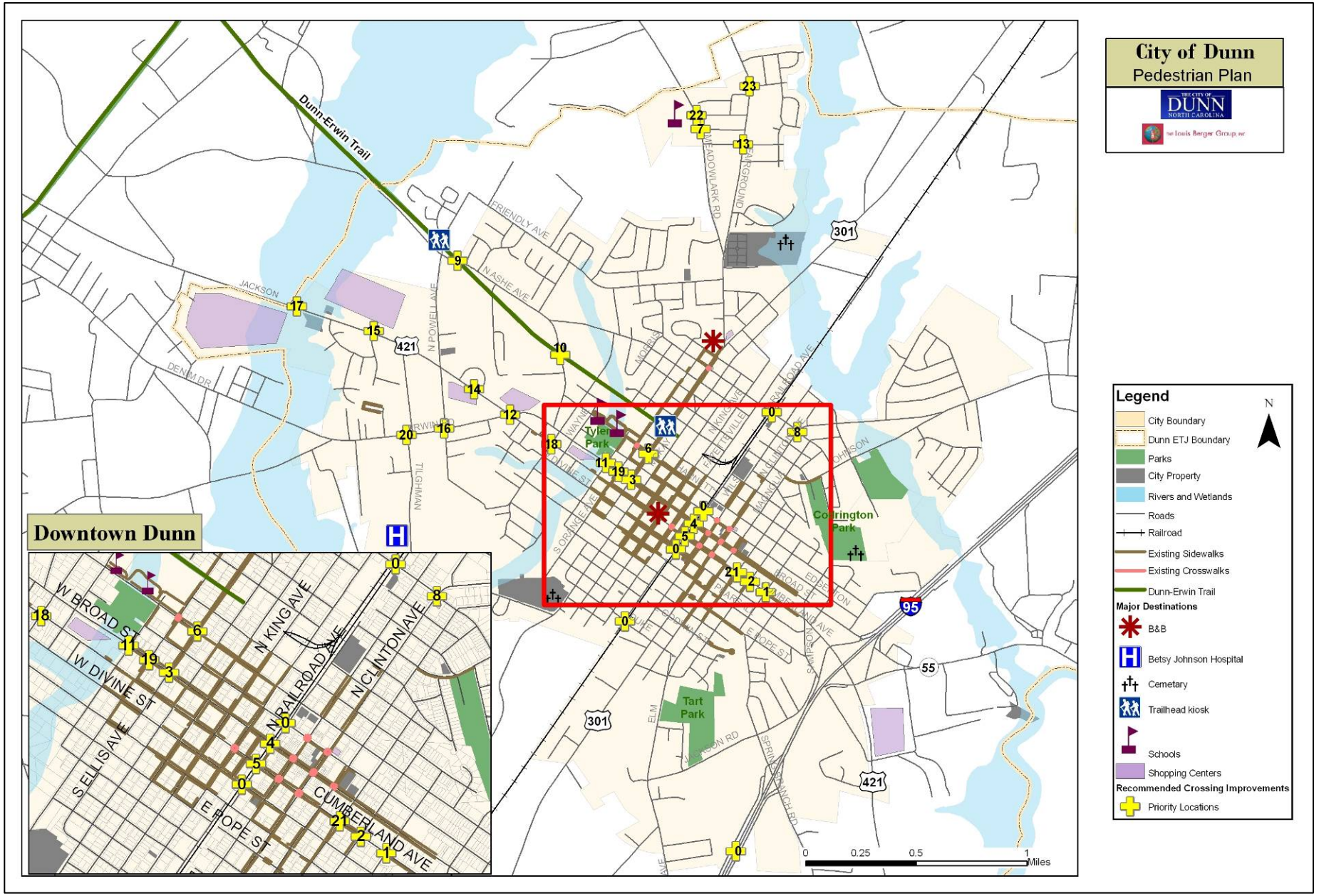
Note that all map ID numbers in Figure 5-7 that read "0" reflect the non-rated (NR) projects in Table 5-4. These projects were not rated due to the lack of existing sidewalk approaches to the intersection or railroad crossing, making them less of a priority than those that are crossed by sidewalk facilities. In the future, as new sidewalk or greenway is installed, these locations should be improved to provide safe and comfortable pedestrian crossings. The crossing of I-95 (southwest of Spring Branch Road) should be noted as a below-grade [tunneled] crossing opportunity. As noted in Section 3, all at-grade interstate crossings should be improved with future construction projects along I-95. Similarly, intersection projects along local streets can often be made in coordination (or incidental to) sidewalk projects, so all intersection improvements should be considered as sidewalks are installed during implementation of the Pedestrian Plan.

As indicated in Table 5-4, further study is needed on several projects prior to final implementation. For instance, in the case of the Meadowlark Road and Beasley Street intersection and the Fairground Road and Sycamore Street intersection, current pedestrian traffic may not warrant immediate improvements, but should be monitored after the installation of treatments at the Meadowlark Road and Chelsea Street intersection. If pedestrian traffic increases, future treatments should be installed to accommodate that future demand. The same is true for the Cumberland Street intersections at Elm Street and Canterbury Street.

Priority	Crossing Location	Description	Recommended Treatments
10	Ashe St & Dunn-Erwin Trail (north)	trail crossing near Martin St intersection	Install flashers, crosswalks & advanced pavement marking
9	Ashe St & Dunn-Erwin Trail (south)	trail crossing between Cole & Harnett	Install flashers, crosswalks & advanced pavement marking
3	Broad St & Ellis St	proposed downtown trail connection	Install crosswalks and pedestrian signals
11	Broad St & General Lee St	near Tyler Park & elementary schools	Install crosswalks, in-street "Yield to Peds" sign
19	Broad St & Orange St	near Tyler Park & elementary schools	Install crosswalks
4	Broad St & RR	Downtown CBD	Create sidewalk connections; add transition over tracks
17	Cumberland St & Black River Bridge	access to Rivers Edge Center	Add sidewalks & pedestrian railing to existing bridge
15	Cumberland St & Briarcliff Rd	Harnett Crossing entrance	Install xwalks & ped signals; expand median refuge; tighten radii
12	Cumberland St & Broad St	Cumberland Square shopping center	Close right "slip lanes" and tighten curb radii; install median refuge islands, crosswalks, ped signals
18	Cumberland St & Canterbury St	access to Tyler Park & schools	Further study needed
14	Cumberland St & Commerce Dr	Dunn Plaza entrance	Extend median refuge; install crosswalks and add pedestrian signals at existing traffic light
21	Cumberland St & Elm St	IGA crossing	Further study needed
5	Cumberland St & RR	Downtown CBD	Create sidewalk connections; add transition over tracks
2	Cumberland St & Washington St	IGA crossing	Install traffic signal at Wilmington St with ped signals
1	Cumberland St & Wilmington St	IGA crossing	May warrant traffic signal with ped signals and crosswalks
NR	Divine St & RR	downtown	Transition over tracks when/if sidewalk installed
NR	Duke St & RR	south-central downtown	Transition over tracks when/if sidewalk installed
NR	Edgerton & RR	downtown	Transition over tracks when/if sidewalk installed
16	Erwin Rd & Powell Rd	near Hospital	Install crosswalks & ped signals at existing traffic signal
20	Erwin Rd & Tilghman Rd	near Hospital	Install new signal with crosswalk & ped signals; tighten curb radii. A photo rendering of potential treatments for this location is included on page 73.
13	Fairground Rd & Beale St	access to Dunn Middle	Install traffic signal with ped signals
23	Fairground Rd & Sycamore St	access to Dunn Middle	Further study needed
8	Granville St & Clinton Ave	near IGA & Codrington Park	Install crosswalks and ped signals at existing traffic light
NR	Granville St & RR	north-central downtown	Transition over tracks when/if sidewalk installed
6	Harnett St & Ellis St	downtown, near Tyler Park & schools	Install crosswalks and ped signals; consider "No Right on Red"
22	Meadowlark Rd & Beasley St	access to Dunn Middle	Further study needed
7	Meadowlark Rd & Chelsea St	access to Dunn Middle	Consider in-street “Yield to Peds” sign during school hours
NR	I-95 Underpass	access to Food Lion shopping center	Consider underpass during future I-95 construction

Table 5-4. Proposed Intersection Improvements

Figure 5-7. Map of final crossing improvement recommendations by priority



5.3 Project Prioritization

Following project development, projects were then prioritized to help create a phased implementation plan for the City.

5.3.1 Sidewalk Prioritization and Phasing Schedule

As can be seen in Table 5-6, the proposed sidewalk projects are extensive – they cover approximately 17 miles of roadway in Dunn along thirty segments of twenty-three named roads. Even if Dunn plans to expand its budget for pedestrian facilities, it will still take a long time for all of these projects to be constructed. To help the City determine which projects to construct first, an analysis was performed to prioritize projects and create a recommended phasing schedule of short-term, mid-term, and long-term projects for construction.

Factors

Prioritization and scheduling were based on the following factors:

Public input: Comments from the Steering Committee and participants in the Open Houses, survey, and other public forums

Project characteristics: In the second Steering Committee meeting, committee members were asked to identify their priority projects regardless of cost. Members then discussed the key factors that contributed to projects receiving top priority. From this discussion, the following items were identified as important project characteristics to making a project a priority:

- Accessibility: Proximity to schools, parks, commercial areas and the Dunn-Erwin trail
- Safety: Measured by the average daily traffic (ADT) on the roadway where the sidewalk is proposed
- Connectivity: Project's potential to complete a critical connection from one location to another, measured by the project's connection to existing sidewalks

Constructability and Cost: Ease of constructing the project, including preliminary design analysis and engineering preparation, right-of-way purchase as well as actual construction.

Process

Project prioritization and scheduling was a layered process which incorporated all of the above factors in the following steps:

1. **Rate projects on key characteristics.** Projects were rated on accessibility, safety and connectivity. A project received points for any of the following characteristics:
   - **Accessibility**: *Schools*. Is a school located within the project limits?
     Yes, between .125 - .25 miles = 3 points
     Yes, between .25 - .5 miles = 2 points
     Yes, between .5 – 1 mile = 1 point
     No = 0 points
   - **Accessibility**: *Parks*. Is a park located within the project limits?
     Yes, between .125 - .25 miles = 3 points
     Yes, between .25 - .5 miles = 2 points
     Yes, between .5 – 1 mile = 1 point
     No = 0 points
   - **Accessibility**: *Commercial Areas.*. Is a major shopping venue located within the project limits?
     Yes, between .125 - .25 miles = 3 points
     Yes, between .25 - .5 miles = 2 points
     Yes, between .5 – 1 mile = 1 point
     No = 0 points
   - **Accessibility**: *Dunn-Erwin Trail*. Does the sidewalk project provide connections with the local trail system, i.e. is the Dunn-Erwin trail within the project limits?
     The sidewalk is proposed as a downtown trail connector = 4 points
     Yes, between .125 - .25 miles = 3 points
     Yes, between .25 - .5 miles = 2 points
     Yes, between .5 – 1 mile = 1 point
     No = 0 points
   - **Safety**. What is the average daily traffic (ADT) count of the roadway?
     Residential Street or Cul-de-Sac = 1
     Collector Street = 2
     Marginal Access Street = 3
   - **Connectivity**. Does the project link one destination to another by way of existing sidewalk?
     (Yes = 1 point, No = 0 points)

- **Constructability**. Will the project be difficult and/or expensive to construct, based on right-of-way constraints, existence or lack of curb and gutter, etc?
  (Very Difficult = 1, Least Difficult = 5)

Table 5-4 lists projects in order of priority ranking based on the above formula.

2. **Assess cost estimates and constructability.** Next, projects were assessed a cost estimate based on proposed treatments and existing conditions. Cost estimates for treatments were as follows:

   - *High Cost: > $200,000*
     - Generally, high cost projects entail construction of significant sections of sidewalk or installation of sidewalk on roadways without existing shoulder width to accommodate sidewalks as is. The latter would prove costly due to the need to pipe existing drainage ditches and install curb and gutter on roadways with shoulder sections.
   - *Moderate Cost: $100,000 - $200,000*
     - Projects in this range generally have some curb and gutter and are less lengthy sidewalk installations on roadways that may have some existing sidewalk in place.
   - *Low Cost: < $100,000*
     - Projects in this category are generally short sidewalk segments ("spot improvements") on roadways with adequate width to install new sidewalks without significant roadway engineering.

3. **Place projects into schedule.** The project cost analysis was then compared to the list of projects organized by rating to determine the appropriate phased implementation schedule. Projects which were estimated to be low cost and also received high ratings were placed in the short-term project category, whereas projects with high cost and low ratings were placed in the long-term project category. Mid-term projects included those projects with low costs and low ratings, and those with high cost but high ratings. By organizing projects in a short-term, mid-term,

and long-term fashion, the City has a list of projects that it can implement quickly in order to take immediate steps towards making Dunn more pedestrian-friendly in the interim before more intensive, long-term projects are undertaken. Table 5-5 and Figure 5-7 show projects organized into short-, mid-, and long-term phasing schedules.

5.3.2 Cost Assumptions

In order to complete the sidewalk phasing schedule outlined above, each proposed sidewalk project was assigned a generic cost estimate. Each cost estimate was calculated based on the length (in linear feet) of that segment and the presence or lack of curb and gutter. All cost estimates are for one-side only, though the ideal condition would be to have sidewalks on both sides of the street. The basic cost assumptions for the calculations in Table 5-6 are:

- Sidewalk (one-side): $50 per linear foot
- Curb and Gutter (one-side): $25 per linear foot

Source: NCDOT Division of Pedestrian and Bicycle Transportation

For each sidewalk project, the following cost factors may increase the per foot cost of constructing sidewalk by the amount shown inside the parentheses. These cost factors were not included in the generic estimates of Table 5-6 due to lack of data, but should be considered prior to implementation by a qualified engineer or engineering professional. All cost figures can be found in Appendix F.

1. Right-of-Way Constraints (cost varies). In some cases, there may not be sufficient right-of-way for sidewalk construction. Property negotiations and land acquisition would need to occur, significantly increasing the cost of the project.
2. Trees and Landscaping ($40). Sometimes, significant trees or landscaping are present in the right-of-way and will need to be removed for sidewalk construction.
3. Structure ($50). The presence of a bridge overpass/wing wall, building, or other structure potentially in the path of the proposed facility.
4. Ditching ($25). Some roadways have drainage ditches near the edge of pavement of the roadway, which would either force piping the ditch or moving the sidewalk further from the roadway and encroaching more on private right-of-way. Either way, project costs would increase as a result.
5. Utility ($15). The presence of utility poles in the path of a proposed sidewalk. As with trees, the sidewalk can be installed "behind" the utility poles, but again would increase the potential for right-of-way conflicts.

Priority Rating (by Rank)	Proposed Sidewalk Location	From	To	Weighted Rank
*1**	Meadowlark	Fairground	Chelsea	31
2	Cumberland 1 (US421)	General Lee	Broad	69
3	Magnolia	Edgerton	Johnson	68
4	Broad	General Lee	Cumberland	68
5	Clinton (US301)	Cleveland	Granville	59
6	Johnson	Railroad	Magnolia	57
7	McKay 1	Broad	Granville	56
8	Wilson	Edgerton	Granville	55
9	Granville 2 (US301)	Morris	King	54
10	Edgerton 1	Fayetteville	Wilmington	53
11	Washington	Hodges	Cleveland	51
12	Spring Branch	Pope	Jackson	51
13	Divine	Canterbury	General Lee	48
14	Pearsall 1	Watauga	Railroad	48
15	Erwin	Tilghman	Cumberland	48
16	Cumberland 2 (US421)	Broad	Powell	46
17	Friendly	Powell	Fairground	44
18	Pearsall 2	Elm	Sampson	44
19	Sampson	Pearsall	Codrington Park	44
20	McKay 2	Susan Tart	Broad	40
21	Granville 1 (US301)	King	Johnson	39
22	Edgerton 2	Wilmington	Holland	38
23	Susan Tart	Tilghman	McKay	33
24	Cumberland 4 (US421)	Sampson	Winterlochen	30
25	Fairground	US301	Beale	28
26	Elm	Duke	Jackson	27
27	Duke	McKay	Hodges	26
28	Cumberland 3 (US421)	Powell	ETJ (Black River)	25
29	Tilghman	Susan Tart	Erwin	23
30	Jackson	Hodges	Spring Branch	22

Table 5-5. Proposed sidewalk project locations by priority rank.

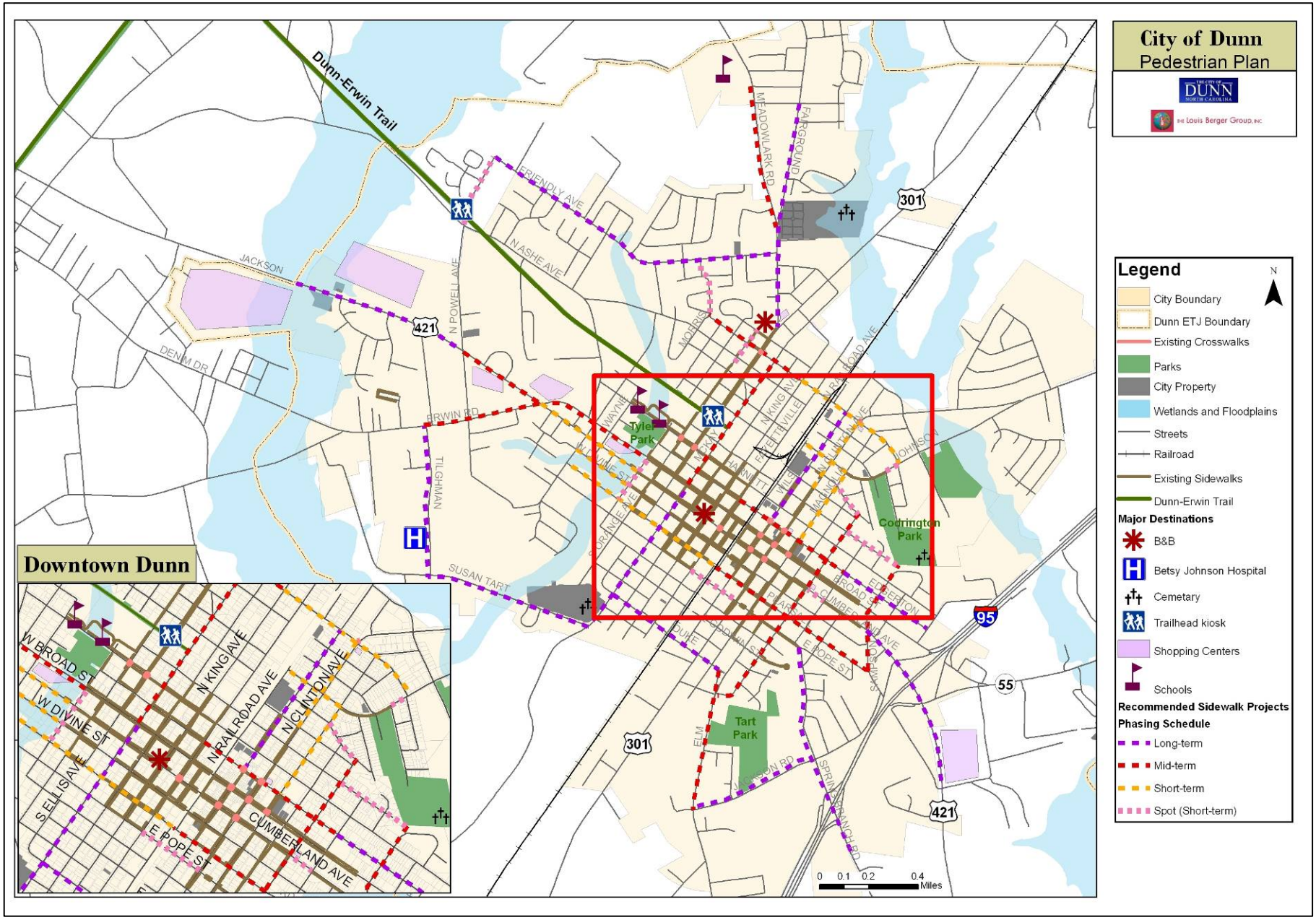
** NOTE: Meadowlark Road was moved up in priority by the Steering Committee to address access to Dunn Middle School.*

Phase	Proposed Sidewalk Corridor Project	From	To	Length (Feet)	Est. Project Cost
Short	**Cumberland 1 (US421)**	General Lee	Broad	2527	$126,329
Short	**Clinton (US301)**	Cleveland	Granville	1721	$86,071
Short	**Johnson**	Railroad	Magnolia	1077	$80,757
Short	**Divine**	Canterbury	General Lee	1354	$67,709
Short	**Pearsall 1**	Watauga	Railroad	4031	$130,550*
Short	**Granville 1 (US301)**	King	Johnson	2787	$139,348
Short	**Magnolia**	Edgerton	Johnson	1774	$133,067
Mid	**Broad**	General Lee	Cumberland	2525	$126,250
Mid	**McKay 1**	Broad	Granville	3217	$241,304
Mid	**Granville 2 (US301)**	Morris	King	2045	$122,657
Mid	**Edgerton 1**	Fayetteville	Wilmington	2714	$135,718
Mid	**Washington**	Hodges	Cleveland	5074	$380,521
Mid	**Erwin**	Tilghman	Cumberland	2534	$126,705
Mid	**Cumberland 2 (US421)**	Broad	Powell	2008	$150,608
Mid	**Pearsall 2**	Elm	Sampson	2475	$185,649
Mid	**Sampson**	Pearsall	Codrington Park	2464	$184,766
Mid	**Meadowlark**	Fairground	Chelsea	3086	$231,473
Mid	**Elm**	Duke	Jackson	3042	$228,181
Long	**Wilson**	Edgerton	Granville	2839	$212,908
Long	**Spring Branch**	Pope	Jackson	4600	$229,991
Long	**Friendly**	Powell	Fairground	6812	$510,878
Long	**McKay 2**	Susan Tart	Broad	3678	$275,854
Long	**Edgerton 2**	Wilmington	Holland	2148	$161,119
Long	**Susan Tart**	Tilghman	McKay	3613	$271,005
Long	**Cumberland 4 (US421)**	Sampson	Winterlochen	3860	$289,491
Long	**Fairground**	US301	Beale	4834	$362,579
Long	**Duke**	McKay	Hodges	2777	$208,268
Long	**Cumberland 3 (US421)**	Powell	ETJ (Black River)	3861	$289,563
Long	**Tilghman**	Susan Tart	Erwin	3275	$245,603
Long	**Jackson**	Hodges	Spring Branch	2709	$203,188
TOTAL				**91,461**	**$6,209,118**

Table 5-6. Proposed sidewalk project phasing

** 3-blocks (1,420 ft) of existing sidewalk deducted from total estimated cost for Pearsall 1 corridor project*

Figure 5-8. Map of recommended sidewalk project phasing.



5.3.3 Greenway Prioritization and Phasing

In order to implement the greenway trail recommendations of the Dunn Pedestrian Plan, the City will need to focus on policy actions that require greenway easements to be dedicated during future development and redevelopment projects. As of November 2008, the City's Code of Ordinances does not require dedication of right-of-way by a developer although a small incentive reducing the amount open space required by half is allowed (Sec. 22-59.8). It is recommended that the City amend this ordinance to require greenway easements and/or construction of trail segments along proposed trail corridors during all future development projects. Once a significant number of easements or trail segments are collected in a given corridor, the City should focus on completion of that greenway trail in full or as a significant trail corridor as part of the City's Capital Improvement Program.

In order to further plan for future implementation, the greenway trail projects have been prioritized into a suggested phasing schedule below. The suggested phasing schedule is a guide for implementation based on ease of construction, cost, available funding mechanisms and current conditions. It is recommended that the City conduct a Trails and Open Space planning effort to create a more detailed analysis of preferred trail alignments, design standards and implementation options. Costs below are based on a per mile figure for construction of 10ft paved greenway trail ($700,000 per mile) or 10ft crushed stone greenway trail ($100,000 per mile) and do not include land acquisition.

Phase	Proposed Greenway Trail	Total Trail Length	Estimated Cost (Paved Trail)	Estimated Cost (Unpaved Trail)
Short-term	**Downtown Trail**	9,191ft* (1.74 miles) *6,600ft existing sidewalk on Ellis, Broad and Clinton Streets plus 2,591ft new trail along the railroad easement from Ellis to Clinton Streets for a downtown "loop"	$ 343,000 (new trail) + signage	$ 49,000 (new trail) + signage
Mid-term	**School Connector Trail**	8,010 ft (1.52 miles)	$ 1,164,000	$ 152,000
Long-term	**Hanna's Pond Trail**	11,150 ft (2.11 miles)	$ 1,477,000	$ 211,000
Long-term	**Black River Trail**	26,000 ft (4.92 miles)	$ 3,444,000	$ 492,000

Table 5-7. Proposed Greenway Trail Phasing Schedule

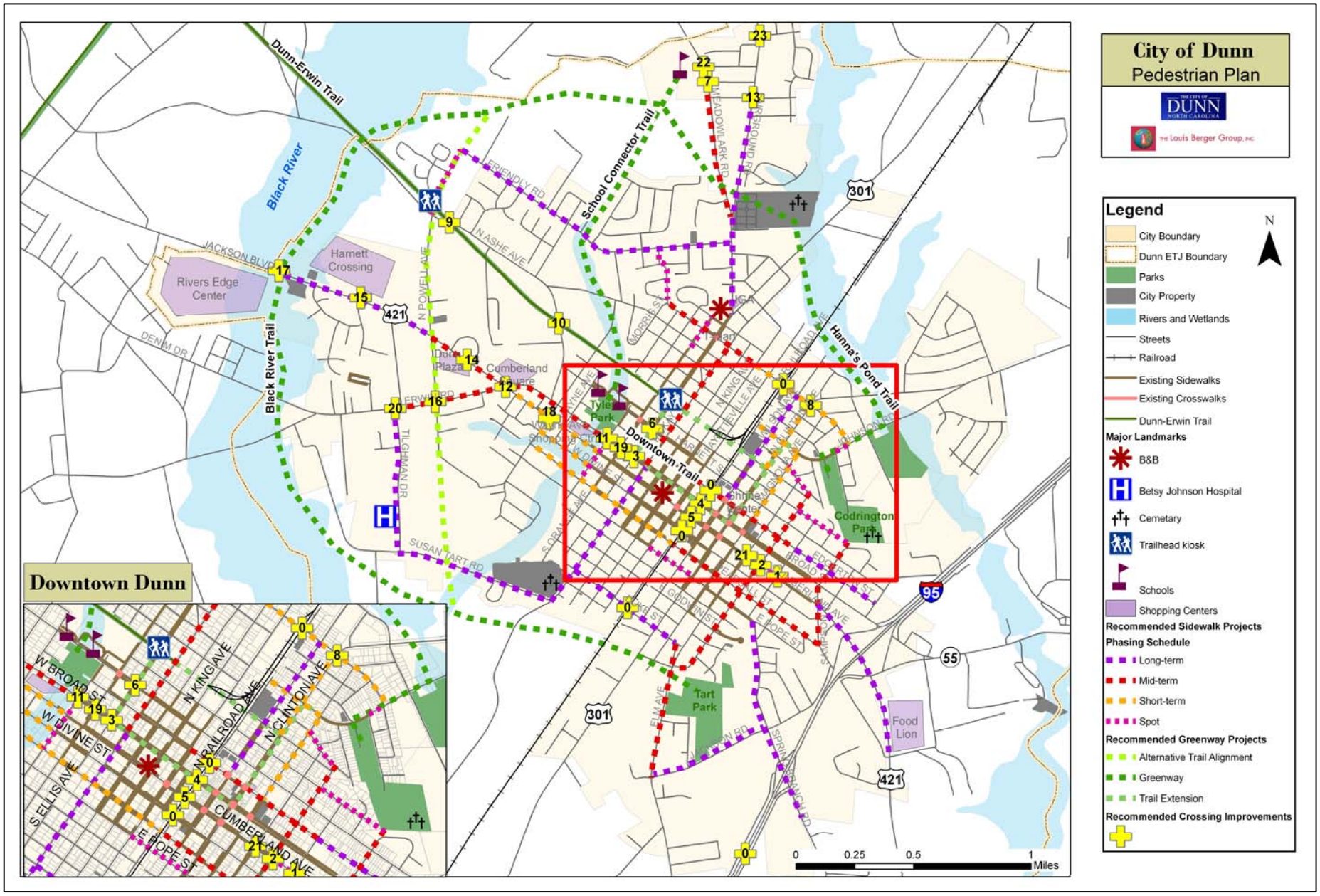
5.3.4 Intersection Prioritization and Phasing

Proposed crossing improvements are primarily located at existing intersections and have been placed into a phasing schedule based on their priority ranking. This phasing schedule should be used as a guide for implementation, but intersection improvements should be constructed as opportunities arise through future intersection or roadway construction projects. Further study by a professional engineer may be necessary prior to installation.

Phase	Priority	Crossing Location	Recommended Treatments	Estimated Cost
Short	*1*	**Cumberland St & Wilmington St**	New traffic signal with pedestrian signals and high-visibility crosswalks	$101,200
Short	*2*	**Cumberland St & Washington St**	Standard crosswalks for north-south crossings (Washington St legs)	$200
Short	*3*	**Broad St & Ellis St**	Add crosswalks and pedestrian signals to existing signalized intersection	$5,000
Short	*4*	**Broad St & RR**	Create sidewalk connections; add transition over tracks	$3,200
Short	*5*	**Cumberland St & RR**	Create sidewalk connections; add transition over tracks.	$3,200
Short	*6*	**Harnett St & Ellis St**	Crosswalks and pedestrian signals; "No Right on Red" signage (4 legs)	$5,360
Short	*7*	**Meadowlark Rd & Chelsea St**	Add mobile in-street "Yield to Peds" sign during school hours	$250
Short	*8*	**Granville St & Clinton Ave**	Add crosswalks and pedestrian signals to existing signalized intersection	$5,000
Mid	*9*	**Ashe St & Dunn-Erwin Trail (south)**	Install flashers, crosswalks & advanced "Ped Xing" pavement marking	$5,700
Mid	*10*	**Ashe St & Dunn-Erwin Trail (north)**	Install flashers, crosswalks & advanced "Ped Xing" pavement marking	$5,700
Mid	*11*	**Broad St & General Lee St**	Install high-visibility crosswalks and in-street "Yield to Peds" sign	$2,200
Mid	*12*	**Cumberland St & Broad St**	Tighten curb radii; install median refuge islands, crosswalks, ped signals	$35,000
Mid	*13*	**Fairground Rd & Beale St**	New traffic signal with pedestrian signals and high-visibility crosswalks	$101,200
Mid	*14*	**Cumberland St & Commerce Dr**	Extend median refuge; install crosswalks and pedestrian signals	$9,000
Mid	*15*	**Cumberland St & Briarcliff Rd**	Crosswalks & pedestrian signals; extend median refuge; tighten radii	$35,000
Mid	*16*	**Erwin Rd & Powell Rd**	Add crosswalks and pedestrian signals to existing signalized intersection	$5,000
Mid	*17*	**Cumberland St & Black River Bridge**	Add sidewalks & pedestrian railing to existing bridge	N/A
Mid	*18*	**Cumberland St & Canterbury St**	Further study needed	N/A
Mid	*19*	**Broad St & Orange St**	Install high-visibility crosswalks	$ 1,200
Long	*20*	**Erwin Rd & Tilghman Rd**	New traffic signal with crosswalk & pedestrian signals; tighten curb radii	$121,200
Long	*21*	**Cumberland St & Elm St**	Further study needed	N/A
Long	*22*	**Meadowlark Rd & Beasley St**	Further study needed	N/A
Long	*23*	**Fairground Rd & Sycamore St**	Further study needed	N/A
Long	*NR*	**Granville St & RR**	Transition over tracks when/if sidewalk installed	$3,200
Long	*NR*	**Divine St & RR**	Transition over tracks when/if sidewalk installed	$3,200
Long	*NR*	**Duke St & RR**	Transition over tracks when/if sidewalk installed	$3,200
Long	*NR*	**Edgerton & RR**	Transition over tracks when/if sidewalk installed	$3,200
Long	*NR*	**I-95 Underpass**	Construct pedestrian underpass during future I-95 construction	$4 million

Table 5-8. Suggested phasing schedule for proposed crossing improvements

Figure 5-9. System map of all recommended sidewalks, greenways and crossing improvements



5.4 Other Physical Improvements

Beyond the construction of new sidewalks and greenways, there are a number of actions and improvements to the physical environment that can greatly improve pedestrian conditions at a fairly low cost. Sidewalk maintenance, for instance, can increase accessibility along existing walkways, especially for wheelchair users, as well as decrease liability for the City. In Dunn, many sidewalks in the older downtown neighborhoods have been overgrown by grass from adjacent lawns and could be "unearthed" and cleared to provide pedestrian access at a fraction of the cost of new sidewalk construction. Also, the development of parks and open space areas can complement other pedestrian amenities and provide "rest stops" for walkers and runners. Finally, the improvement of local intersections with crosswalk and pedestrian signal installations can drastically help improve safety on many walking routes, and crosswalks can be maintained annually to correct fading. Below are some additional ideas for "non-construction" projects:

- Create a regular maintenance schedule for existing sidewalks and crosswalks.
- Work with the NCDOT Rail Division and CSX to improve the conditions of pedestrian crossings of the railroad, especially those identified in this Plan, making smoother transitions over the railroad tracks and providing aesthetic enhancements.
- Create pocket parks that provide refuge along a system of walking trails; an example of one such location would be the abandoned rail car location. Connecting these park areas with signature landscaping and gateway treatments would help to improve and coordinate the aesthetics of the City.
- Consider developing a pedestrian focus area at East Denim Drive/Erwin Road and Powell Avenue to accommodate the new residential development taking place at this location, and that could be connected to nearby shopping opportunities.
- Provide pedestrian-scale lighting, street trees and landscaping, alleyway improvements and other enhancements to the downtown walking environment during upcoming streetscaping project in Downtown Dunn.
- Improve local alleyways to make them more user-friendly for pedestrians through better lighting and landscaping. One recommended improvement would be to enhance the attractiveness of the alley connecting planned Parking Lot #2 to Broad Street, potentially converting it to a pedestrian-only access at some future time. Other immediate options would be to install lighting and use landscaping planters to create a nice pedestrian walkway.

- Formalize a citywide 35mph speed limit (unless otherwise signed) and post related warning signs at the gateway entrances into the City, such as off of I-95.
- Create a system of pedestrian wayfinding signs and complementary route maps for the downtown walking trail - the "DuWalk" trail - proposed in Section 6.
- Consider the use of in-street "Yield to Pedestrians" signage at problem intersections.
- Install street lighting as necessary along dark corridors for pedestrian safety.

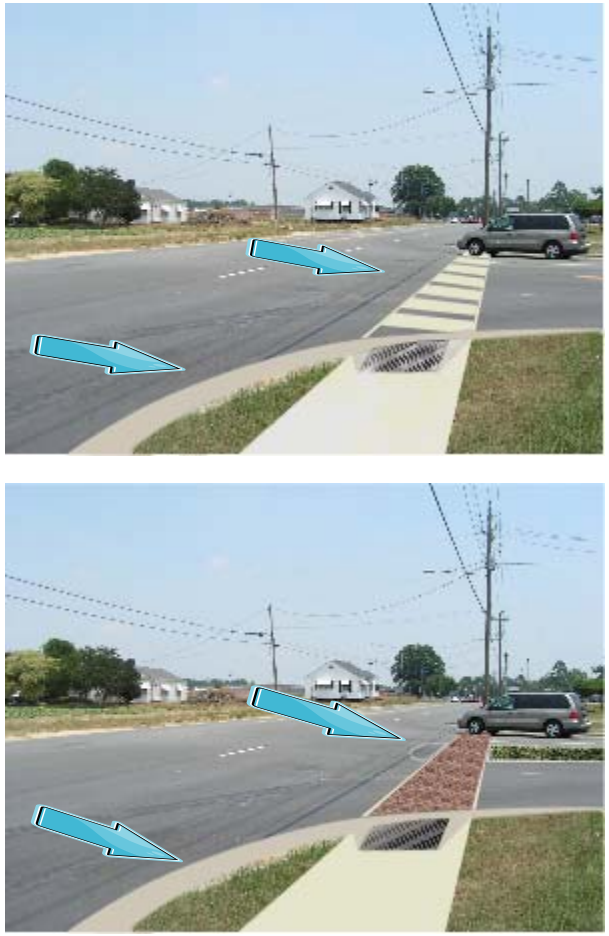


Figure 5-10. *This photograph illustrates the wide curb radius at the Erwin Rd and Tilghman Rd intersection. The images to the right illustrate possible treatments including a curb extension and high-visibility crosswalk (top), or a combination of the curb extension treatment with a textured asphalt crosswalk and median refuge island for added pedestrian safety and comfort (bottom).*

Section 6. Policy & Program Recommendations

Local policies and plans can heavily influence the walkability of a community, and often shape the pedestrian environment, sometimes even without the intent of doing so. Creating strong policies and plans that help to actively create good walking conditions will mean a more balanced future transportation network and a shared private/public burden for providing that benefit. Policy amendments and planning activities can often be achieved at a low-cost to a municipality while resulting in substantial outcomes, and could help Dunn make notable progress in developing a more walkable environment.

This section provides a set of policy and program recommendations to help create a well-balanced approach to improving walkability in Dunn.

6.1 Improvements to Existing Policies and Plans

Dunn and Harnett County are projected to grow significantly in the years to come and hence the City of Dunn has a large extra-territorial jurisdiction (ETJ) boundary within which to grow. The shape and quality of future development will greatly impact the pedestrian-friendliness of the City. If the City can work with the development community to create a more multi-modal transportation network that includes sidewalk connections and greenways, Dunn will stand out as a City with a high quality of life that will continue to attract new residents, businesses and further economic development. For this reason, it is strongly recommended that Dunn work to update and/or create local ordinances to include more pedestrian-oriented language and guidance for walkable future development.

While private/public partnerships are important, it is also recommended that the City create new policies to help guide City staff in serving the local pedestrians' needs. Such policies will help "institutionalize" good pedestrian design and programming throughout all City departments, and create a truly balanced and comprehensive approach to implementing the Pedestrian Plan. Such internal policy changes might include the creation of a sidewalk petition process for "spot improvements" in the pedestrian network, for instance. This and other policy recommendations are summarized in Table 6-2. Finally, several planning efforts could be completed that will complement the City's Comprehensive Pedestrian Plan and help reinforce its recommendations and proposed outcomes.

During the development of the Pedestrian Plan, several pedestrian-friendly policy and program recommendations specific to Dunn were identified and discussed. Recommendations for all such policy and plan development are included in Tables 6-1 through 6-3.

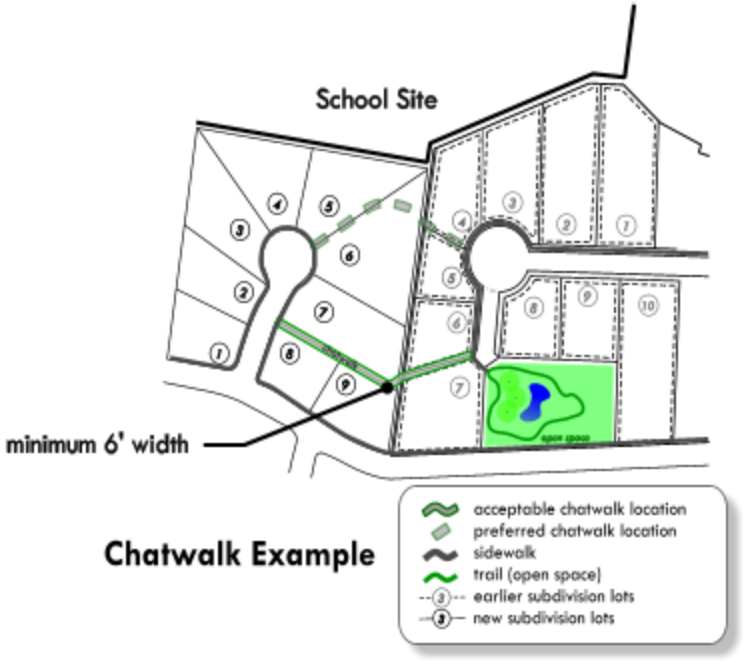


Figure 6-1. *It is recommended that Dunn require short greenway or "chatwalk" connections between new cul-de-sac developments and adjacent parks, schools or residential uses, where appropriate. This can greatly shorten walking distances and enhance the local pedestrian network by providing short, safe links between neighborhoods and commercial centers.*

Developing a sidewalk maintenance program will help the City of Dunn protect its investment in existing sidewalk infrastructure and also help improve local aesthetics, as well as walkability.

Street trees can offer valuable shade in hot weather and create a pleasant, aesthetically-pleasing walking environment. Developing a protective street tree ordinance could help to enhance the quality of Dunn's streets for pedestrians and also create more attractive streetscapes throughout the City.

WHAT IS *PAYMENT IN-LIEU*?

Many communities in North Carolina require sidewalks to be installed within new development and along the public street frontages of all subdivided developments. In some cases, developers are given the choice to opt out of the sidewalk construction and pay in-lieu of constructing pedestrian facilities. This is usually a rare occurrence at the behest of development review staff, the Planning Board and/or City Council, but can be applicable in cases where the cost of the sidewalk installation is disproportionate to the cost of the development. In these cases, a payment in-lieu fee can be assessed to the developer. These funds are paid into a pool used for spot improvements and sidewalk repair in other areas of the City.

Policy changes can often provide simple, cost-effective strategies for improving local pedestrian conditions. For instance, creating a standard setback for parking lots to create an unobstructed walkway for pedestrians can greatly enhance the walking experience, especially along busy thoroughfares such as Cumberland Avenue.

Best Practices Recommendations – Local Ordinances		
Street Design Criteria	■	Modify the Code of Ordinances to reference specific Street Design Criteria, including maximum curb radii downtown and in pedestrian activity centers; street cross-sections that include mandatory five-foot-wide sidewalk or public greenway access on the full perimeter of each adjacent public street; and driveway spacing criteria on all streets to be adhered to in the subdivision and design of new developments. Design criteria should also address curb ramps and driveway design to ensure accessibility for the physically disabled, as outlined in the Americans with Disabilities Act (ADA). A minimum 3ft planting strip or buffer for sidewalks should be standard. Include street classifications in the Street Design Criteria to define local, collector, subcollector, arterial and/or limited access streets. Assigning maximum street widths and sidewalk requirements for each classification will help create better guidance for developers. Minimum 5ft sidewalks should be required on both sides of collectors, subcollectors and arterials, and on at least one side of local streets. The Harnett County Subdivision Ordinance (Article V, Section 5.12.3) should be used as preliminary guidance for these requirements (see Appendix G for a copy).
Construction Detour	■	Develop pedestrian detour requirements when sidewalk is blocked or closed by construction activities (Sec. 19-42).
Sidewalk Requirement	■	Require 5ft wide (minimum) sidewalks along the public frontage of all subdivided and unsubdivided properties to help create sidewalk connectivity along public streets in Dunn.
School Zones (Sidewalk Requirements)	■	Consider developing an ordinance that requires sidewalk along all roads within a quarter-mile of a school and that all signalized intersections within a quarter-mile of the school should have functioning pedestrian signals with crosswalks and push-buttons. If the school is accessed from a mid-block location, then a signalized mid-block crossing should be provided for safe pedestrian access.
Greenway Connections	■	Require the construction of minimum 10 feet (typical: 14 ft) asphalt greenways during new development to connect to existing greenways and create the proposed network of greenway trails throughout the City.
Greenway Connections	■	Consider additional language in local ordinances to allow City Council to require greenway connections between adjacent cul-de-sacs and/or from cul-de-sacs to adjacent schools or greenways, to create better pedestrian connections between local neighborhoods and public destinations.
Parking Lot Design	■	Implement parking lot design requirements in the LDO or Design Guidelines Manual as recommended in this section. Requirements should include a minimum 5ft separation between parking areas and adjacent sidewalk or walkway to create an unobstructed "clear zone" for pedestrian access.
Overlay Districts	■	Create a set of place-making design standards (or "overlay districts") for rural, downtown, and other design markets, respecting the unique character of the rural heritage as well as recognizing the urbanizing trends happening in other areas of the City. Reward and recognize developers that adhere to these design standards by streamlining the project review process and awarding best practice certificates at Planning Board and City Council meetings.
Parking and Setbacks	■	Modify the Code of Ordinances to require or encourage off-street parking to move to the rear and side of buildings in commercial properties to reduce building setbacks from the street, and consider the expansion of conditional uses to include neighborhood retail opportunities in even low- to medium-density residential districts pursuant to adherence to basic design standards and review.
Sidewalk Connections	■	Recalling the nodal development recommendation in the *City of Dunn 2030 Land Use Plan*, require pedestrian connections to adjacent properties, and ensure that these connections "line up" with currently undeveloped properties to create an expanding network of pedestrian ways throughout the City. Emphasize the Medical, Downtown and other nodes mentioned in the *2030 Land Use Plan*.
Street Trees	■	Develop a protective Street Tree Ordinance as part of the City's Landscape Ordinance to help provide shade trees along Dunn's existing and future sidewalks.

Table 6-1. Proposed Amendments to Local Ordinances

Best Practices Recommendations – Internal Policy		
Countdown Pedestrian Signals	■	Formalize a citywide policy of installing "countdown" pedestrian signal heads and crosswalks with the installation of all new signalized intersections. Provide pedestrian signals even in locations without sidewalk on one or both sides of an intersection.
School Zones	■	Create a policy that requires "safe zones" around schools (i.e. school zones) in which speeds are reduced by 10 mph within a quarter mile of the school and signs are posted warning of school and student presence. Typical school zones speeds are 25mph or 35mph. "School" crossing pavement markings are used to reinforce signage, and flashing beacons often accompany speed limit signage.
Signage	■	Restrict use of free-flowing turn lanes, utilizing "No Right Turn on Red" signage at signalized intersections with high pedestrian volumes. Provide appropriate treatments to warn both motorists and pedestrians of potential conflicts when free-flow turn lanes are used (e.g. "Yield to Pedestrians" signage).
Signal Timing	■	At intersections with protected right-on-red for automobiles, provide signal phases which specifically create protected crossing intervals for pedestrians.
Greenway Crossings	■	Create a policy for standard greenway crossing treatments, and develop with NCDOT a mutually acceptable mid-block crossing policy for greenways.
Sidewalk Petition Process	■	Develop a sidewalk petition process and budget allocation to handle "spot improvements," allowing citizens to make requests for short sidewalk connections that will quickly and easily fill gaps in the pedestrian network. Once program is implemented, promote the program to citizens and educate residents on details in order to ensure its success and utility.
Curb Ramps	■	Allocate an annual budget for curb ramp retrofits at intersections throughout the City, and ensure new curb ramps are constructed during all new street/intersection construction, as mandated by federal ADA requirements.
ROW dedication	■	Create a citywide policy to require right-of-way (ROW) dedication, instead of ROW "reservation"
Payment In-lieu Options	■	Consider instituting payment in-lieu standards for certain new development, if sidewalks are not necessary. Payment in-lieu is often used in rural developments where a sidewalk will "lead to nowhere." The decision to allow payment in-lieu should be made on a case-by-case basis after careful evaluation by Planning staff. If the sidewalk in question will not play a role in creating a well-connected pedestrian network, then payment in-lieu may be an appropriate option.
Bridge Accommodations	■	All new and retrofitted roadway bridges should accommodate pedestrians through the inclusion of sidewalks on at least one side of the facility (preferably both) and pedestrian-safe railings (42ft minimum height).
Tunnel/Culvert Accommodations	■	All new tunnels or stream culverts under I-95 or other major roadway/railroad facilities should include an adjacent pedestrian facility, in order to mitigate the barrier effect of the facility through the community.
Crosswalk Installations	■	Create a policy of installing high-visibility (zebra-striped) crosswalks at all intersections within a school zone, as well as in the Central Business District (downtown). Though motorists are required by law to yield the right-of-way to pedestrians at marked and unmarked intersections, crosswalks can be an awareness-building treatment and their visibility is very important in key locations.
Sidewalk & Crosswalk Maintenance	■	Existing sidewalks buried under grass and overgrowth should be unearthed as soon as possible through a city-wide maintenance effort. A regular maintenance schedule should then be established for periodic repairs of sidewalk cracking and restriping of crosswalks that fade with weather and wear.

Table 6-2. Proposed New Policies and Policy Amendments

Best Practices Recommendations – Planning Efforts	
Parks & Open Space Planning	■ Create a Parks and Open Space Master Plan that incorporates and expands upon the ultimate recommendations of this Plan, as well as the recently-adopted Landscape Ordinance.
Pedestrian Design Standards	■ Develop Engineering & Design Standards for pedestrian accommodations. Ensure that such guidelines explicitly state that all facilities must comply with the requirements outlined in the American Disabilities Act Accessibility Guidelines for Buildings and Facilities. These standards should generally follow those provided by this Plan, AASHTO, and MUTCD.
Downtown Streetscape Plan	■ In downtown, provide plenty of pedestrian facilities and street amenities, such as street trees, signage, trash cans, benches, and signature street lamps.
Transportation Plan Update	■ Update the Dunn-Erwin Transportation Plan to include recommendations of the Plan, especially recommendations in Section 3 and Section 5 regarding pedestrian-friendly bridges and roadway approaches to I-95 and pedestrian tunnel under the interstate.
Bicycle Plan	■ Apply to NCDOT for a Bicycle Planning Grant, and create the bicycling counterpart for this pedestrian master plan. Bicycling is an important accompaniment to walking, and increases the range as well as the number of destinations available.
NC Main Street Program	■ Participate in the N.C. Main Streets Program and seek other grant opportunities to continue to enhance the downtown area and promote it as a serious tourism and walking destination.
Traffic Calming Toolbox	■ Develop a "traffic calming toolbox" of treatments to slow traffic and improve pedestrian safety on streets with speeding problems. Treatments could include neckdowns, median islands, curb extensions and speed humps.
Bike/Ped Committee	■ Create a Bicycle & Pedestrian Advisory Committee to help facilitate implementation of the Pedestrian Plan.

Table 6-3. Proposed New Policies and Policy Amendments

6.2 Program Recommendations

Pedestrian facilities alone do not make a town pedestrian-friendly. A variety of programs should also be implemented to create and support a pedestrian-friendly culture. A pedestrian-friendly culture has several different characteristics, including the behavior of people when they are walking, the attitude of motorists in the community towards pedestrians, and the role of police and other law officials to enforce pedestrian safety. To address all of these elements, programs are often created to fit within the "three E's" of pedestrian planning: education, encouragement, and enforcement.

Education programs teach others about safe pedestrian behaviors, the benefits of walking, and can assist people in feeling more comfortable with their "new" mode of travel. Education programs can also be used to teach motorists how to interact safely with pedestrians. Encouragement programs, like education

Figure 6-2. Sample SRTS Materials. *Using inexpensive materials, such as these simple stickers – available for free online and printed on Avery labels – can help create a fun, effective Safe Routes to School outreach program.*

Figure 6-3. *Well-designed pedestrian safety and promotional materials are available for free from FHWA and the National Center for SRTS.*
Source: www.saferoutesinfo.org

programs, can also teach about the benefits of walking, and serve to promote walking and pedestrian-friendly behavior through various activities and incentives. Finally, enforcement programs provide the "teeth" of a safe and legal pedestrian environment. When law enforcement officers and other officials protect pedestrians and encourage walking, this sends a clear message that the presence of pedestrians is a legitimate and permanent condition in the city's transportation network. Additional resources for educational and enforcement resources are available at www.walkinginfo.org.

Tables 6-4 through 6-6 below include recommendations for a well-rounded pedestrian program in the City of Dunn.

Education Program Recommendations	
Safe Routes to School (SRTS) Program	Create a school-based curriculum that involves young students, teachers and parents in the development of school safety programs such as Walk to School Days. These programs can help educate children on safe walking behaviors and encourage more walking and healthier lifestyles. Apply to the North Carolina Department of Transportation for Safe Routes to School (SRTS) program funding, and then participate in SRTS action planning for making key improvements in the vicinity of local schools. More information on NCDOT's SRTS initiative is available at http://www.ncdot.org/transit/bicycle/saferoutes/SafeRoutes.html.
Pedestrian Safety Campaign	Distribute educational brochures on child and adult pedestrian safety at local events and venues like the public library and schools, as well as to City staff and Police officers. Consider also creating TV and radio PSAs on pedestrian safety to create local awareness of issues such as school zone safety. The City might also consider posting bicycle and pedestrian related laws and safety information permanently on the Dunn City website for reference. NC's pedestrian laws are discussed in Section 4.2; further information is available at http://www.ncdot.org/transit/bicycle/laws/laws_intro.html. Finally, educational materials can address other local issues, such as the obstruction of walkways by parked cars or garbage cans.

Table 6-4. Proposed Education Programs

Enforcement Program Recommendations	
Traffic Enforcement	Work with the local police department to enforce speeding, failure to yield to pedestrians in crosswalks, and other violations in targeted areas such as school zones. Other enforcement options could include the purchase and rotating display of a speed trailer at problem spots where speeding and traffic issues are reported as a problem.
Pace Car Program	A pace car program is a participatory program for citizens to pledge to act as "pace cars" that obey signed speed limits at all times on Dunn streets. Pace car participants self-enforce the local speed limit and thereby help to set a normative speed in their community and set examples for courteous, law-abiding traffic behavior in their neighborhoods.

Table 6-5. Proposed Enforcement Programs

Encouragement Program Recommendations	
Healthy Dunn Program	Work closely with the Betsy Johnson Memorial Hospital to design and implement a health-based advocacy program that includes walking clubs and events, along with the promotion of a local walking route and the Dunn-Erwin trail. This program should be promoted in local schools, Senior Centers and at City/County events (e.g. Farmer's Market, Boogie Down on Broad Street, and Touchstone Energy Cotton Festival). A "Fitness Challenge" event and/or regular senior walking program could be incorporated. Business sponsors could help purchase low-cost pedometers and walking route maps for distribution.
"DuWalk" Signed Route	Establish a "DuWalk" walking route in cooperation with the Dunn Area Chamber of Commerce and Dunn Area Tourism Authority that connects the historic destinations in the City with textured pavement treatments (e.g., red brick inlays), wayfinding signage, and a promotional brochure and video piece for the City, Tourism, and Chamber websites. Consider carefully the opportunities for economic advancement, like offering discounts at area retailers and B&B's along the route in exchange for a mention in the guide. The opportunity for "live-work-play" arrangements in Dunn is significant, and should be promoted as a central economic revitalization theme (West Jefferson, NC, as a successful example).
Weekly/Monthly Walking Tours	Establish regular pedestrian outings in Dunn for residents and/or tourists, which highlight the natural resources of the City, historical and cultural landmarks or popular parks and meeting places. This could be a weekly or monthly endeavor, organized to meet regularly at the same place/time, but using different routes and/or facilitators to spice things up. The walking tours might highlight local historic homes, arts and crafts, African American history, gardens or other natural resources. For examples of a successful set of heritage tours in New Bern, NC, visit http://www.visitnewbern.com/heritage_tours.htm.
Commuter Challenge Event	Create an annual or bi-annual Commuter Challenge event to promote walking to work. This event could be held on International Car-free Day or during Bike to Work Week (May). The Dunn Chamber of Commerce or a local civic group could help coordinate activities, including raffle prizes and discounts to participants who "pledge" to walk. International event information, resources and materials are available at www.worldcarfree.net/wcfd/.
Walk to School Day	As part of the local Safe Routes to School program, it is recommended that the City and County work with community members and local schools to promote an annual or bi-annual Walk to School Day. This event could be held on International Walk to School Day in October of each year and help to kick-off other Safe Routes to School programs by encouraging parents, teachers, students and community members to get involved. Info at: www.walktoschool.org.
Dunn 5K Walk/Run Event	Walk/run events are very popular and can help to promote walking and running for recreational purposes, as well as health and wellness. The City should consider working with local businesses and nonprofit organizations to co-sponsor and organize an annual 5K or 10K Walk/Run event in Dunn.

Table 6-6. Proposed Encouragement Programs

6.3 Partnership Opportunities

Many of the education, encouragement and enforcement programs will be carried out by partnerships between City departments, local nonprofit and civic

organizations, business owners, developers and others. Creating strong partners in the citywide effort to improve pedestrian safety and increase walkability will help spread the word and awareness, as well as lead to programs that can withstand the test of time. Potential partners for implementation of the Dunn Pedestrian Plan include:

- Dunn Chamber of Commerce
- Harnett County Health Department
- Dunn-Erwin Trail Committee
- Betsy-Johnson Memorial Hospital
- City of Dunn Recreation Commission
- Local Neighborhoods Associations
- Police Athletic League
- Harnett County School System
- Local Parent Teacher Associations (PTAs)
- City of Dunn Police Department
- Harnett County Sheriff's Department
- City of Dunn Parks & Recreation Department
- Local Kiwanis, Lions and Rotary Clubs
- Women's Club of Dunn
- Harnett County MLK Committee

6.4 Program Evaluation

Evaluation is a useful tool for measuring local progress after the adoption of a Plan. Following up on program activities to verify successes and make changes as needed, and tracking key indicators such as crash statistics, can help provide a focus for future implementation and re-evaluate new needs. It is recommended that the City of Dunn consider working with a citizen committee, such as the Recreation Committee or a new Bicycle/Pedestrian/SRTS Advisory Committee to help implement the Plan, track successes, re-evaluate needs and help to conduct future Plan updates. Key indicators that City staff, citizens and committee members might track include:

- Number of students walking/biking to school
- Records of pedestrian crashes in Dunn
- Participation in programs, such as the Pace Car Program or Healthy Dunn Program
- Database of sidewalk, greenway & intersection improvements

Figure 6-4. *Organizations like the Police Athletic League (PAL) could be valuable partners in implementing various programmatic elements of the Pedestrian Plan, especially education components.*

Section 7. Implementation Plan

This section summarizes project, program and policy recommendations into a set of short-term, mid-term and long-term implementation strategies for Dunn.

7.1 Introduction

Completion of the Dunn Pedestrian Plan is only the first step in creating a walkable community. The implementation of the Pedestrian Plan will require a coordinated effort amongst City officials, leaders, and citizen volunteers. This section provides a series of actions steps for moving forward with the recommendations of the Plan, as well as potential funding sources and partners for proposed projects. Additionally, this section identifies a phased implementation schedule that considers priority and cost with the goal of creating a pedestrian-friendly community over the next 20 year horizon.

7.2 Action Steps

Completing the following action steps will help guide the development of the proposed pedestrian network, and create a supportive program and policy environment for a more walkable Dunn. These steps will be crucial in moving forward with the overall recommendations of the Pedestrian Plan.

1) Adopt this Plan. Adoption of this Plan will be the first step to implementation for Dunn. Once adopted, the Plan should be forwarded to regional and state decision-makers, such as the RPO and NCDOT Division office, for inclusion in a regional planning and development processes.

2) Form a Bicycle and Pedestrian Advisory Committee. The pedestrian planning process has engaged many citizens in visioning and goal-setting for Dunn. Building on this momentum to keep citizens engaged in a permanent committee structure will allow continued citizen involvement in the Plan's implementation.

3) Secure funding for the top priority projects. In order for Dunn to become a more pedestrian-friendly city, it must have the priorities and the funding available to proceed with implementation. The City should work to secure funding for implementation of several high-priority projects (see Section 7.3) and develop a long-term funding strategy. This will help reinforce the commitment to the Pedestrian Plan and reaffirm to residents that the Plan is moving forward.

4) Begin work on top priority projects listed in Section 7.3. In addition to committing local funds to high-priority projects in the Pedestrian Plan, the City is in a unique position to work with NCDOT on a local Safe Routes to School (SRTS) project and/or seek other state, national or private funding sources for continued, long-term success in implementing the Plan.

5) Adopt policy changes that support the goals of the Pedestrian Plan. Proposed ordinance changes that will be crucial to balancing the public/private burden of implementing this Pedestrian Plan are listed in Section 6 and below in Section 7.3. These include requiring sidewalks in all new development projects, establishing a street tree ordinance, and requiring the dedication of greenway easements to "bank" land for future trail construction.

6) Embark on complementary planning efforts. The City should incorporate the recommendations of the Pedestrian Plan into future and existing Plans developed and updated at the local, regional and statewide level. For instance, the recommendations of the Dunn Pedestrian Plan should be incorporated into the statewide Comprehensive Transportation Plan, which is currently under development for Division 6.

7) Develop supportive education, encouragement and enforcement programs. Pedestrian facilities alone do not make a town pedestrian-friendly. A variety of programs should also be implemented to create and support a pedestrian-friendly culture. Programs and policy priorities should be implemented alongside infrastructure improvements.

7.3 Project, Program and Policy Priorities

The following tables summarize specific project, policy, and program recommendations that have been made in order of short-term, mid-term, and long-term time frames. Each table should be used by the City as a flexible framework for implementing the recommendations in the Plan – recognizing that it is important to capitalize on unexpected opportunities while also pursuing long term goals. In general, the City should consider working with a wide range of partners, such as those listed in Section 7.3, to implement various elements of the Plan and conduct periodic evaluations of projects, policies and programs after implementation.

Table 7-1. *Spot Improvement Priorities for Dunn's sidewalk network*

Proposed Spot Improvement	From	To	Proposed Action	Length (Feet)	Estimated Cost
Carr	Clinton	Washington	2-block sidewalk gap project	789	$ 59,211
Cumberland	Washington	Wilmington	1-block sidewalk gap project	450	$ 22,500
General Lee	Pearsall	Broad	3-block sidewalk gap project	1118	$ 55,900
Guy*	Granville	Friendly	3-block sidewalk gap project	1160	$ 87,000
Johnson	Burke	Granville	1-block sidewalk gap project	305	$ 22,872
Orange	Surles	Barrington	2.5-block sidewalk gap project	1064	$ 53,183
Pope	Fayetteville	Clinton	3-block sidewalk gap project	1175	$ 58,727
Powell*	Ashe	Friendly	2-block sidewalk gap project	1607	$ 120,525
Vance	Washington	Codrington Park	2-block sidewalk gap project	1337	$100,240

** Indicates added cost for curb & gutter ($25/LF for C&G plus $50/LF for sidewalk)*

Table 7-2. *Short-term Recommendations (1 – 5 years)*

SIDEWALK PROJECTS				
Proposed Sidewalk Location	**From**	**To**	**Length (Feet)**	**Est. Project Cost**
Cumberland 1 (US421)	General Lee	Broad	2527	$126,329
Clinton (US301)	Cleveland	Granville	1721	$86,071
Johnson	Railroad	Magnolia	1077	$80,757
Divine	Canterbury	General Lee	1354	$67,709
Pearsall 1	Watauga	Railroad	4031	$130,550*
Granville 1 (US301)	King	Johnson	2787	$139,348
Magnolia	Edgerton	Johnson	1774	$133,067

POLICIES	
Description	**Type**
Adopt Minimum Sidewalk Requirements	Ordinance
Adopt ROW Dedication Requirement	Ordinance
Adopt Sidewalk and Greenway Connection Requirement	Ordinance
Adopt Street Tree Ordinance	Ordinance
Establish Parking Lot Design and Setback Standards	Ordinance
School Zone Designation	Internal Policy
Establish a Bicycle/Pedestrian Advisory Committee	Planning Effort
Develop a Citywide Bicycle Plan	Planning Effort
Establish Payment In-lieu Policy	Internal Policy/ Ordinance
Signage, Pedestrian Signals and Signal Timing	Internal Policy
Develop a Downtown Streetscape Plan	Planning Effort

PROGRAMS		
Description	**Type**	**Potential Partners**
Safe Routes to School Program	Education	Harnett County Schools
Walk to School Day	Encouragement	Harnett County Schools
DuWalk Signed Route	Encouragement	Chamber of Commerce
Pedestrian Safety Campaign	Education	Dunn Police Department

** 3-blocks (1,420 ft) of existing sidewalk deducted from total estimated cost for Pearsall 1 corridor project*

Table 7-3. *Mid-term Recommendations (6 - 10 years)*

SIDEWALK PROJECTS				
Proposed Sidewalk Location	**From**	**To**	**Length (Feet)**	**Est. Project Cost**
Broad	General Lee	Cumberland	2525	$126,250
McKay 1	Broad	Granville	3217	$241,304
Granville 2 (US301)	Morris	King	2045	$122,657
Edgerton 1	Fayetteville	Wilmington	2714	$135,718
Washington	Hodges	Cleveland	5074	$380,521
Erwin	Tilghman	Cumberland	2534	$126,705
Cumberland 2 (US421)	Broad	Powell	2008	$150,608
Pearsall 2	Elm	Sampson	2475	$185,649
Sampson	Pearsall	Codrington Park	2464	$184,766
Meadowlark	Fairground	Chelsea	3086	$231,473
Elm	Duke	Jackson	3042	$228,181

POLICIES	
Description	**Type**
Curb Ramp Retrofit Program	Internal Policy
Establish Overlay Districts	Ordinance
Parks & Open Space Planning	Planning Effort
Traffic Calming Toolbox	Planning Effort
Establish Sidewalk Petition Process	Internal Policy
Participate in the N.C. Main Streets Program	Planning Effort

PROGRAMS		
Description	**Type**	**Potential Partners**
Healthy Dunn Program	Encouragement	Betsy Johnson Hospital, Harnett Co. Health Dept
Weekly Walking Tours	Encouragement	Dunn-Erwin Trail Committee; Local Boy/Girl Scout Troops
Dunn 5K Walk/Run Event	Encouragement	Chamber of Commerce
Pace Car Program	Enforcement	Dunn Police Department

Table 7-4. *Long-term Recommendations (11+ years)*

SIDEWALK PROJECTS				
Proposed Sidewalk Location	**From**	**To**	**Length (Feet)**	**Est. Project Cost**
Wilson	Edgerton	Granville	2839	$212,908
Spring Branch	Pope	Jackson	4600	$229,991
Friendly	Powell	Fairground	6812	$510,878
McKay 2	Susan Tart	Broad	3678	$275,854
Edgerton 2	Wilmington	Holland	2148	$161,119
Susan Tart	Tilghman	McKay	3613	$271,005
Cumberland 4 (US421)	Sampson	Winterlochen	3860	$289,491
Fairground	US301	Beale	4834	$362,579
Duke	McKay	Hodges	2777	$208,268
Cumberland 3 (US421)	Powell	ETJ (Black River)	3861	$289,563
Tilghman	Susan Tart	Erwin	3275	$245,603
Jackson	Hodges	Spring Branch	2709	$203,188

POLICIES	
Description	**Type**
Develop and Adopt Street Design Criteria	Planning Effort/Ordinance

PROGRAMS		
Description	**Type**	**Potential Partners**
Commuter Challenge Event	Encouragement	Chamber of Commerce
Traffic Enforcement	Enforcement	Dunn Police Department

7.3.1 Other Physical Improvements

In addition to the proposed sidewalk improvements listed in the implementation schedules above, a number of other recommendations have been made throughout the Plan to produce beneficial changes in the pedestrian environment. These include construction of several new greenway trails, which will produce a valuable recreational and transportation asset to Dunn. The final greenway trail recommendations are shown in Table 7-5.

Table 7-5. *Final Greenway Trail Recommendations (in priority order)*

Phase	Proposed Greenway Trail	Total Trail Length	Estimated Cost (Paved Trail)	Estimated Cost (Unpaved Trail)
Short-term	**Downtown Trail**	9,191ft* (1.74 miles) *6,600ft existing sidewalk on Ellis, Broad and Clinton Streets plus 2,591ft new trail along the railroad easement from Ellis to Clinton Streets for a downtown "loop"	$ 343,000 (new trail) + signage	$ 49,000 (new trail) + signage
Mid-term	**School Connector Trail**	8,010 ft (1.52 miles)	$ 1,164,000	$ 152,000
Long-term	**Hanna's Pond Trail**	11,150 ft (2.11 miles)	$ 1,477,000	$ 211,000
Long-term	**Black River Trail**	26,000 ft (4.92 miles)	$ 3,444,000	$ 492,000

Crossing improvements have been recommended in Section 5 of the Pedestrian Plan to enhance pedestrian safety at local intersections and key pedestrian crossings. The proposed crossing improvements, categorized into implementation phases (based on priority) are included in Table 7-6 below.

Table 7-6. *Final Crossing Improvement Recommendations*

Phase	Priority	Crossing Location	Recommended Treatments	Estimated Cost
Short	*1*	**Cumberland St & Wilmington St**	New traffic signal with pedestrian signals and high-visibility crosswalks	$101,200
Short	*2*	**Cumberland St & Washington St**	Standard crosswalks for north-south crossings (Washington St legs)	$200
Short	*3*	**Broad St & Ellis St**	Add crosswalks and pedestrian signals to existing signalized intersection	$5,000
Short	*4*	**Broad St & RR**	Create sidewalk connections; add transition over tracks	$3,200
Short	*5*	**Cumberland St & RR**	Create sidewalk connections; add transition over tracks.	$3,200
Short	*6*	**Harnett St & Ellis St**	Crosswalks and pedestrian signals; "No Right on Red" signage (4 legs)	$5,360
Short	*7*	**Meadowlark Rd & Chelsea St**	Add mobile in-street "Yield to Peds" sign during school hours	$250
Short	*8*	**Granville St & Clinton Ave**	Add crosswalks and pedestrian signals to existing signalized intersection	$5,000
Mid	*9*	**Ashe St & Dunn-Erwin Trail (south)**	Install flashers, crosswalks & advanced "Ped Xing" pavement marking	$5,700
Mid	*10*	**Ashe St & Dunn-Erwin Trail (north)**	Install flashers, crosswalks & advanced "Ped Xing" pavement marking	$5,700
Mid	*11*	**Broad St & General Lee St**	Install high-visibility crosswalks and in-street "Yield to Peds" sign	$2,200
Mid	*12*	**Cumberland St & Broad St**	Tighten curb radii; install median refuge islands, crosswalks, ped signals	$35,000
Mid	*13*	**Fairground Rd & Beale St**	New traffic signal with pedestrian signals and high-visibility crosswalks	$101,200
Mid	*14*	**Cumberland St & Commerce Dr**	Extend median refuge; install crosswalks and pedestrian signals	$9,000
Mid	*15*	**Cumberland St & Briarcliff Rd**	Crosswalks & pedestrian signals; extend median refuge; tighten radii	$35,000
Mid	*16*	**Erwin Rd & Powell Rd**	Add crosswalks and pedestrian signals to existing signalized intersection	$5,000
Mid	*17*	**Cumberland St & Black River Bridge**	Add sidewalks & pedestrian railing to existing bridge	N/A
Mid	*18*	**Cumberland St & Canterbury St**	Further study needed	N/A
Mid	*19*	**Broad St & Orange St**	Install high-visibility crosswalks	$ 1,200
Long	*20*	**Erwin Rd & Tilghman Rd**	New traffic signal with crosswalk & pedestrian signals; tighten curb radii	$121,200
Long	*21*	**Cumberland St & Elm St**	Further study needed	N/A
Long	*22*	**Meadowlark Rd & Beasley St**	Further study needed	N/A
Long	*23*	**Fairground Rd & Sycamore St**	Further study needed	N/A
Long	*NR*	**Granville St & RR**	Transition over tracks when/if sidewalk installed	$3,200
Long	*NR*	**Divine St & RR**	Transition over tracks when/if sidewalk installed	$3,200
Long	*NR*	**Duke St & RR**	Transition over tracks when/if sidewalk installed	$3,200
Long	*NR*	**Edgerton & RR**	Transition over tracks when/if sidewalk installed	$3,200
Long	*NR*	**I-95 Underpass**	Construct pedestrian underpass during future I-95 construction	$4 million

In addition to these formal project recommendations in Section 5, additional recommendations are made in Section 5-4 for the following engineering programs or facilities.

- Create a regular maintenance schedule for existing sidewalks and crosswalks.
- Work with the NCDOT Rail Division and CSX to improve the conditions of pedestrian crossings of the railroad, especially those identified in this Plan, making smoother transitions over the railroad tracks and providing aesthetic enhancements.
- Create pocket parks that provide refuge along a system of walking trails; an example of one such location would be the abandoned rail car location. Connecting these park areas with signature landscaping and gateway treatments would help to improve and coordinate the aesthetics of the City.
- Consider developing a pedestrian focus area at East Denim Drive/Erwin Road and Powell Avenue to accommodate the new residential development taking place at this location, and that could be connected to nearby shopping opportunities.
- Provide pedestrian-scale lighting, street trees and landscaping, alleyway improvements and other enhancements to the downtown walking environment during upcoming streetscaping project in Downtown Dunn.
- Improve local alleyways to make them more user-friendly for pedestrians through better lighting and landscaping. One recommended improvement would be to enhance the attractiveness of the alley connecting planned Parking Lot #2 to Broad Street, potentially converting it to a pedestrian-only access at some future time. Other immediate options would be to install lighting and use landscaping planters to create a nice pedestrian walkway.
- Formalize a citywide 35mph speed limit (unless otherwise signed) and post related warning signs at the gateway entrances into the City, such as off of I-95.
- Create a system of pedestrian wayfinding signs and complementary route maps for the downtown walking trail and the “DuWalk” routes (proposed in Section 6).
- Consider the use of in-street “Yield to Pedestrians” signage at problem intersections.
- Install street lighting as necessary along dark corridors for pedestrian safety.

7.4 Partnership Opportunities

Many of the education, encouragement and enforcement programs will be carried out by partnerships between City departments, local nonprofit and civic organizations, business owners, developers and others. Creating strong partners in the citywide effort to improve pedestrian safety and increase walkability will help spread the word and awareness, as well as lead to programs that can withstand the test of time. Potential partners for implementation of the Dunn Pedestrian Plan include:

- Dunn Chamber of Commerce
- Harnett County Health Department
- Dunn-Erwin Trail Committee
- Betsy-Johnson Memorial Hospital
- City of Dunn Recreation Commission
- Local Neighborhoods Associations
- Police Athletic League
- Harnett County School System
- Local Parent Teacher Associations (PTAs)
- City of Dunn Police Department
- Harnett County Sheriff's Department
- City of Dunn Parks & Recreation Department
- Local Kiwanis, Lions and Rotary Clubs
- Women's Club of Dunn

Figure 7-1. Organizations like the Dunn Chamber of Commerce could be valuable partners in implementing various programmatic elements of the Pedestrian Plan, especially education and encouragement components.

7.5 Program Evaluation

Evaluation is a useful tool for measuring local progress after the adoption of a Plan. Following up on program activities to verify successes and make changes as needed, and tracking key indicators such as crash statistics, can help provide a focus for future implementation and re-evaluate new needs. It is recommended that the City of Dunn consider working with a citizen committee, such as the Recreation Committee or a new Bicycle/Pedestrian/SRTS Advisory Committee to help implement the Plan, track successes, re-evaluate needs and help to conduct future Plan updates. Key indicators that City staff, citizens and committee members might track include:

- Number of students walking/biking to school

- Records of pedestrian crashes in Dunn
- Participation in programs, such as the Pace Car Program or Healthy Dunn Program
- Database of sidewalk, greenway & intersection improvements

7.6 Funding

Pedestrian facilities are constructed – and therefore funded – through a number of avenues. Funding can be divided into four categories: local, state, federal, and private funding. The following paragraphs describe some of the more prominent sources in each category. Dunn should tap into all of these sources, and search for others as well, in order to take advantage of the funds available.

7.6.1 Local Funding

Currently, Dunn does not have an annual budget line item specifically for pedestrian improvements. In the future, Dunn may wish to consider creating a specific annual budget item to set aside funds for improving pedestrian facilities, especially "spot improvements" to the local sidewalk network. A specific budget item is the most direct way to ensure that funding for pedestrian facilities is available, but sometimes a city's budget may be too limited to finance this work. Pedestrian facilities can also be built through "incidental" projects, by ensuring that such features are constructed with any new projects or improvements, such as parks and recreation facilities, libraries, schools, and new roads. In addition, future private development should be reviewed for adequate pedestrian access and connections. As discussed in the policy recommendations of *Section 6: Programs and Policy Recommendations*, this may mean the City should require developers to install sidewalk with new construction. The City should also consider teaming with other organizations that may have their own projects in Dunn, such as the Dunn-Erwin Trail Committee, the Mid-Carolina Council of Government (RPO) and the North Carolina Department of Transportation.

Municipalities also often plan for the funding of pedestrian facilities or improvements through development of Capital Improvement Programs (CIP). Typical capital funding mechanisms include the following: capital reserve fund, capital protection ordinances, municipal service district, tax increment financing, taxes, fees, and bonds. Each of these categories is described below.

- **Capital Reserve Fund.** Municipalities have statutory authority to create capital reserve funds for any capital purpose, including pedestrian facilities. The reserve fund must be created through ordinance or resolution that states the purpose of the fund, the duration of the fund, the approximate amount of the fund, and the source of revenue for the fund. Sources of revenue can include general fund allocations, fund balance allocations, grants and donations for the specified use.
- **Capital Project Ordinances.** Municipalities can pass Capital Project Ordinances that are project specific. The ordinance identifies and makes appropriations for the project.
- **Municipal Service District.** Municipalities have statutory authority to establish municipal service districts, to levy a property tax in the district additional to the citywide property tax, and to use the proceeds to provide services in the district. Downtown revitalization projects are one of the eligible uses of service districts.
- **Tax Increment Financing.** Tax increment financing is a tool to use future gains in taxes to finance the current improvements that will create those gains. When a public project, such as the construction of a greenway, is carried out, there is an increase in the value of surrounding real estate. Oftentimes, new investment in the area follows such a project. This increase sit value and investment creates more taxable property, which increases tax revenues. These increased revenues can be referred to as the "tax increment." Tax Increment Financing dedicates that increased revenue to finance debt issued to pay for the project. TIF is designed to channel funding toward improvements in distressed or underdeveloped areas where development would not otherwise occur. TIF creates funding for public projects that may otherwise be unaffordable to localities. The large majority of states have enabling legislation for tax increment financing.
- **Installment Purchase Financing.** As an alternative to debt financing of capital improvements, communities can execute installment/ lease purchase contracts for improvements. This type of financing is typically used for relatively small projects that the seller or a financial institution is willing to finance or when up-front funds are unavailable. In a lease purchase contract the community leases the property or improvement from the seller or financial institution. The lease is paid in installments that include principal, interest, and associated costs. Upon completion of the lease period, the community owns

the property or improvement. While lease purchase contracts are similar to a bond, this arrangement allows the community to acquire the property or improvement without issuing debt. These instruments, however, are more costly than issuing debt.

- **Taxes.** Many communities have raised money through self-imposed increases in taxes and bonds. For example, Pinellas County residents in Florida voted to adopt a one-cent sales tax increase, which provided an additional $5 million for the development of the overwhelmingly popular Pinellas Trail. Sales taxes have also been used in Allegheny County, Pennsylvania, and in Boulder, Colorado to fund open space projects. A gas tax is another method used by some municipalities to fund public improvements. A number of taxes provide direct or indirect funding for the operations of local governments. Some of them are:
  - *Sales Tax.* In North Carolina, the State has authorized a sales tax at the state and county levels. Local governments that choose to exercise the local option sales tax (all counties currently do), use the tax revenues to provide funding for a wide variety of projects and activities. Any increase in the sales tax, even if applying to a single county, must gain approval of the state legislature.
  - *Property Tax.* Property taxes generally support a significant portion of a municipality's activities. However, the revenues from property taxes can also be used to pay debt service on general obligation bonds issued to finance greenway system acquisitions. Because of limits imposed on tax rates, use of property taxes to fund greenways could limit the municipality's ability to raise funds for other activities. Property taxes can provide a steady stream of financing while broadly distributing the tax burden. In other parts of the country, this mechanism has been popular with voters as long as the increase is restricted to parks and open space. Note, other public agencies compete vigorously for these funds, and taxpayers are generally concerned about high property tax rates.
  - *Excise Taxes.* Excise taxes are taxes on specific goods and services. These taxes require special legislation and the use of the funds generated through the tax are limited to specific uses. Examples include lodging, food, and beverage taxes that generate funds for promotion of tourism, and the gas tax that generates revenues for transportation related activities.
  - *Occupancy Tax.* The NC General Assembly may grant towns the authority to levy occupancy tax on hotel and motel rooms. The act granting the

taxing authority limits the use of the proceeds, usually for tourism-promotion purposes.

- **Fees.** Three fee options that have been used by local governments to assist in funding pedestrian and bicycle facilities are listed here:
  - *Stormwater Utility Fees.* Greenway sections may be purchased with stormwater fees, if the property in question is used to mitigate floodwater or filter pollutants. Stormwater charges are typically based on an estimate of the amount of impervious surface on a user's property. Impervious surfaces (such as rooftops and paved areas) increase both the amount and rate of stormwater runoff compared to natural conditions. Such surfaces cause runoff that directly or indirectly discharges into public storm drainage facilities and creates a need for stormwater management services. Thus, users with more impervious surface are charged more for stormwater service than users with less impervious surface. The rates, fees, and charges collected for stormwater management services may not exceed the costs incurred to provide these services. The costs that may be recovered through the stormwater rates, fees, and charges includes any costs necessary to assure that all aspects of stormwater quality and quantity are managed in accordance with federal and state laws, regulations, and rules.
  - *Streetscape Utility Fees.* Streetscape Utility Fees could help support streetscape maintenance of the area between the curb and the property line through a flat monthly fee per residential dwelling unit. Discounts would be available for senior and disabled citizens. Non-residential customers would be charged a per foot fee based on the length of frontage on streetscape improvements. This amount could be capped for non-residential customers with extremely large amounts of street frontage. The revenues raised from Streetscape Utility fees would be limited by ordinance to maintenance (or construction and maintenance) activities in support of the streetscape.
  - *Impact Fees.* Developers can be required to provide greenway impact fees through local enabling legislation. Impact fees, which are also known as capital contributions, facilities fees, or system development charges, are typically collected from developers or property owners at the time of building permit issuance to pay for capital improvements that provide capacity to serve new growth. The intent of these fees is to avoid burdening existing customers with the costs of providing capacity to serve

new growth ("growth pays its own way"). Greenway impact fees are designed to reflect the costs incurred to provide sufficient capacity in the system to meet the additional needs of a growing community. These charges are set in a fee schedule applied uniformly to all new development. Communities that institute impact fees must develop a sound financial model that enables policy makers to justify fee levels for different user groups, and to ensure that revenues generated meet (but do not exceed) the needs of development. Factors used to determine an appropriate impact fee amount can include: lot size, number of occupants, and types of subdivision improvements. If Holly Springs is interested in pursuing open space impact fees, it will require enabling legislation to authorize the collection of the fees.

- **Exactions.** Exactions are similar to impact fees in that they both provide facilities to growing communities. The difference is that through exactions it can be established that it is the responsibility of the developer to build the greenway or pedestrian facility that crosses through the property, or adjacent to the property being developed.
- **Payment In-Lieu Fees.** As an alternative to requiring developers to dedicate on-site sidewalk or greenway sections that would serve their development, some communities provide a choice of paying a front-end charge for off-site protection of pieces of the larger system. Payment is generally a condition of development approval and recovers the cost of the off-site land acquisition or the development's proportionate share of the cost of a regional facility serving a larger area. Some communities prefer payment in-lieu fees. This alternative allows community staff to purchase land worthy of protection rather than accept marginal land that meets the quantitative requirements of a developer dedication but falls a bit short of qualitative interests.
- **Bonds and Loans.** Bonds have been a very popular way for communities across the country to finance their pedestrian and greenway projects. A number of bond options are listed below. Contracting with a private consultant to assist with this program may be advisable. Since bonds rely on the support of the voting population, an education and awareness program should be implemented prior to any vote. Billings, Montana used the issuance of a bond in the amount of $599,000 to provide the matching funds for several of their TEA-21 enhancement dollars. Austin, Texas has also used bond issues to fund a portion of their bicycle and trail system.

- *Revenue Bonds.* Revenue bonds are bonds that are secured by a pledge of the revenues from a certain local government activity. The entity issuing bonds, pledges to generate sufficient revenue annually to cover the program's operating costs, plus meet the annual debt service requirements (principal and interest payment). Revenue bonds are not constrained by the debt ceilings of general obligation bonds, but they are generally more expensive than general obligation bonds.
- *General Obligation Bonds.* Cities, counties, and service districts generally are able to issue general obligation (G.O.) bonds that are secured by the full faith and credit of the entity. In this case, the local government issuing the bonds pledges to raise its property taxes, or use any other sources of revenue, to generate sufficient revenues to make the debt service payments on the bonds. A general obligation pledge is stronger than a revenue pledge, and thus may carry a lower interest rate than a revenue bond. Frequently, when local governments issue G.O. bonds for public enterprise improvements, the public enterprise will make the debt service payments on the G.O. bonds with revenues generated through the public entity's rates and charges. However, if those rate revenues are insufficient to make the debt payment, the local government is obligated to raise taxes or use other sources of revenue to make the payments. G.O. bonds distribute the costs of land acquisition and greenway development and make funds available for immediate purchases and projects. Voter approval is required.
- *Special Assessment Bonds.* Special assessment bonds are secured by a lien on the property that benefits by the improvements funded with the special assessment bond proceeds. Debt service payments on these bonds are funded through annual assessments to the property owners in the assessment area.
- *State Revolving Fund (SRF) Loans.* Initially funded with federal and state money, and continued by funds generated by repayment of earlier loans, State Revolving Funds (SRFs) provide low interest loans for local governments to fund water pollution control and water supply projects including many watershed management activities. These loans typically require a revenue pledge, like a revenue bond, but carry a below market interest rate and limited term for debt repayment (20 years).

- **Facility Maintenance Districts.** Facility Maintenance Districts (FMDs) can be created to pay for the costs of on-going maintenance of public facilities and

landscaping within the areas of the Town where improvements have been concentrated and where their benefits most directly benefit business and institutional property owners. An FMD is needed in order to assure a sustainable maintenance program. Fees may be based upon the length of lot frontage along streets where improvements have been installed, or upon other factors such as the size of the parcel. The program supported by the FMD should include regular maintenance of streetscape of off road trail improvements. The municipality can initiate public outreach efforts to merchants, the Chamber of Commerce, and property owners. In these meetings, Town staff will discuss the proposed apportionment and allocation methodology and will explore implementation strategies. The municipality can manage maintenance responsibilities either through its own staff or through private contractors.

7.6.2 State Transportation Funding

Dunn should also consider reaching out to state and national funding sources for assistance in constructing pedestrian facilities. State and national funding are a combined category because many of the state entities administer national funds. The North Carolina Department of Transportation (NCDOT) is the single largest source of funding available to Dunn for pedestrian facilities, with the following potential funding sources:

- **State Transportation Improvement Program (STIP)** – This program is the overall funding source for study, design, and construction of major transportation projects, including pedestrian facilities, in the state. Frequently, projects funded by the STIP are also partly funded by other sources, including matching funds from local municipalities. Pedestrian facilities are eligible for funding from this program as independent projects separate from a roadway construction, widening, or some other sort of roadway work, but one of the most cost-effective and efficient ways to gain funding for pedestrian facility construction is to incorporate them as incidental to a larger project. Overall, most pedestrian accommodations within the state are made as incidental improvements.

  In North Carolina, the Department of Transportation, Division of Bicycle and Pedestrian Transportation (DBPT, or "Division") manages the Transportation Improvement Program (TIP) selection process for independent bicycle and pedestrian projects. Projects programmed into the TIP as "independent

projects" are those which are not related to a scheduled highway project. "Incidental projects" – those related to a scheduled highway project – are bicycle and pedestrian accommodations, such as sidewalks, included as incidental features of highway projects. In addition, pedestrian-safe railings are a standard feature of all highway construction. Most bicycle and pedestrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of National Highway System funds and State Highway Trust Funds.

The Division has an annual budget of $6 million. Eighty percent of these funds are from STP-Enhancement funds[i], while the State Highway Trust Fund provides the remaining 20 percent of the funding. Each year, the DBPT regularly sets aside a total of $200,000 of TIP funding for NCDOT to fund projects such as training workshops, pedestrian safety and research projects, and other pedestrian needs statewide. Those interested in learning about training workshops, research and other opportunities should contact the DBPT for information.

A total of $5.3 million dollars of TIP funding is available for funding various bicycle and pedestrian independent projects, including the construction of multi-use trails, the striping of bicycle lanes, and the construction of paved shoulders, among other facilities. Prospective applicants are encouraged to contact the DBPT regarding funding assistance for bicycle and pedestrian projects. For a detailed description of the TIP project selection process, visit: http://www.ncdot.org/transit/bicycle/funding/funding_TIP.html.

- **Transportation Enhancement Program** - The Enhancement Unit administers a portion of the enhancement funding set-aside through the Call for Projects process. In North Carolina the Enhancement Program is a federally funded cost reimbursement program with a focus upon improving the transportation experience in and through local North Carolina communities either culturally, aesthetically or environmentally. The program seeks to encourage diverse modes of travel, increase benefits to communities and to encourage citizen involvement. This is accomplished through the following twelve qualifying activities:

1. Bicycle and Pedestrian Facilities
2. Bicycle and Pedestrian Safety
3. Acquisition of Scenic Easements, Scenic or Historic Sites
4. Scenic or Historic Highway Programs (including tourist or welcome centers)

5. Landscaping and other Scenic Beautification
6. Historic Preservation
7. Rehabilitation of Historic Transportation Facilities
8. Preservation of Abandoned Rail Corridors
9. Control of Outdoor Advertising
10. Archaeological Planning and Research
11. Environmental Mitigation
12. Transportation Museums

Funds are allocated based on an equity formula approved by the Board of Transportation. The formula is applied at the county level and aggregated to the regional level. Available fund amount varies. In previous Calls, the funds available ranged from $10 million to $22 million. The Call process takes place on even numbered years or as specified by the Secretary of Transportation. The Next Call is anticipated to take place in 2009. For more information, visit: www.ncdot.org/financial/fiscal/Enhancement.

- **Spot Improvement Program** - The NCDOT Bicycle and Pedestrian Transportation Division budgets $500,000/year for "spot" safety improvements throughout the State. These improvements include items such as signing, grate replacement, bike rack installations, hazard remediation at skewed railroad crossings, and other small-scale improvements. The Spot Improvement Program is used only for bicycle and pedestrian projects; however, it should not be viewed as a priority source for funding identified projects. It is typically used for small-scale and special-situation projects that are not of a significantly large enough scale to merit being a TIP project. Taking these requirements into consideration, proposals for projects should be submitted directly to the Bicycle & Pedestrian Transportation Division.

- **Small Urban Funds** – Small Urban Funds are available for small improvement projects in urban areas. Each NCDOT Highway Division has $2 million of small urban funds available annually. Although not commonly used for bicycle facilities, local requests for small bicycle projects can be directed to the NCDOT Highway Division office for funding through this source. A written request should be submitted to the Division Engineer providing technical information such as location, improvements being requested, timing, etc. for thorough review.

- **Hazard Elimination Program** – This program focuses on projects intended for locations that should have a documented history of previous crashes. Bicycle

and pedestrian projects are eligible for this program, although the funds are not usually used for this purpose. This program is administered through the NCDOT Division of Highways. Similar to the Small Urban Funds, it is a significantly limited funding source.

- **Powell Bill Funds** – Annually, State street-aid (Powell Bill) allocations are made to incorporated municipalities which establish their eligibility and qualify as provided by statute. This program is a state grant to municipalities for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways. Funding for this program is collected from fuel taxes. Amount of funds are based on population and mileage of town-maintained streets. For more information, visit www.ncdot.org/financial/fiscal/ExtAuditBranch/Powell_Bill/powellbill.html.

- **Governor's Highway Safety Program (GHSP)** – The mission of the GHSP is to promote highway safety awareness and reduce the number of traffic crashes in the state of North Carolina through the planning and execution of safety programs. GHSP funding is provided through an annual program, upon approval of specific project requests. Amounts of GHSP funds vary from year to year, according to the specific amounts requested. Communities may apply for a GHSP grant to be used as seed money to start a program to enhance highway safety. Once a grant is awarded, funding is provided on a reimbursement basis. Evidence of reductions in crashes, injuries, and fatalities is required. For information on applying for GHSP funding, visit: www.ncdot.org/programs/ghsp/.

- **Sidewalk Program** – Each year, a total of $1.4 million in STP-Enhancement funding is set aside for sidewalk construction, maintenance and repair. Each of the 14 highway divisions across the state receives $100,000 annually for this purpose. Funding decisions are made by the district engineer. Prospective applicants are encouraged to contact their district engineer for information on how to apply for funding.

- **Safe Routes to School Program** –The NCDOT Safe Routes to School Program is a federally funded program that was initiated by the passing of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005, which establishes a national SRTS program to distribute

funding and institutional support to implement SRTS programs in states and communities across the country. SRTS programs facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. The Division of Bicycle and Pedestrian Transportation at NCDOT is charged with disseminating SRTS funding. The State of North Carolina has been allocated $15 million in Safe Routes to School funding for fiscal years 2005 through 2009 for infrastructure or non-infrastructure projects. All proposed projects must relate to increasing walking or biking to and from an elementary or middle school. An example of a non-infrastructure project is an education or encouragement program to improve rates of walking and biking to school. An example of an infrastructure project is construction of sidewalks around a school. Infrastructure improvements under this program must be made within 2 miles of an elementary or middle school. The state requires the completion of a competitive application to apply for funding. For more information, visit www.ncdot.org/programs/safeRoutes or contact the DBPT / NCDOT at (919) 807-0774.

- **Community Development Block Grants (CDBG)** – CDBG funding is intended to help communities provide housing, create suitable living environments, and expand economic opportunities primarily in low- and medium-income areas. Dunn could use these grant funds for recreation facilities and planning. It should be noted that CDBG Funds are highly competitive and the requirements are extensive. For more information, please see: www.hud.gov/offices/cpd/communitydevelopment/programs.

7.6.3 Other State Funding Sources

Several other North Carolina-sponsored opportunities for acquiring planning, design, and / or construction monies are available through state-level institutions that are not associated with the Department of Transportation. These opportunities are described briefly below.

- **The North Carolina Conservation Tax Credit (managed by NCDENR).** This program, managed by the North Carolina Department of Environment and Natural Resources, provides an incentive (in the form of an income tax credit) for landowners that donate interests in real property for conservation purposes. Property donations can be fee simple or in the form of conservation easements or bargain sale. The goal of this program is to manage stormwater,

protect water supply watersheds, retain working farms and forests, and set-aside greenways for ecological communities, public trails, and wildlife corridors. For more information, visit: www.enr.state.nc.us/conservationtaxcredit/.

- **Land and Water Conservation Fund (LWCF).** The Land and Water Conservation Fund (LWCF) program is a reimbursable, 50/50 matching grants program to states for conservation and recreation purposes, and through the states to local governments to address "close to home" outdoor recreation needs. LWCF grants can be used by communities to build a trail within one park site, if the local government has fee-simple title to the park site. Grants for a maximum of $250,000 in LWCF assistance are awarded yearly to county governments, incorporated municipalities, public authorities and federally recognized Indian tribes. The local match may be provided with in-kind services or cash. The program's funding comes primarily from offshore oil and gas drilling receipts, with an authorized expenditure of $900 million each year. However, Congress generally appropriates only a small fraction of this amount. The allotted money for the year 2007 is $632,846. The Land and Water Conservation Fund (LWCF) has historically been a primary funding source of the US Department of the Interior for outdoor recreation development and land acquisition by local governments and state agencies. In North Carolina, the program is administered by the Department of Environment and Natural Resources. Since 1965, the LWCF program has built a permanent park legacy for present and future generations. In North Carolina alone, the LWCF program has provided more than $63 million in matching grants to protect land and support more than 800 state and local park projects. More than 37,000 acres have been acquired with LWCF assistance to establish a park legacy in our state. For more information, visit: http://ils.unc.edu/parkproject/lwcf/home1.html.
- **NC Adopt-A-Trail Grant Program.** This program, operated by the Trails Section of the NC Division of State Parks, offers annual grants to local governments to build, renovate, maintain, sign and map and create brochures for pedestrian trails. Grants are generally capped at about $5,000 per project and do not require a match. A total of $108,000 in Adopt-A-Trail money is awarded annually to government agencies. Applications are due during the month of February. For more information, visit: http://ils.unc.edu/parkproject/trails/grant.html.

- **Recreational Trails Program.** The Recreational Trails Program (RTP) is a grant program funded by Congress with money from the federal gas taxes paid on fuel used by off-highway vehicles. This program's intent is to meet the trail and trail-related recreational needs identified by the Statewide Comprehensive Outdoor Recreation Plan. Grant applicants must be able contribute 20% of the project cost with cash or in-kind contributions. The program is managed by the State Trails Program, which is a section of the N.C. Division of Parks and Recreation. The grant application is available and instruction handbook is available through the State Trails Program website at http://ils.unc.edu/parkproject/trails/home.html. Applications are due during the month of February. For more information, call (919) 715-8699.

- **North Carolina Parks and Recreation Trust Fund (PARTF).** The fund was established in 1994 by the North Carolina General Assembly and is administered by the Parks and Recreation Authority. Through this program, several million dollars each year are available to local governments to fund the acquisition, development and renovation of recreational areas. PARTF funds are allocated through the North Carolina Trails Program to help fund beach accesses, state trail systems, and local trail construction efforts. Applicable projects require a 50/50 match from the local government. Grants for a maximum of $500,000 are awarded yearly to county governments or incorporated municipalities. The fund is fueled by money from the state's portion of the real estate deed transfer tax for property sold in North Carolina. For this last, the City of Wilson would need to apply for the grant (although joint applications – for example, with the Wilson County Public School System – are permissible, one agency must serve as the lead sponsor), which is a one-to-one match on local funds. Only about 30% of the PARTF program goes to fund local trail programs, and the selection process is therefore highly competitive. Selection is based on numerous factors including geographic equity, population size, and scoring criteria that notably incorporate the following: presence of planning documents that support the project; public outreach that shows support; site suitability; size/impact of project; and commitment to operating and maintaining the project upon completion. As with most grant programs, the sponsor should be prepared to adhere closely to the rules governing the grant program, including the preparation of detailed expenditure reports and requests for reimbursement (www.ncparks.gov/About/grants/partf_main.php). For information on how to apply, visit: www.partf.net/learn.html.

- **Clean Water Management Trust Fund.** This fund was established in 1996 and has become one of the largest sources of money in North Carolina for land and water protection. At the end of each fiscal year, 6.5 percent of the unreserved credit balance in North Carolina's General Fund, or a minimum of $30 million, is placed in the CWMTF. The revenue of this fund is allocated as grants to local governments, state agencies and conservation non-profits to help finance projects that specifically address water pollution problems. CWMTF funds may be used to establish a network of riparian buffers and greenways for environmental, educational, and recreational benefits. The fund has provided funding for land acquisition of numerous greenway projects featuring trails, both paved and unpaved. For a history of awarded grants in North Carolina and more information about this fund and applications, visit www.cwmtf.net/.
- **Natural Heritage Trust Fund.** This trust fund, managed by the NC Natural Heritage Program, has contributed millions of dollars to support the conservation of North Carolina's most significant natural areas and cultural heritage sites. The NHTF is used to acquire and protect land that has significant habitat value. Some large wetland areas may also qualify, depending on their biological integrity and characteristics. Only certain state agencies are eligible to apply for this fund, including the Department of Environment and Natural Resources, the Wildlife Resources Commission, the Department of Cultural Resources and the Department of Agriculture and Consumer Services. As such, municipalities must work with State level partners to access this fund. Additional information is available from the NC Natural Heritage Program. For more information and grant application information, visit www.ncnhtf.org/.
- **North Carolina Conservation Tax Credit Program.** North Carolina has a unique incentive program to assist land-owners to protect the environment and the quality of life. A credit is allowed against individual and corporate income taxes when real property is donated for conservation purposes. Interests in property that promote specific public benefits may be donated to a qualified recipient. Such conservation donations qualify for a substantial tax credit. For more information, visit: www.enr.state.nc.us/conservationtaxcredit/.
- **Urban and Community Forestry Assistance Program.** This program offers small grants that can be used to plant urban trees, establish a community arboretum, or other programs that promote tree canopy in urban areas. The

program operates as a cooperative partnership between the NC Division of Forest Resources and the USDA Forest Service, Southern Region. To qualify for this program, a community must pledge to develop a street-tree inventory, a municipal tree ordinance, a tree commission, and an urban forestry-management plan. All of these can be funded through the program. For more information, contact the NC Division of Forest Resources. For more information and a grant application, contact the NC Division of Forest Resources and/or visit http://www.dfr.state.nc.us/urban/urban_grantprogram.htm.

- **Ecosystem Enhancement Program.** Developed in 2003 as a new mechanism to facilitate improved mitigation projects for NC highways, this program offers funding for restoration projects and for protection projects that serve to enhance water quality and wildlife habitat in NC. Information on the program is available by contacting the Natural Heritage Program in the NC Department of Environment and Natural Resources (NCDENR). For more information, visit www.nceep.net/pages/partners.html or call 919-715-0476.
- **Conservation Reserve Enhancement Program (CREP).** This program is a joint effort of the North Carolina Division of Soil and Water Conservation, the NC Clean Water Management Trust Fund, the Ecosystem Enhancement Program (EEP), and the Farm Service Agency - United States Department of Agriculture (USDA) to address water quality problems of the Neuse, Tar-Pamlico and Chowan river basins as well as the Jordan Lake watershed area. CREP is a voluntary program that seeks to protect land along watercourses that is currently in agricultural production. The objectives of the program include: installing 100,000 acres of forested riparian buffers, grassed filter strips and wetlands; reducing the impacts of sediment and nutrients within the targeted area; and providing substantial ecological benefits for many wildlife species that are declining in part as a result of habitat loss. Program funding will combine the Federal Conservation Reserve Program (CRP) funding with State funding from the Clean Water Management Trust Fund, Agriculture Cost Share Program, and North Carolina Wetlands Restoration Program. The program is managed by the NC Division of Soil and Water Conservation. For more information, visit www.enr.state.nc.us/dswc/pages/crep.html.
- **Agriculture Cost Share Program.** Established in 1984, this program assists farmers with the cost of installing best management practices (BMPs) that benefit water quality. The program covers as much as 75 percent of the costs to implement BMPs. The NC Division of Soil and Water Conservation within the

NC Department of Environment and Natural Resources administers this program through local Soil and Water Conservation Districts (SWCD). For more information, visit www.enr.state.nc.us/DSWC/pages/agcostshareprogram.html or call 919-733-2302.

- **Water Resources Development Grant Program.** The NC Division of Water Resources offers cost-sharing grants to local governments on projects related to water resources. Of the seven project application categories available, the category which relates to the establishment of greenways is "Land Acquisition and Facility Development for Water-Based Recreation Projects." Applicants may apply for funding for a greenway as long as the greenway is in close proximity to a water body. For more information, see: www.ncwater.org/Financial_Assistance or call 919-733-4064.
- **The North Carolina Division of Forest Resources.** Urban and Community Forestry Grant can provide funding for a variety of projects that will help toward planning and establishing street trees as well as trees for urban open space. For more information, refer to the following website: http://www.dfr.state.nc.us/urban/urban_ideas.htm.
- **Small Cities Community Development Block Grants.** State level funds are allocated through the NC Department of Commerce, Division of Community Assistance to be used to promote economic development and to serve low-income and moderate-income neighborhoods. Greenways that are part of a community's economic development plans may qualify for assistance under this program. Recreational areas that serve to improve the quality of life in lower income areas may also qualify. Approximately $50 million is available statewide to fund a variety of projects. For more information, visit www.hud.gov/offices/cpd/communitydevelopment/programs/stateadmin or call 919-733-2853.
- **North Carolina Health and Wellness Trust Fund.** The NC Health and Wellness Trust Fund was created by the General Assembly as one of 3 entities to invest North Carolina's portion of the Tobacco Master Settlement Agreement. HWTF receives one-fourth of the state's tobacco settlement funds, which are paid in annual installments over a 25-year period. Fit Together, a partnership of the NC Health and Wellness Trust Fund (HWTF) and Blue Cross and Blue Shield of North Carolina (BCBSNC) established the Fit Community designation and grant program to recognize and rewards North Carolina communities' efforts

to support physical activity and healthy eating initiatives, as well as tobacco-free school environments. Fit Community is one component of the jointly sponsored Fit Together initiative, a statewide prevention campaign designed to raise awareness about obesity and to equip individuals, families and communities with the tools they need to address this important issue. All North Carolina municipalities and counties are eligible to apply for a Fit Community designation, which will be awarded to those that have excelled in supporting physical activity, healthy eating and tobacco use prevention in communities, schools, and workplaces.

Designations are valid for two years, and designated communities may have the opportunity to reapply for subsequent two-year extensions. The benefits of being a Fit Community include heightened statewide attention that can help bolster local community development and/or economic investment initiatives (highway signage and a plaque for the Mayor's or County Commission Chair's office will be provided), as well as the use of the Fit Community designation logo for promotional and communication purposes.

The application for Fit Community designation is available on the Fit Together Web site: www.FitTogetherNC.org/FitCommunity.aspx. Fit Community grants are designed to support innovative strategies that help a community meet its goal to becoming a Fit Community. Eight to nine, two-year grants of up to $30,000 annually will be awarded to applicants that have a demonstrated need, proven capacity, and opportunity for positive change in addressing physical activity and/or healthy eating. For more information, visit: www.healthwellnc.com.

7.6.4 Federal Funding Sources

Federal transportation dollars are used for a number of the funding programs listed in Section 7.6.3, however other non-transportation programs are available through the federal government to fund pedestrian facilities, many of which are geared toward parks and recreation, natural resource conservation and environmental stewardship. These funding options are as follows:

- **Wetlands Reserve Program.** This federal funding source is a voluntary program offering technical and financial assistance to landowners who want to restore and protect wetland areas for water quality and wildlife habitat. The US Department of Agriculture's Natural Resource Conservation Service (USDA-NRCS) administers the program and provides direct payments to private

landowners who agree to place sensitive wetlands under permanent easements. This program can be used to fund the protection of open space and greenways within riparian corridors. For more information, visit http://www.nrcs.usda.gov/PROGRAMS/wrp/.

- **The Community Development Block Grant (HUD-CDBG).** The U.S. Department of Housing and Urban Development (HUD) offers financial grants to communities for neighborhood revitalization, economic development, and improvements to community facilities and services, especially in low and moderate income areas. Several communities have used HUD funds to develop greenways, including the Boulding Branch Greenway in High Point, North Carolina. Grants from this program range from $50,000 to $200,000 and are either made to municipalities or non-profits. There is no formal application process. For more information, visit: www.hud.gov/offices/cpd/communitydevelopment/programs/.
- **USDA Rural Business Enterprise Grants.** Public and private nonprofit groups in communities with populations under 50,000 are eligible to apply for grant assistance to help their local small business environment. $1 million is available for North Carolina on an annual basis and may be used for sidewalk and other community facilities. For more information from the local USDA Service Center, visit: http://www.rurdev.usda.gov/rbs/busp/rbeg.htm.
- **Rivers, Trails and Conservation Assistance Program (RTCA).** The Rivers, Trails, and Conservation Assistance Program, also known as the Rivers and Trails Program or RTCA, is the community assistance arm of the National Park Service. RTCA staff provides technical assistance to community groups and local, State, and federal government agencies so they can conserve rivers, preserve open space, and develop trails and greenways. The RTCA program implements the natural resource conservation and outdoor recreation mission of the National Park Service in communities across America. Although the program does not provide funding for projects, it does provide valuable on-the-ground technical assistance, from strategic consultation and partnership development to serving as liaison with other government agencies. Communities must apply for assistance. For more information, visit: www.nps.gov/ncrc/programs/rtca or call Chris Abbett, Program Leader, at 404-562-3175 ext. 522.
- **Public Lands Highways Discretionary Fund.** The Federal Highway Administration administers discretionary funding for projects that will reduce

congestion and improve air quality. The FHWA issues a call for projects to disseminate this funding. The FHWA estimates that the PLHD funding for the 2007 call will be $85 million. In the past, Congress has earmarked a portion of the total available funding for projects. For information on how to apply, visit: http://www.fhwa.dot.gov/discretionary/.

7.6.5 Private Funding and Partnerships

Another method of funding pedestrian systems and greenway trails is to partner with public agencies, private companies and/or not-for-profit organizations. Contrary to NCDOT and federal funding, most private funding sources offer limited grants. In addition, public-private partnerships engender a spirit of cooperation, civic pride and community participation. The key to the involvement of private partners is to make a compelling argument for their participation. Major employers and developers should be identified and provided with a "Benefits of Walking" handout for themselves and their employees. Very specific routes that make critical connections to place of business would be targeted for private partners' monetary support following a successful master planning effort. Potential partners include major employers which are located along or accessible to pedestrian facilities such as multi-use paths or greenways. Name recognition for corporate partnerships could be accomplished through trailhead signage or interpretive signage along greenway systems. Utilities often make good partners and many trails now share corridors with them. Money raised from providing an easement to utilities can help defray the costs of maintenance. It is important to have a lawyer review the legal agreement and verify ownership of the subsurface, surface or air rights in order to enter into an agreement.

The following paragraph provides a description of some private funding sources that Dunn might consider.

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

other than cash could include donations of services, equipment, labor, or reduced costs for supplies.

- **Volunteer Work.** It is expected that many citizens will be excited about the development of a greenway corridor. Individual volunteers from the community can be brought together with groups of volunteers form church groups, civic groups, scout troops and environmental groups to work on greenway development on special community work days. Volunteers can also be used for fund-raising, maintenance, and programming needs.
- **Private Foundations and Organizations.** Many communities have solicited greenway funding assistance from private foundations and other conservation-minded benefactors. Below are a few examples of private funding opportunities available in North Carolina.
  - *Land for Tomorrow Campaign.* Land for Tomorrow is a diverse partnership of businesses, conservationists, farmers, environmental groups, health professionals and community groups committed to securing support from the public and General Assembly for protecting land, water and historic places. The campaign is asking the North Carolina General Assembly to support issuance of a bond for $200 million a year for five years to preserve and protect its special land and water resources. Land for Tomorrow will enable North Carolina to reach a goal of ensuring that working farms and forests; sanctuaries for wildlife; land bordering streams, parks and greenways; land that helps strengthen communities and promotes job growth; historic downtowns and neighborhoods; and more, will be there to enhance the quality of life for generations to come. For more information, visit http://www.landfortomorrow.org/.
  - *The Trust for Public Land.* Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the Trust for Public Land is the only national nonprofit working exclusively to protect land for human enjoyment and well being. TPL helps conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities. Since 1972, TPL has worked with willing landowners, community groups, and national, state, and local agencies to complete more than 3,000 land conservation projects in 46 states, protecting more than 2 million acres. Since 1994, TPL has helped states and communities craft and pass over 330 ballot measures, generating almost $25 billion in new conservation-related funding. TPL's legal and

real estate specialists work with landowners, government agencies, and community groups for the creation of urban parks and greenways, open space dedication, and land conservation. For more information, visit http://www.tpl.org/.

- *Z. Smith Reynolds Foundation.* This Winston-Salem based Foundation has been assisting the environmental projects of local governments and non-profits in North Carolina for many years. The foundation has two grant cycles per year and generally does not fund land acquisition. However, the foundation may be able to support municipalities in other areas of greenways development. More information is available at www.zsr.org.
- *North Carolina Community Foundation.* The North Carolina Community Foundation, established in 1988, is a statewide foundation seeking gifts from individuals, corporations, and other foundations to build endowments and ensure financial security for nonprofit organizations and institutions throughout the state. Based in Raleigh, North Carolina, the foundation also manages a number of community affiliates throughout North Carolina that make grants in the areas of human services, education, health, arts, religion, civic affairs, and the conservation and preservation of historical, cultural, and environmental resources. In addition, the foundation manages various scholarship programs statewide. Web site: http://nccommunityfoundation.org.
- *National Trails Fund.* In 1998, the American Hiking Society created the National Trails Fund, the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting and maintaining foot trails in America. Each year, 73 million people enjoy foot trails, yet many of our favorite trails need major repairs due to a $200 million in badly needed maintenance. National Trails Fund grants give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. For 2005, American Hiking distributed over $40,000 in grants thanks to the generous support of Cascade Designs and L.L. Bean, the program's Charter Sponsors. To date, American Hiking has granted more than $240,000 to 56 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from $500 to $10,000 per project. The American Hiking Society will consider project types such as acquisition of trails and trail corridors, building and maintaining and constituency building around

specific trail projects including volunteer recruitment and support. For more information on the National Trails fund, consult: www.americanhiking.org/alliance/fund.html.

7.6.6 Recognition Programs

Similar to funding sources, recognition programs can be administered through both public and private entities. Although recognition programs may not include funding, through highlighting recipient achievements, they provide free marketing to make a city more attractive to visitors, businesses, and future residents.

- **Robert Wood Johnson Foundation Active Living By Design Awards** - Active Living by Design is a national program of the Robert Wood Johnson Foundation and is administered by the UNC School of Public Health. The program establishes innovative approaches to increase physical activity through community design, public policies and communications strategies. Active Living by Design is funding 25 community partnerships across the country to demonstrate how changing community design will impact physical activity. Although funding is currently not available for additional communities, the City of Dunn should continue to monitor Active Living by Design as a potential funding source should the City chose to make a commitment to healthy living. For more information, please see: http://www.activelivingbydesign.org/.

7.7 Conclusion

Using this plan as a guide, the City of Dunn should be able to create a better, safer network of sidewalks, greenway trails, paths, and crossings for pedestrians. The City's next steps should begin to immediately address the short-term priority program, policy, and project recommendations. At the same time, the City should also start to lay the groundwork for the longer term recommendations by developing relationships with potential partners such as the Dunn Chamber of Commerce, the Harnett County Health Department and the Betsy Johnson Hospital, and by starting to budget for future projects. Most importantly, the City should continue its efforts to raise awareness about the importance of making a community more walkable in order to continue to cultivate support for more pedestrian improvements and programs. Residents, visitors, and local leaders

should be familiar with the economic, health, and environmental benefits of a community in which there is less dependence on automobiles and more reliance on foot travel as not only a form of recreation, but also as a form of transportation.

As a small city anticipating significant growth and development, Dunn is in an ideal situation to develop a more walkable community. The City should capitalize on its location and its attractions, such as the Dunn-Erwin Trail, to reinforce its existing pedestrian infrastructure with new projects and improvements. With careful planning, deliberate steps and persistence, Dunn can become a more pedestrian-friendly community.

Resources and Citations

[i] After various administrative adjustments for programs within the Surface Transportation Program, or "STP", there is a 10% set-aside for Transportation Enhancements. The 10% set-aside is allocated within NCDOT to internal programs such as the Bicycle/Pedestrian Division, the Rail Division, the Roadside Environmental Unit, and others. The Enhancement Unit administers a portion of the set-aside through the Call for Projects process.

Appendix A. Public Involvement Materials

The following materials were used for public outreach during the Pedestrian Plan process.

City of Dunn Pedestrian Survey

Thank you for participating in the City of Dunn Pedestrian Survey! Dunn is currently preparing a Comprehensive Pedestrian Plan, and these survey results will be used by City Staff to help understand the needs of Dunn's residents. Your responses will also be used to identify important locations for new sidewalk or intersection improvements.

For more information about the Pedestrian Plan, contact Steven Neuschafer at (910) 230-3503 or by email at planning@dunn-nc.org, or contact Alison Carpenter at (919) 866-4422 or via email at acarpenter@louisberger.com.

Please note that your participation in this survey is completely voluntary. Please feel free to leave blank any questions you feel uncomfortable answering. When you are finished, you may mail this survey to the address on the back, or deliver it to City Hall when you pay your utility bills. Thank you for your time!

General Information

ZIP Code: _____

Sex: M F

Age:

☐ Under 20 ☐ 40-49 ☐ 70-79

☐ 20-29 ☐ 50-59 ☐ 80 and over

☐ 30-39 ☐ 60-69

On a scale of 1 to 9, where 1 is never and 9 is very frequently, how often do you walk *to*:

Work	1 2 3 4 5 6 7 8 9
A school	1 2 3 4 5 6 7 8 9
Church	1 2 3 4 5 6 7 8 9
The grocery store	1 2 3 4 5 6 7 8 9
The library	1 2 3 4 5 6 7 8 9
A park or recreation center	1 2 3 4 5 6 7 8 9
A restaurant	1 2 3 4 5 6 7 8 9
Shopping	1 2 3 4 5 6 7 8 9
The post office	1 2 3 4 5 6 7 8 9
A movie or similar entertainment	1 2 3 4 5 6 7 8 9
A friend's house or to visit family	1 2 3 4 5 6 7 8 9
Other:_____	1 2 3 4 5 6 7 8 9

On a scale of 1 to 9, where 1 is never and 9 is seven days a week, how often do you walk…

For exercise or recreation	1 2 3 4 5 6 7 8 9
For transportation (to go to work, school, shopping, etc.)	1 2 3 4 5 6 7 8 9
To walk the dog	1 2 3 4 5 6 7 8 9
Other:_____	1 2 3 4 5 6 7 8 9

On a scale of 1 to 9, where 1 is very uncomfortable and 9 is very comfortable, how comfortable do you feel walking…

In your neighborhood?	1 2 3 4 5 6 7 8 9
In downtown Dunn?	1 2 3 4 5 6 7 8 9
In the area near your work?	1 2 3 4 5 6 7 8 9
On the Dunn-Erwin trail?	1 2 3 4 5 6 7 8 9
Crossing the street at intersections?	1 2 3 4 5 6 7 8 9

On a scale of 1 to 9, where 1 is not at all and 9 is very much, if you could, how much would you *like* to walk to…

Work	1 2 3 4 5 6 7 8 9
School	1 2 3 4 5 6 7 8 9
Church	1 2 3 4 5 6 7 8 9
The grocery store	1 2 3 4 5 6 7 8 9
The library	1 2 3 4 5 6 7 8 9
A park or recreation center	1 2 3 4 5 6 7 8 9
Shopping	1 2 3 4 5 6 7 8 9
The post office	1 2 3 4 5 6 7 8 9
A movie or similar entertainment	1 2 3 4 5 6 7 8 9
A friend's house or to visit family	1 2 3 4 5 6 7 8 9
Other:_____	1 2 3 4 5 6 7 8 9

On a scale of 1 to 9, where 1 is never and 9 very likely, how likely are you to choose not to walk somewhere because…

There isn't continuous sidewalk to that destination.	1 2 3 4 5 6 7 8 9
Traffic makes it unsafe and unpleasant (speeding cars, cars don't yield when you need to cross the street, it is smelly and noisy, etc.).	1 2 3 4 5 6 7 8 9
It is too far.	1 2 3 4 5 6 7 8 9
I have a health condition.	1 2 3 4 5 6 7 8 9
The neighborhood is dangerous.	1 2 3 4 5 6 7 8 9
I have a lot to carry (ie: kids, equipment, groceries) and need my car to haul all of the stuff.	1 2 3 4 5 6 7 8 9
I have to run many errands in many different locations and it would take too long to walk.	1 2 3 4 5 6 7 8 9
The weather is bad (too hot, too cold, too wet, etc.)	1 2 3 4 5 6 7 8 9
I don't like walking.	1 2 3 4 5 6 7 8 9
Other: _____	1 2 3 4 5 6 7 8 9

Given that funds are limited, would you prefer that Dunn invest in sidewalks along existing roads or greenways along natural areas (i.e. the shoreline)?

- ☐ Sidewalks along existing roads
- ☐ Greenways along natural areas

Please tell us the roads where you would like to see sidewalks:

Road Name	Starting Point	Ending Point
(example) Meadowlark Rd.	Vann Ln.	Fairground Rd.

Please tell us the roads or greenways where there is sidewalk that needs repair or is obstructed:

Road Name, Start, End	
(example) Vance St. between Ellis Ave. and King St.	Cracked pavement from tree roots. Dangerous for wheelchairs & strollers.

Please tell us about any intersections where you would like to see improvements for pedestrians. *Improvements could include adding a crosswalk, new pedestrian signals, pedestrian warning signs, curb ramps, or audible pedestrian signals.*

Intersecting Roads	Problem	Improvement
(example) Cumberland St and Washington Ave.	Have to wait a long time to cross the street.	Please provide a pedestrian signal.

Please provide us with any additional comments you may have:

Additional Optional Information:

Name: _____

Address: _____

_____

For more information about the Pedestrian Plan, please drop-in at the upcoming Open House, Tuesday, April 29 @ 6:30-8:30pm Dunn Community Bldg (205 Jackson Rd)

Thank you for taking the City of Dunn Pedestrian Survey! You can return this survey to City Hall when you pay your utility bill, or mail it to the following address:

Dunn Pedestrian Plan Survey
C/O Alison Carpenter
The Louis Berger Group, Inc.
1001 Wade Ave, Ste 400
Raleigh, NC 27605
acarpenter@louisberger.com

City of Dunn Pedestrian Plan Open House

What: The City of Dunn is working on a Pedestrian Plan and needs your input. The Plan is a guide to help Dunn in becoming a more pedestrian-friendly community. **Please drop-in to the April 29 open house any time between 6:30 - 8:30 pm to speak with City representatives about the project.**

Where:
Dunn Community Building
Tart Park
205 Jackson Rd.

When: **Tuesday, April 29**
Drop in from 6:30 – 8:30 pm

Why: **To make sure your voice is heard!**

For more information, visit:
http://dunnpedplan.pbwiki.com

Contact: Steven Neuschafer
City of Dunn Planning Director
910-230-3503 (t) | sneuschafer@dunn-nc.org

Thank you for your time and participation!

City of Dunn Pedestrian Plan Open House

What: The City of Dunn is working on a Pedestrian Plan and needs your input. The Plan is a guide to help Dunn in becoming a more pedestrian-friendly community. **Please drop-in to the April 29 open house any time between 6:30 - 8:30 pm to speak with City representatives about the project.**

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Contact: Steven Neuschafer
City of Dunn Planning Director
910-230-3503 (t) | sneuschafer@dunn-nc.org

Thank you for your time and participation!

the Dunn PEDESTRIAN Plan 2008

Why a Pedestrian Plan?

The City of Dunn, like many communities across the state, recognizes the importance of a bicycle- and pedestrian-friendly community in attracting residents, visitors and businesses. Beyond better and safer pedestrian access to destinations, a more walkable community can have economic, environmental, and health benefits for residents.

Preliminary Project Recommendations

- Improve the maintenance level for existing sidewalks.
- Identify key sidewalk linkages like those shown in the Plan map (see back) to target for construction using City or NCDOT funding, or other mechanisms.
- Provide pedestrian-scale lighting, street trees and landscaping, alleyway improvements and other enhancements to the downtown walking environment.
- Improve pedestrian crossings of the railroad.
- Create pocket parks that provide refuge along a system of walking trails and sidewalks throughout the City.
- Create better connections to existing parks and schools from downtown and local residential areas.
- Provide crosswalks and walk signals at all signalized intersections throughout Dunn, as routine accommodation.
- Provide a set of pedestrian improvements at the busy Broad Street and Cumberland Street intersection, including crosswalks and walk signals.
- Consider developing a pedestrian focus area at East Denim Drive/Erwin Road and Powell Avenue to target the new residential development taking place at this location.
- Review potential connections from the Dunn-Erwin Rail-Trail to local schools, recreation centers, parks, downtown and other pedestrian generators.

What is in the Pedestrian Plan?

The Pedestrian Plan will contain recommendations for projects, programs, and policies which will help make Dunn a more pedestrian-friendly community. Some preliminary project ideas have been recommended by the Steering Committee and are shown on the map (see back). The Plan will need your input and that of your neighbors to make additional recommendations that serve everyone.

When will the Plan be finished?

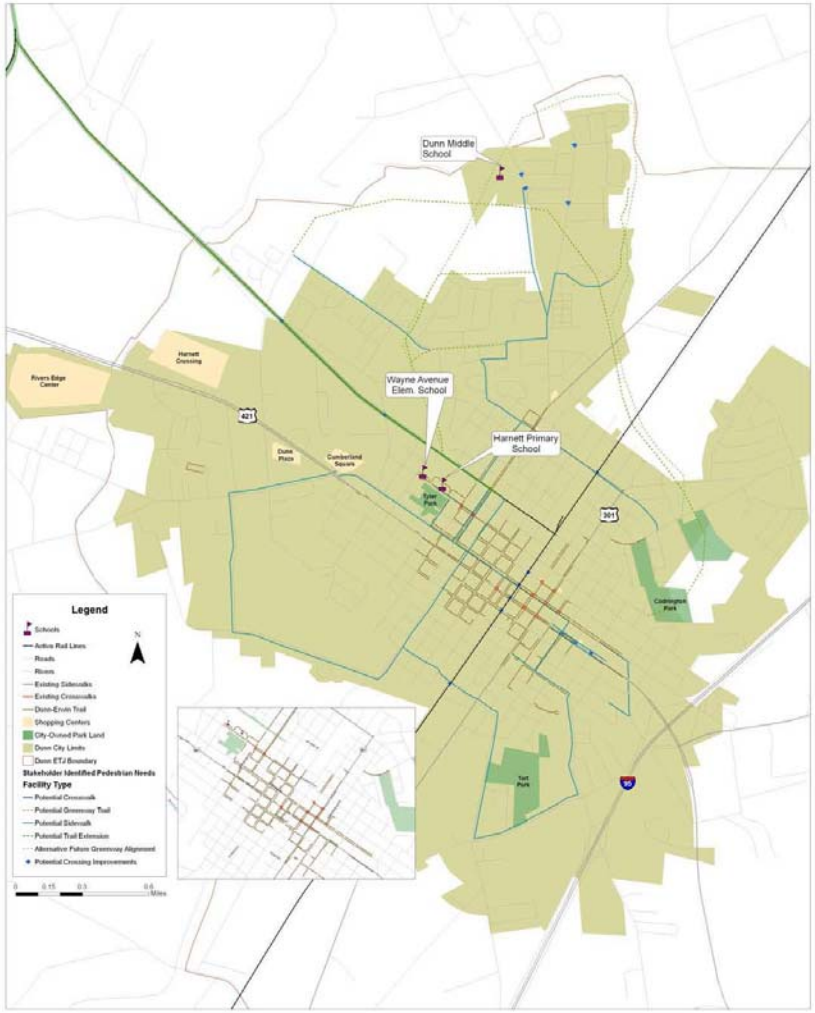
The Pedestrian Plan is estimated to be complete by December 2008. Public participation is critical to a successful Pedestrian Plan; therefore, the City will provide several opportunities for citizen comment during the process, including a series of public meetings and an online survey.

How do I provide input?

There are several avenues – a survey is available in both paper copy and online. Paper copies can be picked up at the Open House or at Dunn City Hall. The online version can be accessed by visiting the Dunn Pedestrian Plan webpage: http://dunnpedplan.pbwiki.com and you will find a link to the survey from there.

For More Information:
http://dunnpedplan.pbwiki.com

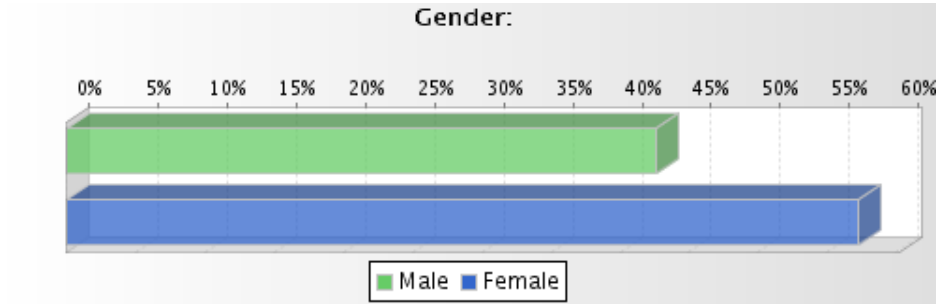
Contact:
Steven Neuschafer
City of Dunn Planning Director
910-230-3503
sneuschafer@dunn-nc.org

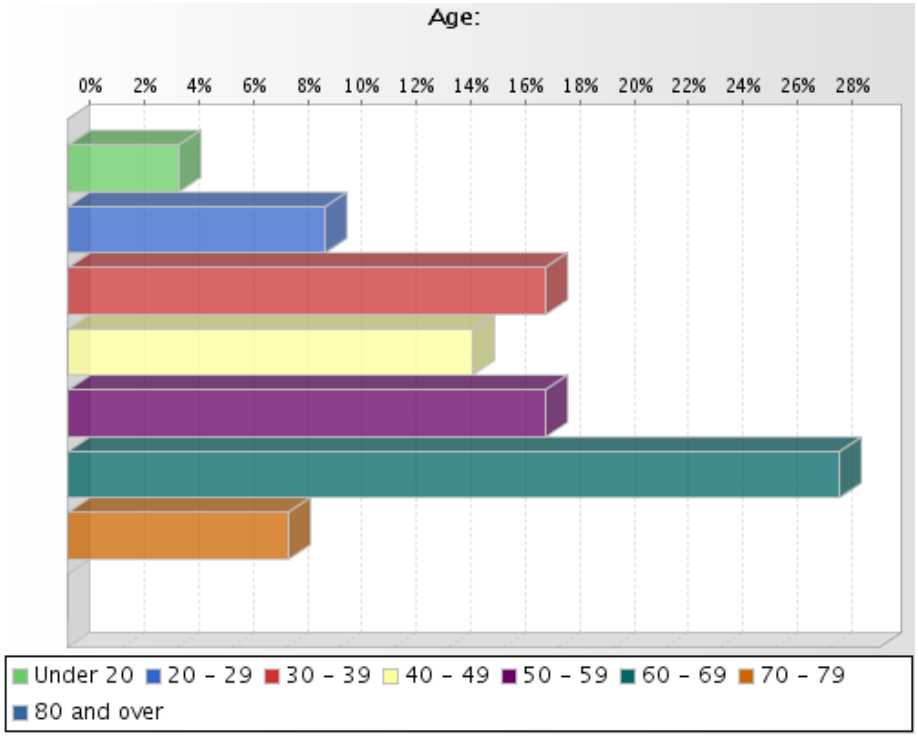


Thank you for your time and participation!

Appendix B. Survey Results

The survey for the Dunn Comprehensive Pedestrian Plan was used as a tool for collecting input on pedestrian needs throughout the City. Results of the survey were used to create project recommendations, and also influenced program and policy ideas. The results are tabulated below.





On a scale of 1 to 9 how often do you walk to:

	1 Never	2	3	4	5 (Neutral)	6	7	8	9 (Very Frequently)	Response total
work	78.6% (55)	4.3% (3)	0% (0)	0% (0)	5.7% (4)	4.3% (3)	1.4% (1)	1.4% (1)	4.3% (3)	70
a school	78.8% (52)	0% (0)	6.1% (4)	0% (0)	3% (2)	3% (2)	0% (0)	1.5% (1)	7.6% (5)	66
church	66.2% (47)	7% (5)	8.5% (6)	1.4% (1)	2.8% (2)	2.8% (2)	1.4% (1)	0% (0)	9.9% (7)	71
the grocery store	80.6% (58)	2.8% (2)	2.8% (2)	0% (0)	2.8% (2)	1.4% (1)	1.4% (1)	4.2% (3)	4.2% (3)	72
the library	76.1% (54)	2.8% (2)	2.8% (2)	1.4% (1)	5.6% (4)	1.4% (1)	1.4% (1)	4.2% (3)	4.2% (3)	71
a park or recreation center	65.8% (48)	4.1% (3)	4.1% (3)	0% (0)	5.5% (4)	4.1% (3)	4.1% (3)	6.8% (5)	5.5% (4)	73
a restaurant	70.4% (50)	8.5% (6)	5.6% (4)	0% (0)	2.8% (2)	4.2% (3)	2.8% (2)	2.8% (2)	2.8% (2)	71
shopping	69% (49)	5.6% (4)	2.8% (2)	4.2% (3)	1.4% (1)	5.6% (4)	2.8% (2)	4.2% (3)	4.2% (3)	71
the post office	82.6% (57)	2.9% (2)	1.4% (1)	1.4% (1)	1.4% (1)	1.4% (1)	4.3% (3)	2.9% (2)	1.4% (1)	69
a movie or similar entertainment	83.1% (59)	2.8% (2)	0% (0)	2.8% (2)	5.6% (4)	0% (0)	2.8% (2)	1.4% (1)	1.4% (1)	71
a friend's house or to visit family	21.6% (16)	8.1% (6)	5.4% (4)	8.1% (6)	14.9% (11)	8.1% (6)	8.1% (6)	5.4% (4)	20.3% (15)	74

On a scale of 1 to 9, where 1 is never and 9 is seven days a week, how often do you walk ...

	1 Never	2	3	4	5 (Neutral)	6	7	8	9 (Very Frequently)	Response total
For exercise or recreation	6.7% (5)	8% (6)	10.7% (8)	9.3% (7)	12% (9)	21.3% (16)	8% (6)	9.3% (7)	14.7% (11)	75
For transportation(to go to work, school, shopping, visiting, etc.)	64.2% (43)	9% (6)	6% (4)	3% (2)	4.5% (3)	3% (2)	3% (2)	1.5% (1)	6% (4)	67
To walk the dog	47.7% (31)	4.6% (3)	3.1% (2)	1.5% (1)	15.4% (10)	7.7% (5)	4.6% (3)	4.6% (3)	10.8% (7)	65

On a scale of 1 to 9 where 1 is very uncomfortable and 9 is very comfortable, how comfortable do you feel walking...

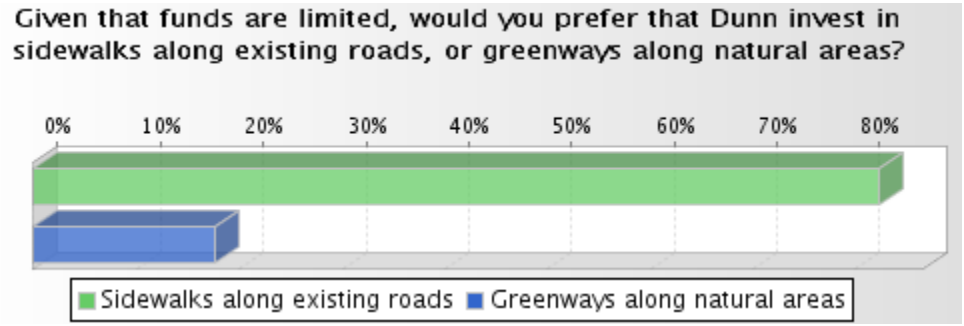
	1 (very uncomfortable)	2	3	4	5 (neutral)	6	7	8	9 (very comfortable)	Response total
in your neighborhood?	9.3% (7)	1.3% (1)	1.3% (1)	2.7% (2)	14.7% (11)	4% (3)	13.3% (10)	6.7% (5)	46.7% (35)	75
in downtown Dunn?	14.9% (11)	5.4% (4)	5.4% (4)	4.1% (3)	18.9% (14)	6.8% (5)	17.6% (13)	8.1% (6)	18.9% (14)	74
in the area near your work?	19.1% (13)	4.4% (3)	2.9% (2)	2.9% (2)	19.1% (13)	8.8% (6)	11.8% (8)	13.2% (9)	17.6% (12)	68
crossing the street at intersections in Dunn?	9.7% (7)	4.2% (3)	9.7% (7)	12.5% (9)	22.2% (16)	12.5% (9)	9.7% (7)	12.5% (9)	6.9% (5)	72

On a scale of 1 to 9 where 1 is not at all and 9 is very much, if you could, how much would you like to walk to...

	1 (Not at all)	2	3	4	5 (Neutral)	6	7	8	9 (Very Much)	10	Response total
work	50.7% (35)	1.4% (1)	1.4% (1)	1.4% (1)	13% (9)	13% (9)	2.9% (2)	4.3% (3)	10.1% (7)	1.4% (1)	69
school	61.5% (40)	3.1% (2)	1.5% (1)	1.5% (1)	18.5% (12)	3.1% (2)	0% (0)	4.6% (3)	6.2% (4)	0% (0)	65
church	43.8% (32)	4.1% (3)	1.4% (1)	5.5% (4)	11% (8)	4.1% (3)	4.1% (3)	6.8% (5)	16.4% (12)	2.7% (2)	73
grocery store	43.8% (32)	2.7% (2)	5.5% (4)	1.4% (1)	13.7% (10)	4.1% (3)	5.5% (4)	2.7% (2)	19.2% (14)	1.4% (1)	73
library	45.1% (32)	2.8% (2)	2.8% (2)	2.8% (2)	11.3% (8)	7% (5)	1.4% (1)	5.6% (4)	18.3% (13)	2.8% (2)	71
a park or recreation center	30.7% (23)	1.3% (1)	2.7% (2)	4% (3)	8% (6)	8% (6)	5.3% (4)	12% (9)	24% (18)	4% (3)	75
shopping	32.9% (23)	5.7% (4)	5.7% (4)	10% (7)	11.4% (8)	8.6% (6)	1.4% (1)	5.7% (4)	15.7% (11)	2.9% (2)	70
post office	55.6% (40)	1.4% (1)	1.4% (1)	2.8% (2)	9.7% (7)	6.9% (5)	2.8% (2)	4.2% (3)	13.9% (10)	1.4% (1)	72
movie or similar entertainment	48.6% (35)	4.2% (3)	0% (0)	4.2% (3)	11.1% (8)	9.7% (7)	2.8% (2)	1.4% (1)	13.9% (10)	4.2% (3)	72
friend's house or family	9.7% (7)	1.4% (1)	5.6% (4)	2.8% (2)	12.5% (9)	12.5% (9)	9.7% (7)	6.9% (5)	29.2% (21)	9.7% (7)	72

On a scale of 1 to 9 where 1 is never and 9 is very likely, how likely are you to choose not to walk somewhere because...

	1 (Never)	2	3	4	5 (Neutral)	6	7	8	9 (Very Frequently)	10	Response total
There isn't continuous sidewalk to that destination	14.5% (11)	10.5% (8)	2.6% (2)	5.3% (4)	14.5% (11)	9.2% (7)	10.5% (8)	6.6% (5)	23.7% (18)	2.6% (2)	76
Traffic makes it unsafe and unpleasant (speeding cars, cars don't yield when you need to cross the street, it is smelly and noisy, etc.)	10.1% (7)	8.7% (6)	5.8% (4)	1.4% (1)	14.5% (10)	10.1% (7)	10.1% (7)	8.7% (6)	26.1% (18)	4.3% (3)	69
It is too far.	10% (7)	8.6% (6)	1.4% (1)	5.7% (4)	14.3% (10)	5.7% (4)	5.7% (4)	10% (7)	31.4% (22)	7.1% (5)	70
I have a health condition.	49.3% (33)	6% (4)	9% (6)	1.5% (1)	13.4% (9)	1.5% (1)	4.5% (3)	3% (2)	11.9% (8)	0% (0)	67
The neighborhood is dangerous.	29.2% (21)	11.1% (8)	5.6% (4)	2.8% (2)	16.7% (12)	2.8% (2)	8.3% (6)	9.7% (7)	8.3% (6)	5.6% (4)	72
I have a lot to carry and need my car to haul all of my stuff.	12.9% (9)	10% (7)	4.3% (3)	7.1% (5)	24.3% (17)	5.7% (4)	5.7% (4)	10% (7)	15.7% (11)	4.3% (3)	70
I have to run many errands in many different locations and it would take too long to walk.	15.3% (11)	6.9% (5)	2.8% (2)	6.9% (5)	9.7% (7)	6.9% (5)	9.7% (7)	11.1% (8)	25% (18)	5.6% (4)	72
The weather is bad.	13.9% (10)	2.8% (2)	8.3% (6)	5.6% (4)	22.2% (16)	9.7% (7)	9.7% (7)	6.9% (5)	15.3% (11)	5.6% (4)	72
I don't like walking.	47% (31)	7.6% (5)	1.5% (1)	1.5% (1)	16.7% (11)	7.6% (5)	1.5% (1)	9.1% (6)	7.6% (5)	0% (0)	66



Please tell us the roads you would like to see sidewalks on:

2 All of W.Pearsall, W.Pope, etc. W.Divines ST.
5 Cumberland, Broad and Divine
6 Fairground and Meadowlark
7 With so many Hispanics who walk and more people without cars walking, I would like to see sidewalks along Cumberland and have the streets that are available to be continuous and fully repaired.
8 All major roads in Dunn.
10 Ashe Ave. Edgerton st.
13 421 with greenways
14 a downtown walking area = 1/4 or 1/2 mile walk starting and ceasing at the new public parking area. Great shade provided by buildings and storefronts to give people a good visual while walking
18 At Dunn Middle School Connecting Dunn-Erwin Trail to Downtown Dunn All of Downtown Dunn
19 I CAME FROM A CITY THAT HAD SIDEWALKS EVERYWHERE. IT WAS VERY UNUSUAL WHEN I CAME HERE AND REALIZED THAT SIDEWALKS WERE VERY SPARSE.
23 Broad Street Roads leading to Tart Park/Tyler Park (all recreational areas)
25 jonesboro road/ clinton ave ashe ave susant tart (to walk /ride bike) from downtown to the hospital
26 Cumberland street from Ellis Avenue to Walmart and Broad Street from Orange to Cumberland
29 Would like to see these repaired. I would like to see sidewalks on Divine & Pearsall Streets.
30 North Orange Ave (Continuous), West Divine St (Continuous)
31 Whole length of Cumberland Street, from I-95 to Plaza Intersection.
33 extend sidewalks to reach all the way down broad street to the intersection of broad and 421. finish sidewalks from surles st to barrington house down orange ave. Ashe Ave. (between Broad and Powell Ave.)- sidewalks should extend between ashe and 421 along Powell Ave. to make it convenient to walk to shopping center. Meadowlark Rd. to middle school
34 Cumberland from Food Lion at 421 s to Wal mart at 421n Broad from the beginning to Cumberland All of Divine Street All of Orange Ave All of Harnett Ave (all streets should have sidewalks)All of Erwin Road, All of Susan Tart Rd.
35 We need a sidewalk along Powell St. from Friendly Rd to Erwin Rd. and a blinking caution light at Ashe/Powell intersection and a cross walk at West Cumberland
36 Fairground Road especially and the Pondereosa area in general
37 better sidewalks leading to downown and other shopping, also restaurants
38 $20,000 isn't alot of money - Dunn is not a very attractive town as it looks now. My vote is for improving the looks of highly visible areas that make an impression , ie. Broad St, Ellis Ave, Cumberland. There are some side streets that need improvements, but aesthetics in this town is more important at this time.
42 Fairground Rd from Basin St to N Ellis/301 - need sidewalk and bike path
43 Old Fairground Rd from Ellis Ave to Holly Ave
46 Old Fairground Rd from 301S to Dunn Middle School Harnett St from Wayne Ave School to Ashe St Susan Tart Rd from McKay St to BJRMH
48 any improvements appreciated
53 Hwy 301 South, from 301N to Tart Park Ellis Avenue from Ellis to Friendly Rd
59 Cumberland St
65 Cumberland St. (421 South)
66 Fairground Rd from Beale St to Canal Dr

67 Fairground Rd: Ponderosa to Ellis Ave Meadowlark Rd: Middle School to Ellis Ave
68 Meadowlark Rd: Dunn Middle School to Ellis Ave Fairground Rd: Ponderosa to Ellis Ave
69 Meadowlark Road: Dunn Middle School to Short Stop Store
70 Fairgrounds Rd: Meadowlark Rd to City Limits
71 Fairground Rd: Meadowlark to City limits
72 Meadowlark to Fairground Rd
74 Meadowlark Rd
75 Meadowlark Rd
76 Beasley Street: Meadowlark Rd to Fairground Rd

Please tell us the roads or greenways where there is sideawlk that needs repair or is obstructed:

2 300 Pearsall sidewalk both sides lots of sidewalks downtown
5 N/A
6 Braod Street
7 I can't name any specifics but there are several with broken pavement and several that have trees overhanging. I don't know how blind people could travel in the town of Dunn.
8 All over Dunn.
10 If the town is doing their jobs properly.(police,public works,all city employees, they would see and turn this info it the dept For correction especially when they are travling around town ,either working or just joy riding, or on the way to ch or on the way to shop.
14 na
16 US 421 & US 301
18 some sidewalks in Downtown Dunn are in bad shape
22 Ellis Ave
24 pearsall st.
29 Most of the sidewalks downtown are in bad need of repair. Many on South King & South Layton need repair.
31 Repair the broken and dangerous sidewalk on north side of 300 block of West Broad Street.
33 Sidewalks along Ellis Ave need to be repaired.
34 Most existing sidewalks need repair
37 most of downtown and the older residential areas
38 Ellis Ave.
42 bad sidewalk in front of Daily Record office on Broad Street
46 Wilson Ave - no sidewalk past the Office Value block Martin Luther King Hwy - no sidewalk for most of the length beyond downtown
53 Chicken Farm Rd - cracked, bumpy pavement with dangerous curves
76 Ellis Ave between Vance St and Harnett St: cracked pavement

Please tell us about any intersections where you would like to see improvements for pedestrians:

2 Wilson and 421. Stop light too quick.
4 Would like to see walk/don't walk signs at busy intersecitons
5 Ellis and Cumberland & Ellis and Broad
7 More crossing places on Cumberland with walk lights. It's too dangerous to cross w/o lights. Dunn is a good retirement town but older and disabled people have difficult crossing streets and managing sidewalks the way they are. Little access for wheelchairs so many

ride in the street.
8 All intersections along Cumberland Street
10 421 hwy and commerce drive. dunn erwin rd. and st to hospital.
13 421 and 301 (clinton ave)
14 downtown dunn
18 where Dunn-Erwin Trail crosses Ashe Avenue near city limits needs to be safer - all potential crossings on Hwy 421 need to be safer - it is a hazard crossing 421 anywhere now and there are a lot of pedestrian near misses near IGA
23 Downtown Dunn, better marked crosswalks (pedestrian signs- Walk/Don't Walk)
25 Walmart/Lowes. Impossible to walk across 421 right there, but many people shop at both
28 Carlie C's on Cumberland Street
29 Any intersection crossing Cumberland Street between Watauga and I-95. These are dangerous now for cars. Pedestrian traffic needs better crossings in this area.
31 Wayne Ave. from Divine Street to Vance Street for the kids going to either of the two schools, especially the 300 and 400 blocks of Wayne Ave where the kids have to walk in the open street and cars going by them in the morning and afternoons, Also on George Street going to Dunn Middle School. There was an accident the very first day of school when a little girls was hit by a car because she had to walk in the street.
32 Broad Street and the Railroad Tracks, Cumberland and Broad
33 Ellis and Broad St.
34 Cumberland -Orange,Broad -Orange,Cumberland-Wautauga,Broad -Wautauga,Cumberland -Washington
35 The speed limit approaching Powell St. from the west side of Ashe needs to be 35mph and a blinking light or traffic light installed
37 crossing 421---also would like to see well lighted walking areas to create more pedestrian travel to our downtown to help create night time use of this district
38 Broad St and and Ellis Ave.
39 traffic lights hold too long at Goodyear/KFC intersection and 301/421 intersection
41 Powell & Ashe Ashe & Broad
44 Dunn Erwin Rd at Funeral House - signal lights
46 Wilson/Hwy 421 - dangerous; please provide ped signal 421/301 intersection - very dangerous crossing; needs crosswalks and ped signals McKay/421 - very dangerous; needs crosswalk and ped signal
59 Jonesboro/ I-95 - dangerous
71 Fairground Rd: traffic for school children (walking) is a problem and traffic is too fast on Beasley St
76 Broad Street and Wilson Ave: have to wait a long time to cross the street - need pedestrian signal

Appendix C. Demographic Analysis

The following tables display U.S. Census demographic data for the year 2000 that is pertinent to the City of Dunn's Pedestrian Plan. All data was collected from the U.S. Census website, except where noted.

Population

	City of Dunn	North Carolina	United States
1990 Census Population	8,336	6,628,637	248,709,873
2000 Census Population	9,196	8,049,313	281,421,906
Percent Change	10%	21%	13%
2006 Census Population Estimate	**9,972**	**N/A**	**N/A**

Age

	City of Dunn	North Carolina	United States
Total Population	**9,196**	**8,049,313**	**281,421,906**
Percent of Population:			
14 and under	21.16	20.54	21.41
15 - 19	6.11	6.71	7.18
20 - 24	5.59	7.17	6.74
25 - 34	11.79	15.07	14.18
35 - 44	13.46	15.99	16.04
45 - 54	13.92	13.48	13.39
55 - 64	9.58	8.99	8.63
65 - 74	9.11	6.63	6.54
75 and up	9.26	5.41	5.9

Race

	City of Dunn	North Carolina	United States
Total Population	**9,196**	**8,049,313**	**281,421,906**
Percent of Population			
White Alone	54.5	72.1	75.1
Black Alone	41.2	21.6	12.3
American Indian	1.0	1.2	0.9
Asian	0.6	1.4	3.6
Two or More Races	1.3	1.3	2.4
Other	1.4	2.4	5.6

Educational Attainment

	City of Dunn	North Carolina	United States
Population 25 years and over	**6,150**	**5,282,994**	**182,211,639**
Percent of Population			
Less than 9th grade	651	7.83	7.55
9th to 12th grade, no diploma	1,116	14.03	12.05
High school graduate (includes equivalency)	1,808	28.45	28.63
Some college, no degree	1,168	20.45	21.05
Associate degree	371	6.78	6.32
Bachelor's degree	782	15.3	15.54

Income and Poverty (in 1999)

	City of Dunn	North Carolina	United States
Median Household Income	$28,550	$39,184	$41,994
Median Family Income	$39,521	$46,335	$50,046

Total Population	9,196	8,049,313	281,421,906
Percent of Population			
Below Poverty Line	23.0	11.9	12
Percent of Children Under Age (5/6) Below Poverty Line	16.0	12.8	9.7
Percent of People Over Age 65 Below Poverty Line	13.8	31.5	33.6

Household Vehicle Availability

	City of Dunn	North Carolina	United States
Percent of Housing Units			
None	18.6	7.5	10.3
1	37.5	32.3	34.2
2	28.5	39.9	38.4
3 or more	11.3	20.3	17.1

Work Commute Mode

	City of Dunn	North Carolina	United States
Total Workers 16 years and over	**3,461**	**3,837,773**	**128,279,228**
Percent of Workers 16 years and over			
Car, truck, or van	93.1	93.4	87.9
Drove alone	79.9	79.4	75.7
Carpooled	13.2	14	12.2
- In 2-person carpool	9.0	10.4	9.4
- In 3-person carpool	1.2	2.1	1.7
- In 4-person carpool	1.7	0.8	0.6
- In 5- or 6-person carpool	0.3	0.4	0.3
- In 7-or-more-person carpool	1.0	0.2	0.2
Public transportation	0.2	0.9	4.7
Bus or trolley bus	0.2	0.7	2.5
Taxicab	0	0.1	0.2
Motorcycle	0	0.1	0.1
Bicycle	0	0.2	0.4
Walked	3.7	1.9	2.9
Other means	3.1	0.8	0.7

Work Commute Travel Time

	City of Dunn	North Carolina	United States
Workers who did not work at home	**3,393**	**3,734,822**	**124,095,005**
Percentage of workers travel time			
Less than 10 minutes	24.7	13.5	14.4
10 to 14 minutes	20.2	16.2	15
15 to 19 minutes	13.6	18	15.8
20 to 24 minutes	5.9	15.9	14.5
25 to 29 minutes	3.5	6	5.8
30 to 34 minutes	9.7	13.3	13.2
35 to 44 minutes	6.0	5.2	5.9
45 to 59 minutes	8.7	6.3	7.4
60 to 89 minutes	4.6	3.5	5.2
90 or more minutes	3.2	2.3	2.8
Mean travel time to work (minutes)	**24.2**	**24**	**25.5**

Occupation Type

	City of Dunn	North Carolina	United States
Employed civilian population 16 years and over	**3,550**	**3,824,741**	**129,721,512**
Percentage of workers			
Management, professional, and related occupations	27.5	31.2	33.6
Service occupations	17.1	13.5	14.9
Sales and office occupations	23.9	24.8	26.7
Farming, fishing and forestry occupations	0.6	0.8	0.7
Construction, extraction, and maintenance occupations	10.9	11	9.4
Production, transportation, and moving occupations	20.0	18.7	14.6

Demographic Analysis

It is important to examine a city's demographics before developing a pedestrian plan because demographic information provides valuable clues about citizen travel behavior and preferences. Characteristics such as age, income, vehicle ownership, and commute time can suggest a population's potential for walking as a mode of transportation. The following paragraphs provide a summary of the demographic analysis for the city of Dunn and explain the implications of the analysis for the recommendations made in the Dunn Pedestrian Plan. The complete demographic analysis can be found in Appendix 1.

According to 2000 U.S. Census data, the city of Dunn's population is racially balanced between Caucasian and African-Americans, and relatively low income with nearly one-quarter of the population below poverty-level. Age-distribution patterns in Dunn reflect an interesting pattern compared to state and national averages. Though there is a similar percentage of youth below 19 years of age in Dunn, the population of age group 20-44 is significantly less than state and national averages, while age groups 55+ are larger than state and national averages. This could indicate that younger workers are moving away to find job opportunities, or that Dunn is not attracting young workers (age 20-44).

The City's household vehicle availability statistics are congruent with the City's somewhat low income levels and high poverty rate; Dunn has a higher percentage of households with 0 or 1 car available and a lower percentage of households with 2 or more cars available than both the state and nation. Roughly 19 percent of Dunn households do not have access to a vehicle. Despite this, only 7 percent of all workers do not commute by automobile. It is also interesting to note that the City has no bicycle commuters, but 3.7 percent of commuters walk to work, which is significantly higher than the state and national percentages, respectively. The demographic analysis also reveals that Dunn has a higher percentage of work commuters who travel less than 14 minutes to work, as well as those who travel over 35 minutes to work, than both the state and national percentages. However, Dunn has a lower percentage of work commuters who travel between 14 and 34 minutes to work. The data indicates that most Dunn residents (over 58%) live within 14 minutes from work, suggesting that people who work in the city also live within the city, which means that increasing pedestrian commutes can be a realistic goal.

Overall, the results of the demographic analysis suggest that the City's population would be amenable to walking for transportation purposes. Based on the income levels, poverty rate, and household vehicle availability, commuting on foot seems to be a potentially practical option for many workers. Therefore, the Dunn Pedestrian Plan should make recommendations that focus on improving pedestrian facilities to encourage people to travel to work by foot, as well as make recommendations to promote walking for recreational or non-work trip purposes. In addition to the environmental and air quality benefits of increased walking and decreased automobile use, the effects of adopting these pedestrian improvements will also ease vehicle traffic congestion while potentially improving the overall health and wellness of the residents of Dunn.

Appendix D. Google Sketch-Up Graphics

The following materials graphics were included in Section 4 of the Pedestrian Plan and illustrate potential pedestrian crossing treatments for Dunn.

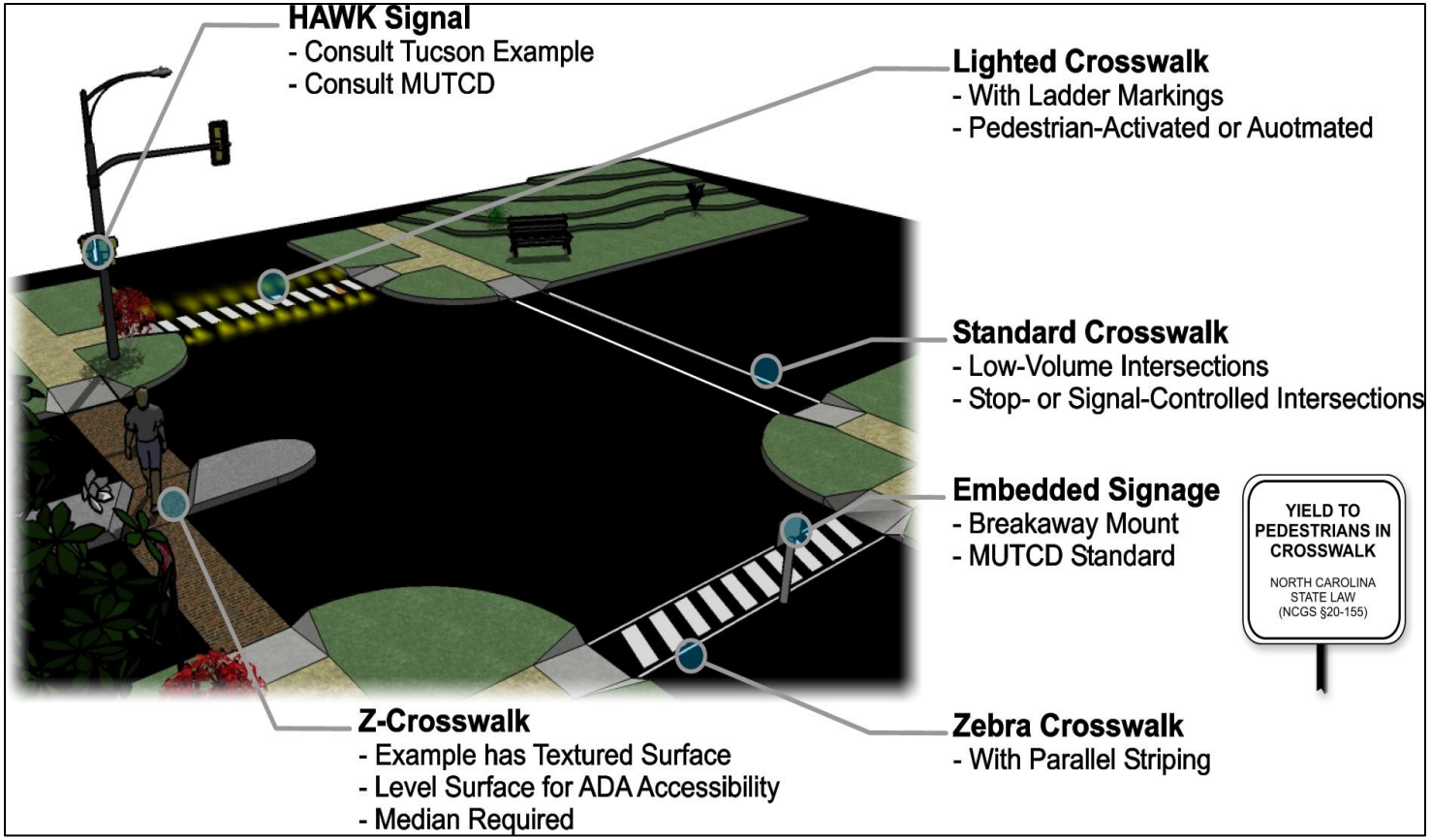


Figure 4-10. A diagram of various crossing treatments Dunn might consider to improve pedestrian accessibility and safety crossing the street.

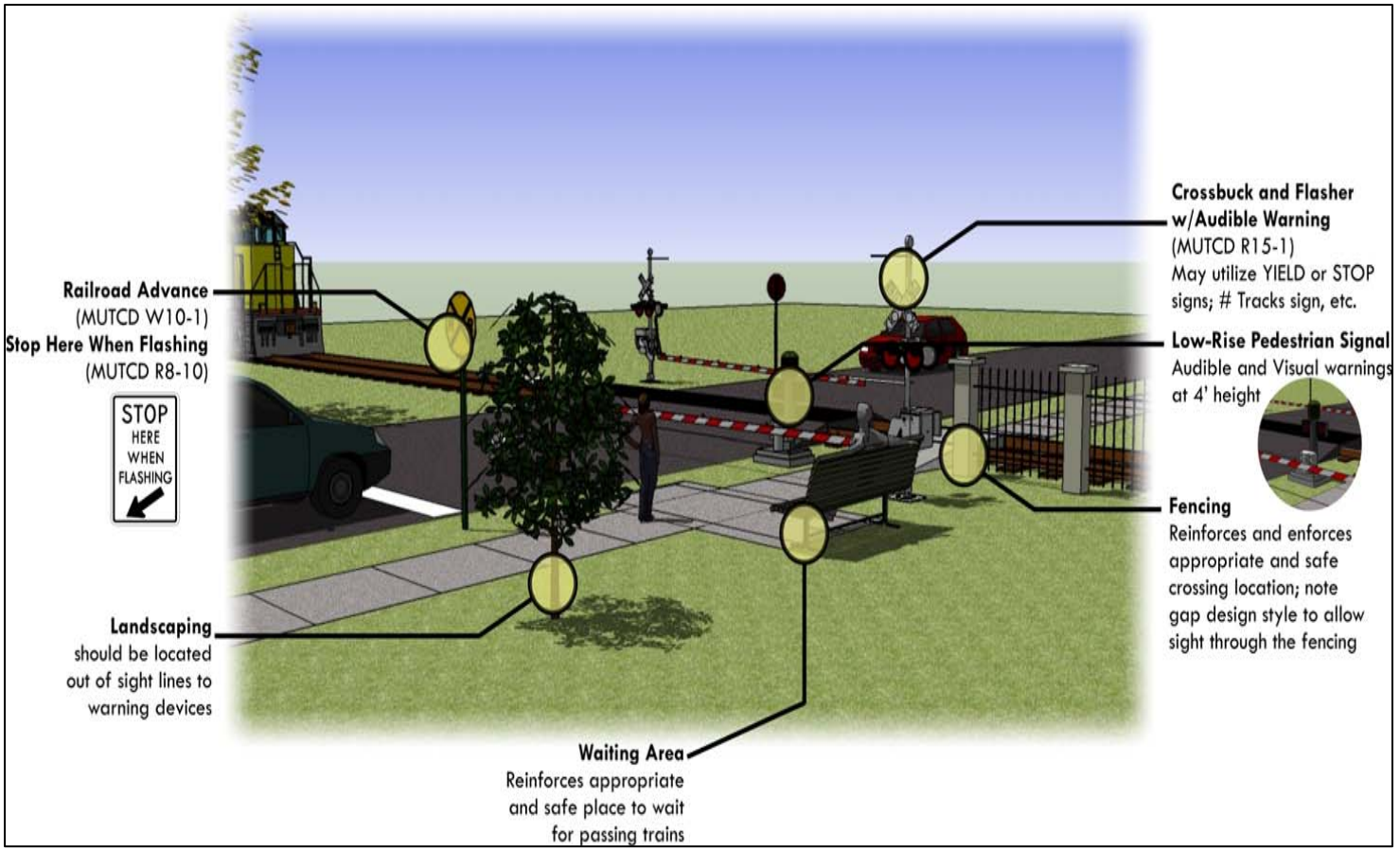


Figure 4-33. Typical Railroad Crossing Treatments.
Source: FRA Compilation of Pedestrian Safety Devices in Use at Grade Crossings; Manual on Uniform Traffic Control Devices; The Louis Berger Group, Inc

Appendix E: Sample Railroad Safety Evaluation

The Nevada DOT has developed an extensive checklist for analyzing bicycle and pedestrian impacts of rail crossings, including accessibility to disabled pedestrians (i.e. ADA compliance) and safety. The following pages include the full checklist developed by NVDOT.

APPENDIX A

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION
RAILROAD SAFETY DIAGNOSTIC REVIEW FORM
PATHS WITHOUT MOTOR VEHICLES

TEAM MEMBER:	AGENCY:	REVIEW DATE:

CROSSING DATA	PATH DATA
DOT Number:	Location:
	Type of Path Use: ☐ Shared ☐ Bike ☐ Pedestrian
Railroad Milepost:	Bike/Trail Route/System ☐ Yes ☐ No
	Pedestrian AADT:
Track Class:	Bicycle AADT:
	Bicycle Speed:
Number of Trains: Passenger _____ Freight _____	Other Crossing Users:
	User Destinations:
Injury	Path Owner:
	Level of Service: (A – F)
Principal Rail Line: ☐Yes ☐ No	

TYPE OF EXISTING OR PROPOSED WARNING DEVICES

Automatic Gates:	2-Quad ☐	4-Quad ☐	Median ☐	LOOK Signs: ☐ Yes	☐ No
				STOP Signs: ☐ Yes	☐ No
Bells:	Gong ☐	Electronic ☐		Emergency Notification ☐ Yes	☐ No
				Access Control Devices - List ☐ Yes	☐ No
Multi Track Sign: 2-Track ☐	3-Track ☐	4-Track ☐	6-Track ☐	Lighting: ☐ Yes	☐ No
				Swing Gates ☐ Yes	☐ No
Pavement Markings: Stop Bars ☐	RxR ☐	Lane Lines ☐	Dynamic Envelope ☐	Other ☐	
List Other Devices & Condition of Devices:					

PATH SECTION

Development Type: Residential ☐ Industrial ☐ Commercial ☐ Open Space ☐ Institutional ☐		
Are the advance warning signs in good condition?	☐ yes	☐ No
Path width _____' Number of Travel Lanes __ Is Path Wide Enough (shared = 10' + 2' edges)?	☐ Yes	☐ No
Is there adequate capacity?	☐ Yes	☐ No
Does the path have a 2% cross slope?	☐ Yes	☐ No
Is the person's attention being diverted?	☐ Yes	☐ No
Is there an adequate landing platform (10' clear+ decision/reaction on table+ tracks+ 15' between track)?	☐ Yes	☐ No
If the approach is inadequate, can it be adjusted?	☐ Yes	☐ No
Is there an adequate edge	☐ Yes	☐ No
Is there adequate drainage? List drainage present: Size: Location:	☐ Yes	☐ No
Do culverts, drop inlets, etc. need to be adjusted?		
Utilities adjustment needed? Overhead Lines ☐ Buried Lines ☐ Gas Vent Riser ☐	☐ Yes	☐ No
Are there adequate maintenance procedures, funds & RR agreements for path & crossing, including	☐ Yes	☐ No
Are there informational signs for non-standard path conditions, such as grades?	☐ Yes	☐ No

RAILROAD SECTION

Is the track on a curve? Degree of curve: ___° Super elevation: ___ " Cross level: ___%	☐ Yes	☐ No
Are active warning devices needed? Type of circuitry: AC-DC ☐ CWT ☐ MS ☐	☐ Yes	☐ No
Is there adequate warning time from the railroad signals? Need 2.8 seconds per foot to cross + warning.	☐ Yes	☐ No
Can multiple tracks be removed?	☐ Yes	☐ No
Are gates warranted? Standard ☐ Barrier ☐ Swing ☐	☐ Yes	☐ No
Does the track height need to be adjusted?	☐ Yes	☐ No
Is the surface smooth?	☐ Yes	☐ No
Is surface rehabilitation required to facilitate signal installation?	☐ Yes	☐ No

ADA

Are there curb cuts at nearby intersections and a clear path present to curb cuts at nearby intersections?	☐ Yes	☐ No
Are detectable warnings advised?	☐ Yes	☐ No
Is the path width adequate (36" is minimum)?	☐ Yes	☐ No
Are there vertical obstructions (standard: none between 27" to 80" above ground or within path)?	☐ Yes	☐ No
Slope of path transition (standard is 12:1 or less).	☐ Yes	☐ No
Landing platform (standard is level and 5' x 5' or more).	☐ Yes	☐ No
Is surface smooth (standard: passable by a wheelchair, no broken or buckled asphalt, edges < ¼")?	☐ Yes	☐ No
Panel length (crossing surface panel needs to extend 1' behind back of path to be standard).	☐ Yes	☐ No
Are there flange gaps 2½", or less, or flange fillers?	☐ Yes	☐ No
Can full flange fillers be used in low speed applications?	☐ Yes	☐ No
Is grade 5% or less? If grade is over 5%, how long is grade? '	☐ Yes	☐ No
If grade is 8% and 200', 10% and 30' or 12.5% and 10', are there rest areas?	☐ Yes	☐ No
Are there 43" handrails for grades over 5%?	☐ Yes	☐ No
Is widening proposed? How wide? _____'. When? _____ Consider in project? _____	☐ Yes	☐ No
Mitigation:		

AWARENESS OF XING

Overall awareness of railroad crossing, including visibility and effectiveness of possible signs, signals and markings.	☐ Acceptable	
Horizontal and vertical alignment considerations.	☐ Acceptable	
Pedestrian Sight Distance: Clearing sight distance of_____' from 17' from rail needed. North/East Side of Xing _____' South/West Side of Xing _____'	☐ Acceptable	
Bicycle Sight Distance 1: *Distance where crossing can be identified.* North/East Side of Xing _____ feet South/West Side of Xing _____ feet	☐ Acceptable	
Bicycle Sight Distance 2: *Need _____' down tracks from _____' down path.* North/East Side Looking East/North _____' West/South _____' South/West Side Looking East/North _____' West/South _____'	☐ Acceptable ☐ Recommend Improvement	
Bicycle Sight Distance 3: *Distance down path to see _____' down tracks if #2 not acceptable.* North/East Side Looking East/North _____' West/South _____' South/West Side Looking East/North _____' West/South _____'	☐ Acceptable ☐ Recommend Improvement	
Bicycle Sight Distance 4: Stopped *17' from rail, need _____' down tracks.* North/East Side Looking East/North _____' West/South _____' South/West Side Looking East/North _____' West/South _____'	☐ Acceptable ☐ Recommend Improvement	
Nighttime visibility, including ambient lighting.	☐ Acceptable	
Skew of Xing: ____° Does skew limit perception?	☐ Yes	☐ No
Are there simultaneous train movements on multiple tracks? Can standing boxcars block the view?	☐ Yes	☐ No ☐
Do Pedestrians and bicycles violate warning devices?	☐ Yes	☐ No
Mitigation of inadequate perception: ☐ Additional Signage ☐ Luminaires & Where ☐ Multiple Track Removal		

STOP AND YIELD SIGNS

THE FOLLOWING CONSIDERATIONS MUST BE MET IN EVERY CASE WHERE A STOP SIGN IS INSTALLED		
STOP or YIELD signs may be used by path authority if there are two or more TADT and xing is **passive**.	☐ Yes	☐ No
Are law enforcement & judiciary committed to enforcement equal to road intersections with STOP signs?	☐ Yes	☐ No
Would installation of STOP sign create a more dangerous situation than would exist with YIELD sign?	☐ Yes	☐ No

ANY OF THE FOLLOWING CONDITIONS INDICATE THAT A STOP SIGN MIGHT REDUCE RISK AT A CROSSING		
Maximum train speeds equal, or exceed, 30 mph.	☐ Yes	☐ No
Train movements are 10 or more per day, five or more days per week.	☐ Yes	☐ No
The rail line is regularly used to transport a significant quantity of hazardous materials.	☐ Yes	☐ No
The path crosses two or more tracks, particularly where both tracks are main tracks or one track is a passing siding that is frequently used.	☐ Yes	☐ No
The angle of approach to the crossing is skewed.	☐ Yes	☐ No

The line of sight from an approaching path user to an approaching train is restricted such that approaching path traffic is required to substantially reduce speed.	☐ Yes	☐ No

THE FOLLOWING CONSIDERATIONS SHOULD BE WEIGHED AGAINST PLACING STOP SIGNS		
There are active warning devices.	☐ Yes	☐ No
STOP sign would cause queuing onto nearby road.	☐ Yes	☐ No
The path is other than secondary in character.	☐ Yes	☐ No
The path is a steep ascending grade to or through the crossing, sight distance in both directions is unrestricted in relation to maximum closing speed, and bicycles or wheelchairs use the crossing.	☐ Yes	☐ No

REVIEW FOR AUTOMATIC GATES

ACTIVE DEVICES WITH AUTOMATIC GATES SHOULD BE CONSIDERED AT CROSSINGS WHENEVER AN ENGINEERING STUDY BY A DIAGNOSTIC TEAM DETERMINES ONE OR MORE OF THE FOLLOWING CONDITIONS EXISTS		
If inadequate sight distance exists in one or more quadrants and ALL of the following are 'Yes':	☐ Yes	☐ No
a. Is it physically or economically unfeasible to correct the sight distance deficiency?	☐ Yes	☐ No
b. Is no acceptable alternate access available? If access exists, then close the crossing.	☐ Yes	☐ No
c. On a life cycle cost basis, would the cost of providing acceptable alternate access or grade separation exceed the cost of installing active devices with gates?	☐ Yes	☐ No
Is the crossing in near schools, industries or commercial areas where there is higher than normal usage.	☐ Yes	☐ No
Are there multiple main or running tracks through the crossing?	☐ Yes	☐ No
Does the expected accident frequency (EAF) for active devices without gates exceed 0.1?	☐ Yes	☐ No
Is there queuing across the tracks from a nearby intersection?	☐ Yes	☐ No
Does the diagnostic team have other reasons?	☐ Yes	☐ No

OPTIONAL USE OF AUTOMATIC GATES

ACTIVE DEVICES WITH AUTOMATIC GATES SHOULD BE CONSIDERED *AS AN OPTION* WHEN THEY CAN BE JUSTIFIED ECONOMICALLY AND WHEN ONE OR MORE OF THE FOLLOWING CONDITIONS EXISTS		
Do multiple tracks exist?	☐ Yes	☐ No
Are there 20 or more trains per day?	☐ Yes	☐ No
Does the posted path speed exceed 40 mph in urban areas, or exceed 55 mph in rural areas?	☐ Yes	☐ No
Does the AADT exceed 2,000 in urban areas, or exceed 500 in rural areas?	☐ Yes	☐ No
Are there multiple lanes of traffic in the same direction of travel?	☐ Yes	☐ No
Does the product of the number of trains per day & AADT exceed 5000 urban, or 4000 rural?	☐ Yes	☐ No
Has an engineering study indicated the absence of active devices would result in the path facility performing at a level of service below Level C?	☐ Yes	☐ No
Does the expected accident frequency (EAF) exceed 0.075?	☐ Yes	☐ No
Is this a new project or are the current active devices being replaced?	☐ Yes	☐ No
Does the diagnostic team have other reasons?	☐ Yes	☐ No

CANTILEVER FLASHING LIGHTS

Two or more lanes the same direction.	☐ Yes	☐ No
High speed paths regardless of number of lanes.	☐ Yes	☐ No
Objects on the side of the path can obstruct the visibility of mast mounted flashing lights.	☐ Yes	☐ No
Horizontal or vertical curves or other topographical features obstruct the mast mounted flashing lights.	☐ Yes	☐ No

WARNING/BARRIER GATE SYSTEM

Crossing with high-speed trains.	☐ Yes	☐ No
Crossing in quiet zones.	☐ Yes	☐ No
As otherwise deemed necessary by the diagnostic review team.	☐ Yes	☐ No

PEDESTRIAN TREATMENTS

Can devices be designed to avoid stranding pedestrians between sets of tracks?	☐ Yes	☐ No
Can audible devices be added if determined necessary?	☐ Yes	☐ No
Would swing gates operate safely for disabled individuals?	☐ Yes	☐ No
Are skirted gates or other warning devices needed?	☐ Yes	☐ No
Can crossing controls/delays be used near stations?	☐ Yes	☐ No
Are added pedestrian signs needed?	☐ Yes	☐ No
List pedestrian signs needed:		
Notes:		

CLOSURE

CROSSING SHOULD BE CONSIDERED FOR CLOSURE WHEN ONE OR MORE OF THE FOLLOWING APPLY		
Does the crossing have nearby acceptable alternate bicycle and pedestrian access?	☐ Yes	☐ No
On a life cycle cost basis, would improvement exceed cost of providing acceptable alternate access?	☐ Yes	☐ No
If an engineering study determined any of the following.		
a. FRA Class 1,2, or 3 track with daily train movements		
1. AADT less than 500 in urban areas, acceptable alternate access within ¼ mile, and the median trip length would not increase by more than ½ mile.	☐ Yes	☐ No
2. AADT less than 50 in rural areas, acceptable alternate access within ½ mile, and the median trip length would not increase by more than 1½ miles.	☐ Yes	☐ No
b. FRA Class 4 or 5 track with active rail traffic.		
1. AADT less than 1,000 in urban areas, acceptable alternate access within ¼ mile and the	☐ Yes	☐ No
2. AADT less than 100 in rural areas, acceptable alternate access within 1 mile, and the trip	☐ Yes	☐ No
c. FRA Class 6 or higher track with active rail traffic.		
AADT less than 250 in rural areas, acceptable alternate access within 1½ miles, and the median trip length would not increase by more than 4 miles.	☐ Yes	☐ No
Does an engineering study determines the crossing should be closed because railroad operations will occupy or block the crossing for extended periods of time on a routine basis and it is not physically or economically feasible to grade separate or shift train operations to another location. Such locations would typically include the following areas:		☐ Yes ☐ No

☐	a. Rail yards
☐	b. Passing tracks primarily used for holding trains while waiting to meet or be passed by other trains
☐	c. Locations where train crews are routinely required to stop trains because of cross traffic on intersecting lines, or switch cars
☐	d. Switching leads at the ends of classification yards
☐	e. Where trains are required to "double" in or out of yards and terminals
☐	f. In the proximity of stations where long distance passenger trains are required to make extended stops to transfer baggage
☐	g. Locations where trains must stop or wait for crew changes

GRADE SEPARATION

CROSSING SHOULD BE CONSIDERED FOR GRADE SEPARATION WHEN ONE OR MORE OF THE FOLLOWING APPLY		
Is the path designed to have full control access?	☐ Yes	☐ No
Does the AADT exceed 100,000 in urban areas or 50,000 in rural areas?	☐ Yes	☐ No
Is the maximum authorized train speed over 110 mph?	☐ Yes	☐ No
Is there an average of 150 or more trains per day or 300 million gross tons per year?	☐ Yes	☐ No
Is there an average of 75 or more passenger trains per day in urban areas or 30 or more in rural?	☐ Yes	☐ No
Crossing exposure (product of trains per day & AADT) exceeds 1,000,000 in urban, 250,000 rural.	☐ Yes	☐ No
The expected accident frequency (EAF) for active devices exceeds 0.5?	☐ Yes	☐ No
Path user delays exceed 40 vehicle hours per day?	☐ Yes	☐ No

CROSSING SHOULD BE CONSIDERED FOR GRADE SEPARATION WHEN ONE OR MORE OF THE FOLLOWING APPLY AND THE LIFE CYCLE COSTS CAN BE FULLY ALLOCATED		
Is the path designed to have partial control access?	☐ Yes	☐ No
Does the path posted speed exceed 55 mph?	☐ Yes	☐ No
Does the AADT exceed 50,000 in urban areas or 25,000 in rural areas?	☐ Yes	☐ No
Is the maximum authorized train speed over 100 mph?	☐ Yes	☐ No
Is there an average of 75 or more trains per day or 150 million gross tons per year?	☐ Yes	☐ No

Is there an average of 50 or more passenger trains per day in urban areas or 12 or more in rural?	☐ Yes	☐ No
Crossing exposure (product of trains per day & AADT) exceeds 500,000 in urban, 125,000 rural?	☐ Yes	☐ No
The expected accident frequency (EAF) for active devices exceeds 0.2?	☐ Yes	☐ No
Path user delays exceed 30 vehicle hours per day?	☐ Yes	☐ No
Does the engineering study indicate that the absence of a grade separation will result in the path facility	☐ Yes	☐ No

NEW CROSSINGS

PERMITTED AT EXISTING RAILROAD TRACKS AT-GRADE WHEN IT CAN BE DEMONSTRATED ALL FOLLOWING APPLY & NOT ON MAINLINES		
On public paths where there is a clear and compelling need (other than enhancing the value or development potential of the adjoining property).	☐ Yes	☐ No
Grade separation cannot be economically justified (benefit to cost ratio on a fully allocated cost basis is less than 1.0 & the crossing exposure exceeds 50,000 in urban areas & 25,000 in rural areas)	☐ Yes	☐ No
There are no other viable alternatives.	☐ Yes	☐ No

IF A CROSSING IS PERMITTED, THE FOLLOWING CONDITIONS SHOULD APPLY		
The crossing will be equipped with active devices with gates.	☐ Yes	☐ No
The plans and specifications should be subject to the approval of the highway agency having jurisdiction over the path (if other than a State agency), the State DOT or other State agency vested with the authority to approve new crossings, and the operating railroad.	☐ Yes	☐ No
All costs associated with the construction of the new crossing should be borne by the party or parties requesting the new crossing, including providing financially for the ongoing maintenance of the crossing surface and traffic control devices where no crossing closures are included in the project.	☐ Yes	☐ No
Whenever new public path-rail crossings are permitted, they should fully comply with all applicable provisions of the TWG proposed recommended practice, MUTCD, AASHTO, ITE and other standards.	☐ Yes	☐ No
Whenever a new path-rail crossing is constructed, consideration should be given to closing one or more adjacent crossings.	☐ Yes	☐ No

RECOMMENDATION SUMMARY

☐ Closure	☐ Do Not Stop on Tracks Signs (for queuing) R8-8
	☐ LOOK Sign R15-8
☐ Crossing Relocation	☐ Bicycle Signs
	☐ Additional Signage
☐ Automatic Gates	☐ Pavement Markings (No thermoplastic)
	☐ Luminaires
☐ Cantilever Flashing Lights	☐ Crossing Surface Smoothness ¼ “, Width or Rehabilitation
	☐ Additional ADA
☐ Bells	☐ Zigzag Approaches
	☐ Storage Improvement for Queuing
☐ Active Second Train Coming Sign	☐ Approach & Landing Platform Modification
	☐ Detour Signage for Grades
☐ Barrier Gates or Skirted Gates	☐ Parking & Pedestrian Channelization
	☐ Railings
☐ Texturing – Detectable	☐ Utility & Culvert Adjustments
	☐ Path Surface or Edge
☐ Multi-Track Signs # Tracks	☐ Rest Areas on Grades
	☐ Fixed Object Removal
☐ STOP Sign R1-1	☐ Maintenance
	☐ Other –

RECOMMENDATION DESCRIPTION

PRECONSTRUCTION MITIGATION

What interim measures are needed?
If improvements are needed but will not be done, document reasons.
If no improvement needed, document adequacy of current devices.

TYPE OF PROTECTION DURING CONSTRUCTION

	☐ Combination daylight flagging and stop signs.
☐ 24 hour Flagger protection.	☐ Construction of half the crossing at a time with work zone detour.
	☐ Temporary signal protection (only under stringent conditions).
☐ Work zone traffic control with lane closures and detours with railroad flagging during working hours.	
☐ Other	

NEVADA PUBLIC UTILITY COMMISSION AUTHORITY REQUIRED

APPLICATION REQUIRED	APPLICATION NOT REQUIRED
☐ New Crossing	☐ Signal Installation, Circuitry improvements, etc.
	☐ Surface Improvement, Install Prefab Crossing, etc.
☐ Relocation	☐ Passive Improvement, Signs, Markings, etc.

Appendix F. Itemized Construction Cost Estimates

The following materials were used for public outreach during the Pedestrian Plan process.

Crossing Improvements	
Standard marked crosswalk (with two transverse lines)	$100 per leg
High-visibility crosswalk (continental style)	$300 per leg
Patterned concrete crosswalk	$20,000 per leg
Curb Extension to tighten curb radii at intersections	$5,000 to $25,000 per corner
New traffic signal with countdown pedestrian signals	$ 100,000 per intersection
Countdown pedestrian signal and crosswalk additions to existing signalized intersection	$4,000 to $6,400 per intersection
Audible pedestrian crossing cues added to existing pedestrian signal	$2,400 per intersection ($500 - $800 per countdown signal)
“No Right on Red” signage	$30 to $150 per sign plus installation at $150 per sign
Regulatory and Warning signage (e.g. Stop, Yield, or Pedestrian Crossing signs)	$ 50 to $150 per sign plus installation at $150 per sign
In-Street Yield to Pedestrians Sign	$250 per sign plus installation
Advanced “Ped Xing” warning and related pavement markings (e.g. advanced stop bar or yield marking)	$600 each
Curb ramps with detectable warning strips	$1,200 per ramp; $300 per truncated dome panel
Median refuge island (low cost is monolithic concrete island without landscaping)	$4,000 to $30,000
Pre-cast concrete or rubber flangeway filler for railroad crossings	$1,600 per pad (8ft x 8ft)
Pedestrian underpass or overpass (cost depends on site characteristics)	$750,000 to $4 million
Flashing beacon signal	$3,300 each

Sidewalk Installation	
Sidewalk only (existing curb & gutter or shoulder section)	$ 50 per linear foot
Concrete curb & gutter only	$ 25 per linear foot
Pedestrian-level street lights (10 to 15 ft in height)	$2,200 each
Tree Grates (4ft by 4ft)	$1,200 each

Greenway Trail Construction	
10ft paved shared-use trail (construction only)	$700,000 per mile
10ft unpaved crushed stone shared-use trail (construction only)	$100,000 per mile
Trail markers (not including installation)	$50 each
Information kiosks (not including installation)	$1,200 each
Water fountain (assumes water is already available)	$2,000 each
Bollards (not including installation)	$600 each
Bench (not including installation)	$800 to $1,000 each
Trash Cans (not including installation)	$800 to $1,500 each

Sources: Pedestrian and Bicycle Information Center (www.walkinginfo.org)
NCDOT Division of Pedestrian and Bicycle Transportation
NCDOT Project Services Division, 2007 Bid Averages (http://ncdot.gov/doh/preconstruct/ps/contracts/estimating2.html)

Appendix G. Harnett County Subdivision Ordinance, Article V, Section 5.12.3: Sidewalk Requirements

The Harnett County Subdivision Ordinance was recently amended to address minimum sidewalk requirements for all new subdivided developments. The City of Dunn should use these requirements as a baseline for immediate policy action and during future development of local Street Design Criteria.

generally recognized standards relating to the need for such areas. The Board recognizes, however, that due to the particular nature of a tract of land, or the particular type or configuration of development proposed, or other factors, the underlying objectives of this Section may be achieved even though the standards are not adhered to with mathematical precision. Therefore, the Planning board is authorized to permit minor deviations from these standards whenever it determines that (i) the objectives underlying these standards can be met without strict adherence to them and (ii) because of peculiarities in the developer's tract of land or the particular type or configuration of the development proposed, it would be unreasonable to require strict adherence to these standards.

2. Whenever the Planning Board authorizes some deviation from the standards set forth in open space requirement, the official record of action taken on the development application shall contain a detailed statement of the reasons for allowing the deviation.

5.12.3 SIDEWALKS

Sidewalks required by this section shall be designed and constructed in accordance with the following standards:

A. The sidewalk shall be constructed of concrete material

B. The subdivider shall bear the costs of the installation of the sidewalks required for all new or existing streets within the subdivision in accordance with specifications of the county. In lieu of requiring the installation prior to final plat approval the subdivider may enter into an agreement with the county in accordance with Article III, Section 3.7.2.

C. Shoulders shall be sufficient to permit the adequate installation and maintenance of sidewalks and utilities, as well as provide sufficient clear zone distance as defined by NCDOT.

D. The minimum thickness of a sidewalk shall be 4 inche. (Sidewalks shall have a uniform slope toward the roadway of ¼ inch per foot.) The utility strip between the sidewalk and the back of curb shall not be less than ¼ inch per foot nor greater than ½ inch per foot toward the roadway.

E. Where sidewalks and/or greenways intersect any section of curb and gutter, a wheelchair ramp shall be installed. In all other instances, the regulations of the American's with Disabilities Act must be adhered to.

F. Grooved construction joints shall be cut to a depth equal to at least 1/3 of the total slab thickness. The joint shall be no less than 1/8 inch in width and cut at intervals equal to the width of the sidewalk. A 1/2-inch expansion joint filled with joint filler shall be placed between all rigid objects and placed no farther than 50 feet apart for sidewalks and curb and gutter, extending the full depth of the concrete with top of the filler 1/2 inch below the finished surface.

G. Maintenance of sidewalks will be the responsibility of the homeowners' association or comparable individual, or group that has responsibility for other common areas. Maintenance of sidewalks shall be addressed in the organizational papers and by-laws.

H. Sidewalks shall be located within the dedicated, non-paved portion of the street right-of-way as follows unless otherwise noted:

STREET CLASSIFICATION	LOCATION	MINIMUM WIDTH	MINIMUM DISTANCE OFF BACK OF CURB
Major Thoroughfare	Both sides of street	5'	6.5'
Minor Thoroughfare	Both sides of street	5'	5.5'
Collector, Local or Cul-de-Sac Streets in any Non-residential or Multi-Family Development	Both sides of street	5'	3.5'
All streets in any Neo-Traditional Development	Both sides of street	5'	3.5'
Collector Street in any Residential Development	One side of street	4'	3.5'
Local Street or Cul-de-Sac Street in any residential Development	One side of street	4'	3.5'
Private Street	Same standard as above for comparable Public Street		

5.12.4 CURB AND GUTTER

All curb and gutter sections shall be concrete and meet Division of Highways Standards. All Neo-Traditional designed lots shall conform to North Carolina Department of Transportation Traditional Neighborhood Development Guidelines.

5.12.5 STREET TREES

A. The subdivider or developer of developments of more than 6 residential lots or 6 dwelling units shall either plant or retain existing healthy trees so that there is for every 50 linear feet of street at least one deciduous street tree. Street trees shall be planted or retained along both sides of newly created public or private streets.

B. Street trees shall be of species that is expected to attain a minimum height of 25 - 35 feet at maturity. Where required street trees are located under overhead utility lines, the species shall be of a type to reach a maximum of 20 to 25 feet. All street trees shall be at least 2 inches in caliper and a minimum of 6 feet at the time of planting.

C. Street trees shall be planted in a linear arrangement parallel to the street no less than 5 feet and no more than 10 feet outside the right of way. Street trees shall be planted at least 8 feet from utility poles and 10 feet from electrical transformers.

D. Plans for street tree planting and retention of existing trees shall be approved by the NCDOT for all streets proposed to be dedicated as public streets.

E. In lieu of requiring the installation prior to final plat approval the subdivider may enter into an agreement with the county in accordance with Article III, Section 3.7.2.

F. Street Tree requirements shall be waived on any Local Street or Cul-de-Sac Street in any residential Development

SECTION 5.13 HOMEOWNER ASSOCIATION (HOA)

A. A copy of the recorded organizational papers and by-laws shall be submitted at the final plat review stage to the DRB for review and approval.

B. The Homeowners' Association shall be established before the homes or units are sold.

C. Membership shall be mandatory for each buyer, and any successive buyer. No property shall be removed from the HOA without approval form the County Commissioners.

D. The developer or any subsequent developer shall manage the Homeowners' Association, which shall be responsible for all maintenance of the development, until sixty percent (60%) of all units to be sold are sold.