Pedestrian Plan

Kerr-Tar Regional Council Of Governments
Regional Transportation Planning Organization

June 2014

Town of Stem

Table of Contents:

ACKNOWLEDGEMENTS

A special thanks to the citizens of the Town of Stem for their involvement at public meetings and through comment forms and surveys.

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Part 1: PLAN OVERVIEW

Background

In 2013 the Town of Stem, as a member of the Kerr-Tar Regional Transportation Planning Organization, requested that the Organization prepare a comprehensive pedestrian plan. Stem had previously adopted the Granville County Comprehensive Transportation Plan (CTP) on September 17th, 2007. The Adopted CTP includes several road widening schemes as well as new intersection improvements in Stem and its immediate environs. The Town of Stem Pedestrian Plan recognizes the positive impact other modes of transportation, such as walking and cycling, can have on the life within and beyond this small community in southwestern Granville County and seeks to emphasize multimodal opportunities, such as walking and cycling, for the town's inhabitants and visitors.

Stem is located along Old NC 75, roughly between Durham and Oxford, North Carolina. The town also has the advantage of being located within commuting distance of the Research Triangle and the Interstate 85 Corridor. Established in 1888 by William Thomas Stem, the community is an old railway town created at the terminus of the Richmond and Danville Railroad (now a part of Norfolk Southern Rail). The town was incorporated as a municipality by the North Carolina General Assembly in 1911 and has a Mayor and Board of Commissioners for its governing body.

The population of Stem in recent years has been increasing, rising from 355 individuals at the 2000 Census to 463 individuals at the 2010 Census. Between the years of 2000 and 2010, the population of the town increased at an annual rate of 2.69%, a rate slightly higher than Granville County's annual population increase of 2.14% within the same time period. Currently the population stands at 508, with a 2018 population projection of 547 people.

According to the 2010 Census, the town's racial makeup is predominantly white with a smaller percentage of residents who are black alone, Asian, Pacific Islander, Hispanic, some other race, or people of two or more races. 24.6% of Stem's residents are under the age of nineteen, with a slight projected decrease to 23.3% in 2018. 26.1% of the Town's population is 55 or older with a projected increase to 30.3% by the year 2018. In Stem, 9.9% of households earn less than $15,000 per year in 2013 as estimated by the US Census. The projected number in this income bracket decreases slightly to 9.2% in 2018. The median household income in Stem was $48,687 in 2013 and expected to rise to $54,912 by 2018. Wages and salaries make up most of the income earned with some self-employment ventures. Stem residents tend to be politically active and serve on local committees. People living in Stem are very proficient do-it-yourselfers, working on homes, gardens and vehicles. Interests include fishing, hunting and woodworking. Dogs are a favorite pet (ESRI Community Tapestry, p.49). About 8% of the town's inhabitants participate in jogging and running with about 25% of the inhabitants indicating that they participate in walking for exercise (ESRI 2010 Sports and Leisure Market Potential for Stem Town-Projected to 2013).

The town itself covers 1.5 square miles. Its compact, small-town core features several stores, eating establishments, churches, gas stations, fire department with emergency management services, post office, a town hall and police station, as well as other small businesses and dwellings within convenient walking distance of one another.

The central part of Stem straddles the railway line, with Old NC 75 and Tally Ho Road forming the major road access in and through the town. Main Street runs perpendicular to the railway and connects these two main roads. Two residential developments located within a thirty minute walk outside of the main town have been incorporated into Stem and would benefit from pedestrian links into the town center. The compact nature of Stem has the potential to enable a pedestrian-oriented lifestyle. This walkable community would greatly benefit from pedestrian improvements which would successfully address the multimodal requirements within the adopted CTP for Granville County as well as the Granville County Greenways Master Plan. Such pedestrian improvements would have the potential to link destinations in the town center to the surrounding neighborhoods, improving pedestrian safety, health and quality of life, as well as providing an affordable nonmotorized transportation choice.

Vision, Scope and Goals

Vision for Stem:

The Town of Stem Pedestrian Plan incorporates the Vision of safe pedestrian connections to town facilities, services, neighborhoods and school by improving existing roadway corridors and creating new or repurposing existing off road connections for pedestrians, thereby increasing transportation choices and pedestrian connectivity while improving the quality of life for the Town's inhabitants.

Scope:

The creation of a comprehensive pedestrian plan for the Town of Stem will provide a focus and guide for targeting and applying for funding from local, state, regional and national programs, including non-profit pedestrian programs. The pedestrian plan is intended to enhance pedestrian links and improvements guided by existing and proposed infrastructure in the Granville County Comprehensive Transportation Plan, Granville County Greenways Master Plan as well as Stem's adopted Local Stormwater Program, Stormwater Ordinance for New Development and Stem's Zoning Ordinance. By utilizing Stem's existing adopted plans in addition to the Town of Stem Pedestrian Plan, it is anticipated that the town will be able to make pedestrian friendly choices for the health of the physical structure of the town as well as its inhabitants. Street tree planting and permeable pavement contributing to sustainable stormwater management can work to complement the pedestrian plan as a whole.

Goals:

It should be emphasized that the Granville County Comprehensive Transportation Plan (CTP) specifically states that one of its three major goals is to "provide a comprehensive multi-modal transportation network that should improve air quality through reduction of single-occupancy vehicle trips," with the dual objectives of providing transportation options for pedestrians, bicycles and transit within the County and educating the public on their transportation options and how they can benefit by alternative transportation mode choices(Pp.2 and 3).

The goals of the Town of Stem Pedestrian Plan are:

- To identify areas where the needs of the pedestrian are greatest in order to establish funding priority as it becomes available
- To improve local pedestrian connections to nearby services and amenities
- To provide aesthetic improvements in Stem by introducing pedestrian crossings and traffic calming measures where possible
- To increase the number of walking trips undertaken for all transportation purposes and to decrease the number of injuries to pedestrians, benefitting public health
- To contribute to the recreational activity as well as tourist interest created by the North Carolina Lakes District Regional Bike Plan and Granville County Greenways Master Plan

It should be noted that the Granville County CTP highway transportation improvements going through the Town of Stem could potentially undermine a pedestrian friendly environment and need careful consideration before implementation. These proposals are listed below.

Listed are projects in the adopted Granville County Comprehensive Transportation Plan (CTP) that may have an impact on pedestrian access and conflict with the objective of building a more pedestrian friendly town. Potential CTP conflicts with the needs of pedestrians must be anticipated and addressed.

Road Improvements for Stem included in the adopted Granville County Comprehensive Transportation Plan (Adopted by Stem on 9/17/2007 and the NC Board of Transportation on 6/6/2008):

1. Stem Western Loop going around Stem-Proposed improvements for Old Route 75 (SR 1004) going around Stem on Range Road and Little Mountain Road, this road will consist of 4 lanes
2. Old Route 75 (SR1004) going through Stem is marked as needing improvement with a proposal for widening from two lanes to three
3. Brogden Road and Belltown Road (Talley Ho Road) are indicated as needing improvement with a proposal for widening from two lanes to three lanes
4. Intersection Improvement - Stem Center (SR1132 and SR1127 intersection, called Belltown Road at Brogden Road on P.102 of the CTP, in town these roads are called Creedmoor and Talley Ho Rd.)
5. Intersection improvement-NE of Stem, Saunders Road and Belltown Road outside of the town line, on the way towards Granville Central High School

Benefits of a Pedestrian Lifestyle

Improving pedestrian infrastructure, walkability and connectivity in a community is an important ingredient to the health, well-being and growth of the community itself, including its residents and visitors. Pedestrian planning does require time and effort, but the outcome is well worth the input.

Lower income groups traditionally have the least access to transportation. The ability to get to a job is often impacted by the cost of owning a reliable personal vehicle. According to the American Automobile Association, the cost of operating a small sedan for a year is approximately $7,962, while walking is basically free (AAA, P.6). The American Public Health Association supports research that shows that transportation investments can have a deep impact on the public health of the elderly, the poor, the disabled and other vulnerable groups. Adverse health impacts such as increased risk of heart disease, asthma and obesity can be improved by implementing a multimodal transportation system that promotes health and equity in the community by meeting the needs of users of all ages and abilities.

Increasing evidence suggests that the design characteristics of a community have an impact on physical activity, social equity and the ability to age in place, as well as water quality (CDC, P.9). The Center for Disease Control recommends that adults need at least two hours and thirty minutes of a moderate intensity aerobic activity such as brisk walking every week along with muscle strengthening activities. Children and adolescents need at least one hour of physical activity every day (CDC, "Physical Activity for Everyone," www.cdc.gov). The design of a community should allow its inhabitants to safely walk and be able to achieve this health benefit if they desire. Residents of Stem would all benefit from improved walkability for health, safety and financial reasons and would be aided by the implementation of a comprehensive pedestrian plan.

Walking and cycling as a form of recreation is becoming more and more popular. The Town of Stem has the opportunity to be a participant in a bike route extending from Butner through Roxboro connecting Stem with the North Carolina Lakes District. In addition, Butner, Stem, Oxford and Stovall comprise the four towns in Granville County located along the proposed route of the East Coast Greenway (www.nclakesdistrict.com). By creating a bicycle and pedestrian friendly environment, tourists are encouraged to visit and patronize local establishments, contributing to recreation based economic development in the region.

Many ingredients contribute to the overall quality of life for the citizens in a community such as Stem. Some of these ingredients are the local education system, quality employment opportunities, and housing affordability. Increasingly, citizens claim that access to alternative means of transportation and nearby recreational opportunities such as parks, trails, greenways, and bicycle routes, are important factors for them in determining their overall pleasure within their locale. Communities that possess these amenities increasingly attract new industries, businesses and new residents. In addition, the benefits of a pedestrian lifestyle positively impact individuals within the community by enabling increased social interactions as people talk to one another and spend more time outdoors, contributing to their overall health and quality of life.

Some benefits of a pedestrian lifestyle:

1. An important ingredient to the health, well-being and growth of the community itself, including its residents and visitors
2. Has a positive impact on physical activity, social equity and the ability to age in place, as well as water quality
3. Contributes to tourism through recreation based economic development
4. Provides a safe and inexpensive way for residents to access local schools, businesses, amenities and destinations

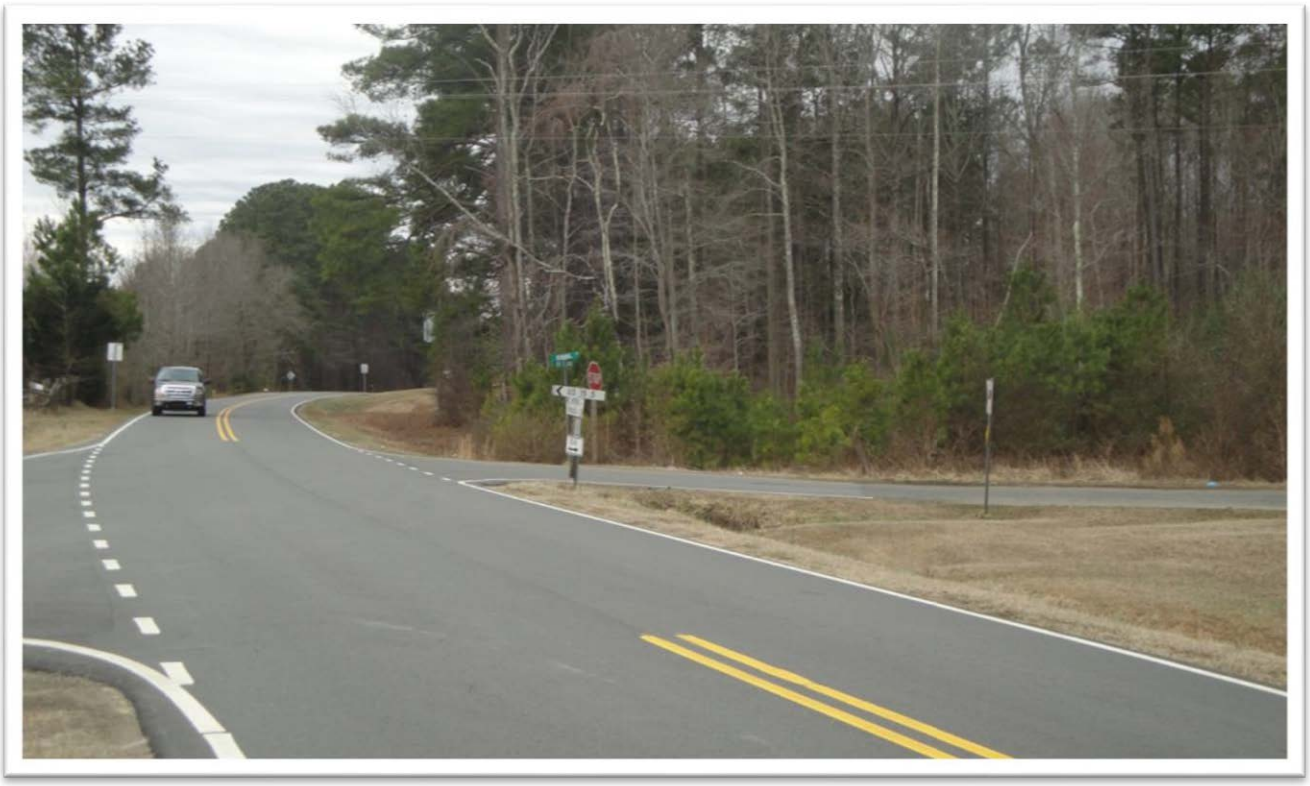
Part 2: CURRENT CONDITIONS

Existing Conditions

Stem Town Center has a compact structure which larger towns would like to copy after experiencing problems related to rapid growth. Two housing developments, the Reserve at Prestwick and Magnum Farms, are incorporated into the town within walking and biking distance to the town center. Stem has great potential to become a walkable and pedestrian friendly community with the addition of a pedestrian infrastructure.

Pedestrian facilities are currently nonexistent in the main street along Tally Ho Road, as well as other streets linking to the center of Stem. Pedestrians are forced to walk along the road shoulder to destinations such as the Dollar General and the United States Post Office. A network of sidewalks along the town's streets could greatly improve both its walkability and aesthetics. The other main issue that currently impedes walkability in Stem is the lack of dedicated road crossings and traffic calming measures. Talley Ho Road and Old Route 75 are two lane highways with traffic moving quickly through the area. The only traffic calming measure observed within the town were speed bumps located along School Street.

Looking to Dollar General on East Talley Ho Road from the Stem Post Office parking lot on Franklin Street



Intersection at School Street, Old 75 South and West Tally Ho Road

The Pedestrian Plan Questionnaire completed in the fall of 2013, mentions the intersections at Gooch Street and Old 75 North, School Street and Old 75 South, as well as Franklin Street and Tally Ho Road as the top three intersections needing pedestrian facilities or pedestrian facility improvements. These same three areas are again mentioned in the same survey as the top three roadway corridors that need improvement for pedestrian facilities or pedestrian facility improvements.

The Town of Stem also contains buildings associated with an earlier age of motoring, represented by the two classic gas stations in the center of town (one of which is currently Betsy's Consignment Store) at the corners of Tally Ho Road and Main Street, a former dance hall on Old Route 75 (now called the Tally Ho Trader) and several enchanting old churches such as the Stem United Methodist Church near Gooch Street on Old 75 North, as well as many historic homes.

Buildings associated with an earlier age of motoring at the intersection of Tally Ho and Main Street

Stem United Methodist Church near Gooch Street on Old 75 North

Several new developments have been annexed and are included in the Town of Stem boundaries, but in reality are separate suburban islands located outside of the town. Magnum Farms Subdivision on Old Route 75 and Prestwick Subdivision on Brogden Road are walking

and cycling distance to town if only the existing road network could accommodate the needs of cyclists and pedestrians.

The Reserve at Prestwick on Brogden Road, looking toward Stem Town Center

Providing a pedestrian network could improve pedestrian visibility, walkability and also potentially attract visitors to the downtown area in the future, especially if some revitalization takes place to renovate or add contextually compatible new buildings and businesses to the town center. Without the appropriate traffic calming, the municipal building, town businesses and homes along these routes are just buildings along the side of the road heading northeast to Oxford or southwest to Butner. Stem is a lovely small town with an interesting history-it should be noticed!

Current Policies, Plans and Programs

Pedestrian links and improvements will be based on the adopted Granville County Comprehensive Transportation Plan (CTP) as well as the Granville County Greenway Master Plan. Additional adopted documents include the Town of Stem Local Stormwater Program and the Town of Stem Stormwater Ordinance for New Development as well as the Stem Zoning Ordinance.

The Granville County CTP includes several roads in Stem classified as minor thoroughfares identified as needing improvement and recommends widening them from two lanes to three lanes. These roads include Brogden Road, Talley Ho Road and State Route 1004 (Old Route 75)(see CTP Project Proposal Map, Sheet 5 of 5). Part of State Route 1004 (Old Route 75) going around Stem is classified as a boulevard needing improvement and recommends widening to four lanes to form the Stem Western Loop(CTP,P.83). In addition, a public transportation bus route loop is proposed along Brogden Road coming from Butner into Stem and State Route 1004 (Old Route 75) leaving Stem going to Butner. A stop along the loop links to service to and

from Oxford. Proposed bicycle routes along Brogden Road and State Route 1004 (Old Route 75) are identified and need improvement. An off-road cycling route is recommended for Stem extending along the Norfolk Southern Railway Line. In addition, the Granville County CTP recommends two intersection improvements in Stem based on crash data on Belltown Road at Saunders Road, northeast of Stem, and Belltown Road(Talley Ho Road) at Brogden Road, in Central Stem (CTP,Pp.102-104, figure 5).

The adopted Granville Greenways Masterplan has two greenway routes going through Stem. One route, identified as G12a, follows Old Route 75 (SR 1004) as it goes through Stem and then follows Talley Ho Road/Saunders Road/Belltown Road (SR 1132) heading northeast. An off-road route identified as G12b follows the Norfolk Southern Railway line (http://granvillegreenways.org/master-plan/).

Currently, the Town of Stem is subject to water supply watershed requirements in addition to the Falls Lake Rules**.** The town lies entirely within the Upper Falls Lake Watershed (Stem Local Stormwater Program, Pp.3-4).The town is also identified as lying within a High Quality Water Zone as indicated in the Granville County CTP (CTP, Pp.115-119, Figure 10). The Town of Stem Local Stormwater Program emphasizes Low Impact Development principles, reduction of road widths and minimizing curb and gutter (Pp.26-27). The Stem Zoning Ordinance has a Watershed Overlay District (P.4-1)

Part 3: PLAN RECOMMENDATIONS

Possibilities to Consider

A positive outcome from the water rules is the potential for more compact development that will reinforce walkability. The Town of Stem Pedestrian Plan should go hand in hand with revitalization of the downtown area. By encouraging contextually compatible and site specific revitalization, the Stem downtown area could greatly benefit by taking advantage of its existing compactness. Environmentally sensitive choices, such as permeable paving and street tree planting along pedestrian and bicycle routes should also be considered and can be reinforced by Stem's Stormwater and Zoning Ordinances.

Some of the benefits of such revitalization efforts in Stem could positively impact the town by:

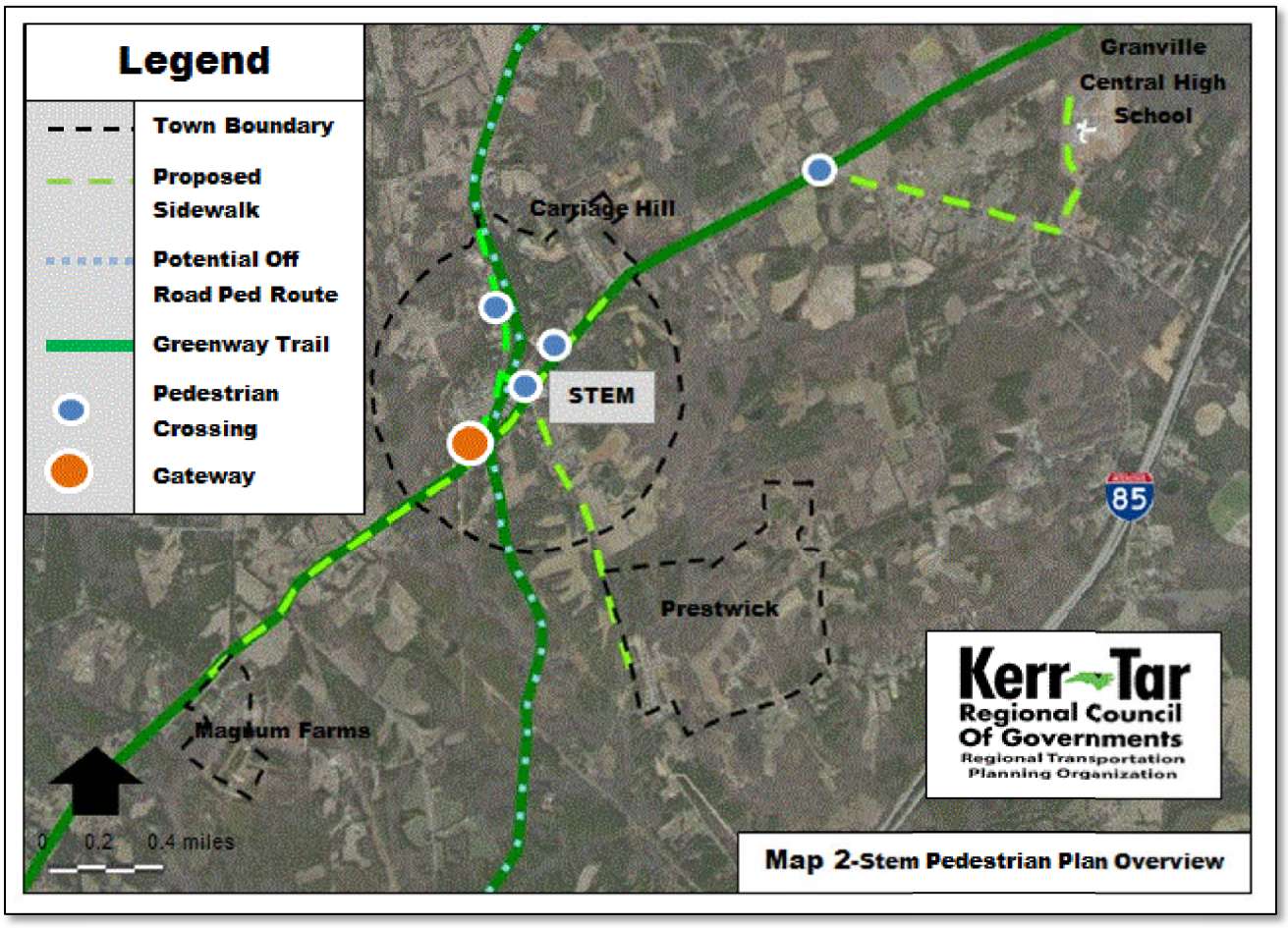
- Increasing the tax base because unoccupied or underutilized buildings are converted to businesses that produce revenue
- Increasing the mix of retail so that dollars that would be spent in other locations are circulated locally
- Encouraging building maintenance and rehabilitation within the town
- Increasing tourism and tourism-related spending
- Promoting the downtown as its own unique and attractive place that serves as a focus of life in the community
- Creating new pride in the community as well as new jobs, businesses and investment
- Decreasing the cost of municipal services to the town because the city limit is not expanding outwardly
- Creating a community where people can live, work, and socialize without the necessity of traveling long distances
- By combining such revitalization efforts with a pedestrian plan as well as other modes of transportation such as bus, rail and cycle routes, vehicular traffic can also be reduced-thereby lessening its associated health and economic costs

As Central Stem grows, it is important to ensure that newly developed portions of town be interconnected. Streets with cul-de-sacs should be allowed only if a curvilinear or rectilinear street network determined by topography and natural features is not possible. Creating street networks in this manner enhances connectivity to the center of town and between neighborhoods. New sidewalks and bike paths can be constructed as an integral part of this new development. In areas near streams, single loaded residential streets can be constructed outside of the flood zone with homes facing informal pedestrian paths located in the park-like riparian zone.

An example of a single loaded residential street opposite parkland with stream-Monteith Park, Huntersville, NC

An example of curvilinear streets determined by topography, linked to rectilinear street grid-Vermillion Neighborhood, Huntersville, NC

Walking to and from various locations in the center of Stem such as the Stem Town Hall/Police Station, post office, local churches, historic homes, the Stem Family Cemetery and local businesses is entirely possible due to the compact nature of Stem, but is hampered by the lack of sidewalks. The main barriers in Stem to walking are lack of pedestrian crossings, few traffic calming measures and the absence of a comprehensive pedestrian network including sidewalks and greenway trails. The annexed subdivisions of Magnum Farms and Prestwick would greatly benefit from a sidewalk linking to the center of town. Any sidewalk network created should include curb ramps and truncated domes in compliance with Americans with Disability Act (ADA) standards. Priority recommendations are listed on the following pages, serving to illustrate some of the key proposals of this plan and are not ranked in order of importance. In order to further these recommendations, the Town of Stem is encouraged to liaise with the North Carolina Department of Transportation (NCDOT), Ker-Tar Regional Transportation Planning Organization (Kerr-Tar RPO) and Granville County.

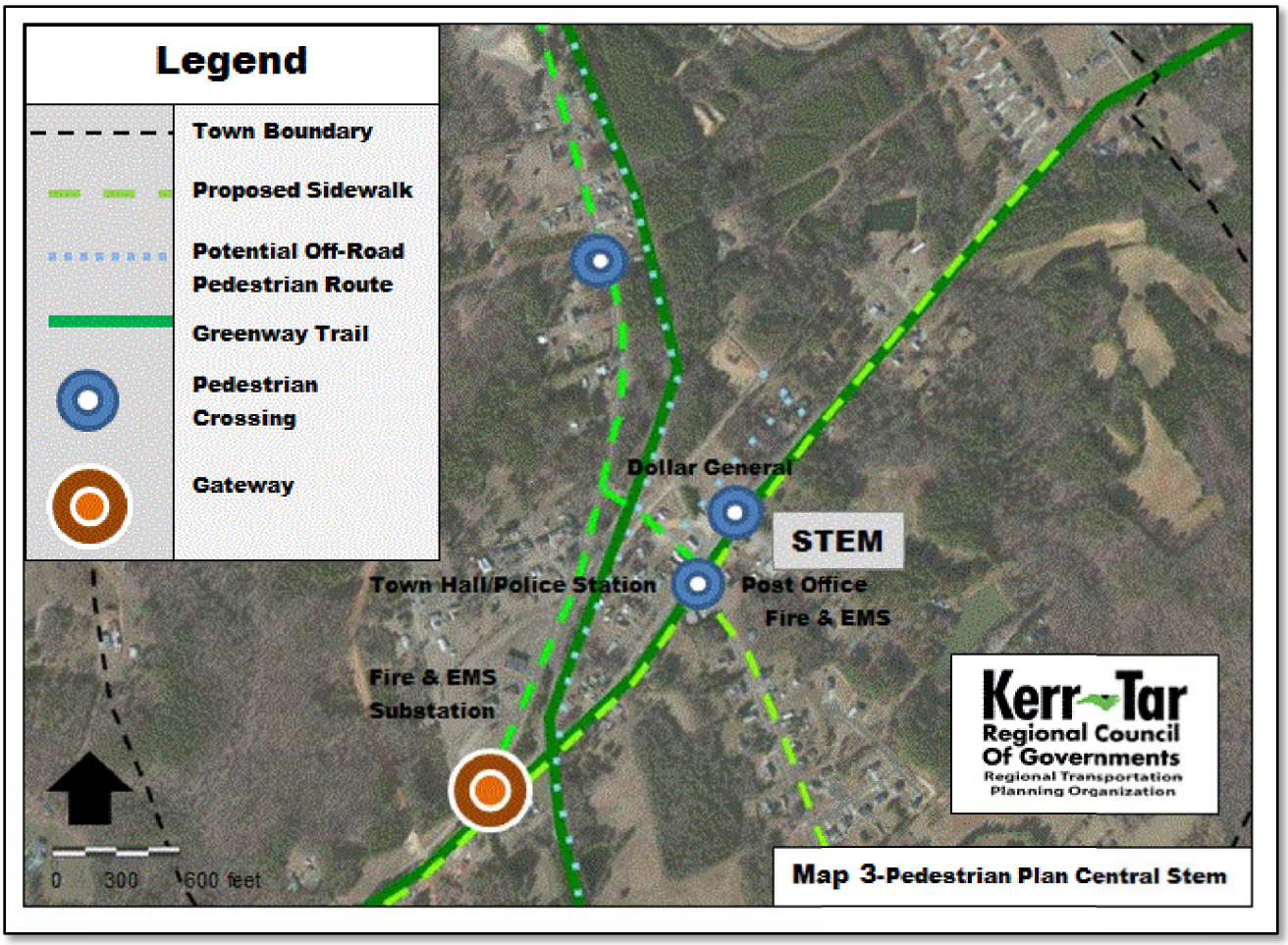


Priority Recommendation #1:

Add sidewalks to link the suburban developments that are a part of Stem, Prestwick and Magnum Farms, as well as Carriage Hill, to the downtown area (see Map 2-Pedestrian Plan Overview on previous page)

The proposed sidewalk network will extend from Magnum Farms on Old Route 75 through Central Stem. Another sidewalk branch will link the Reserve at Prestwick to Central Stem along Creedmoor/Brogden Road, continuing along Talley Ho Road and terminating at Carriage Hill Drive at the Carriage Hill Subdivision. Sidewalks should incorporate appropriate signage, waymarking and crosswalks.

Proposed sidewalk route extending from the Reserve at Prestwick, continuing in front of the Village at Alpine Way and along Creedmoor/ Brogden Road to Central Stem



Priority Recommendation #2:

Add sidewalks to downtown area linking potential walking destinations

Proposed sidewalks are indicated with a dashed green line in Map 2 and Map 3 above. Routes are designed to go past potential destinations in the town center, such as the United States Post Office, as well as shops selling food and merchandise to the public such as Dollar General, Stem Mini Mart and Hunt Brothers Pizza. In addition residential Stem streets, such as Sunset Street or within Carriage Hill for example, could be linked by sidewalks to the central area to provide neighborhood connections.

Examples of Local Stem Businesses in the Town Center

Priority Recommendation #3:

Add crosswalks at Franklin Street and Talley Ho Road; at the intersection of Tally Ho Road, Brogden Road and Main Street in the Town Center; and at Gooch Street and Old 75 North (see Map 3-Pedestrian Plan Central Stem)

These new pedestrian crosswalk proposals are indicated by blue dots on Map 3 above. Pedestrian access between two main destinations in town, the US Post Office and Dollar General at Franklin Street and East Talley Ho Road, can be improved by adding a crosswalk to the proposed sidewalk network.

A crosswalk(s) can be added in the Town Center at the Main Street, Tally Ho Road, Brogden Road intersection where the Granville County CTP has already proposed an intersection improvement. The scale of these improvements should not dominate the Town Center and should make sure that the needs of pedestrians and other nonmotorized modes of transportation are given priority.

A new pedestrian crosswalk is also proposed at Gooch Street and Old 75 North. This crossing will allow access to the Town Center from developments in the northern part of town, such as Carriage Hill.

Examples of Pedestrian Crossings

Standard Pedestrian Crossing

In-Road State Law Stop for Pedestrians Sign at Standard Crossing

Pedestrian Crossing with Protected Landscaped Median

Accessible Signaled Crossing

Priority Recommendation #4:

Rail with Trail on or alongside Norfolk Southern Rail Line

The Granville County Greenway Master Plan includes this north-south rail with trail connecting Oxford to Butner along the Norfolk Southern Railway line. A potential opportunity for off-road pedestrian and bicycle access is created that can connect neighboring communities and states, providing new avenues for tourism, economic development and health within the Town of Stem. It is recommended that the Town continue to work with Granville County and Granville Greenways to develop this project.

The Norfolk Southern Line as it goes through Stem

An example of a bike and pedestrian path running alongside existing railway Line (Rail with Trail) Carrboro, NC

Priority Recommendation #5:

Creating a defined gateway or entry point to Stem, so that everyone, no matter what mode of transportation they use, realizes they are in the Town of Stem!

Stem is its own unique town with a unique history, not a part of Butner or a place that one passes through on the way to Oxford. Several intersections in Stem have gateway potential, such as the intersection of School Street with Old Route 75 South and West Talley Ho Road in the south western end of town. The gateway can complement the proposed sidewalks, off-road pedestrian links and greenway trails. The gateway is identified with an orange dot in Maps 2 and 3. An alternative gateway possibility exists at the intersection of Creedmoor/Brogden Road and Talley Ho Road (State Roads 1127 and 1132) in Stem Center.

Care should be taken to preserve existing buildings with minimal setbacks and to allow for emergency access. Make sure the needs of pedestrians are considered with crosswalks designed to Americans with Disabilities Act (ADA) standards, adequate signage, and traffic calming measures, so that no mode of transportation is ignored. The defined gateway could take the form of a planted traffic circle, a planted median strip or a bump out.

Examples of Gateways

Traffic Circle-Coronado, CA

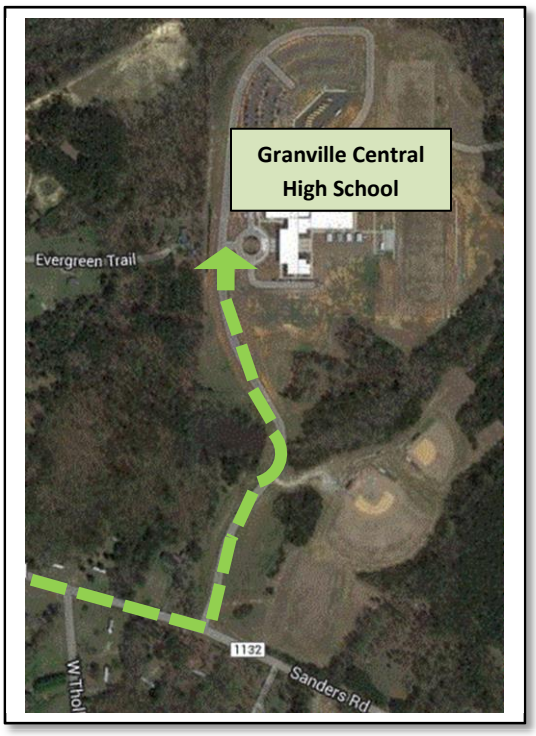
Planted Median-Houston, TX

Bump Outs with On Street Parking, Florida

Priority Recommendation #6:

Add a sidewalk link from Granville Central High School along Saunders Road joining with the proposed greenway trail

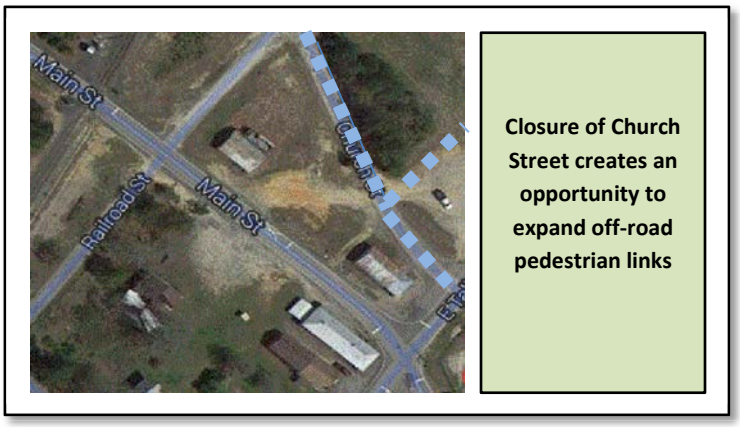
Currently no sidewalks exist to or from the high school. Adding sidewalks would provide an opportunity for students and faculty to walk some of the way to school, encouraging the health benefits of increased activity.



Priority Recommendation #7:

The closing of Church Street creates an opportunity to expand off-road pedestrian links

When the proposal to close Church Street becomes reality, the intersection at Main Street and East Tally Ho Road will be safer for vehicles and pedestrians. An opportunity is also created to expand the off-road pedestrian links proposed in Maps 2 and 3 on pages 14 and 16, which extend along the Greenway Rail with Trail and potentially between the block behind the Dollar General.



Part 4: RECOMMENDED POLICY AND ORDINANCE MODIFICATIONS

No new road facilities should diminish pedestrian access. There are three and four lane road improvements referenced in the Granville County CTP, which without proper consideration and design could disable other modes of transportation in favor of the automobile as well as encroaching on buildings in the center of Stem that have minimal setbacks. It is recommended that Stem adopt an Access Control Ordinance and also Multimodal Site Design standards in order to enhance mobility for the maximum number of users. Forming a Stem Pedestrian Committee could assist the Town in prioritizing pedestrian needs. In addition, planning measures should be used to reduce impervious surfaces as recommended in the Stormwater Plan.

Locations of New Public Facilities

By policy, locations of new public facilities should first take into consideration pedestrian access. The current placement the town hall/police station, post office, churches and local businesses allow individuals living in the community to be less car dependent (especially with augmented pedestrian infrastructure).

• A policy statement should be made that the preferred method of transportation of children to school is non-motorized (walking, bicycling, skating, etc.). For the development of new schools, a school location should be determined that is within walking distance of the majority of residential areas. Where students live within walking or biking distance, school policy should encourage and assist children to go to school without the use of cars or buses.

• The locations of any new post offices, health departments, Social Security offices, parks, libraries, police stations, abuse care centers, courts, DMV offices and other civic facilities should be in a location where pedestrian access is top priority. Simply placing these facilities near a sidewalk is not adequate, but placing these facilities on a sidewalk within a short walk to neighboring residents is ideal. Many of the users of these facilities are not able to or cannot afford to drive. In cases where there is typically one branch office, a central location is best. The town should have a policy to work with the county, the state, and the federal governments to make this possible.

• Plans for new roadway construction must not compromise projects and concepts brought forth in the Stem Pedestrian Plan. A new roadway should never sever a planned shared-use path corridor and a road widening project must always leave room for sidewalks.

Part 5: FUNDING AND IMPLEMENTATION

Sample Cost Estimates for Facilities

Approximate unit costs for the types of pedestrian projects proposed in this plan are listed below and are based on some example project costs that have been recently implemented, along with costs of other pedestrian projects. These are only example costs and should not be used to determine actual costs for specific projects. An engineer's estimate should be obtained before requesting project funding from County, State, or Federal sources.

Sidewalks

- $15 per foot for curb and gutter (plus 10% for design and administration)
- $30 per square yard sidewalk (plus 10% for design and administration)
- 5' sidewalk – The Town of Mooresville is spending $119 - $200 per linear foot ($629,000 - $1,056,000 per mile) for recent sidewalk projects. This figure includes all necessary costs of design & administration, curb & gutter, various retrofitting costs, etc.

Shared-Use Paths

- Floodplain paths, such as creek or sewer paths may require more site preparation. Floodplain costs usually involve drainage issues (i.e., need for culverts and bridges, or geotextiles), permitting issues, and boardwalk. Greenways are typically constructed on creek corridors or sewer easements.
- Rail Trails and side paths that have the advantage of being on a relatively cleared alignment with some existing grading and base work already complete can be constructed more economically. Typical Costs Associated with Floodplain Shared - Use Paths on Waterways or Sewer Lines:
- $120 per linear asphalt foot (installation including grading, clearing, construction, and a subbase with 18" on either side of asphalt for shoulder stabilization) $633,600 per mile + 10% administration and design = approximately $700,000 per mile = $132 per linear foot
- 10' Concrete walkway: $300,000 - $500,000 per mile (with design and administration – add 10%)
- 10' wide prefabricated "Steadfast" type Pedestrian Bridge: $1,200 per linear foot with design, engineering, installation and administration costs. An 8' wide clearance can reduce this cost.
- 10' paved asphalt path (with two-foot margins and associated improvements): $100 - $125 per foot ($528,000 - $660,000 per mile.) Add 10% for design and administration.
- Boardwalk: Historically $200 / linear foot ($1,056,000 / mile), lately has increased to $225 - $250 per linear foot. Unit prices on bids can see boardwalks come in anywhere from $150 - 350/LF. Boardwalk is 8' clear.

• Converted Culverts and Underpasses: $60,000 - $100,000.The cost varies according to width, lighting needs, if stream restoration is involved and other circumstances.

• Greenway designers typically estimate $120 per linear foot for construction of path (clearing, grading, and subbase -- 14' wide, asphalt trail 10' wide).

• General estimates consistently identify $1,000,000/mile for the design and construction of greenway (10' wide asphalt).

• Rail Trail construction can be estimated at $510,000 per mile, based on other North Carolina Rail Trail projects plus an additional 10% for design and administration. This plan uses $106 per linear foot to calculate all costs estimations for paths built on roadway and other upland corridors.

• The American Tobacco Trail (a rail trail in the Raleigh-Durham area) cost $330,000 per mile for construction costs in 2002. The City of Durham notes that they have seen a 10 – 11% increase in construction costs in later years, with a more moderate climb earlier. This cost included hauling away ballast and ties (not rails), filling in areas of bad soil, upfitting 12" and 18" drain pipes to 24" and 36" to meet new code requirements, grading, and paving.

• 10' Crushed Rock walkway: $80,000 - $120,000 per mile (with design and administration – add 10%). These greenways have high maintenance costs.

Intersections

• Crosswalk/Countdown signal: $5,000 per intersection (this includes installation and an additional installed post). This cost can be up to $15,000 per intersection if a retrofit is done with Accessible Pedestrian Signals (APS) devices.

• Curb extensions: $5,000 - $25,000

• Simple neighborhood crosswalks with signs and markings: $500 - $1,500

• Enhanced crosswalk with special stencils, raised platforms, or special signage: $5,000

• Raised crosswalks: $2,000 – $15,000

• Refuge island: $10,000 – $40,000

• In pavement illumination: $25,000 – $40,000 per crossing

• Pedestrian only traffic signal: $40,000 - $75,000

• Hawk signal: $40,000

• Mid Block Flashing Crosswalk: $20,000 for equipment and $20,000 to install

Lane Marking

- Bicycle or vehicle lane striping (thermoplastic): $15,000/mile with design and administration for both sides of the road

- $1.20 per linear foot of thermoplastic for line striping

- $350.00 for each set of performed thermoplastic bike symbols with arrows

Lighting, Landscaping, and Signage

- Lighting: Varies widely depending on type of light and location. Lighting an underpass could be $2,000 - $5,000 for 3 to 4 lights. Mecklenburg County Parks and Recreation recently paid approximately $11,000 for the wiring and installation of 2 underpasses (8-12 lights under each)

- Landscaping: Contractor installed foliage costs around $400 - $500 per tree and $25 - $50 per shrub

- Marking a route with signs: $2,000 per mile with design and administration Signs: $250 – $350 each

Traffic Calming

Some general cost estimates and other notes are included here from the United States Department of Transportation for traffic calming facilities:

Measure	Reduces Traffic	Noise	Loss of Parking	Restrict Access	Emergency Entrance	Maintenance	Cost
Traffic Education Campaign	Maybe	No change	None	None	None	No	Varies
Speed Display	Yes	No change	None	None	None	No	$250/day
Neighborhood Sign	Maybe	No change	None	None	None	No	$200/sign
High Visibility Crosswalks	Maybe	No change	None	None	None	Yes	$1K-$5K
Police Enforcement	Yes	No change	None	None	None	No	$75/hour
Narrowing Lanes	Yes	No change	None	None	None	Yes	$1K-$3K
Speed Limit Signing	Maybe	No change	None	None	None	No	$200/sign
Stop Signs	Maybe	Increase	None	None	None	No	$200/sign
Signing Restrictions	No	No change	None	Yes	None	No	$200/sign

Funding Strategies

A combination of funding sources will be needed to construct the infrastructure projects recommended in this report. The Town of Stem and subsequent planning entities should seek all viable funding opportunities for project implementation, including Federal and State monies where available (i.e. inclusion on the State TIP). Special funding programs for specific types of projects (e.g. Safe Routes to School) should also be pursued where appropriate. Private foundations, such as the Blue Cross Blue Shield of NC Foundation, should be thoroughly researched to identify possible funding options. Although many funding sources potentially can provide revenues for project implementation, it is likely that local government funding will be a primary component (for matching federal / state funds and for implementation where other revenue streams are not available). Therefore, it is recommended that the Town establish a set aside amount in the annual Public Works budget for pedestrian infrastructure project implementation. An annual set aside would ensure that progress is made every year on constructing the specified projects, and would illustrate a commitment from the Town to improve walkability.

The Plan Adoption and Approval Process

The recommended policy and priority identifications should be fully considered as the Town of Stem updates its existing zoning ordinances. Incorporating the policy recommendations in the Town's updated planning and zoning tool kit will play a major role in defining the future pedestrian environment of Stem.

Part 6: APPENDICES

1. Facility Standards and Guidelines

Guidelines for the placement and design of pedestrian facilities should be flexible to some extent so that context-sensitive design solutions can be implemented, but should adhere to standards established by the American Association of State Highway and Transportation Officials (AASHTO), the Manual on Uniform Traffic Control Devices (MUTCD), and the NCDOT.

Several overall guidelines for facility development are highlighted below.

• Give transportation priority to the completion of pedestrian routes to schools, neighborhood shopping areas, parks, and transit stops.

• Incorporate the natural and historical linear aspects of the town into pedestrian projects.

• Ensure that the safety and convenience of pedestrians are not compromised by transportation improvements aimed at motor vehicle traffic.

• Ensure that the pedestrian circulation system is safe and accessible to children, seniors and the disabled.

• Street furniture, vendors, water fountains, bicycle racks, lighting, and other pedestrian amenities should be welcomed, but also be placed out of the immediate pedestrian travel area.

• Establish links between sidewalks, trails, parks, and the rest of the community.

• Retain public pedestrian access when considering private right-of-way requests.

• Support changes to existing policies that would enhance pedestrian travel.

• The pedestrian system should connect to residential, commercial, industrial, educational, and recreational areas.

• Off-site street improvements or enhanced bicycle and pedestrian facilities may be required as a condition of approval for land divisions or other development permits.

• Aesthetics and landscaping shall be a part of the transportation system.

• Coordinate transportation planning and efforts with neighboring municipalities.

A number of specific pedestrian improvement projects are proposed in this plan. These projects will play an important role in helping to improve the walkability of the town; however, it is even more important to ensure that appropriate pedestrian accommodations are made with future development. It is useful for the town to consider a set of guiding design principles that cater to the needs of pedestrians and the general means by which these needs are to be

met. Some basic principles for incorporating pedestrian accommodations in a transportation system include the following:

• It should be accessible.

• It should connect to the places where people want to go.

• It should be easy to use and convenient.

• It should provide a sense of place and make an effort to be appealing to the senses.

• It should be well maintained.

• External factors such as noise, crime potential, exposure to the elements, and hazardous objects should be minimized.

• It should be used for multiple purposes such as dining, shopping, and special events so long as it does not contradict any of these principles.

2. Sidewalks (and other pedestrian facilities)

Clearly, no pedestrian system is complete without sidewalks. Even if no pedestrian travel exists, studies show that walking can be expected to increase when the facilities are provided, and walking levels are highest when the pedestrian routes are complete and continuous. It is relatively easy to design a policy that requires new development to include sidewalks in their construction, but it can be difficult to retrofit new sidewalks into existing communities. The American Association of State Highway and Transportation Officials (AASHTO) recommend the construction of sidewalks on all city streets, including those in rural areas. The Institute of Transportation Engineers (ITE) recommends sidewalk installation on both sides of the street whenever possible for new urban and suburban streets, especially in commercial areas, residential areas with four or more units per acre, or residential areas on major arterials and collectors. If sidewalks on both sides of the road are not possible, lower density rural residential areas might adequately serve its pedestrians with a sidewalk on only one side and/or four-foot wide shoulders. Although separate pedestrian and automobile corridors are necessary on any roadway other than a low-speed driveway, sidewalks are the most useful along roadways with a fair amount of traffic volume and with speeds higher than 25 miles per hour. The higher the speed of traffic, the more the need may exist to route the pedestrian away from that road. Store frontage walkways or shared-use paths that provide the pedestrian with multiple options are sometimes preferred. Sidewalks should never be intentionally built directly adjacent to a roadway if the space exists for a buffer such as a planting strip, on-street parking, a furniture zone or bicycle lanes. Because of frequent intersections, dips, and narrow widths, sidewalks are not meant for bicycles other than new riders who are accompanied by a pedestrian trainer. One of the most common reasons for bicycle/car collisions are attributed to that rider being on the sidewalk.

Bicycle provisions are addressed briefly in this plan as a traffic calming measure, but should be addressed completely in a separate plan.

ITE Recommendations for Sidewalks:

• Central Business District: Wide enough to accommodate users. Minimum 8 feet.

• Commercial area outside the central business district: 7 feet wide if no planting strip is possible, or 5 feet wide with a 2-8 foot planting strip (Wider planting strips accommodate greater buffers from traffic and the opportunity to plant large shade trees).

• Residential areas should have 5 foot-wide sidewalks with a minimum of two-foot wide planting strips.

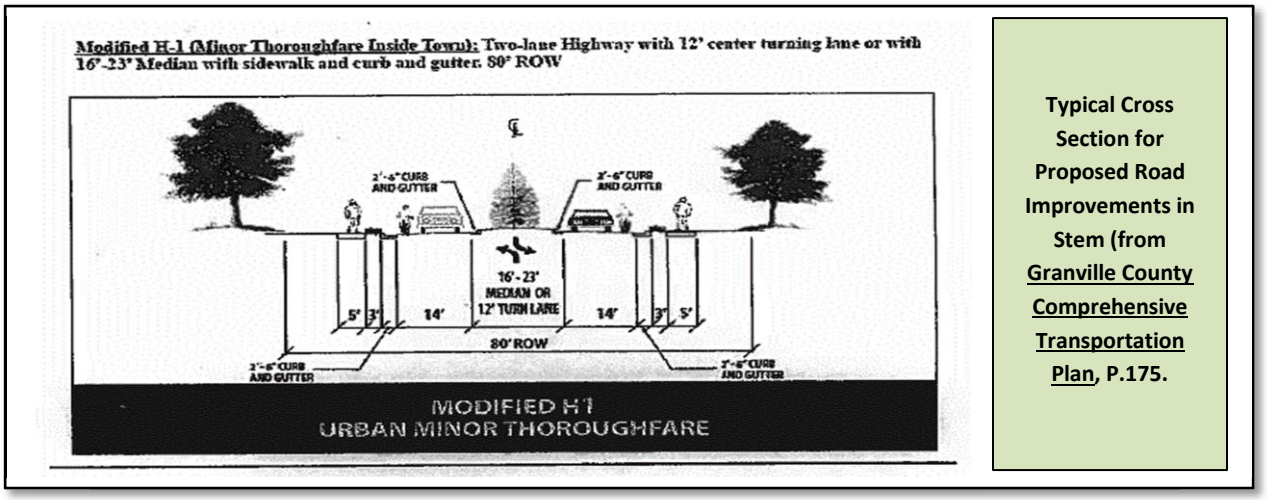
• 4 to 8 foot wide planting strips or furniture zones are recommended along all sidewalks to provide separation from vehicles. This space is useful for landscaping, lighting, poles, trash receptacles, signage, water fountains, benches, weather debris, bike racks, and curb ramps. Six foot wide minimum buffer strips between the sidewalk and the curb are required for the correct slope needed to accommodate ADA requirements for curb ramps while maintaining the sidewalks' 2 % maximum cross slope. Eight foot wide buffers are recommended for the planting of any shade tree.

• Sidewalks should be clear of obstructions such as utility poles, sign posts, fire hydrants, bike racks, newspaper stands, etc. These objects must remain in the furniture zone or planting buffer strip.

• Vertical clearance should be at least 7 feet from ground level to the bottoms of signs or the lowest tree branches.

• Increasing sidewalk widths by 2 - 3 feet would accommodate shoulder-high intrusions like building walls, bridge railings, and fences.

• Maximum cross-slope of 1:50 (2%) is considered to be level. Limit running slope to 5% (1:20), or no greater than 8.33% (1:12) where topography requires it. Ramps with level upper and lower landings are necessary for ADA requirements.



Typical Cross Section for Proposed Road Improvements in Stem (from Granville County Comprehensive Transportation Plan, P.175.

3. Small Town Main Street Program

The North Carolina Department of Commerce's Main Street Program assists small towns in making improvements to reestablish their downtowns as thriving economic centers. Since the Program's start in 1980, towns have experienced a total gain of $1.66 billion in new investment and 14,600 new jobs. While the Main Street Program takes a wide approach to improving downtowns, many plans completed through the Program include initiatives to make streets more bicycle and pedestrian friendly. Towns have focused on improving sidewalk connectivity, creating marked walking routes, installing bike lanes, and implementing street-level design improvements for a more enjoyable walking experience. Transforming downtown shopping into an enjoyable, active experience has helped towns attract consumer spending that might previously have occurred at larger shopping centers outside their tax base and improve downtown property values.

As previously stated, the Town of Stem is compact and has the potential for a wonderful downtown area. The Town would greatly benefit from directing future resources and planning efforts towards enhancing this area. While relatively small, the potential for a vibrant, walkable area could be easily achieved by encouraging and assisting in the revitalization of the historic buildings in downtown Stem. As the improvement of this area progresses, the Main Street Program could be a great resource for Stem.

4. Town of Stem Pedestrian Survey Responses

These three pages contain the tabulated survey responses from members of the public who attended the Stem Open House on September 30th, 2013.

Stem Pedestrian Questionnaire (Page 1 of 3)

TOWN OF STEM PEDESTRIAN PLAN QUESTIONNAIRE RESPONSES

1.How long have you lived in Stem?	< 1yr	1-5 yrs	5-10 yrs	>10 yrs	Do not live in Stem	Total
	1	4	1	5		11

2. How old are you?	<18	18-24	25-34	35-44	45-54	55-64	65 or older	Total
		1	2	1	2	1	4	11

3.How important to you is the goal of creating a walkable community?	very important	somewhat important	not important	don't know	Total
	10	1			11

4.How pedestrian friendly is Stem today?	very	somewhat	somewhat unfriendly	very unfriendly	Total
1		3	2	5	11

5.How often do you make walking trips now?	5+ x week	3-4 x week	at least once a week	a few times a month	never	Not Answered	Total
	3	1	3	2	2		11

6.For what purposes do you walk most how and/or would you want to walk for the future (all that apply)	
Fitness or recreation	10
Primary transportation	2
Social visits	5
Shopping	5
Walking baby or dog	6
Other safety, specifically walks to Dollar General	2

7.What factors discourage walking in Stem? (all that apply)	
Lack of sidewalks and trails	11
Poorly maintained sidewalks	1
Traffic	7
Unsafe road crossings	4
Lack of nearby destinations	5
Aggressive motorist behavior	3
Physical barriers	
Lack of time	
Lack of interest	
Other-Please specify	

Stem Pedestrian Questionnaire (Page 2 of 3)

TOWN OF STEM PEDESTRIAN PLAN QUESTIONNAIRE RESPONSES

8.Which destinations in town are you most like to get to in Stem? (Top Three)		
Trails and greenways		7
Parks		4
Shopping		3
Restaurants		2
Civic buildings (library, City Hall)		3
Work		2
Entertainment		3
Public Transportation		
School		
Other		
Other Specified	tennis courts	1

9.The Town has limited funding to address all of the pedestrian needs in Stem. To help prioritize, please select your top three improvements.		
Repair/replace existing sidewalks		3
Fill in the gaps in the existing sidewalk network		
Add new sidewalks		6
Add crosswalks and other improvements at key crossings		2
Construct a greenway trail/multi-use path system		5
Create more pedestrian friendly destinations		5
Improve public transportation		
Address barriers to pedestrian travel		3
Improve pedestrian accommodatioons at key intersections (crosswalks, ramps, signals)		3
Other-Please specify	gym, swimming pool, kid's park	3

10.Rate the importatce of adding crosswalk and side walk improvements to the following locations:

	Very important	Important	Somewhat important	Not important	Did Not Answer Q.10=2
Transit Stops	2	3		1	
Schools				1	
Retail developments	1	3		1	
Grocery stores	3	1	1		
Pharmacies	2	2		1	
Parks	4	1		1	
Neighborhoods	3	3		1	
Other-Please specify	We don't have any of these things.				

TOWN OF STEM PEDESTRIAN PLAN QUESTIONNAIRE RESPONSES

11.What do you think are the top THREE roadway corridors most needing pedestrian facilities or pedestrian facility improvements?		Did Not Answer Q.11=6
	Franklin and Tally Ho	2
	Gooch and Old 75	2
	Franklin and Old 75(Tally Ho)	2
	Brogden/Creedmore Rd.	1
	Tally Ho	1
	Main Street	1
	The Satellite Neighborhoods	1
	Not Sure	1
12.What do you think are the top THREE intersections most needing pedestrian facilities or pedestrian facility improvements?		Did Not Answer Q.12=5
	Gooch St. and 75	2
	School St. and 75	2
	Franklin and Tally Ho	2
	Creedmore/Tally Ho	1
	E. Tally Ho Rd.	1
	W. Tally Ho Rd.	1
	Main St. asnd Brogden	1
	Not Sure	1
13. What strategies would you be supportive of the Town using to develop/improve pedestrian facilities in the Town? (all that apply)		Did Not Answer Q.13=3
	Provisions in the Land Development Code (LDC)	3
	Dedicated funding sources in the Town budget	4
	Bonds	3
	Grants	7
	Private financing	2
	Other-Please specify	
14.Please visit http://www.walkscore.com to learn more about Walk Score, how it works and to use it to determine the Walk Score for your residence or neighborhood.		
	None of the 11 people who filled out the questionnaire determined the Walk Score in the space provided.	
Members of the public completed this survey at the Stem Open House on September 30th, 2013.		

5. Sources

American Automobile Association, Your Driving Costs, Stock 2717, www.aaa.com, 2013, P.6.

American Public Health Association, "Public Health and Equity Principles for Transportation," www.apha.org, 2014.

Center for Disease Control(CDC), Atlanta Georgia, Healthy Community Design, 2009, P.9.

CDC, "How much Physical Activity do Adults Need?" www.cdc.gov, 2014.

Comprehensive Transportation Plan for Granville County, March 2010.

"ESRI 2010 Sports and Leisure Market Potential for Stem Town"-projected to 2013.

ESRI Tapestry Segmentation Reference Guide. "26 Midland Crowd" ESRI: Redlands, California, www.esri.com, 2012.

Granville Greenways Website, http://granvillegreenways.org/

NC DOT Crash Data, Justin Jorgensen, Granville County Transportation Planning.

North Carolina Lakes District Website, www.nclakesdistrict.com

Town of Stem Website, www.stemnc.org

US Census 2000, 2010, 2013 and 2018 updates.

Town of Stem, North Carolina Local Stormwater Program, Revised November 15, 2011.

Town of Stem Stormwater Ordinance for New Development, 2012.

Town of Stem Zoning Ordinance, August 19, 2013.

Pedestrian Plans:

Chicago Pedestrian Plan, Chicago, Illinois, 2011.

Town of Norwood Pedestrian Plan, 2009.

Town of Plymouth Pedestrian Plan, 2010.

Town of Stovall Pedestrian Plan, 2013.