



SouthWest Area Study



6.28.2019

Acknowledgments

The SouthWest Area Study was produced by the Consultant Team with the combined efforts of personnel representing Wake County, Harnett County, and the Towns of Apex, Cary, Fuquay-Varina, and Holly Springs, with further assistance from the dedicated Study Oversight Team and Core Technical Team.

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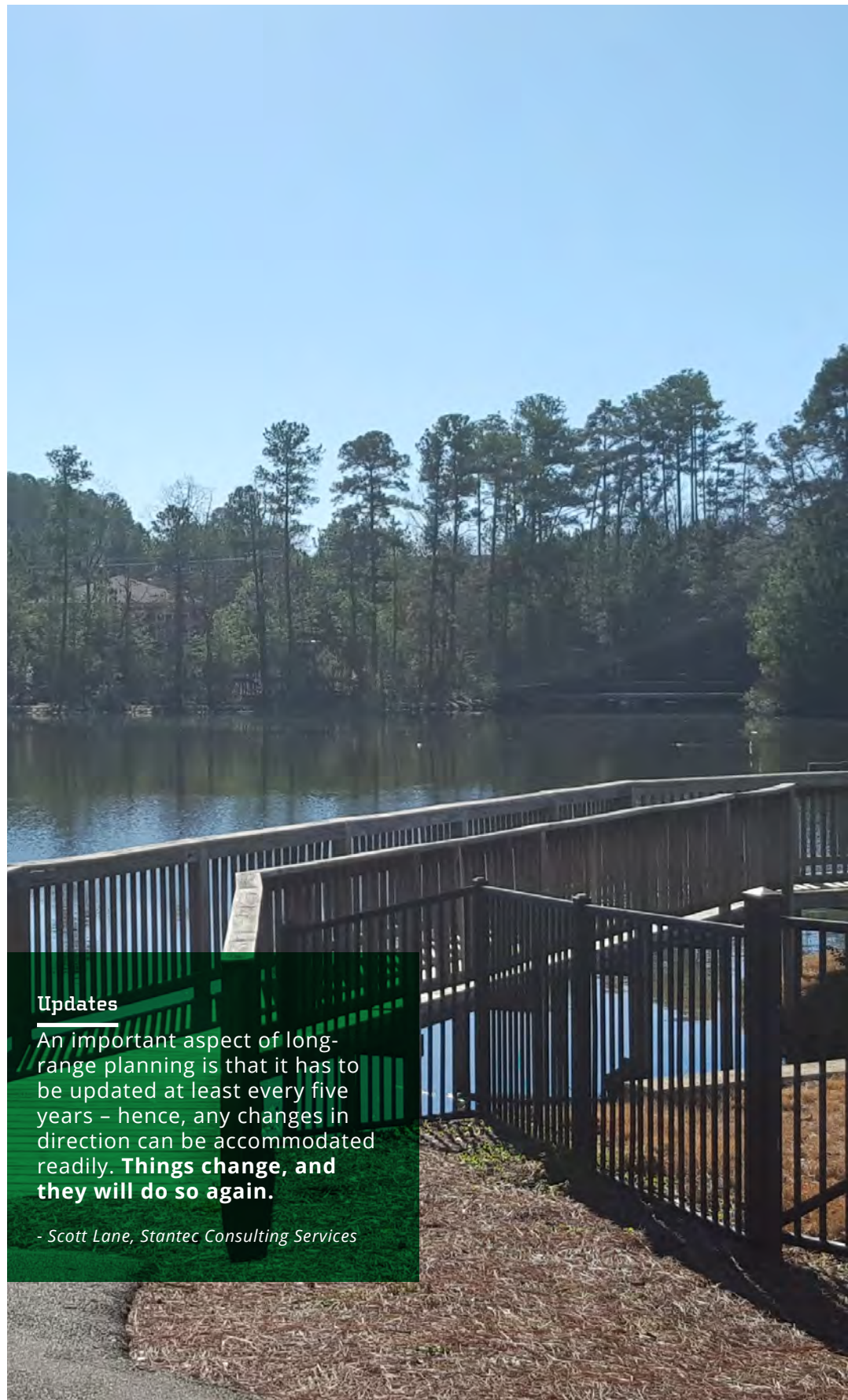
Ch. 1

The background image shows a street scene. On the left, there is a building with a dark roof and a sign that reads "Angier Museum". The building has a white door and windows with dark frames. A utility pole with wires is visible in the center. To the right, there is a tree and another building with a sign that partially reads "ANGIER".

Project Context

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Updates

An important aspect of long-range planning is that it has to be updated at least every five years – hence, any changes in direction can be accommodated readily. **Things change, and they will do so again.**

- Scott Lane, Stantec Consulting Services

Introduction & Problem Statement

The Southwest Area Study (SWAS) was initiated by the North Carolina Capital Area Metropolitan Planning Organization (CAMPO) in cooperation with the North Carolina Department of Transportation (NCDOT) to provide an update to a previous study published in 2012. Since then, the regional transportation needs and demands of southwestern Wake County and northern Harnett County have grown significantly. The update is written within the context of new laws and programs that address the consequential population and employment growth in the partnering communities of Apex, Holly Springs, Fuquay-Varina, and Angier.

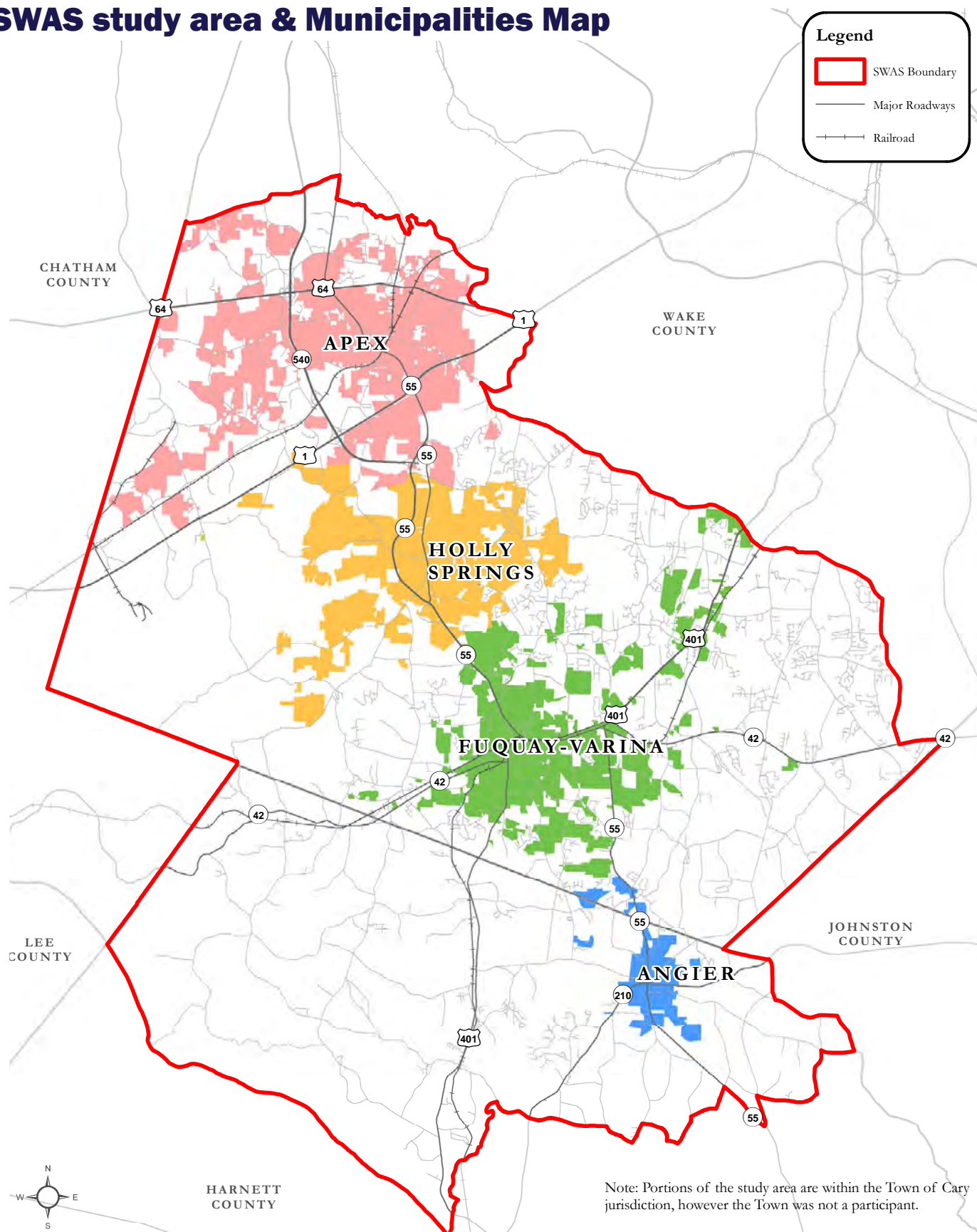
The context of transportation in this study area, as well as regionally and nationally, have also changed dramatically. The passage of dedicated transit funding for Wake County has opened new opportunities, while advances in technology and experiments with peer-to-peer services have changed the definition of transit. North Carolina's passage of the Strategic Transportation Initiative and subsequent technical scoring process for project funding also changes the planning context.

This study report is intended to be a resource for partnering agencies and CAMPO to help guide the construction of transportation infrastructure and planning of publicly funded improvements as well as private sector, developer-funded improvements to the surrounding transportation facilities. Recommended transportation projects and improvements are presented in this study report and the various projects will be prioritized in the next update of the metropolitan transportation plan (MTP).

The study area encompasses 311 square miles of a unique mix of small towns, suburbs, farms, open space and some urban areas. Wake County is one of the fastest-growing counties in the United States, and Harnett County has proved similarly attractive due to resources within and proximity to major employers as well as the Research Triangle Park and Fort Bragg.

The study focused on an integrated approach that considered land use development and transportation strategies that took into account an array of factors to find the best, most cost-feasible set of recommendations. The people in these communities brought their concerns, initiative, needs, and innovation to a comprehensive vision for the Southwest Area. People here will be able to walk safely on a sidewalk to a bus stop; travel safely on the roadway without undue congestion; bicycle to school with their child; and experience the plan that was created in part through their input provided through the numerous outreach efforts during the project. From computerized transportation models to rendered visions of "hot spots," this plan wove together these communities into a fabric that will bring health, vitality, and opportunity to all citizens and attract / retain businesses and employees.

SWAS study area & Municipalities Map



Map 1-1: The SWAS Study Area Boundary (Wake and Harnett Counties)

Study Area & Partnerships

The study area encompassed the following communities in Wake County: Apex, Holly Springs, and Fuquay-Varina; the CAMPO (Capital Area Metropolitan Planning Organization) portion of Harnett County that included Angier was also represented. It is a large area – over 311 square miles, larger than 19 of North Carolina’s counties. The diversity of the area in terms of its people may be even greater: 21% of the population self-reports as African American / Black or Asian. **Map 1-1** lays out the study area and municipal framework.

This project was initiated and funded primarily by CAMPO and the North Carolina Department of Transportation (NCDOT). It was completed in partnership with staff of the towns of Apex, Holly Springs, Fuquay-Varina and Angier, as well as staff of the county planning departments for Wake and Harnett counties, NCDOT staff, and other transportation and land use regulatory agencies and their stakeholders.



“Buckhorn Duncan Road ... narrow with non-existent shoulders...numerous bikes use this road and it is unsafe ... with such harsh conditions..”

- Survey Respondent; many comments like this one reflected current conditions)



Updating an Original

In 2012, the first area study was completed for the CAMPO Region; and titled the Southwest Area Study. The 2012 study analyzed the existing transportation facilities, areas of concerns, opportunities for improvement, and provided recommendations for future roadway projects. The 2012 Southwest Area Study had a smaller 230 square mile study area, as it did not include the full length of the US 64 corridor, nor did it include all of Apex. As part of the 2012 Southwest Area Study, approximately 175 transportation projects were recommended to further improve the transportation operations and facilities within the southwest CAMPO area.

Since 2012, there was one major change to the existing regional transportation network, the opening of NC Highway 540 between NC 54 near the Research Triangle Park and the NC 55 Bypass on the Holly Springs – Apex border. There were other additions to the roadway network that are significant at a local level. These will be discussed later in this report. There were several significant policy changes including the:

- Strategic Transportation Investments Law (STI) (approved July 1, 2013);
- CAMPO's Locally Administered Projects Program (LAPP) (adopted October 20, 2010);
- Wake County Transit Plan (approved by referendum on November 8, 2016); and
- Wake County Transit Sales and Use Tax (effective April 1, 2017).

The implementation of these programs has significant influence on funding for transit and on project selection for funding.



IMPORTANT CONTEXTS INFLUENCING THE SHAPE OF THE 2045 SWAS

The ultimate disposition of the SWAS recommendations will be considered for incorporation into the fiscally constrained 2050 Metropolitan Transportation Plan, a document and process required of all metropolitan planning organizations. This document becomes the guiding document for projects that receive federal and state funding across all modes of travel, which are the principal sources of financing for major transportation projects in this region. An important part of the context of the 2045 SWAS during its formation was the shifting priorities assigned to various “tiers” of transportation facilities – Statewide, Regional, and Division. State law (a.k.a the Strategic Transportation Initiative) was changed in 2013 that altered how much money would be allocated to each of these three regional tiers, and the way that projects were prioritized to receive funding was also changing. The 2045 SWAS therefore had to react to these changes which in some cases were fairly significant (for example, the new law that restricted state funds from matching federal funds for bicycle / pedestrian projects).

This being said, the 2045 SWAS and the CAMPO Metropolitan Transportation Plan (MTP) are visionary documents looking out 20 or more years. In the context of timeframe, the recommendations should not be closely aligned with short- or medium-term policy decisions enacted at any level of government. Instead, the priorities, policies, and project evaluations conducted in this document represent what was thought to be the most reasonable blending of current contexts and what the communities in our study told us that they wanted to see happen over this generational span of time. An important aspect of the MTP is that it has to be updated at least every five years – hence, any changes in direction can be accommodated readily. Things change, and they will do so again.

The following sections of the study report describe the basic project planning framework as well as key modal recommendations stemming from this comprehensive process.





Planning Framework

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Guiding Principles

This update of the Southwest Area Study represents a continuing regional approach for local agencies that collaborate to identify and address strategies to improve transportation services and facilities across jurisdictional boundaries. The following are the principles that will guide the prioritization of improvements to inform the next Metropolitan Transportation Plan:

- **Livability:** protecting community character while balancing the following:
 1. Mobility needs
 2. Housing and transportation affordability
 3. Accommodating future growth
 4. Facilitating active living / transportation
- **Mobility and Accessibility:** Improving transportation choices for everyone with coordinated roadway, bicycle, pedestrian, and transit strategies that mutually support transportation and land use initiatives. Emphasizing multi-modal connectivity, accessibility and improved choices in travel routes and modes for everyone, regardless of age or ability.
- **Technology:** embracing innovations that transform travel patterns and transportation habits.
- **Sustainability:** promoting, in three forms:
 1. **Economic Vitality:** investing in transportation services and facilities that support a diversified economy with more jobs in the study area.
 2. **Environmental Balance:** preserving environmentally sensitive areas, scenic viewsheds and rural heritage lands.
 3. **System Preservation:** prioritizing investments to preserve the existing transportation system.

The following objectives were established for the 2045 SWAS Update:

- Identify solutions that accommodate sustainable development and address the needs for regional mobility;
- Establish and / or enhance a transportation system that includes key transportation corridors, pedestrian and bicycle facilities, railroad corridors, and fixed route transit to meet the mobility needs of the study area;
- Evaluate and update a regional land use vision that builds upon locally adopted land use planning efforts;
- Identify potential transportation and environmental impacts and associated mitigation strategies;
- Facilitate stakeholder and decision-maker involvement that informs, educates, receives, documents, and responds to all input;
- Secure stakeholder buy-in on preferred alternatives and implementation strategies and priorities;
- Evaluate and address on-road and off-road freight movement needs for the future conditions in the study area;
- Thoroughly document the planning process, including documentation regarding selected versus non-selected transportation alternatives in a manner suitable for packaging for the project development process;
- Design and implement a robust public involvement process and document all public involvement efforts, including comments, survey results, or other input received from the public;
- Consider all federally-required Title VI (of the Civil Rights Act of 1964) and Limited English Proficiency regulations associated with regional transportation planning public engagement efforts; and
- Develop feasible recommendations that address the anticipated planning-level capacity deficiencies across the transportation network for all modes, with attention to long-term and short-term priorities.

Incorporating the Guiding Principles

accessibility

The project team wanted to make certain that they considered the technical components of the work in such a way that the layperson could not only access the same information that the consultant and staff were using but played an integral role in developing various aspects of the work products. In order to make that happen, the project team used a variety of graphics, presentations, and performance measures to distill “heavy” content into something that was useful to many people.

communication

The most important part of this study was communication: talking to stakeholders, elected officials, and many different people across a very large geographic space. Not only was the process challenged by space, but also by time: a key question in every long-range planning process is how to get people to “see” beyond what they encountered when they drove to the public meeting, to work, or to school that day. In order to make this communication happen at a meaningful level, the project approach used a variety of outreach techniques from social media platforms to individual and group meetings with stakeholders in the communities that SWAS serves.

coordination

The project team of CAMPO and consultant staff, as well as the steering committees (Core Technical Team and Stakeholder Oversight Committee, or CTT and SOT, respectively) recognize that this is an opportunity for coordination of policies across jurisdictions when considering effects outside of their own corridors (e.g., US Highway 1, US Highway 401, and NC Highway 55) and that policies were critically important over the long term creating the recommended projects and places that people said that they wanted to see in their future. Policies have an especially important place in areas and time periods when large-scale capital infusion from state and federal governments are generally unlikely or in a declining trend.

The following sections of the report discuss in greater detail what was discovered through the public process, both externally and through the two steering committees. Recommendations, by mode of travel, are followed by a separate chapter – the Policy Guidebook – that describes best practices that the SWAS municipalities and counties can follow in order to achieve the goals that people described to the project team throughout the life of the study.

Public Outreach Methods

As mentioned, the design of SWAS intentionally worked to create as many venues and opportunities for different segments of the public to participate in the planning process. The table below names the outreach methods and provides some information about the appropriateness of each one to reaching certain segments of the public as well as the level of detailed input it provided to the process. The number of stars indicate how appropriate the method was for receiving feedback from each demographic or the level of detail provided. Each method is briefly described in the following paragraphs.

	General Public	Elected Officials	Hispanic Outreach	Detail of Input	Low Income	Youth
Pop up Events	*		***	**	***	
Social Media	*	*	*	**	*	**
Website with interactive map	*	*	*	***	*	**
Survey (paper)	*	*		**		
Public Meetings	**	**		***		
Board Briefings	*	***		*		

Table 2-1: Effectiveness of Public Outreach Methods

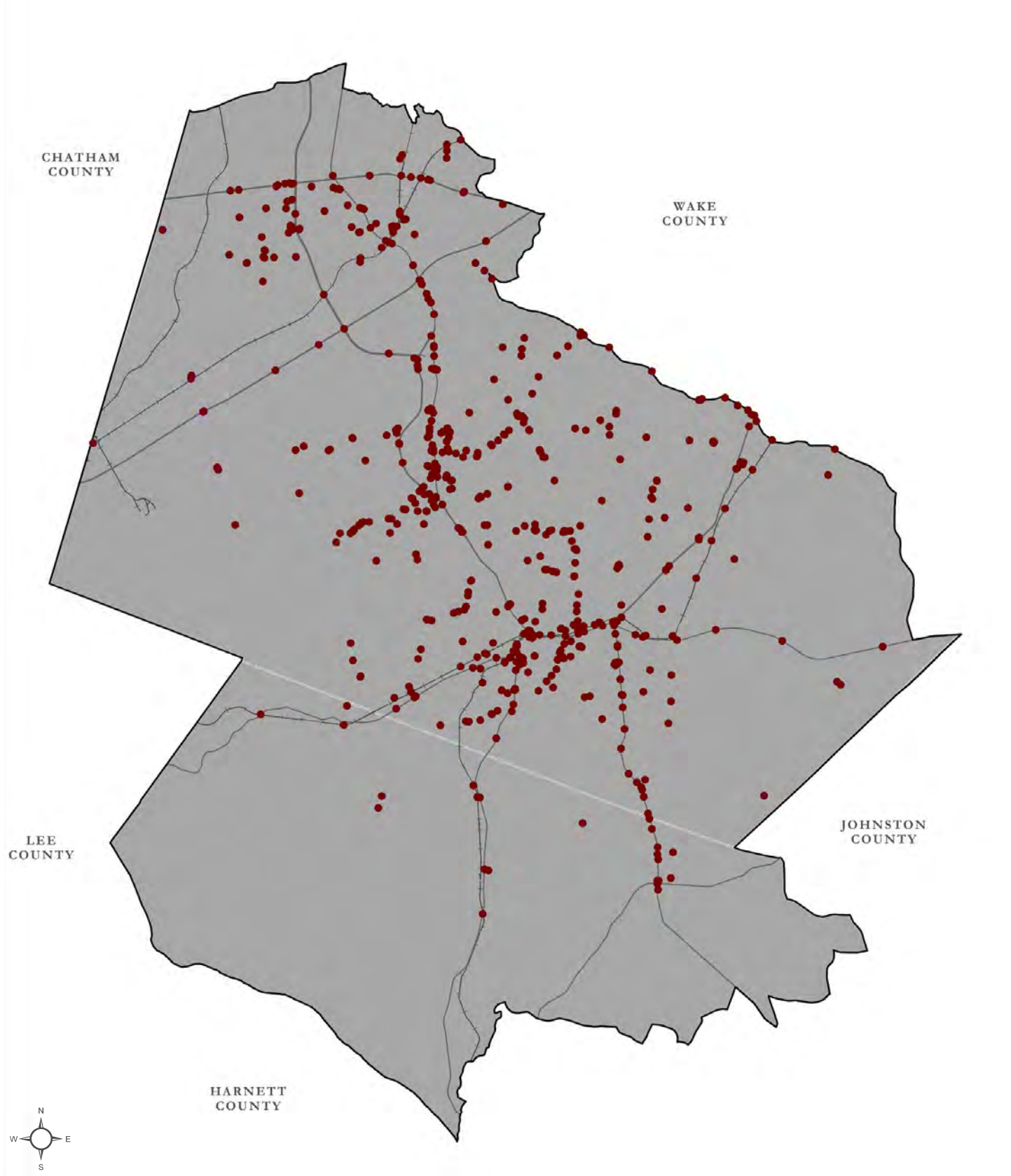
Traveling Roadshows

The traveling roadshow concept was divided into two separate parts, but all of the versions of this technique involved taking materials and planning concepts to places to get feedback where the public already meets. The first phase of roadshow met with several groups around SWAS to present them with an overview of the project and to acquire information on their specific transportation issues. One variant of the traveling roadshow was conducted at the Holly Springs Food Pantry and was offered at that location to engage a population group that tended toward lower-wealth. Another variation of the roadshow was made at the Southern Wake Regional Center to engage people who visited that location for government services. The second phase of roadshow met with different groups in the downtown areas to present them with maps showing recommendations and a newsletter with highlights and the website address.

Survey

Traditional surveys were employed both in paper-based formats and online, not only to gain input from the public but from the SOT to identify popular strategies. The survey tool was an online software application that was used twice: once to gather specific issues and locations and again to identify priority recommendations for different modes of travel and preferred financing mechanisms to pay for the improvements. A summary of the public comments received is included in Appendix A.

Public Area Of Concerns Comments Map



Map 2-1: Areas of Concerns Specified During Public Comment Period

Newsletter

One additional outreach mechanism was the electronic newsletter. This was produced twice during the project: at the beginning to inform readers of the project and upcoming activities, and second, with the release of the draft recommendations. These were shared via email through CAMPO's general distribution channels and shared with the SOT and CTT members for distribution through their channels as well.

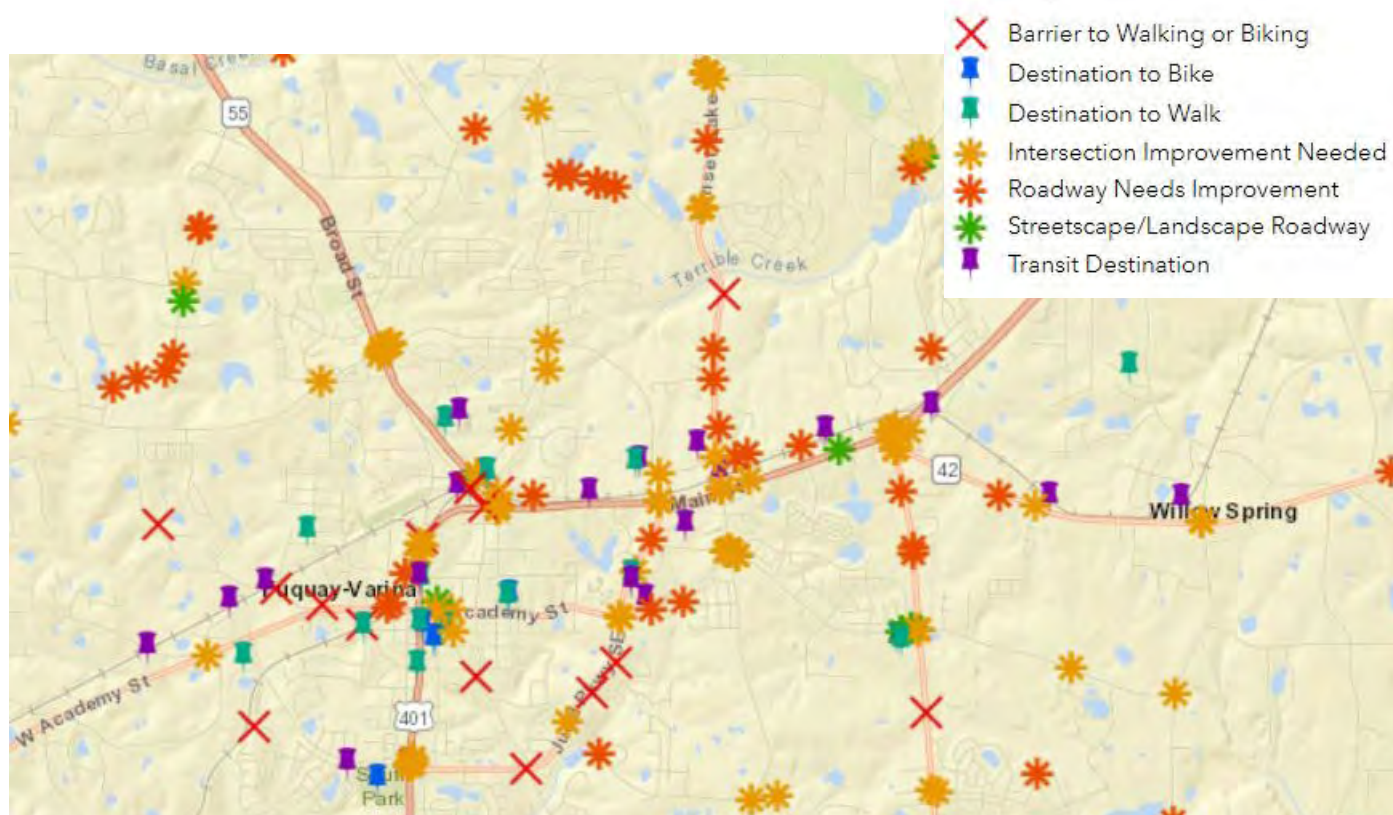
Website

Few social enterprises would be considered complete without a presence on the Internet. A dedicated project website was used during the study. The website was primarily used to

help stakeholders and the CTT / SOT members keep track of information and events. The SWAS website online map was used to provide information in the form of over 900 comments during the study. CAMPO staff used its handles on Twitter, Facebook and Instagram to advertise public meetings and share project updates.

Board Briefings

In order to communicate with elected officials, a round of board briefings was conducted for the 2045 SWAS planning effort. The purpose was to gather information on issues and present the framework of SWAS ; to gain input on preliminary findings of the land use and transportation assessments; and to present the draft recommendations. Board briefings were conducted for each municipality and both counties for a total of **11** meetings. Periodic updates were also made to the CAMPO Technical Coordinating Committee (TCC) and Executive Board.



Sample of comment points responders included on the interactive map exercise

Public Meetings

Two public meetings were held, one in December 2018 and one in April 2019. The project team invited elected officials and other stakeholders directly, as well as advertising through email lists and the CTT / SOT mailing lists. Approximately 48 people attended the public workshops to gather at workstations to state their issues concerning land use, bicycle, pedestrian, transit, roadway, health, and traffic concerns.

The outcomes of each of these engagement strategies, as well as numerous data gathering and analysis techniques, were used to develop the context of the planning area; land use and transportation strategies; and gather input on the ideas and generate refinements to create this study report.

Frequent Points of Concern

Based on the various public input techniques described, the people of SWAS identified a variety of key concerns expressed in the following bullet points.

- ✔ Protection of farmland / open space was important to some
- ✔ More greenways & education as improvements to bicycle / pedestrian travel
- ✔ Improvements to both auto and transit speed & convenience were wide spread desires
- ✔ In terms of land use, more shopping opportunities along NC 55 and inside the small towns were clear desires of many people surveyed; in general, more density in the towns themselves were identified as desirable

In addition to these issues raised by the public during our outreach efforts, there were a number of additional issues that helped evolve the various modal considerations described in subsequent chapters. The Regional Snapshot in the next chapter provides the contextual overview of the complex 2045 SWAS planning effort and its people.



Ch. 3



Regional Snapshot

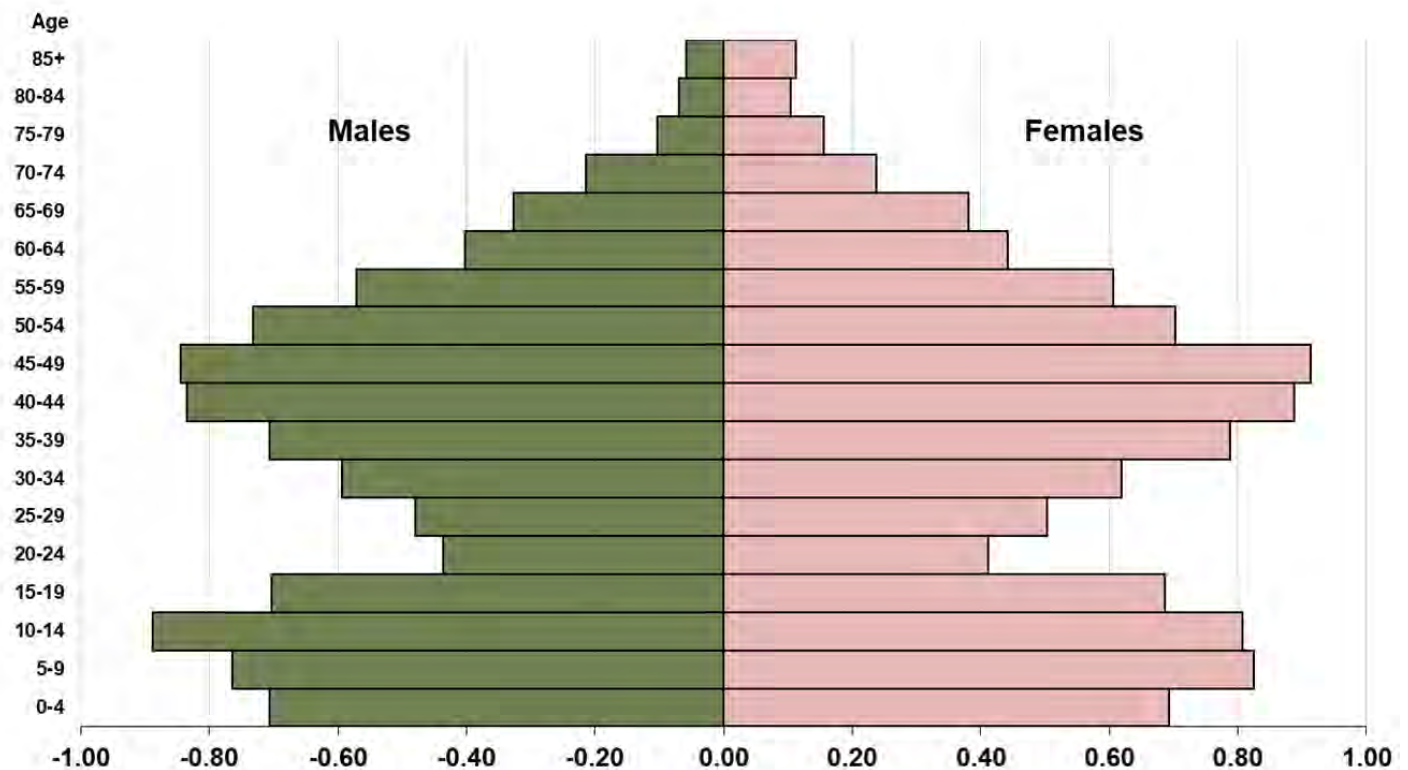
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The People of SWAS

The SWAS study area is mostly populated with middle-aged residents between the ages of 35 and 54 and also children under the age of 19 years. The population distribution is illustrated in Figure 3-1 which represents the population distribution of age within the study boundary, separated by gender. There is a noticeable gap between the ages of 20 and 34 living in the study area. In one meeting of the study oversight team, this gap was referred to as the “missing millennials,” meaning those born between 1983 and 2000.

According to the US Census Bureau, the 2016 minority population of the SWAS study area was approximately 21.1%, which was calculated based on census block group data. This is lower than the state average, which is at approximately 29% of the total population. A majority of the minority population within the southwest CAMPO area is comprised of residents who self-identify as African American / Black or Asian.



Source: United States Census Bureau

Figure 3-1: 2016 Age Distribution in the SWAS study area

According to the US Census Bureau, the 2016 Latino / Hispanic population in the SWAS study area was approximately 9.1%, which was calculated based on census block group data. This is similar to the statewide average Latino / Hispanic population percent of 9.2%. The largest portions of the Latino / Hispanic community live in Apex, Fuquay-Varina and unincorporated areas.

Within the study area, the median per capita income was approximately \$34,000 in 2016, according to the US Census Bureau. The median household income was approximately \$84,000 in 2016. These income levels represent about a 6% increase since the 2010 census data showing a median household income of \$79,000 was published.

The per capita poverty rate within the SWAS study area was 7.2% in 2016 according to the US Census Bureau. Poverty is a special study focus in the 2045 SWAS Update because there is a goal of identifying the types and location of transportation services and facilities needed to support low-wealth communities. A median household income of \$24,300 in 2016 was considered the threshold for household poverty for a family of four. There are pockets of poverty that do not show up in maps of large census tracts. There are neighborhoods with significant concentrations of household poverty.

There are four areas in SWAS that have pockets of households reporting household income below the federally-defined poverty level; that is, areas where more than 20 percent of households report income below the poverty level. One area is in Apex; in and near downtown, extending eastward to US 1. Another area is in Fuquay-Varina; south of NC Highway 42 and east of Kennebec Road. Another is the Lincoln Heights neighborhood immediately west of downtown Fuquay-Varina. One additional area is in Angier and unincorporated Harnett County; south of NC 210 and west of NC 55.

Population Trends

The population of the Triangle region of North Carolina (the metropolitan areas of Raleigh, Durham, and Chapel Hill) is growing at a much higher rate compared to the rest of the state of North Carolina. The same holds true for the SWAS study area, which is experiencing a population growth rate that is up to five times higher than the state. See Table 3-1 below for a breakdown of the population trends in the SWAS study area, which includes portions of Harnett and Wake Counties.

	Total Housing Units		Population Estimate	
	2008	2018	2008	2018
Portion of SWAS in Harnett County	7,705	8,584	17,933	21,545
Portion of SWAS in Wake County	52,304	69,319	136,346	188,850
SWAS Study Area	60,009	77,903	154,279	210,395
North Carolina	4,200,447	4,684,876	9,222,414	10,383,620
United States	129,060,383	138,537,078	304,059,728	327,167,434

Table 3-1: Population Trends for SWAS study area
Source: Harnett County GIS Department, Wake County Planning Department, US Census Bureau American Community Survey.

Regional Landscape

The study area is comprised mostly of town centers, activity centers, suburbs, farms and undeveloped land. The number of residents within the study area is rapidly growing as the Triangle Region attracts more business opportunities and appeals to young families looking for safe communities to raise children. Culturally diverse communities of language and ethnicity are scattered throughout the study area, with significant concentrations in the Apex and Fuquay-Varina vicinities. Within the study

area, there are many community resources to serve residents. Among these facilities are 239 places of worship, 41 public schools, 45 parks, and one hospital. There are also multiple community resources near the study area, including Wake Med Cary Hospital only two miles east and northeast of Apex, Central Harnett Hospital and First Choice Community Health Center which are both located in Lillington, at the edge of the SWAS study boundary, only seven miles southwest of Angier.

Harnett County

Harnett County was the 3rd fastest-growing county in North Carolina between 2010 and 2014. The portion of Harnett County that is within the SWAS study area provides rural landscape that is close to major urban and employment centers. The county is home to Raven Rock State Park, which is within the project study area. Harnett County has more than 700 farms with approximately 30 percent of land area in farming. Harnett County and the entire SWAS study area is influenced greatly by the presence of Fort Bragg, the world's largest military base. The Fort Bragg community has approximately 50,000 active duty soldiers, 12,000 reservists, 8,000 civilian employees, 3,500 contractors, 63,000 active duty family members, and nearly 100,000 army retirees and their family members. Altogether, the active duty soldiers and their families plus the civilian employees and contractors would be the eighth largest city in the state of North Carolina. Fort Bragg occupies roughly 163,000 acres; some in adjacent Cumberland County and a significant amount of training operational areas are in Harnett County.

Angier

Angier has jurisdiction within both Harnett and Wake counties, although the town center and a majority of the jurisdiction is within Harnett County. The town is located approximately 30 miles from the Research Triangle Park, Fort Bragg, Fayetteville, and downtown Raleigh. This makes Angier a central location for households with two adults who work at different employment centers.

Wake County

Wake County was the 20th fastest-growing county in the nation between 2010 and 2017 based on total population numbers. The Triangle is one of the top ten metropolitan areas in the country for technology workers. Since the state capitol, Raleigh, is within Wake County, there are multiple employment centers for state employees located throughout the county. Additionally, with the Research Triangle Park being a short drive from most of the CAMPO region, Wake County is becoming a desirable destination for people who work in the area and want to live in urban or suburban areas.

Apex

Established on the peak of two watersheds, Apex is a popular residential community situated in proximity to the Research Triangle Park and Raleigh-Durham International Airport. In August of 2015, Apex was voted as the #1 Best Place to Live by “Money” magazine. The residents also think Apex is a great place to live, with 95% giving the town a “4” or “5” on a five-point scale in a 2017 survey conducted by the town. The town ranks higher than the national average in 53 of 55 categories in this survey. The town continues to grow in population while striving to maintain its small-town character.

Fuquay-Varina

Originally a rural agriculture community, Fuquay-Varina now has more than 30,000 residents living in Town limits and more than 35,000 people living in the extended service area (i.e., extraterritorial jurisdiction and urban service area combined). It was known to many as a “bedroom community”, an affordable suburb of Raleigh and the Research Triangle Park where residents commute 20 to 40 minutes a day. Convenient access to the new southeastern extension of NC 540 (with five nearby interchanges planned) will reduce travel times to anywhere in the Triangle area; this includes destinations such as Raleigh-Durham International Airport, Chapel Hill, Durham, and Research Triangle Park. The Town is also home to several large manufacturers (Aviator Brewing Company, Bob Barker, John Deere Turf Care, Southbend, TE Connectivity), and the Town’s strategic location, workforce, and growing population have positioned it to experience significant commercial and industrial growth in the present and future.

Holly Springs

Originally built around a small freshwater spring that provided its name, Holly Springs is a desirable suburban community that is located nearby both the Research Triangle Park and downtown Raleigh. Like its neighboring communities of Apex and Fuquay-Varina, the community is rapidly growing as the Triangle Region rapidly increases employment and education options. Holly Springs ranked tops in the Triangle Region for safety (first in NC in 2018). With a homeownership rate of nearly 90% and median household income of nearly \$100,000, the town is well-positioned to pursue additional economic development opportunities. The proximity to the Holly Springs Bypass, which has proved to be attractive to retail centers, as well as its attractive and thriving downtown create a variety of attractions for local and regional employers and citizens.

Environmental Resources

About 50 percent of the study area is zoned for residential uses. Conservation areas and agricultural / ag-residential land account for another 40 percent of the study area. The sale of farmland for residential and non-residential development is occurring rapidly. Commercial and mixed-use development is zoned within activity centers and along major roadways in the study area, primarily US 64, US 401, and NC 55. In addition to the existing zoning, each of the municipalities has a Land Use Plan that has been adopted and can be referred to for the preferred and planned land uses throughout the study area. The transportation recommendations reflect updated land use and development estimates from each of the partner municipalities.

A large proportion of the study area in Harnett County is designated as “environmentally sensitive” except within the Town of Angier, along the US 401 and NC 210 corridors, and within the extra territorial jurisdiction (ETJ) of Angier, Coats and Lillington and in and around Buies Creek. A few of these resources are listed below:

1. **Upper Cape Fear River Aquatic Habitat** – between the Lee / Harnett County line and Raven Rock State Park, this North Carolina Natural Heritage Area is the longest section of the Cape Fear River that is free-flowing without any dams. This part of the Cape Fear River is used for drinking water of all the towns and cities along its course. This part of the river is home to rare species, endangered species and nesting bald eagles.
2. **Raven Rock State Park** – this 4,700-acre state park is entirely within Harnett County, along the banks of the Cape Fear River. There are 12 miles of hiking trails and 8 miles of horse trails along with opportunities for paddling, camping, fishing and education programs. Habitats within the park includes waterfalls, rapids, cliffs, bluffs, granite flatrocks, bottomland hardwood forest, floodplain pools, sandbars and low elevation seep wetlands. There are extensive forests of Piedmont Longleaf Pines which are extremely rare.
3. **High Quality Waters of the Parker, Avetts and Hector Creeks** – these creeks are classified by the North Carolina Division of Water Resources (NC DWR) as having good water quality, especially for recreational purposes. All three creeks are in northwest Harnett County, all three empty into the Cape Fear River and all three are located west of US Highway 401.

Environmentally sensitive areas in Wake County include Jordan Lake Reservoir Property and associated “critical watershed areas,” Shearon Harris Lake and County Park, Swift Creek watershed area, other primary streams and buffers, designated open spaces, parks, recreation areas, and greenways.

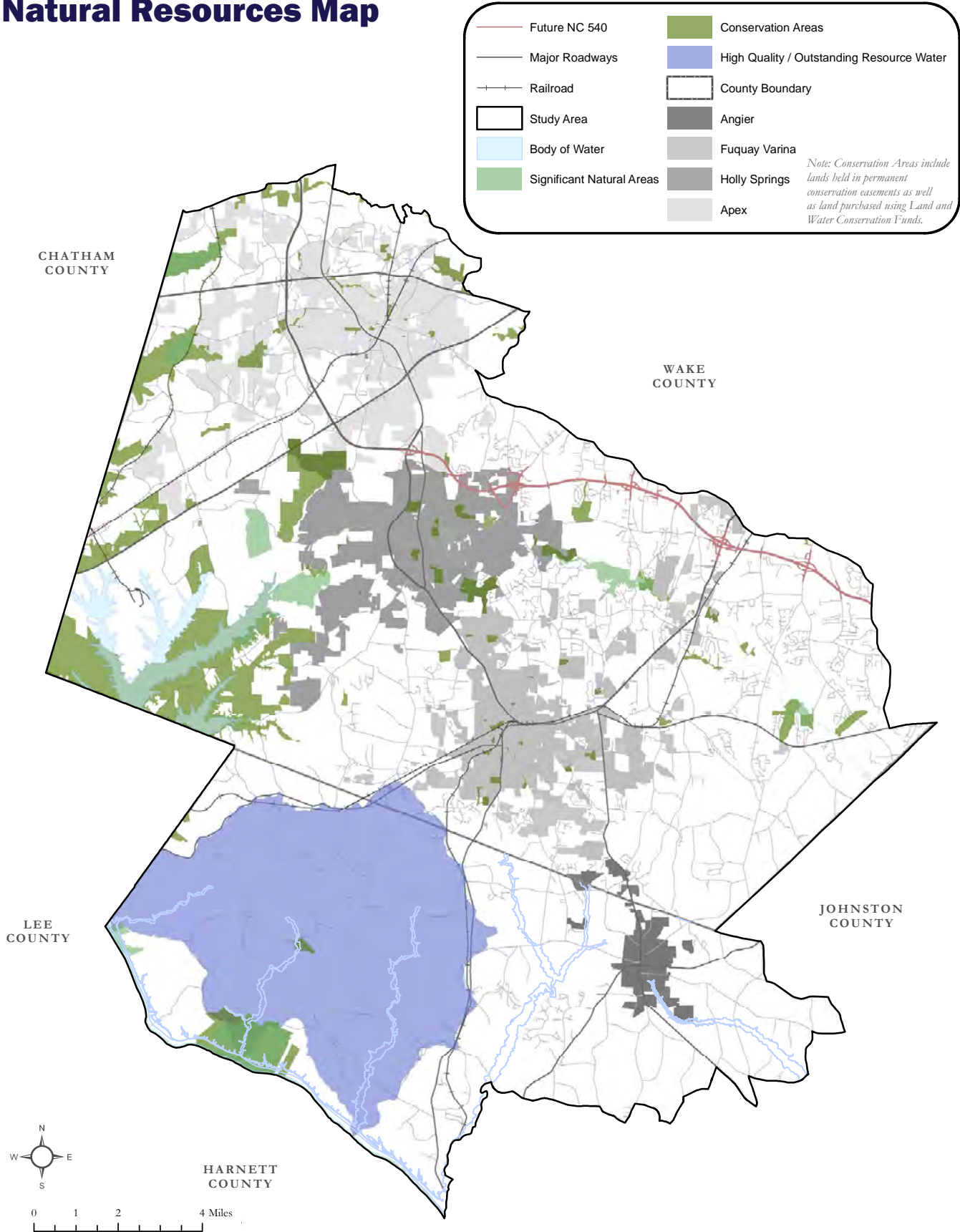
Figures 3-2 and 3-3 display natural resources and soil classification in the SWAS study area. The text box on the opposite page provides links to important local plans.



- The Town of Apex adopted their updated land use map and comprehensive transportation plan in February 2019; called Advance Apex: The 2045 Plan. Information about Advance Apex can be found online at <https://www.apexnc.org/1193/Advance-Apex>.
- The Town of Holly Springs held a public workshop in March 2019; the Town is updating the Future Land Use & Community Character section of the comprehensive plan, the policy that guides decisions on how the town will grow, look and feel in the future. Information about ReVision Holly Springs can be found online at <https://revisionhsnc.us.engagementhq.com/>.
- The Town of Fuquay-Varina adopted the 2035 Community Vision Land Use Plan in June 2017. The 2035 Community Vision Land Use Plan can be found [**online on the Town Planning website**](#).
- The Town of Angier adopted the Comprehensive Plan in September 2017. The Town of Angier Comprehensive Plan can be found [**online on the Town Planning & Permitting website**](#)
- Harnett County adopted the Grow Harnett County: Comprehensive Growth Plan (2015), which can be found [**online on the County Long-Range Planning & Transportation website**](#). Harnett County is currently evaluating a small area plan that encompasses that county's portion of SWAS . A draft report can be found online at: <http://www.harnett.org/planning/long-range-planning.asp>.
- Wake County is in the process of updating the Land Use Plan; refer here for more information: <http://www.wakegov.com/planning/growth/Pages/lup.aspx>

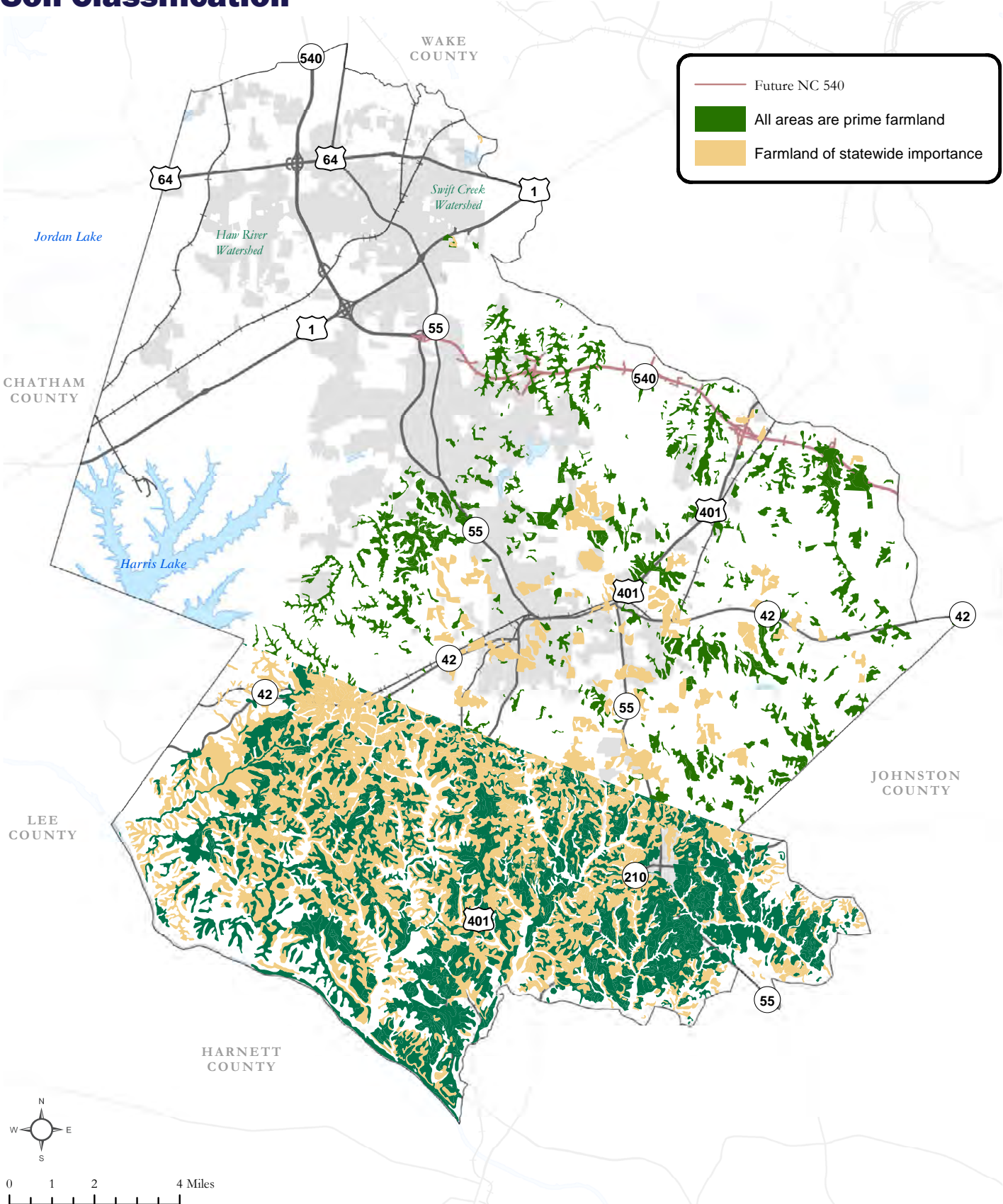


Natural Resources Map



Map 3-1: Natural Resources

Soil Classification



Map 3-2: Soil Classifications

Regional Mobility

The major roadway facilities in the study area include US 1, US 64, US 401, NC 42, NC 55, and NC 540; all of which provide varying levels of mobility and access to and through the study area. Of these facilities, only two are oriented generally in an east-west direction within the study area, which are US 64 and NC 42. The other four major roadway corridors provide primarily north-south connections or radial, direct routes to major job centers in RTP and Raleigh.

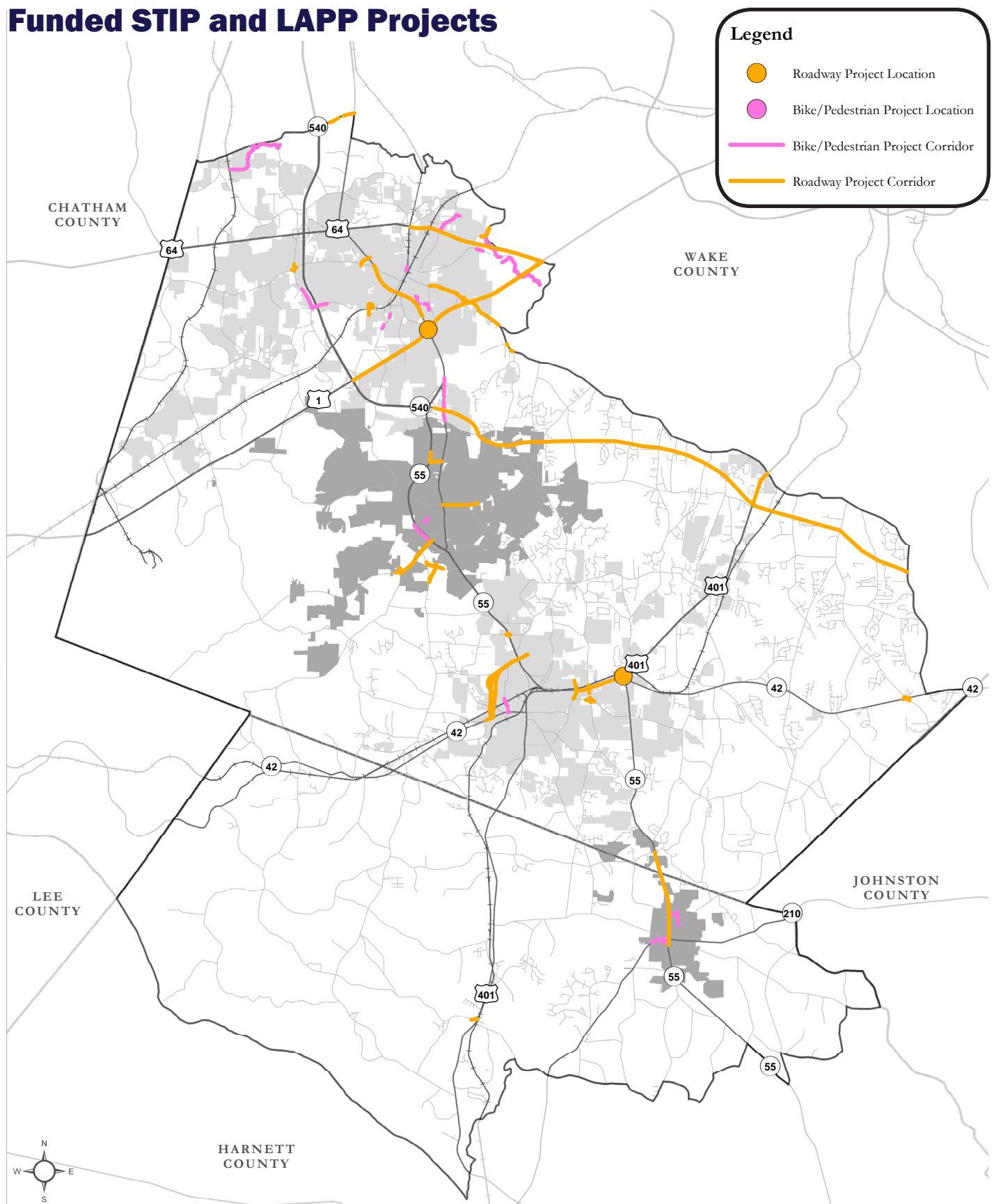
Funded Roadway Improvements

NCDOT is managing various transportation improvement projects in the study area. In order to receive federal or state funding for a specific transportation project, the project must be submitted to the NCDOT to be scored and ranked among other projects. If a project scores high enough, it will be included within the State Transportation Improvement Program (STIP). STIP projects are voted on a biennial basis and provide funding expectations for a ten-year timeline. The current STIP Program runs from 2018 to 2027. In addition to the STIP, transportation projects within the study area can also receive funding through CAMPO's Locally Administered Projects Program (LAPP). The LAPP Program was adopted by CAMPO in October of 2010 and provides assistance and prioritization to local projects receiving federal funding. Table 3-2 lists the draft STIP 2020 to 2029 projects in the SWAS study area. Map 3-3 on page 28 shows the funded STIP and LAPP projects.

Roadway	Limits	Description	Start Construction
US 1 (U-6066 / U-6101)	NC 55 in Apex to US 64 in Cary	Add lanes	2028
US 1 / NC 55 (U-5981)	Improve interchange and widen northbound NC 55 in Apex		2026
US 64 (U-5301)	Laura Duncan Road to US 1 in Apex	Upgrade and improve corridor	2024
US 401 (U-5746)	Wake Tech Community College to Ten Ten Road	Add lanes	2020
US 401 / NC 42 / NC 55 (U-5980)	N. Judd Pkwy to NC 55 in Fuquay-Varina	Manage access	2025
US 401 at NC 55 / NC 52 (U-5751)	Convert two adjacent at-grade intersections to a grade-separated interchange		2024
NC 540 (R-2828 / R-2721)	NC 55 in Apex to I-40 in Garner	Build toll road on new location	2020
NC 55 (R-5705)	Mabry Road in Angier to NC 42 in Fuquay-Varina	Build on new location in Harnett County & widen to multi-lanes in Wake County	2022
NC 55 Williams Street (U-2901)	US 1 to north of Olive Chapel Road in Apex	Widen to multi-lanes	2024
Apex Peakway (U-5928)	James Street to Towhee Drive and CSX crossing in Apex	Grade separated interchange	2019
Avent Ferry Rd (U-5529 / U-5889)	Cass Holt Road to Village Walk Drive in Holly Springs	Widen to multi-lanes	2020 / 2021
Town of Fuquay-Varina (U-6022)	Construct Signal and Intelligent Transportation System		2020
Holly Springs Road (U-6094)	NC 55 to Flint Point Lane in Holly Springs	Widen to multi-lanes	2019
Lake Pine Drive (U-5537)	MacGregor Pines Road to Versailles Drive	Widen to three lanes with sidewalk and multi-use path	2019
North Judd Pkwy (U-5317 / U-5927)	NC 55 to NC 42 and Old Honeycutt Rd to Products Rd in Fuquay-Varina	Widen to multi-lanes including portion on new location	Under Construction
Purfoy Rd / Old Honeycutt (U-6096)	Intersection Improvements		2019
Ten-Ten Road (U-5825)	Apex Peakway in Apex to Kildaire Farm Road in Cary	Widen to multi-lanes	2023
Ten-Ten Road (U-6112)	At US 401	Convert at-grade intersection to interchange	2029
US 64 at NC 751 (R-5887)	Build square-loop interchange at US 401	Build interchange	2027

Table 3-2: Draft State Transportation Improvement Program 2020 - 2029 for SWAS study area

Funded STIP and LAPP Projects



Map 3-3: Funded Projects from the NCDOT 2018-2027 STIP and CAMPO 2018 LAPP

Summary of Adopted Plans

Between all the municipalities represented in this study, there are 30 adopted transportation-related plans; even when local plans primarily or only impact local land use, those plans can substantially alter demand for new transportation infrastructure. These transportation plans include plans related specifically to roads, pedestrian and bicycle facilities, land use, and parks and recreation. Among these plans, there are many similarities between the goals, objectives, and conclusions. The municipalities within the study area are all experiencing the rapid growth of the Triangle and want to maintain their individual unique charm to avoid becoming indistinct bedroom communities in the suburbs of major employment and city centers. Each municipality wants to provide the best facilities and amenities to their residents, such as parks, active town centers, and various transportation options including greenways, bike lanes, sidewalks, transit, and roadway connectivity. What has become increasingly important in the study area is improved local and regional connectivity of roadways and additional greenway trails that can be used either for recreation or as a means to travel within the study area.

Angier: The Comprehensive Plan and Pedestrian Plan were reviewed. Angier residents want to maintain a small-town feel while providing resources necessary to walk around a mixed-use downtown area. They want upgrades to specific major roadway facilities to handle expected future growth, and a plan to focus growth in areas with sufficient transportation infrastructure and near existing employment centers.

Apex: The Town engaged residents and employers in a major update to their transportation plan and future land use map, called Advance Apex: The 2045 Plan. Advance Apex was a community-driven planning process that establishes a vision for the transportation system and land use in Apex, identifies needs and deficiencies, guides growth and development, recommends specific projects and strategies, and creates an action plan for implementation. Along with Advance Apex, the Town developed Bike Apex, a comprehensive bicycle plan that identifies opportunities and constraints for bicycling in Apex and establishes recommendations for improvement.

Fuquay-Varina: The Town's primary guiding document is the Community Transportation Plan, which is intended to advance the following Town goals: coordinate transportation investments with land use and development decisions; provide a balanced transportation system that makes it easier to bike, walk, or take transit; make it easier to connect within and throughout Town for all modes; enhance the quality of life and preserve local character; support the local economy by making it easier to move people and freight around and through Town; and promote a safe and secure transportation system by reducing crashes and improving emergency response. Other transportation-related documents include the 2035 Community Vision Land Use Plan, Community Pedestrian Master Plan, Community Transportation Plan, Town Center Plan, and Varina Streetscape Master Plan. In

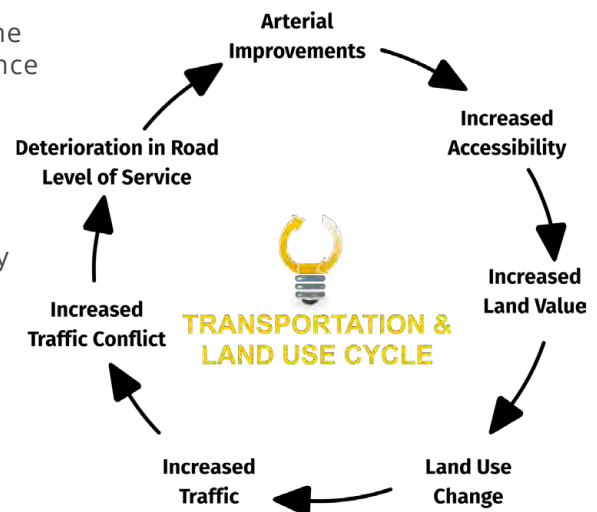


Figure 3-2: Transportation and Land Use Interactions

summary, the Town would like to have a variety of land uses to create an inviting town center with its own unique brand and character. There is a desire for more opportunities to live an active lifestyle by providing active transportation facilities. The Town would like to see the inclusion of complete and connected streets. Additionally, Fuquay-Varina would like to see that the existing green spaces are protected and that residents are provided easy and convenient connections to utilize these parks and community greenspaces.

Harnett County: The county has a Comprehensive Growth Plan adopted in 2015, a Comprehensive Transportation Plan (2011), and a Parks and Recreation Master Plan (2007). Also, Harnett County was a key focus of a 2014 Regional Growth Management Strategy for the Fort Bragg Region. A synthesis of the key land use recommendations of these plans is for the County to encourage growth where infrastructure exists, to promote land use decisions that reverse leakage (to other counties) trends, to promote compatible uses in areas adjacent to Fort Bragg and to maintain the rural character and agricultural economy. Key transportation recommendations are to get a four-lane road built between Harnett and Wake counties, to improve the efficiency of the local roadway network, to develop a countywide greenway system, and to provide multi-modal options near development nodes and residential focus areas.

Holly Springs: The Town has multiple transportation plans such as the Comprehensive Plan, Parks and Recreation Master Plan, Holly Springs Bike Plan, and Comprehensive Transportation Plan. These plans can be summarized by some of the recurring themes throughout the documents. Holly Springs would like to focus on fostering growth while maintaining the Town character and preventing excessive sprawl. There is a desire to see a mix of land uses being developed in the Town, included various types of housing options. The Town would like to see safe, active transportation networks for residents, as well as providing new greenspaces with convenient trail connections. Wayfinding to the greenspaces is a noted goal within the various plans. The Town vision for a balanced transportation network will be revisited in 2020 when the Comprehensive Transportation Plan is updated.

Wake County: The county adopted a Comprehensive Transportation Plan for unincorporated areas in 2003, a Collector Street Plan in 2004, and a Transit Plan in 2016. Wake County began preparing a Land Use Plan in 2018 to update the 1982 General Development Plan and the 1997 Land Use Plan which have undergone numerous updates that resulted in eight jointly prepared plans with individual municipalities; referred to by Wake County as Perimunicipal Planning Areas (PPAs). In 2003, Wake County partnered with the towns of Fuquay-Varina and Garner to comprehensively study that specific area. Transportation recommendations focused on interconnectivity of the transportation network (collector roads), future interchanges on the southern leg of (then Interstate) 540, and safer crossings for pedestrians and bicyclists. In 2007, Wake County partnered with the towns of Apex, Cary and Holly Springs to comprehensively study 74 square miles and plan for growth. The objective of the transportation element was to focus on interconnectivity of the transportation network, to increase active transportation options, to expand bus and human-service transit options, and to build the western section of NC (then referred to as Interstate) 540.

Land Use Update and Sensitivity Analysis

Planning and prioritizing projects in SWAS relied in part on future growth anticipated for the study area, and the distribution of future land uses and development intensities envisioned in locally-adopted comprehensive plans, small area plans, and zoning ordinances described previously. The original assumption was that the Triangle Region's Connect 2045 Scenario Planning Initiative's preferred growth scenario released on January 2, 2018 would be used for updating the Southwest Area Study; however, the number of new comprehensive plans underway or adopted by jurisdictions in the study area since data was collected for Connect 2045 raised questions about whether new land use information should be considered for updating the Southwest Area Study. Ultimately, the project team decided to build a new Southwest Area CommunityViz Model based on a land use sensitivity analysis. Socioeconomic data from the CommunityViz Model was shared with team members for re-running the Triangle Regional Travel Demand Model so that the "latest and greatest" assumptions about land use and development were used to assess the roadway recommendations contained in this plan. The appendix contains a complete technical memorandum on the process summarized in the following steps.

1. The project team contacted municipalities and counties in the study area to obtain copies of land use plans that had been recently completed, and that might introduce changes to the adopted, preferred growth scenario used in the current Metropolitan Transportation Plan (MTP) and demographic files in the Triangle Regional Model (TRM).
2. Data files, including geographic information system (GIS) and other planning documents, were collected by email or File Transfer Protocol (FTP) site from each jurisdiction's staff. Follow-up calls and emails to local staff were conducted to ensure that the material was understood by the project team. An emphasis was placed on those parcels that were deemed undeveloped, under-developed, or that had redevelopment potential. Some areas will never develop due to land use or environmental constraints.

General Development Category	Connect 2045	SWAS Update	Change
Open Space	13%	12%	-1%
Agriculture	3%	13%	+10%
Rural Living	11%	12%	+1%
Suburban Neighborhood	60%	48%	-12%
Suburban Retail	2%	2%	-
Suburban Office	4%	4%	-
Industrial	3%	5%	+2%
Urban Centers	4%	4%	-

Table 3-3: Land Area Type Changes from Connect 2045 to SWAS Update

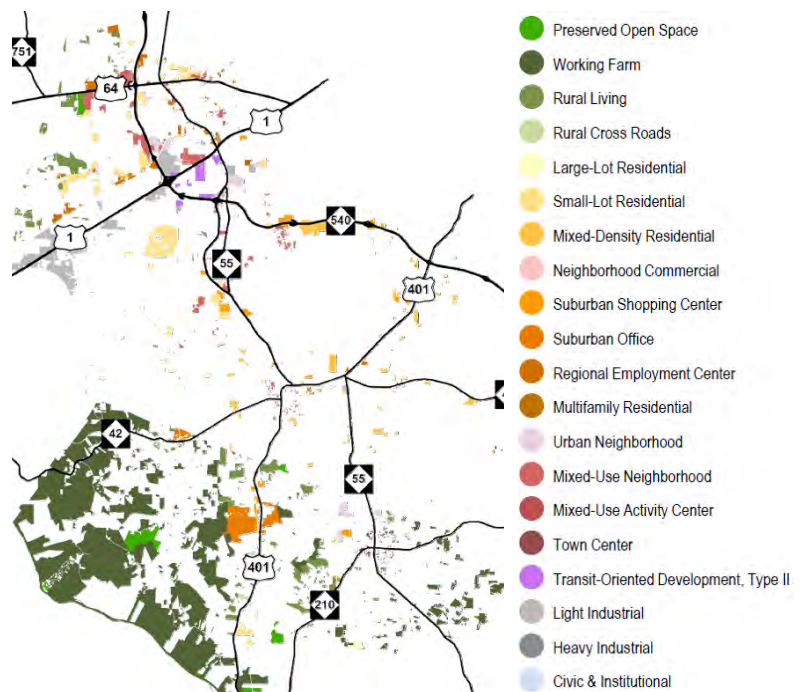


Figure 3-3: Placetype Assignment Changes, Connect 2045 and SWAS

3. The project team compared land use patterns, density, and types of land development with the Connect 2045 (adopted) land use forecasts to gain an understanding of any changes and their magnitude. Build-out potential statistics were summarized using seven development categories — single-family residential, multifamily residential, office, retail, service (low traffic), service (high traffic), and industrial — and one horizon period (2045).
4. The resulting new demographic file was used as input to the Triangle Regional Model for a new travel demand model run with updated land use data inputs; then a meeting with CAMPO and City Explained, Inc. staff (who led the land use model element) was conducted to validate the results. The TRM model run, including proposed roadway network changes was completed to create an updated volume assignment used in the development of the draft SWAS report.

Employee Changes

Dwelling Units Changes

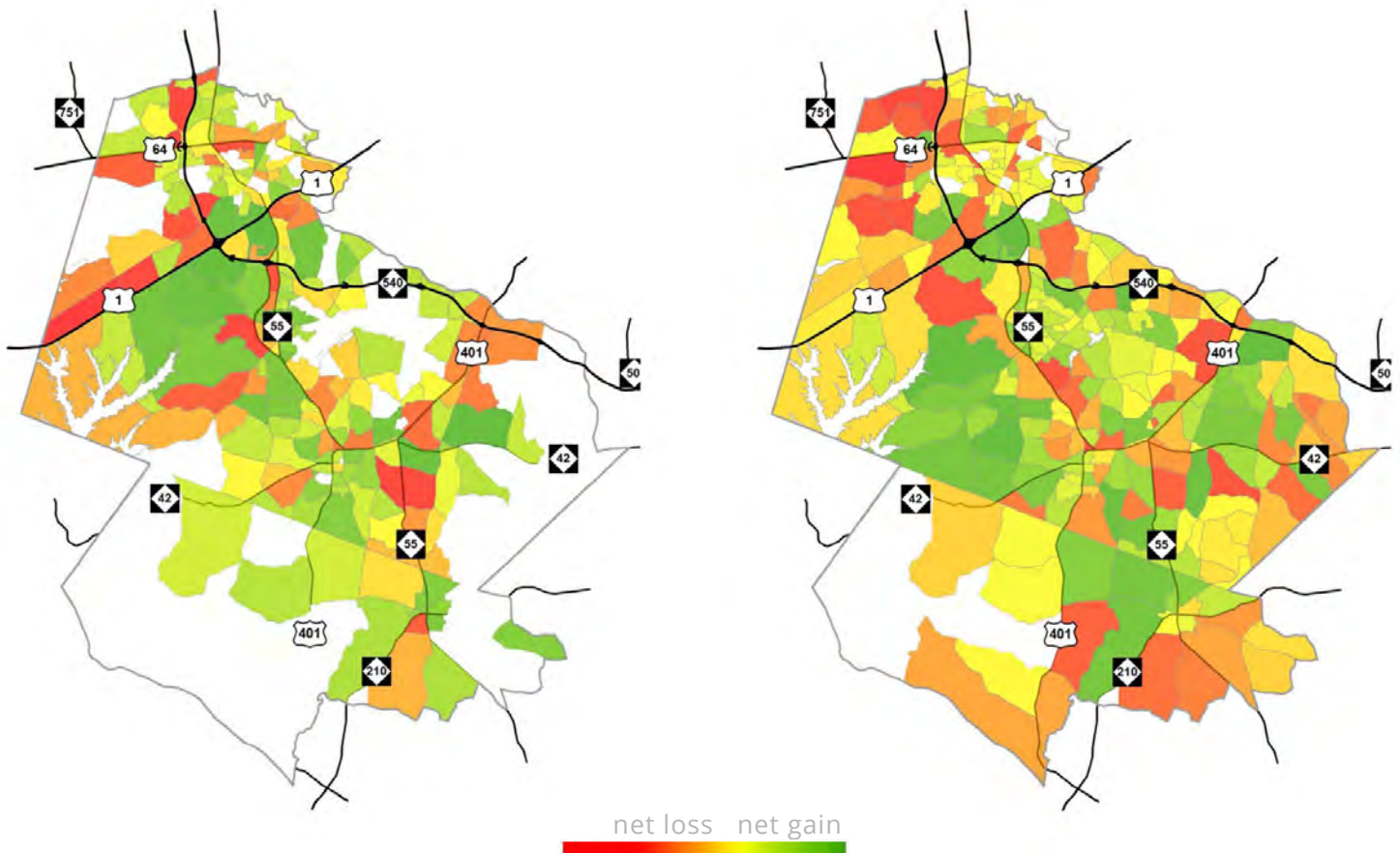


Figure 3-4: Employee (left) and Dwelling Unit (right) Changes, Connect 2045 and SWAS

Roadway Conditions

Travel Times to Work

The SWAS study area is situated between multiple employment centers, which include Cary, downtown Raleigh, downtown Durham, Research Triangle Park, Fayetteville, and Fort Bragg. These major employment centers are all within a 45-minute drive of the study area. A portion of the study area residents are driving to one of these major employment centers for work. Table 3-4 provides an average travel time to work that residents in the respective municipalities experience.

Crash History

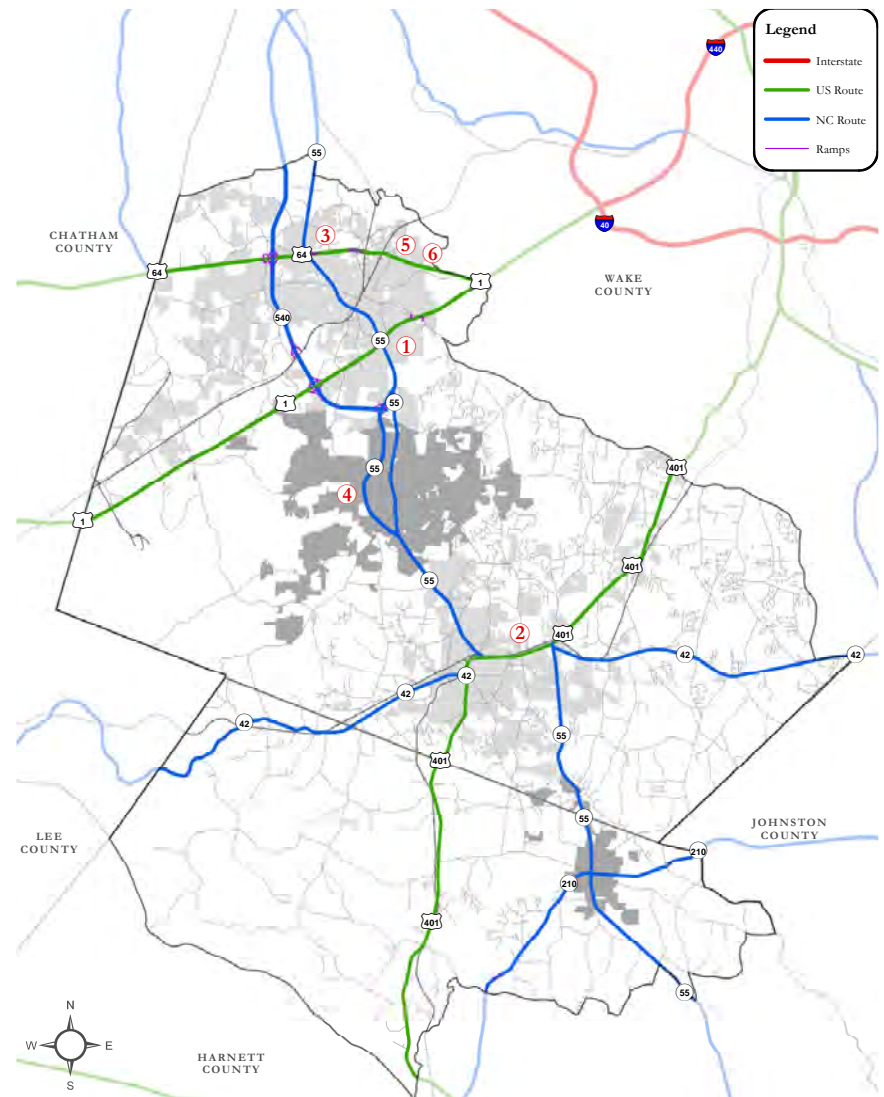
Below is a list of the six intersections with the highest number of reported crashes within the study area between 2012 and 2016:

1. US 1 and Williams Street (NC 55) in Apex – 142 crashes
2. North Main Street (US 401) and Purfoy Road (SR 1301) in Fuquay-Varina – 122 crashes
3. US 64 and West Williams Street (NC 55) in Apex – 105 crashes
4. GB Alford Highway (NC 55 Bypass) and New Hill Road / Holly Springs Road (SR 1152) – 103 crashes
5. US 64 and Laura Duncan Road (SR 1308) in Apex – 79 crashes
6. US 64 and Lake Pine Drive (SR 1521) in Apex – 75 crashes

NCDOT collects information from all reported crashes, such as time of day, weather conditions, road location, and crash type / severity.

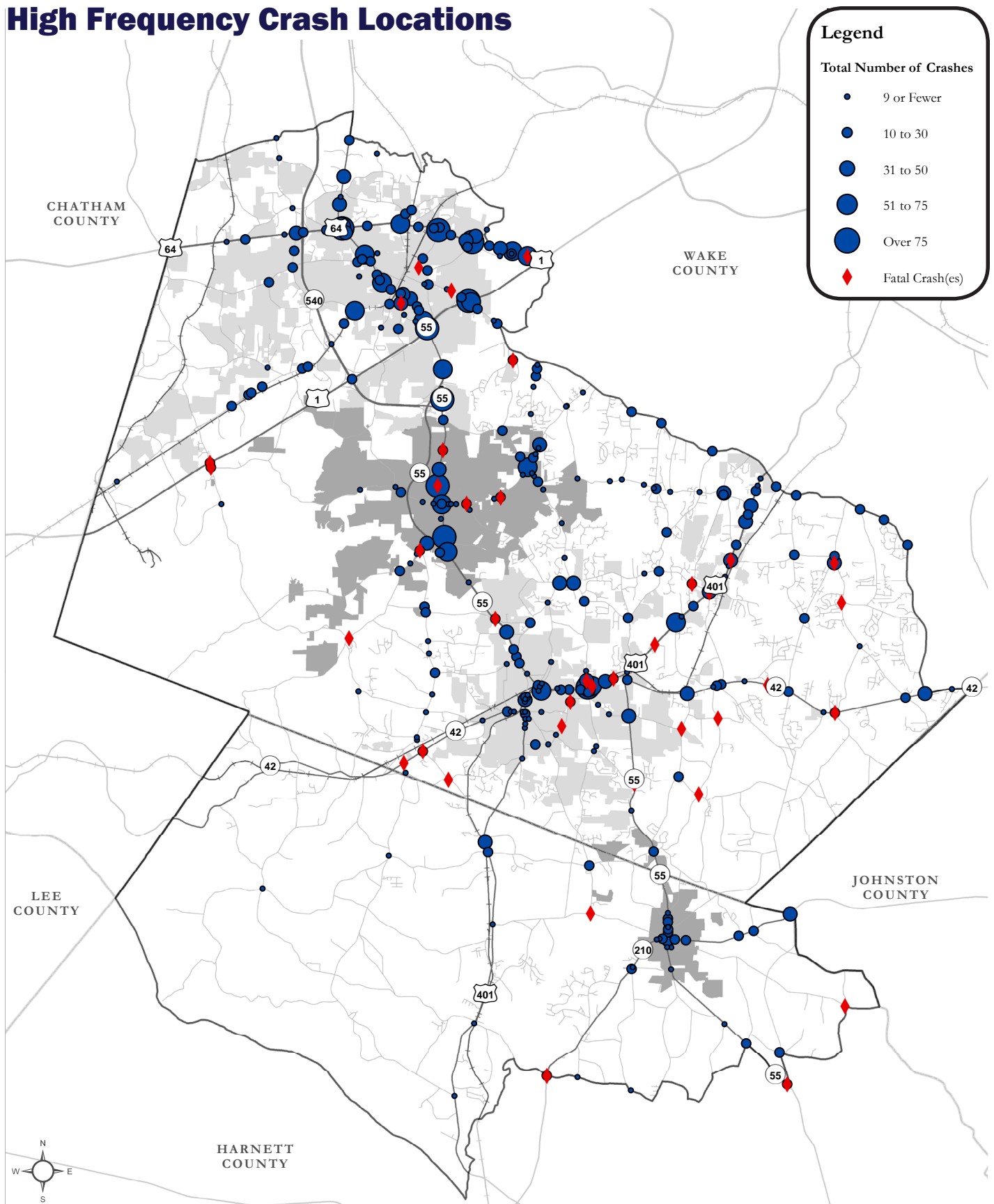
	2016 Mean Travel Time to Work (minutes)
Angier	34.8
Fuquay-Varina	30.8
Holly Springs	28.0
Apex	23.8
North Carolina	24.1

Table 3-4: Mean Travel Time to Work
Source: US Census Bureau



Map 3-4: Major Existing Roadway Facilities

High Frequency Crash Locations



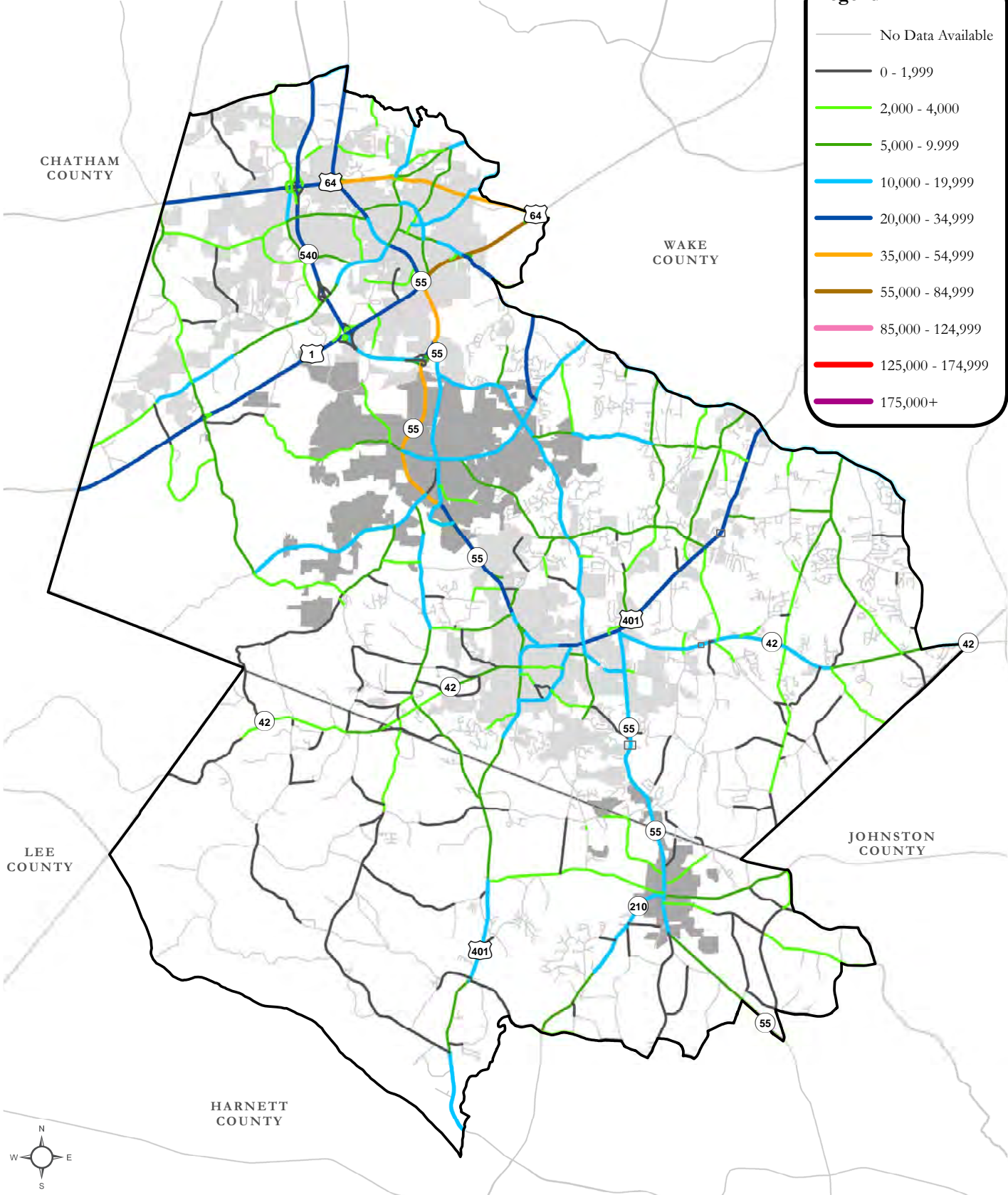
Map 3-5: High Frequency Crash Locations

Traffic Volume

NCDOT collects roadway traffic volume data for many of the state-maintained roadways. Based on data available from NCDOT, the most traveled roads within the study area are US 1, US 64, US 401 and NC 55. This is based on the Average Annual Daily Traffic (AADT), which is the average number of vehicles that travel a section of road in a 24-hour period. Daily traffic data is collected over an entire year and averaged to account for seasonal changes as shown in Map 3-6 on page 36.

- US 1 carries 30,000 vehicles per day (vpd) at the Wake-Chatham County line and volume increases along US 1 to 59,000 vpd just south of the US 64 interchange.
- US 64 carries 25,000 vpd at the Wake-Chatham County line and volume increases along US 64 to 48,000 vpd just west of the US 1 interchange.
- US 401 carries 11,000 vpd just north of Lillington and 7,600 vpd at the Wake-Harnett County line. The volume on US 401 increases to 11,000 vpd through downtown Fuquay-Varina and 34,000 vpd approaching the intersection with NC 55 / NC 42. US 401 carries 29,000 vpd in northern Fuquay-Varina increasing to 34,000 vpd along the frontage of Wake Tech Community College.
- NC 55 carries 7,900 vpd south of Angier, increasing to 19,000 in downtown Angier. In Wake County, depending on the specific location, NC 55 carries 9,200 to 34,000 vpd in Fuquay-Varina, 26,000 to 44,000 in Holly Springs, and 18,000 to 45,000 in Apex.

Average Annual Daily Traffic Map



Mean Driving Speed in the Peak Hour

The most common posted speed limit throughout the study area is 35 mph, accounting for 35 percent of all roadways. The combination of 25, 35 and 45 mph streets collectively equate to 87.5 percent of all roadways in the study area with only 12 percent with speed limits of 55 mph or more. For example, NC 55 in the study area typically has a posted speed limit of 45 mph, yet evening peak hour prevailing speeds measured by NCDOT average 34 mph.

Project Name	Posted Speed Limit (mph)	AM Peak Hour Measured Speed		PM Peak Hour Measured Speed	
		NB	SB	NB	SB
US 1 – s/o 540	65 NB / 55 SB	72	71	72	72
US 1 – n/o 540	65 NB / 55 SB	72	70	67	56 - 65
US 401 – Harnett Co.	55	47 - 48	46	45	45
US 401 n/o Harnett – Wake County line	45	47	46	45	45
US 401 – N. Main Street in Fuquay-Varina (F-V)	35	28	26 - 31	25 - 30	25 - 30
US 401 – N. Main Street in Five Points vicinity of F-V	45	34	34	25	25
US 401 – s/o TenTen Road	35	35	42	37 - 45	37 - 46
NC 55 – s/o Angier	55	48	48	46	47
NC 55 – N. Raleigh Street in Angier	35	41	41	40	37
NC 55 – n/o Harnett – Wake County line	45	40	41	40	37
NC 55 – E. Broad Street - in Varina Business District	45	34	36	21 - 34	32
NC 55 – n/o N. Judd Pkwy NE	45	34	36	34	32
NC 55 – GB Alford Highway in Holly Springs	55	41	41	40 - 50	34 - 41
NC 55 – s/o US 1	45 - 55	n/a	39	31	35 - 38
NC 55 – Williams Street in Apex	35 - 45	33	32	20 - 28	20 - 35
NC 55 – n/o US 64	45 - 50	37	36	35 - 38	35 - 45
NC 540 – s/o US 1	70	67	69	67	66
NC 540 – s/o US 64	70	69	71	72	70
NC 540 – n/o US 64	70	70	72	71	70
US 64 – w/o NC 540	55	56	55	55	55
US 64 – e/o NC 540	55	58	56	58	57
US 64 – e/o N. Salem Street	55	42	36 - 49	44	48
US 64 – w/o US 1	50 - 55	40	40	30	29 - 30
NC 42 – Harnett County	45 - 55	43 - 50	43 - 51	41 - 50	42 - 50
NC 42 – W. Academy Street in F-V	45 - 50	43	43	41	42
NC 42 – e/o NC 55 and US 401 in eastern F-V	50 - 55	47	44	44	43

Table 3-5: Measured Vehicular Speeds on Major Study Area Roadways in 2018

Source: Go NC (NCDOT). PM measured 4:00 to 7:00 pm. AM measured 6:00 to 9:00 am. Speed data are averaged for the time period 1/1/2017 through 3/31/2017 on weekdays. <http://ncdot.maps.arcgis.com/home/gallery>

NB – northbound. SB – southbound. EB – eastbound. WB – westbound.

n/o – north of. s/o – south of. e/o – east of. w/o – west of.

Level of Service

The Level of Service (LOS) of a roadway is a frequently used measure of effectiveness for determining how well a roadway is operating. LOS can be defined as the relationship of travel demand, or number of vehicles traveling on a road, to the roadway capacity. Roadway capacities are based on the type of facility, roadway speed, and number of travel lanes.

There are six levels of service to describe the conditions of a roadway. Conditions can range from LOS A, which describes a freely flowing roadway, to

LOS F, which would be used to describe the worst operating conditions of a highly congested roadway. Typically, urban and suburban roadways in metropolitan areas with a vibrant economy operate at LOS D or worse during peak periods.

Based on volume to capacity maps that CAMPO created as part of "Connect 2045: The Metropolitan Transportation Plan," roughly 80 percent of the analyzed roadways within the study area operated at LOS D or better in 2015.

Transit Conditions

Transit Services and Facilities

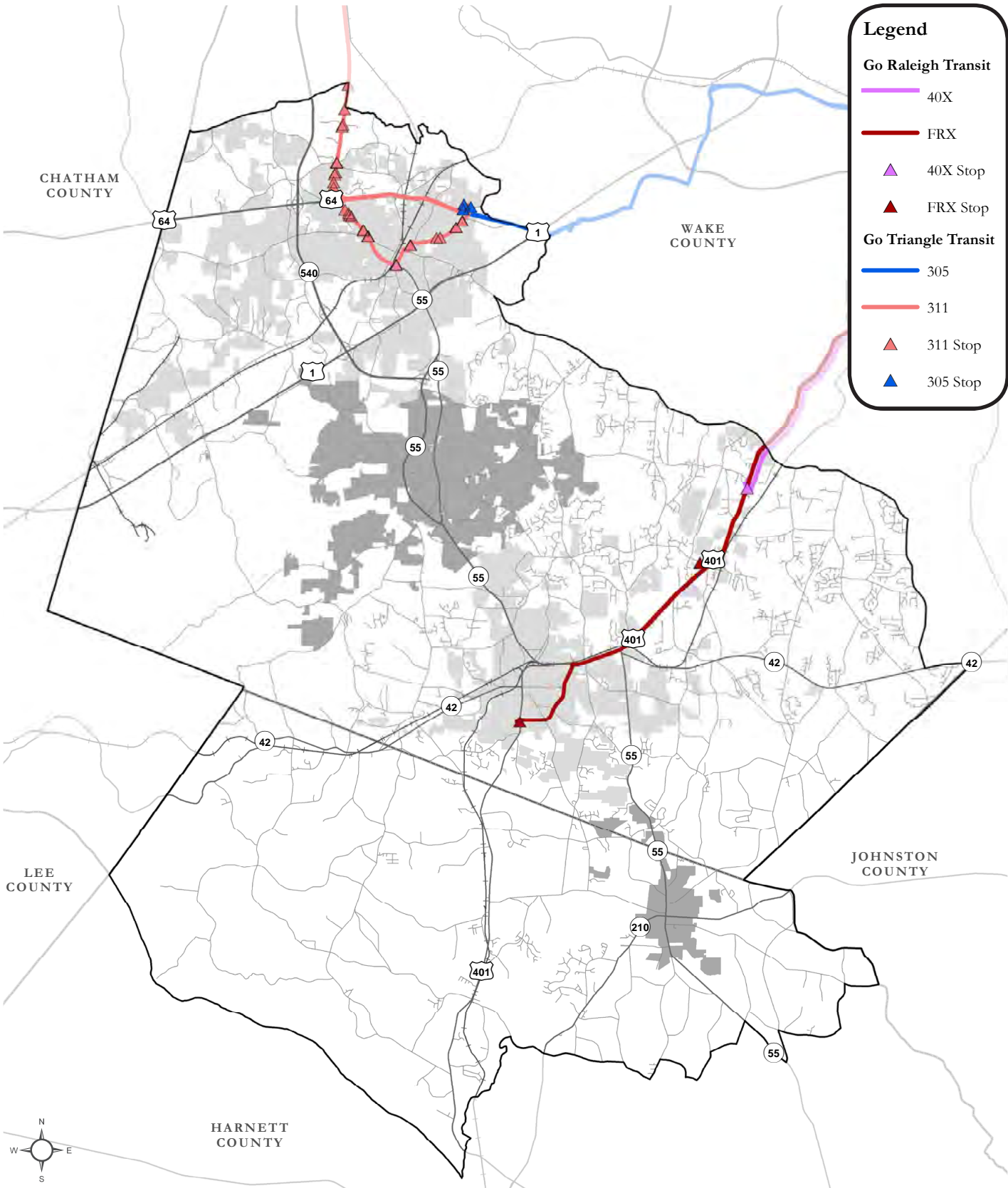
Within the study area GoTriangle, GoCary and GoRaleigh all provide fixed-route mass transit services. Harnett Area Rural Transit System (HARTS) is a community transportation program that serves human service customers and the general public with subscription service, dial-a-ride and demand-response service trips. GoWake Access provides door-to-door, shared-ride service to seniors, people with a disability, rural residents and people who qualify for work or health-plan sponsored medical trips. Currently there are 49 bus stops across five different fixed-route bus routes that operate in the study area. Existing transit routes offer connections to downtown Raleigh, Research Triangle Park (RTP), and downtown Cary from the following locations in the study area:

- Wake Tech Community College Southern (main) Campus on US 401 (Route 40X).
- Fuquay-Varina South Park (park and ride lot) and Wake Tech Community College to downtown Raleigh via US 401 (Route FRX).

- Lake Pine Plaza shopping center to WakeMed Cary Hospital, NC State University and downtown Raleigh via Tryon Road and Western Boulevard (Route 305).
- Downtown Apex / Lake Pine Plaza to RTP (GoTriangle Regional Transit Center) via NC 55 (Route 311).

None of the available transit routes provide connections between the municipalities in the study area. All four routes are only offered during weekday peak travel times: three provide service to downtown Raleigh (GoTriangle Route 305, GoRaleigh FRX and GoRaleigh 40X) and one provides service to RTP (GoTriangle Route 311).

Current Transit Routes And Stops Serving The Southwest Area



Map 3-7: Current Transit Routes and Stops serving the Southwest Area

Active Modes Conditions

Commute to Work by Active Modes

In 2016, less than one percent (1%) of all working residents within the study area walked or biked to work. Most of the working residents within the study area drove alone. According to the US Census Bureau, roughly 80 percent of the SWAS study area residents reporting driving a vehicle alone to work in 2016. It should be noted that approximately 8 percent of the study area residents work from home, which is becoming a popular work option as technology advances telecommunication capabilities. New technologies as applied in the workplace are expected to change established travel patterns and anticipated traffic volumes.

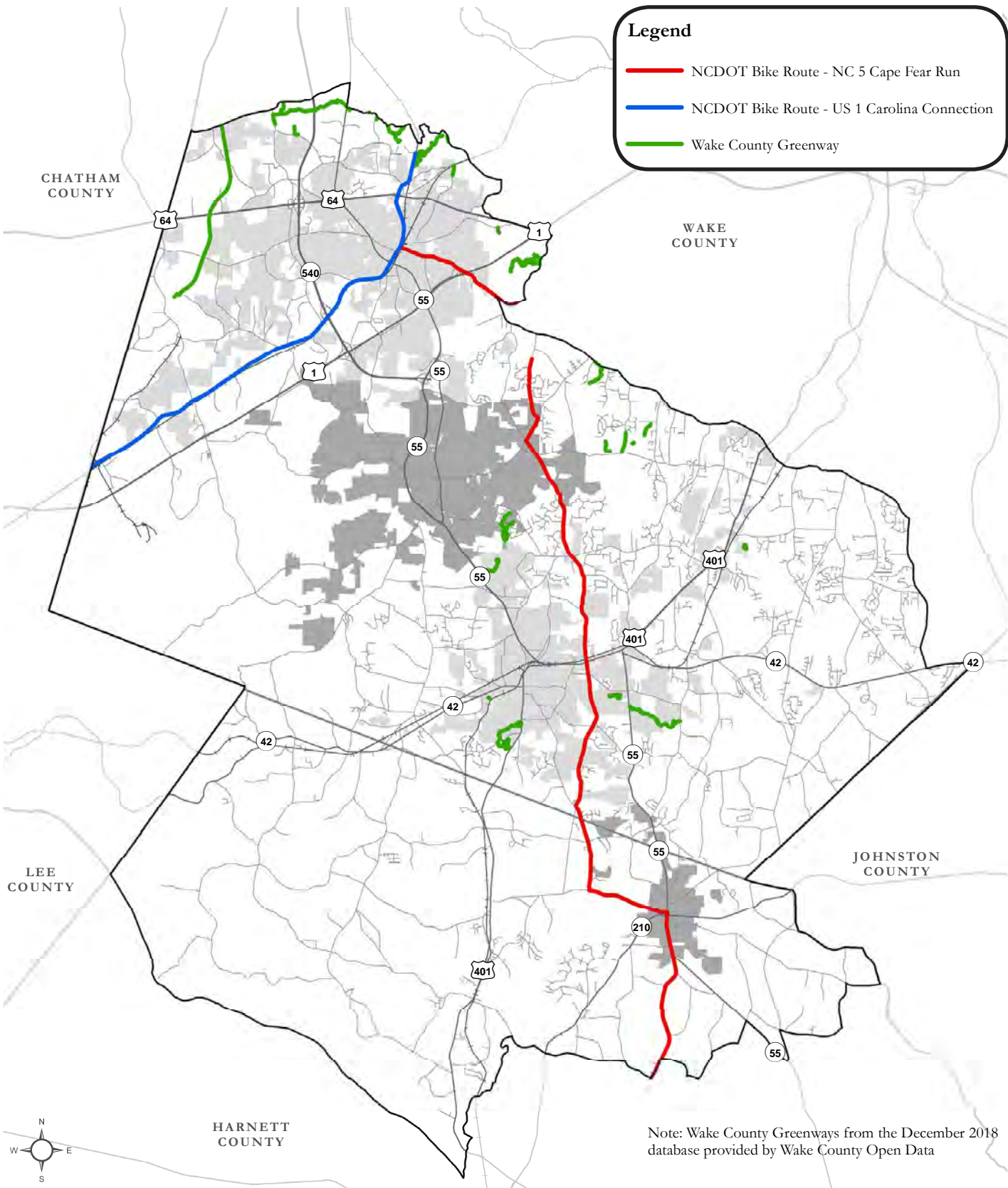
On-Road Bicycle Facilities

Two state bicycle routes run through the study area: US 1 Carolina Connection and NC 5 Cape Fear Run. These two bicycle routes provide north-south connections across the state. In addition to the two state bicycle routes, there are several regional multi-use facilities that provide service for cyclists traveling through the more local areas within the study area, including the American Tobacco Trail which provides a 23-mile off-road crushed rock surface for walking, running and cycling. A portion of the East Coast Greenway is currently under construction along the northern border of Apex. When complete it will connect the American Tobacco Trail with Umstead State Park via the White Oak Creek and Black Creek Greenways, a distance of about 12 miles. Since 2012, about two miles of dedicated bicycle lanes have been constructed for a total of approximately three miles in the study area.

Pedestrian Facilities

Currently, there are approximately 470 miles of sidewalk within the SWAS study area. There are approximately 433 centerline miles of roads maintained by municipalities in the study area; these are within municipal corporate limits, at least 16 feet or wider road width, and not on the State roadway system. All four municipalities within the study area: Angier, Apex, Fuquay-Varina and Holly Springs have Pedestrian Plans that identify future facilities and provide guidance and planning direction for the pedestrian transportation network. Since 2012, a minimum of 140 miles of sidewalk has been constructed in the study area for a total of approximately 413 miles of sidewalk in the study area in 2018.

Existing Bike Routes And Greenways



Map 3-8: Existing Bike Routes and Greenways

Multi-Use Facilities

Various multi-use facilities provide active transportation as well as recreation options within the SWAS study area. Greenways within the study area provide various needs, whether it is providing safe connections between adjacent developments, recreation access to loop around a park, or provide an active transportation option to regional destinations, similar to how the American Tobacco Trail connects to downtown Durham. Since 2012, approximately 32 miles of greenway paths have been constructed in the study area for a total of approximately 73 miles of greenway paths in the study area in 2018.

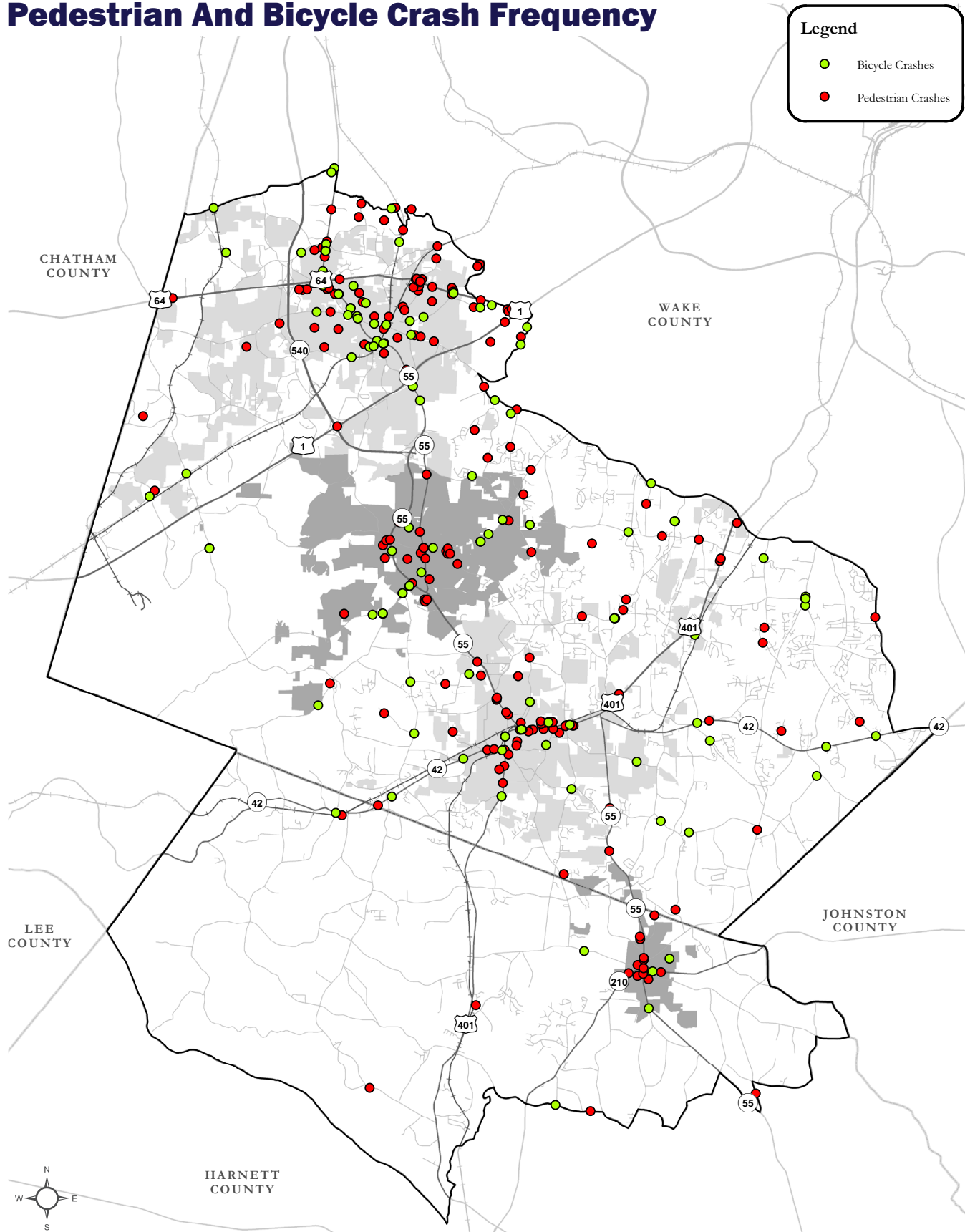
Crashes Involving Pedestrians and Cyclists

Active transportation crash data for roadways within the SWAS study area is currently maintained by the North Carolina Department of Transportation (NCDOT). From 2007 to 2015, there were 311 reported bicycle or pedestrian collisions in the SWAS study area.

Bicycle and pedestrian crashes are distinctly harmful with evident injuries occurring to the cyclist or pedestrian in just over 40 percent of all crashes (128 of 311), and possible injuries occurring in just under 35 percent of all crashes (107 of 311). In addition, 4.5 percent (or 14 of 311) resulted in disabling injuries while sadly, 3.85 percent (or 12 of 311) resulted in fatalities. The roadway speed limits for the locations of each crashes have been found to be relatively diverse, however, 30 to 45 mph is the most commonly posted speed limit when and where crashes occur (148 or 47.6 percent).

The majority of pedestrian and bicycle crashes, (190 of 311) or 61 percent, occurred in urban areas (greater than 70 percent of land developed) of the study area with 69 total crashes or 22 percent occurring in rural areas (less than 30 percent of land developed). Just over half of all bicycle and / or pedestrian crashes occurred on two-lane roadways with the vast majority occurring on two-way, undivided roads (75.2 percent). Crash history shows that most of these collisions take place on either local streets (40 percent), state secondary roads (20 percent) or in public vehicular areas (such as parking lots) (22 percent). Additionally, while about one-fourth (26 percent) of all collisions occur at stop signs or in "Stop and Go" situations, over half (168 or 54 percent) occurred in locations with no traffic control measure present.

Pedestrian And Bicycle Crash Frequency



Map 3-9: 2007-2015 Pedestrian and Bicycle Crash Frequency, source: NCDOT

Rail Conditions

Railroad Crossings

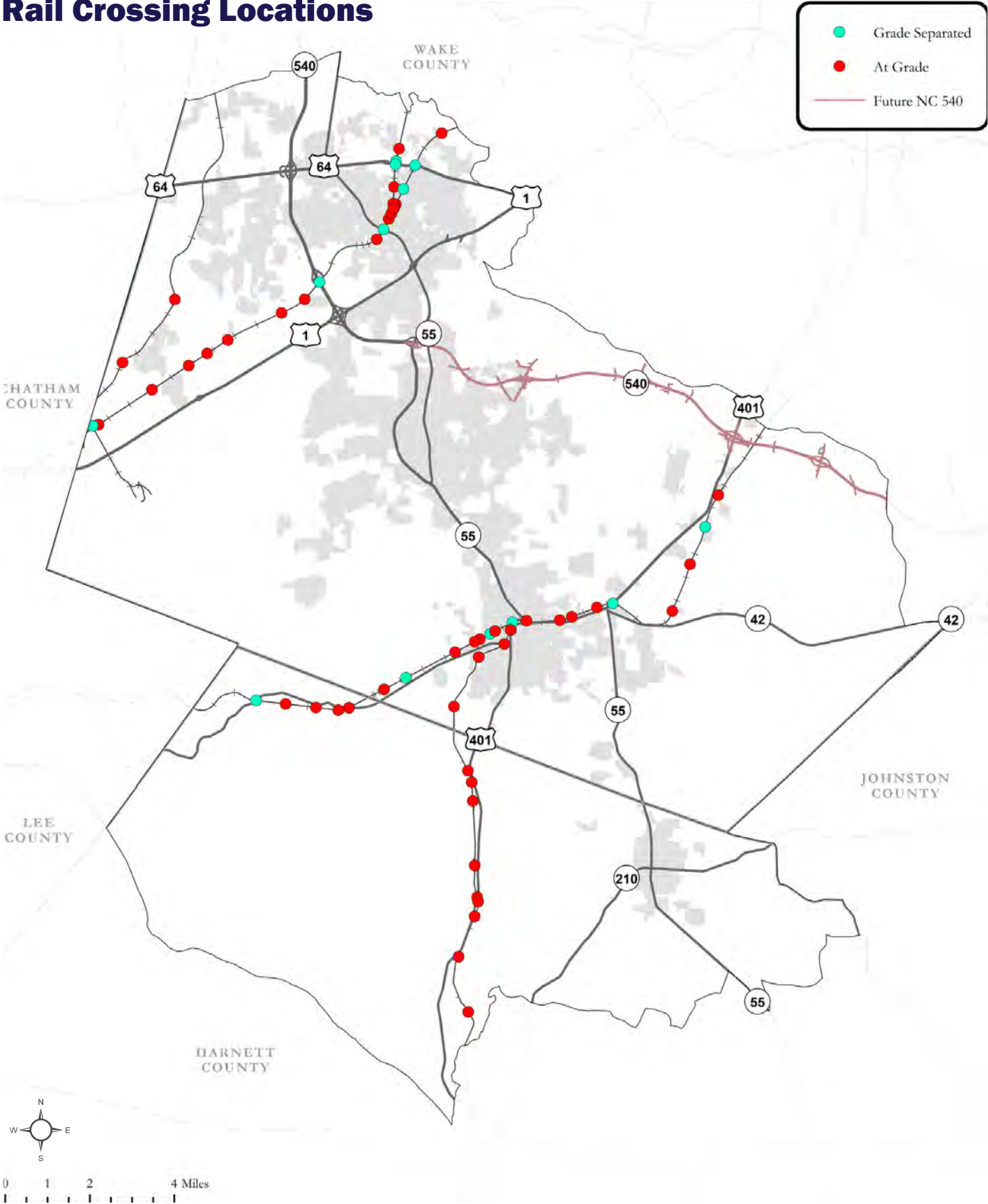
There are 44 miles of railways within the study area, including 49 at-grade rail-highway crossings and 13 grade-separations. According to 2018 US DOT Federal Railroad Administration data are between two and ten trains per day use the CSX rail corridor and two to four trains per day use the Norfolk Southern rail corridor. There is a rail yard (Apex Yard) at the intersection of the CSX rail corridor at Center Street in downtown Apex. There are two through-tracks plus one industrial spur track.

Two private rail corridors are owned by CSX Transportation Company, a Class I railroad; one that enters Apex from the north (Cary) at a location just east of the US 64 / Salem Street interchange and another corridor that enters Apex from the north (Cary) a mere one-half mile east of the other corridor. These CSX corridors join to form a double-track corridor in downtown Apex near Center Street. There is a rail yard operated by CSX near the Center Street crossing. The corridor parallels South Salem Street / Old US 1 south of downtown Apex and narrows to single track approximately one mile southwest of downtown Apex. These corridors and rail-yard are major assets held by CSX Transportation, a private company. This railroad connects CSX freight customers in Apex with Sanford, Southern Pines, Hamlet and points in all directions from Hamlet.

Two private rail corridors are owned by Norfolk Southern Railway, a Class I railroad; one corridor enters Fuquay-Varina near the Harnett County line along State Highway 42 approximately four miles southwest of the Varina business district and the other corridor enters Fuquay-Varina from the south at the Harnett County line just west of US Highway 401. In Harnett County, the rail line parallels and crosses US 401 several times along its 10-mile length from Lillington. These corridors join in the Varina business district near the intersection of US 401, NC 42 and NC 55. West and south of the junction, the corridors are single-track, increasing to multi-track for about three-quarters of one mile, and then back to single-track. These corridors are major assets held by Norfolk Southern, a private company. This railroad connects NS freight customers in Harnett County and Fuquay-Varina with North Carolina ports via the North Carolina Railroad in downtown Raleigh and customers in Fayetteville, Lee County, Chatham County, Randolph County and Guilford County.

Less than four miles of the westernmost rail corridor is owned by a private entity known as the East Carolina Chapter of the National Railway Historic Society, Inc. (www.nhvry.org) with its office in nearby New Hill; meetings are held at the North Carolina Railway Museum in nearby Bonsal. The organization restores trains and depots and operates short, scenic passenger train trips from Bonsal. The same corridor north of New Hill Olive Chapel Road, approximately five miles in the study area, is owned by NCDOT and operated as the American Tobacco Trail.

Rail Crossing Locations



Map 3-10: Rail Crossing Locations





Moving Ahead

The SWAS study area is home to many people and is quickly growing faster than the state average. As the population continues to grow, the existing facilities will start to operate at maximum capacity and will need improvements. The Southwest Area Study includes recommendations for all of the following:

- Improve the performance and safety of existing transportation facilities;
- Provide travel options to the single-occupant vehicle that include biking, walking, transit, and incorporation of technological enhancements;
- Improve local and regional connectivity and economic vitality; and
- Enhance travel safety to and from ten schools in the study area.



A person wearing a white cap and dark clothing is standing on a ladder, painting a brick wall. The wall is made of light-colored bricks, and the person is applying a darker paint to a section of it. The scene is outdoors, and the lighting suggests it's daytime.

Active Modes

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Not Every Trip is Made in a Hurry

Suitable walking and biking conditions allow users to slow down and enjoy a low stress trip around the community. Improving travel conditions can allow for time to enjoy the local attractions.

Imagine a community where your children can walk or bike safely to school or to a park; where your family can take an evening stroll; where you can make a quick trip to the store without getting in a car. Chapter Four is a blueprint for providing quality of life investments by improving active modes of transportation; that is, walking, running, bicycling and other forms of non-motorized travel, for communities in the SWAS study area.

The Active Modes Chapter is built on a framework with five pillars: safety, health, economy, mobility and the environment. There are many different levels of confidence in walking, running and bicycling ranging from the bold “strong and fearless” that comprise one percent of the population to the “interested but concerned” that make up about 60 percent. A solid 30 percent say “no way, no how” because they perceive unacceptable risks or have physical disabilities that convince them to never ride a bicycle under any circumstance or only walk as far as their car. 2045 SWAS focuses on creating opportunities for everyone to walk and bicycle safely, but the primary audience are those that would like to be more physically active in their community but currently need other support to make it happen for them and their families.

The 2045 MTP lists roadway, transit, bikeway / pedestrian, and reflect the region’s shared values from various stakeholders in cials, planners, engineers, the business community, stakeholders also reflects current and projected area conditions and local / s

Planning a system of “Low Stress” facilities

Stress can be created by the perceived danger in walking, running, or cycling in the presence of vehicular traffic. A good quality of life is synonymous with a low stress environment. This report defines a future network of interconnected, low-stress facilities. The elements of connectedness, serving an important design function, gives this network a level of regional importance.

Revisiting the Four Types of Cyclists In
Transportation Research Record 2587. TRB, National
Research Council, Washington, DC (2016
[National percentages shown])

Who Rides Bicycles? (and who wants to)

- Never Going to Ride
- Interested...but Concerned
- Commute or Confident
- Strong and Fearless

Low Stress

A low-stress bicycle and/or walking facility is suitable for all ages and abilities, including children and the elderly, to use any form of active transportation. These are not stress-free facilities; that is, some conflict crossings with vehicular traffic are inevitable. Also, it is entirely possible some hills and terrain may create some stress in walking, running or cycling. All the following facility types are considered low-stress.

- Greenways and Trails (per Wake County Greenway System Plan)
- Sidepaths (per Advance Apex Plan and Fuquay-Varina Community Transportation Plan) that are multi-use paths in the road right-of-way but away from the vehicular travelway
- Streetside Greenway or Trail (per Advance Apex Plan and Cary Community Plan)
- Parkways and Road Linkage Parks (per Holly Springs Parks and Recreation Master Plan)
- Protected Bike Lanes and Cycle Tracks

Regional Connections



The role of CAMPO and the Southwest Area Study is to facilitate discussions and planning for a regional transportation system. To that end, this section of the report focuses on connections between local communities rather than within them. Each municipality plans for facilities within their jurisdiction.

This planning effort builds on adopted plans including the Wake County Greenway System Plan (2017), Angier Comprehensive Pedestrian Plan (2014), Fuquay-Varina Community Transportation Plan (2017), Holly Springs Parks and Recreation Master Plan (2018), Advance Apex (2019), and the draft Northwest Harnett County Area Plan (2019). None of these plans define a low-stress facility, but the terms and design criteria match up well with the low-stress facilities bullet-listed above.

The Wake County Greenway System Plan (2018) depicts greenways that currently exist as well as those in the development phase. It shows connections to communities, parks and lakes. It also shows missing segments or gaps that need more attention given to them in order to “bridge the gap.”

Wake County

Adopted by Wake County in 2017, the Wake County Greenway System Plan focuses on establishing greenway trail connections with a stated preference for corridors along waterways instead of man-made corridors such as roadways; however, “roadway corridors are often necessary for routing trails to certain destinations and population centers, where other opportunities do not exist.”

Map 3.0 in the Wake County Greenway Plan, features the Countywide Greenway System showing only those corridors that offer the best potential for regional trail connectivity, based primarily on connections between existing trails and the ability to connect to destinations such as downtowns, activity centers, parks and lake trails. Wake County’s Greenway System is intended to make walking, running and bicycling for transportation and recreation relatively stress-free, at least in terms of conflicts with vehicular traffic.



Harnett County

The draft Northwest Area Plan in Harnett County was published on February 1, 2019 for public review. Recommendations in the plan include implementing policies and working towards completing the Harnett Cross County Trail – a series of trails and greenways that parallels Neills Creek. The draft plan includes a proposed 6.6-mile-long greenway along Avents Creek connecting Raven Rock State Park and the Wake County line near Duncan. The draft plan also includes a seven-mile-long parallel greenway to Rawls Church Road that would connect the Lafayette Trail with Angier. The combination of recommended trails and greenways in the Northwest Area Plan will connect the major places. The SWAS Team focused on the task of building upon these recommendations and connecting with the Wake County system at key strategic locations.

Recommendations

On-Road Facilities for Active Modes

The previous description of low-stress facilities is paired with this section of the report that briefly touches on other types of facilities that serve “strong and confident” pedestrians and bicyclists but may result in higher stress levels in all others who are less confident. Basic on-road facilities for walking include paved shoulders and marked crosswalks with some exposure to moving vehicular traffic. Basic on-road facilities for bicycling include paved shoulders, bicycle lanes, and in limited situations wide outside lanes. There are many other types of facilities but these cover the basics. There are excellent resources in CAMPO’s and NCDOT’s library of documents that describe each of these facilities and the many subtypes that aren’t included here. One excellent resource is [WalkBike NC: the NCDOT Statewide Master Plan](#).

Planned Facilities in the Study Area

Adopted local transportation plans for partnering municipalities informed follow-up discussions with local agency staff to offer the following summary. Each local agency approaches facilities slightly differently so CAMPO addressed the situations where an on-road facility connects neighboring jurisdictions; specifically how to transition safely from one to another, such as when one municipality provides on-road bicycle lanes but those lanes are planned as sidepaths in the neighboring municipality. The next page outlines the local plans that were considered during the planning process.

The low-stress network proposed for 2045 SWAS is shown in Figure 4-1 on page 59. Pages 54 to 58 identify the proposed regional connections for the low-stress network.



HOLLY SPRINGS

The adopted Comprehensive Transportation Plan (CTP) for Holly Springs is slated to be updated in 2020. Local staff were helpful in offering guidance on current interpretation of the current CTP. The town pursues on-street bike lanes on street segments as shown on the CTP map as well as shared lane markings on existing roads and shared lane markings in combination with wider outside lanes on proposed roads or on road widening sections.

The town also builds sidewalks. The town considered a Parks and Recreation Master Plan in 2007. Recommended also including acquiring additional right of way along one side of Holly Springs Road, Old Holly Springs Apex Road, Cass Holt Road and other connecting segments of roads. Additional recommendations include acquiring thirty to fifty feet beyond the curb was to allow for ample separation from moving traffic so that truly low-stress facilities for active transportation could be built with a landscaped park-like setting. The objective is consistent with this study report; that is, to create a network of low-stress facilities that serve neighborhoods and popular destinations for pedestrians, runners and bicyclists. Implementation of that vision has proven costly and difficult. The concept will be revisited in 2020 when Holly Springs updates their Comprehensive Transportation Plan.

ANGIER

A Comprehensive Pedestrian Plan was adopted in 2014. The town is evaluating SWAS-recommended bike lanes on Raleigh Street between Broad Street on the north and Depot Street on the south. These would be the first designated lanes for bicycles in the community.



FUQUAY-VARINA

The Comprehensive Transportation Plan (CTP) for Fuquay-Varina was adopted in 2017. A Comprehensive Pedestrian Plan was adopted in 2013. The CTP calls for sidewalk and sidepath facilities for active transportation.

Staff indicated that sidepaths, paired with wide outside lanes, serve both the “strong and confident” cyclists, as well as more casual users who prefer to be off the vehicular travel lanes.

For more information, the document can be reviewed [here](#).

APEX

The adopted Advance Apex Comprehensive Transportation Plan and Bike Apex Plan envision the following facility types: sidewalks, bridges, underpasses, pedestrian crossings, greenways, sidepaths, streetside greenways, bike lanes, paved shoulders, shared lane markings and the American Tobacco Trail. For more information about the location and application of each type of facility refer to the Bicycle, Pedestrian and Equestrian Plan [here](#).

Making Connections



American Tobacco Trail (ATT)

This rail-to-trail facility forms a western spine of the 2045 SWAS low-stress network. It currently exists for 22 miles from its southern trailhead about two miles south of US 64 through western Wake and eastern Chatham County to downtown Durham, including a signature bridge over Interstate Highway 40 at the Streets of Southpoint regional shopping center. The southern eleven miles of the ATT is covered with crushed stone and averages ten feet in width; it is wheelchair accessible and is open to equestrians. There is another trailhead in the SWAS study area located along Wimberly Road, north of Jenks Road in Apex.

Apex to American Tobacco Trail

Plans are underway by Apex to build a 1.6-mile-long trail between the Apex trail system and a regional low-stress facility – the American Tobacco Trail. The eastern half of the project will extend Beaver Creek Greenway with an immediate connection to Apex Nature Park. The western terminus links the American Tobacco Trail at Olive Chapel Road near Jordan Lake.

Harris Lake (Wake) County Park and Fuquay-Varina

The western spine of the SWAS low-stress network can connect to Harris Lake County Park in Wake County with some proposed road widening and new construction as follows. The 2045 SWAS study report recommends road improvements to create a four-lane, median-divided corridor along New Hill Holleman Road, Rex Road, Sweet Springs Road and a road on new location along the Wake – Harnett County line (just to the north of it) to existing Piney Grove Rawls Road and then connecting to a future Fuquay-Varina Parkway system. A sidepath on the south side of this new roadway corridor could be part of the SWAS low-stress network.



Duncan to Raven Rock State Park (Harnett County)

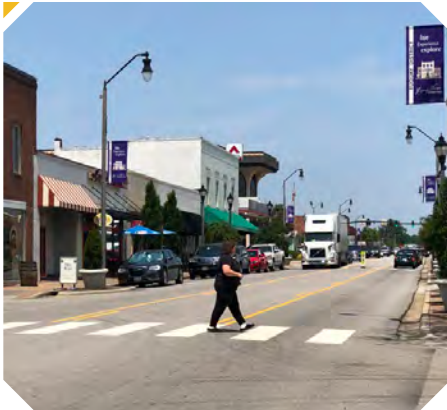
The western spine of the SWAS low-stress network can be completed with suitable facilities along one-half mile adjacent to Cokesbury Road between the Wake – Harnett County line and the community of Duncan. From there, Harnett County plans to build the Avent's Creek Greenway south to Raven Rock State Park at the River Road entrance. At nearly 4,700 acres, Raven Rock State Park straddles both sides of the Cape Fear River and offers hike & bike trails, equestrian trails, camping, canoeing, and even some whitewater rapids over the fall line where the piedmont meets the coastal region.

Raven Rock State Park to Angier

Harnett County is planning a 10-mile trail along the Cape Fear River to connect Raven Rock State Park with downtown Lillington. The Cape Fear River Trail will meet the Harnett Cross County Trail at Lillington, following Neills Creek north to Angier. Along the way a connection will be made to Central Schools Connector Trail so that Harnett Central Middle, High and North Harnett Primary schools can be served with low-stress facilities. Neills Creek Park is adjacent to the schools and will also be served. A sidepath (1.5 miles) is planned along West Williams Street to the intersection with Raleigh Street in downtown Angier. A superstreet-type at-grade intersection is being designed on West Williams Street at the future NC 55 bypass; including a pedestrian crossings along West Williams Street.

Angier to Fuquay-Varina

Harnett County is planning a four-mile greenway parallel to Rawls Church Road between Angier and US 401. At the crossing of Kenneth Creek, a greenway is envisioned by the 2045 SWAS Team that would connect to a greenway along the same creek that is shown in the Fuquay-Varina Community Transportation Plan. The Fuquay-Varina greenway would continue northwest along a branch of Kenneth Creek and end at US 401 and the Carroll Howard Johnson Environmental Park just northeast of its intersection with Holland Road. A planned sidepath along US 401 from there to the intersection with Judd Parkway would provide a low-stress facility. The Town of Fuquay-Varina envisions a sidepath adjacent to Judd Parkway for its entire distance around the town.



Key Facilities in Fuquay-Varina

A number of planned roadway improvements are envisioned as having adjacent sidepaths including Judd Parkway, Fuquay-Varina Parkway and Hilltop-Needmore Road. The Town has also planned a number of greenways that follow various streams and creeks including Black Creek, Little Black Creek, Terrible Creek and Kenneth Creek. The interconnected nature of these facilities will create a network of low-stress facilities.

Fuquay-Varina to Wake Tech Community College

Fuquay-Varina envisions sidepaths along US 401 between Five Points and Ten Ten Road including a low-stress connection to the Wake Tech campus. The planned six-lane roadway should have sufficient land at the edge of the 200 to 300-foot wide right-of-way to provide a separated sidepath. The separation will be beneficial given the number of travel lanes and anticipated high speed of vehicular movement on US 401.

Wake Tech Community College to Crowder County Park

The best option for an east-west low-stress facility that connects Wake Tech with Crowder Park, located at Ten Ten Rd and Holly Springs Road, is to follow the planned Middle Creek and Camp Branch Greenways. This would avoid navigating the intersection and future interchanges on US 401 at NC 540 and at Ten Ten Road. It would also avoid putting people on Ten Ten Road.



Key Facilities in Holly Springs

Holly Springs envisions a “primary parkway system” that will connect downtown with outlying activity centers, parks and lakes. This includes Crowder County Park, Sunset Lake, Bass Lake, Windy Farm, Harris Lake Waterfront Center and the 12 Oaks Commerce Center. The parkways are envisioned by the Town of Holly Springs as a 30-to-50-foot-wide streetside area where a multi-use path would flow through a parklike setting. The specific corridors include Holly Springs Road from the northeast corner of the community to downtown Holly Springs, Old Holly Springs Apex Road from the northern edge of the community (at Veridea) to downtown, and Cass Holt Road and Buckhorn Duncan Road between the southern edge of the community and downtown.

Holly Springs to Apex

The main pedestrian connection will be the Middle Creek Greenway. A primary parkway is envisioned by the Town of Holly Springs that would follow the alignment of Old Holly Springs Apex Road to Veridea. The new bridge over NC 540 will be a constraint as it only provides enough space for narrow sidewalks at the edge of curb. Veridea Parkway may also be a constraint in that it is not anticipated to have low-stress facilities. Within the Veridea planned development, however, low-stress facilities are planned along Jessie Drive, NC 55, and Lufkin Road. Another potential connection between Holly Springs and Apex is the possible extension of Pleasant Plains Road over US 1. The significance of the athletic park that Apex is planning at Pleasant Plains Road and Old US 1 could benefit further from having access via low-stress facilities.

Key Facilities in Apex

A number of planned roadway improvements are envisioned as having bike lanes, adjacent sidepaths, and streetside greenways including Apex Peakway, Ten Ten Road, Green Level West Road, Jenks Road, Laura Duncan Road, Old Raleigh Road and Richardson Road. The Town has also planned a number of greenways that follow various streams and creeks including Beaver Creek, Middle Creek, Swift Creek, and Williams Creek. The interconnected nature of these facilities will create a network of low-stress facilities. Further consideration of additional low-stress facilities that connect to downtown Apex destinations would further extend the benefits of this vision.



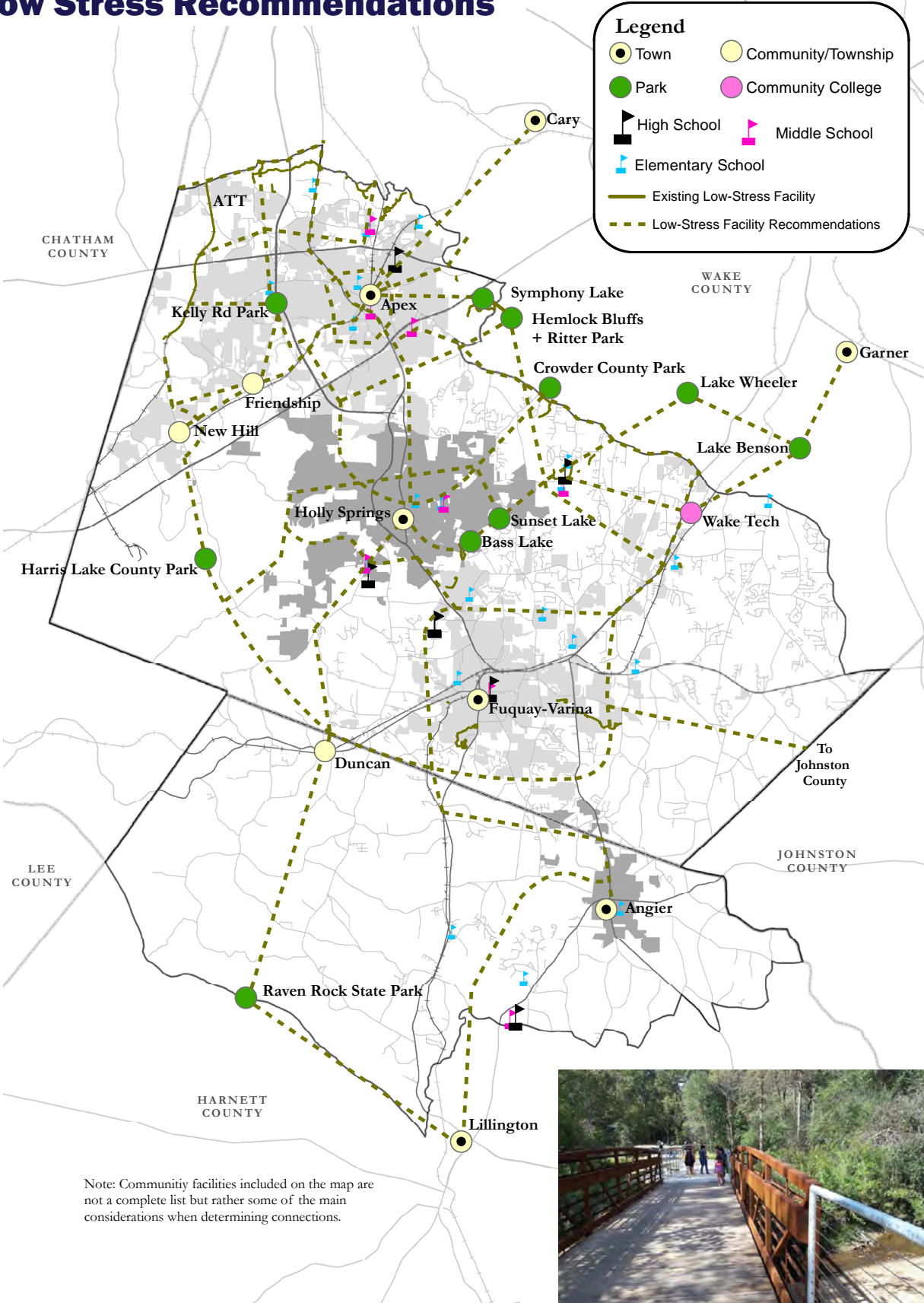
Apex to Regency Park / Symphony Lake / Koka Booth Amphitheatre

Plans are underway by Apex, Cary and Wake County for a 2.6- mile-long recreational trail between two of the larger parks in the region: Apex Community Park and Regency Park. Much of the planned trail alignment is located in non-residential areas. Construction plans were completed in 2012 from Apex Community Park to US 1. Two major roadways – US 64 and US 1 – will require long pedestrian bridges. There are greenways at both ends: Community Lake Trail on the west and Symphony Lake Greenway connecting to Swift Creek Greenway, Ritter Park and Hemlock Bluffs on the east.

New Hill Historic District

The western spine of the SWAS low-stress network can be extended with a planned one-mile-long extension of the ATT west to New Hill Olive Chapel Road along the existing access road to the ATT trailhead. A proposed widening of New Hill Olive Chapel Road and New Hill Holleman Road to a four-lane median-divided section with sidepath would allow for the continuation of the low-stress network south to New Hill. To avoid impacts to the historic district, it is recommended to build a one-mile-long road on new location immediately east of the historic district and to leave the existing street system within the historic district intact. Connections between the existing streets and the new four-lane road would be provided north and south of the historic district. It is uncertain whether or not the existing at-grade rail crossing within the historic district will be permitted to remain; if so, then the low-stress network could travel through the historic district. The low-stress network could follow either the existing streets within the existing pavement or adjacent to the new four-lane road on a sidepath within the roadway right-of-way.

Low Stress Recommendations



Map 4-1: Low Stress Recommendations

Transitions

Within the SWAS study area there are several locations on different roads where bicyclists will transition from one municipality to another. This will occur at intersections as well as mid-block. In advance of these locations, there is a need to provide traffic control devices that adequately warn bicyclists of a change in facility type ahead so that transitions (or turn arounds) can occur safely.

For example, the Town of Fuquay-Varina has a policy that requires wide outside lanes on-road with parallel sidepaths off-road. The on-road facility is intended to serve confident bicyclists while the sidepath is intended to serve less-confident cyclists who prefer not to ride with traffic. Adjacent communities including the Town of Holly Springs and the Town of Cary have policies to require on-road bicycle lanes and parallel sidewalks; a configuration that will encourage if not require cyclists to ride on the road, not the sidewalk.

A guiding principle in developing the transition from one facility type to another is to provide clear communication and messages to cyclists that a different type of facility is ahead. With clear information, the user can choose to turn back if they prefer not to ride on the different facility or they can choose to move ahead following clearly marked traffic control devices to lead them through the transition area.

Cyclists that will only ride on a sidepath will be able to stop and turn around as they approach the transition. Cyclists who only ride on the road will have a natural transition between the striped bicycle lane and a wide outside lane; the lack of pavement markings with a wide outside lane along with a sign indicating the end of the bicycle lane will be adequate.

Cyclists that prefer the sidepath but choose to use a bicycle lane, but not a wide outside lane, will make a lateral transition within the intersection.

In the intersection, the cyclist would move laterally from the bicycle lane to the off-road shared-use path (sidepath). The stop bar for traffic should be placed so as to avoid conflicts with bicyclists in the transition to and from the shared-use path. The crosswalk for pedestrians can be shared with bicyclists.

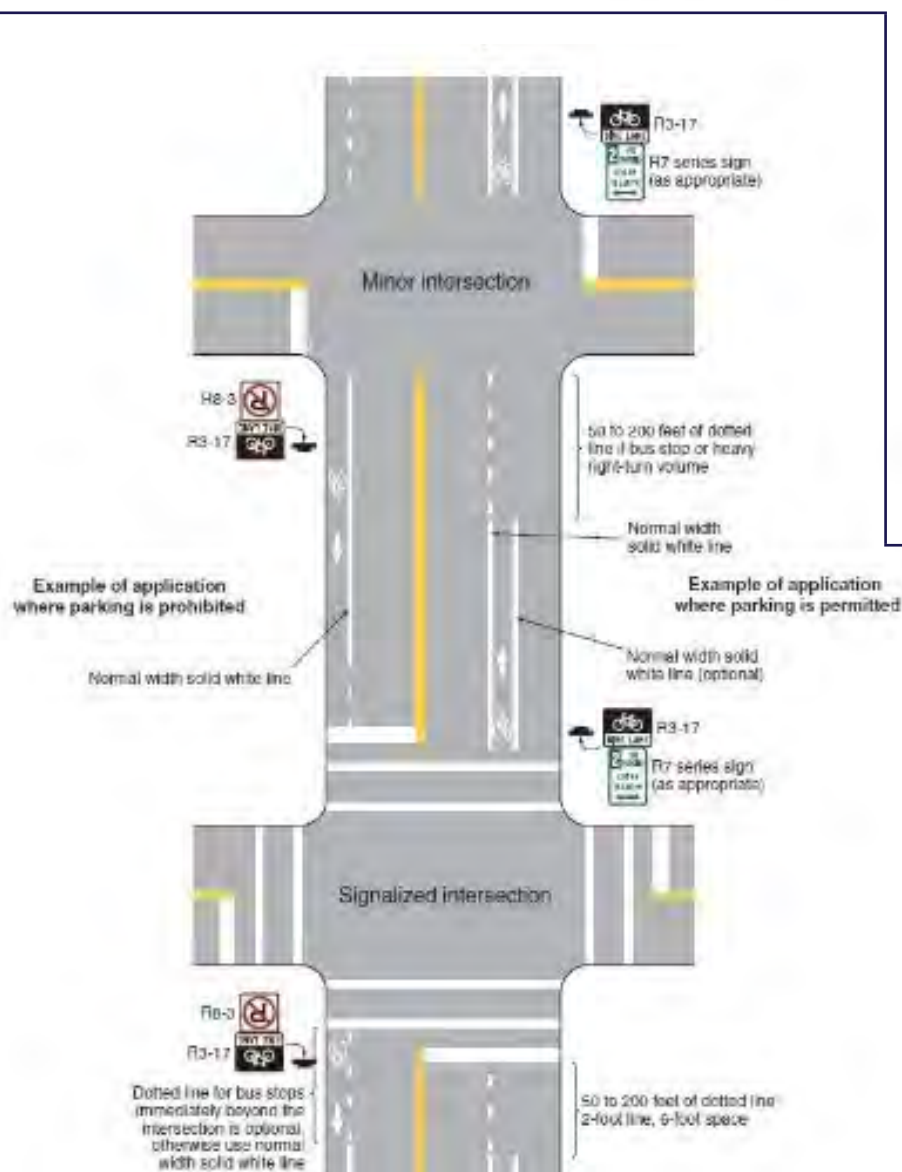
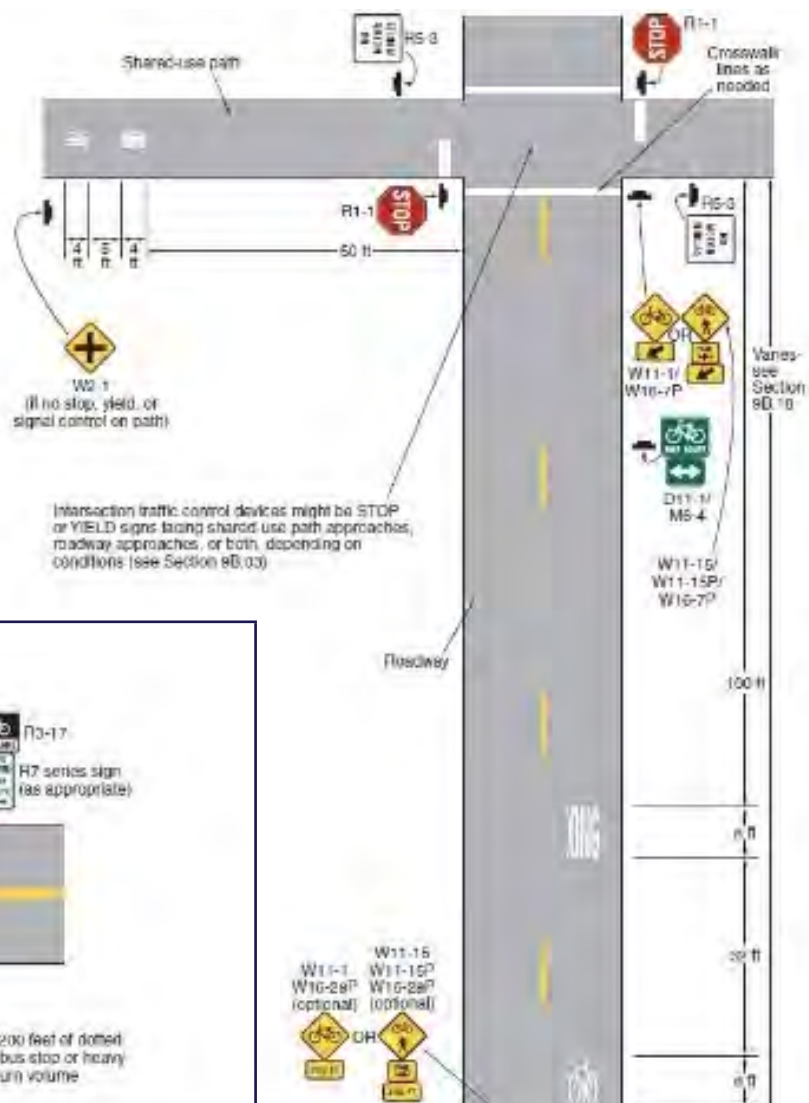
Further discussion is recommended to occur at the local level to develop a transition plan between on-road and off-road bicycle facilities that will occur mid-block. One option is to not allow this to occur and instead purposefully designing a safe transition at the nearest adjacent intersection.



Figure 4-1: Shared-Use Path Marking and Bicycle Lane Markings for Two-Way Street

The striped bicycle lane will be terminated using the appropriate MUTCD pavement markings and signage warning cyclists and motorists that the bicycle lane is ending.

The bottom image shows a striped bicycle lane at a signalized intersection and an unsignalized intersection (top of graphic).





Conclusion

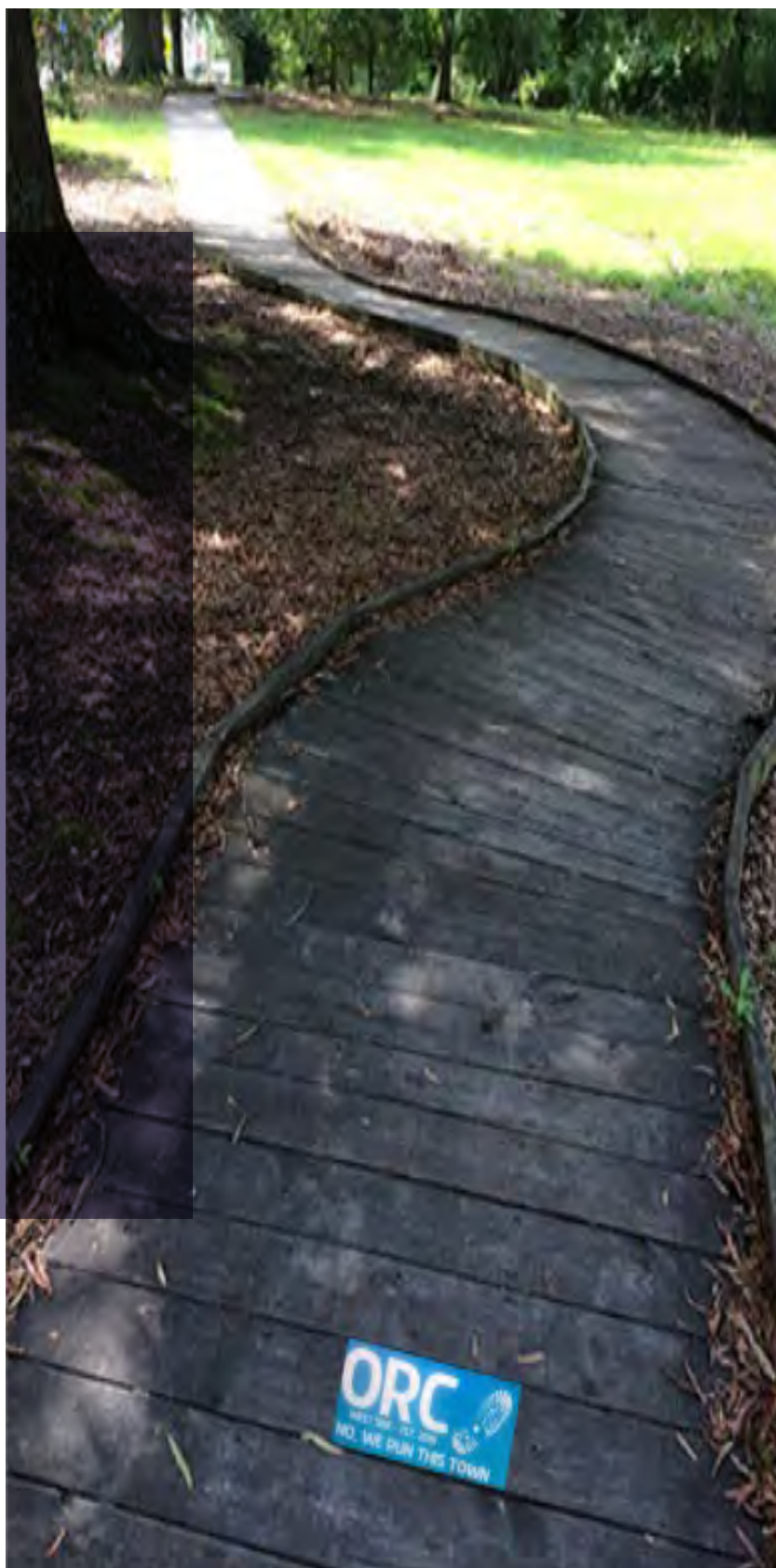
Communities in the SWAS study area are making substantial investments in all ways of improving the quality of life for residents, workers and visitors. Walking, running, cycling and other forms of movement that do not involve a motor vehicle are very popular and additional facilities are in demand. As the population continues to grow, more facilities that facilitate active transportation will be needed. An inter-connected network that serves popular destinations and neighborhoods is a goal.

Priorities for bike and pedestrian projects in the study area include:

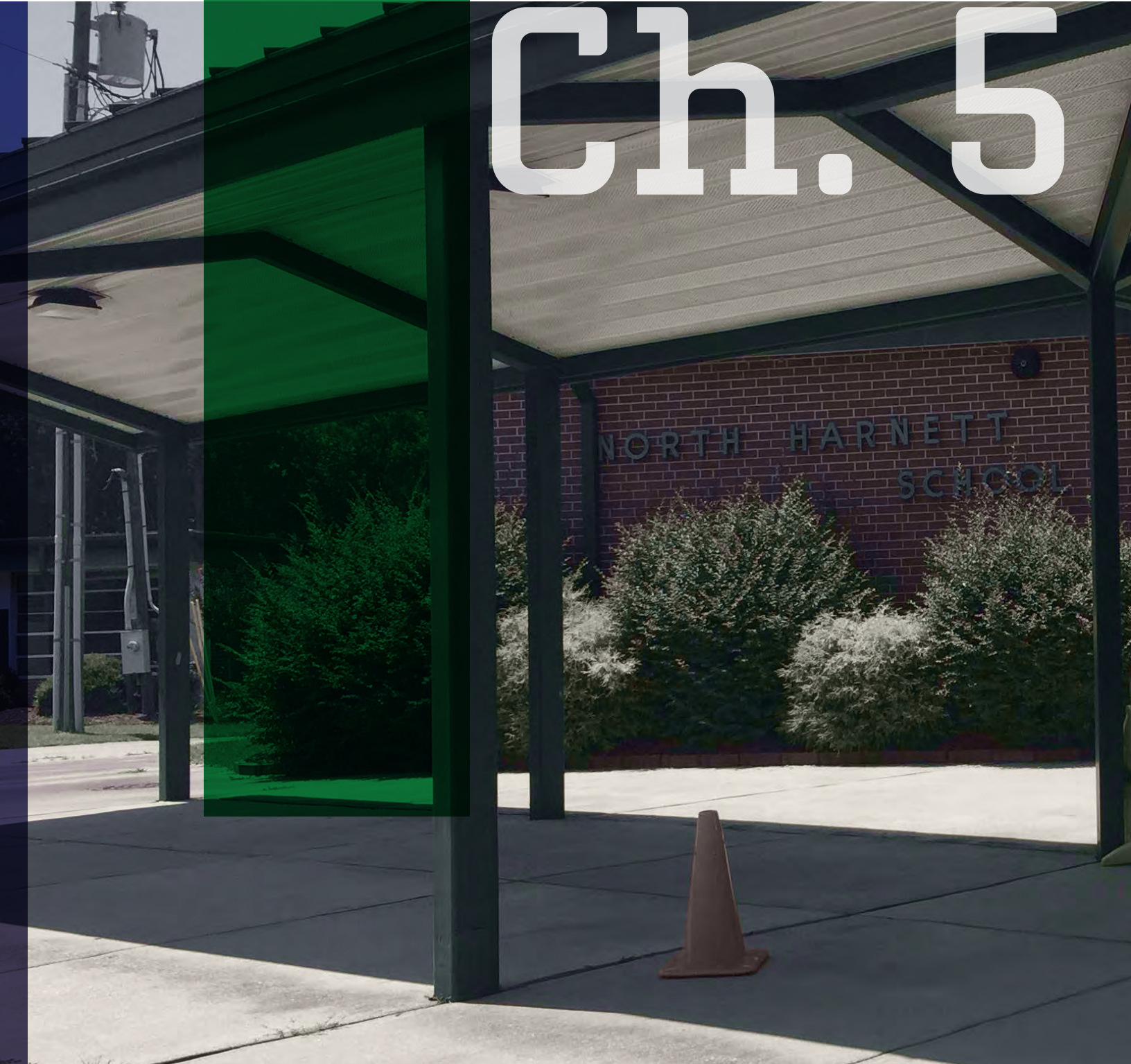
- Local agency endorsement or refinement of the low-stress network recommendations in forthcoming local plans.
- SPOT scoring and STI prioritization that reflects the recommendations shown on Map 4-1.
- Inclusion of facility type in future updates of the STIP.

The Southwest Area Study includes recommendations for all of the following:

- Incorporate locally-chosen facilities (e.g. sidewalks, sidepaths, multi-use paths, trails, greenways and on-street bike lanes) as integral design elements of all major roadway projects; and
- Secure funding from all available and appropriate sources to implement the plan to build a low-stress network.



Ch. 5



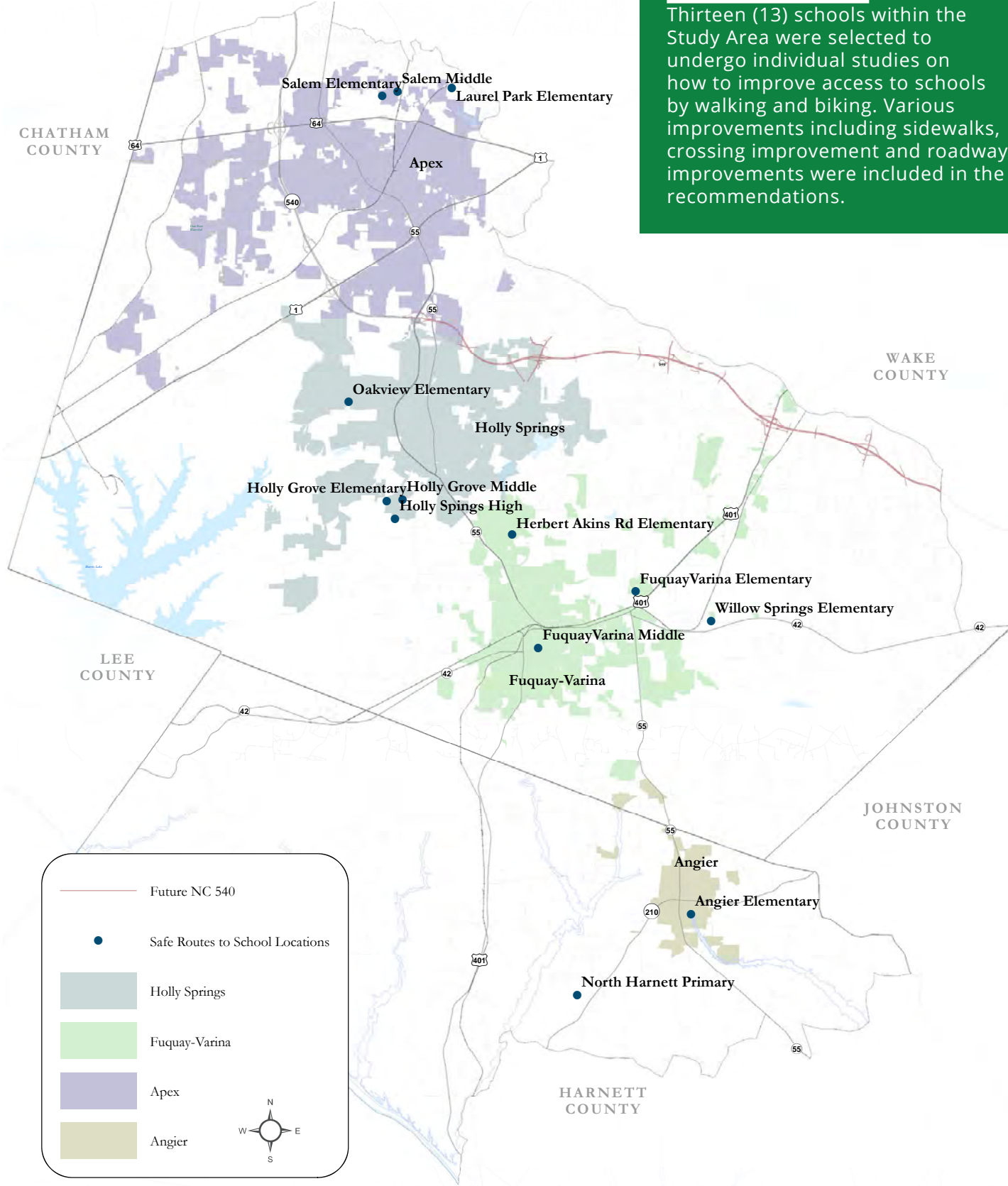
Safe Routes to School

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Selected School Locations Map

Safe Routes to Schools
Thirteen (13) schools within the Study Area were selected to undergo individual studies on how to improve access to schools by walking and biking. Various improvements including sidewalks, crossing improvement and roadway improvements were included in the recommendations.



Map 5-1: School Locations Studied

Introduction

Walking is the most affordable and simplest mode of travel that has significant positive impacts on the health and well-being of an individual. Studies show that traveling to school by walking or biking, may lead to improved individual grades and test scores.

As part of the SWAS study, thirteen area schools were selected to be studied to understand how to improve walking and biking conditions to and from school for students and staff. A review of existing conditions with a one-half mile radius was studied to understand what improvements are needed to create a safe network for walking and biking.

Improvement recommendations including sidewalk additions to complete connections, intersection improvements, roadway improvements and bicycle accommodations at and near the school sites.

The following pages provide a brief characterization of the issues that each of the school sites on this page face to creating better, safer walking and cycling environments for their students and faculty.

Construction costs are listed in 2019 dollars, include right-of-way acquisition, and will need to be refined for each project during construction document design.

Resources

Active Education: Growing Evidence on Physical Activity and Academic Performance, Research Brief, Active Living Research, sponsored by Robert Wood Johnson Foundation, January 2015

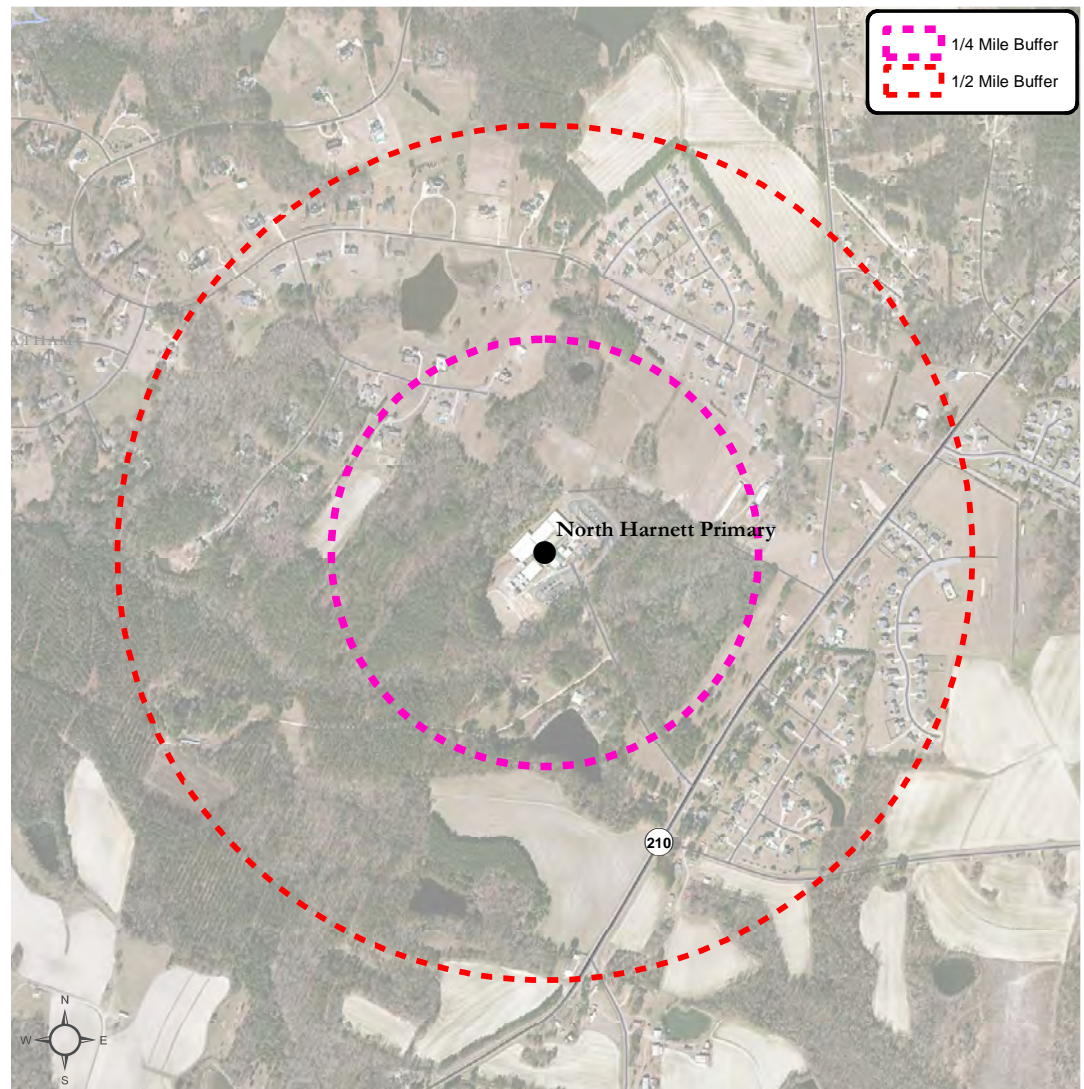
https://activelivingresearch.org/sites/activelivingresearch.org/files/ALR_Brief_ActiveEducation_Jan2015.pdf

Centers for Disease Control and Prevention, "The Association Between School-Based Physical Activity, Including Physical Education, and Academic Performance," US Department of Health and Human Services, 2010

https://www.cdc.gov/healthyyouth/health_and_academics/pdf/pa-pe_paper.pdf

School Studies

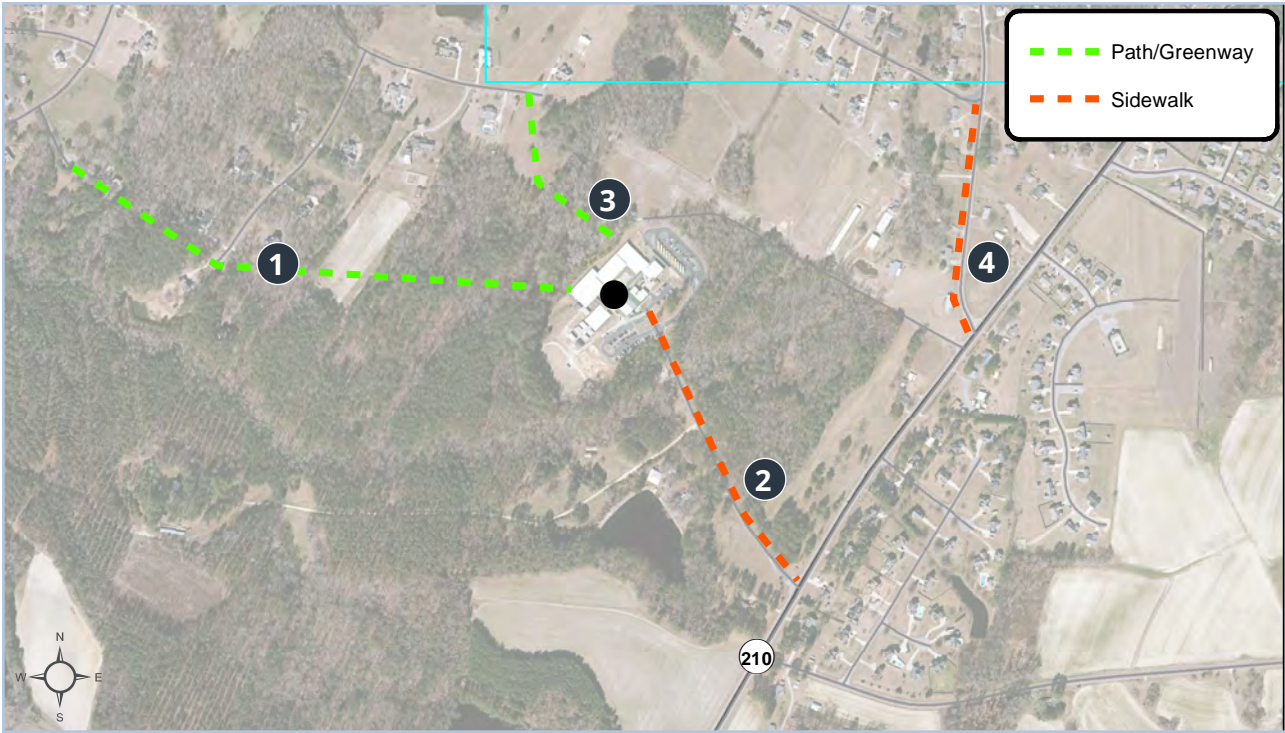
North Harnett Primary School



North Harnett Primary pick up/drop off shelter



Entrance into North Harnett Primary



Address: 282 N. Harnett School Rd, Angier

Grade Levels: K-5

Current Enrollment: 439

Capacity: 475

Arrival / Dismissal Times: 7:55am / 3:10am

Identified Concerns

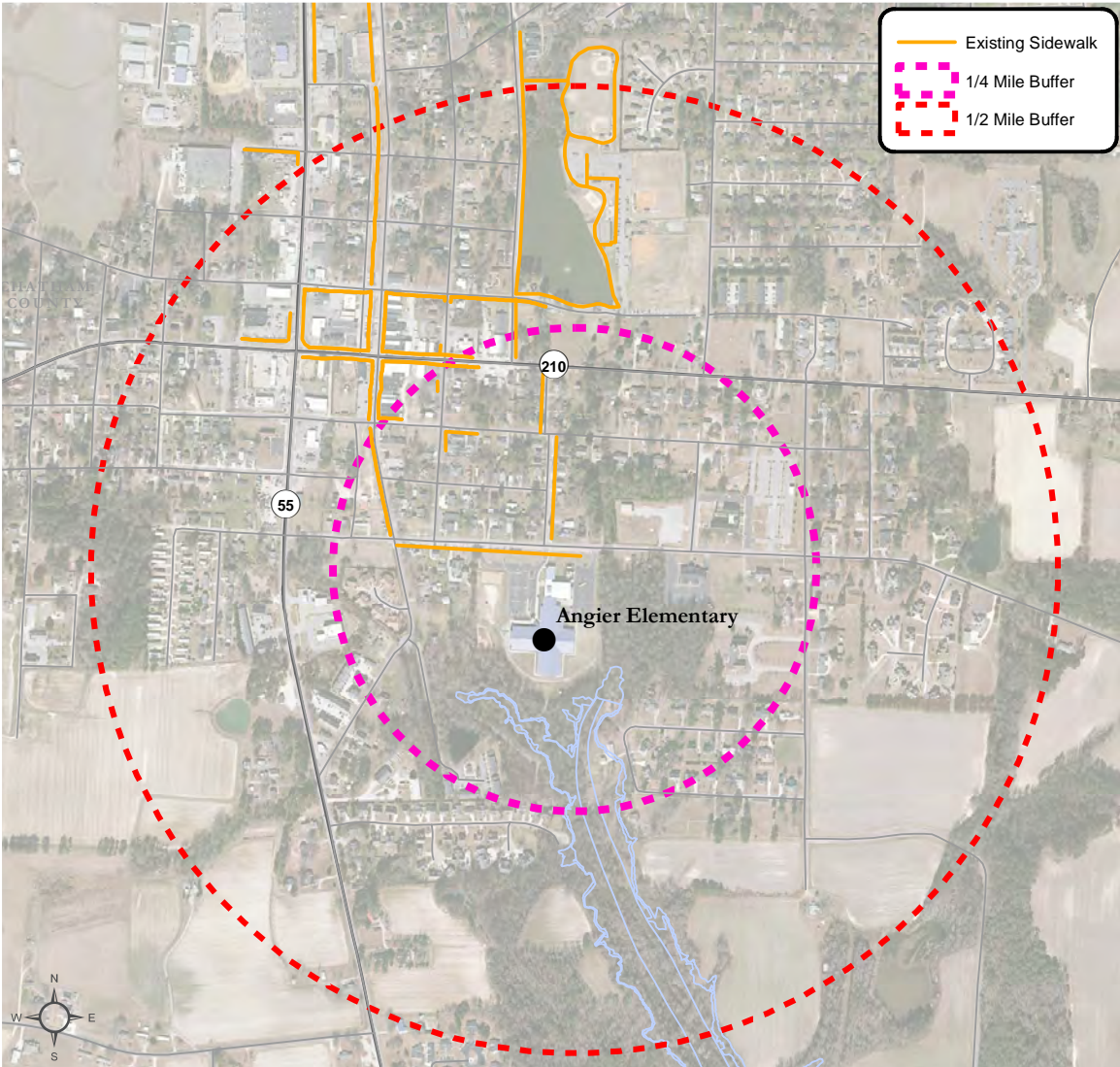
North Harnett Primary is located off of Hwy 210. The area is primarily rural, yet two residential neighborhoods are located to the east and north of the school site. A large tract of land located to the west of the school has the potential for development. No sidewalks are available within a half-mile of the school. Several houses are located within 1/4-mile of the school but there is a lack of roadways that connect to the school without students being forced onto Hwy 210.

Summary of Recommendations

Sidewalks on school property, Hwy 210, and James Norris Rd. Greenways are recommended for any future development adjacent to the site as well as connecting the school to the residential development just north of the school.

Map ID No.	Recommendation	Cost
1	Greenway connection	\$424,000
2	Sidewalk along school entrance road	\$275,000
3	Greenway connection	\$151,000
4	Sidewalk along James Norris Rd	\$207,000

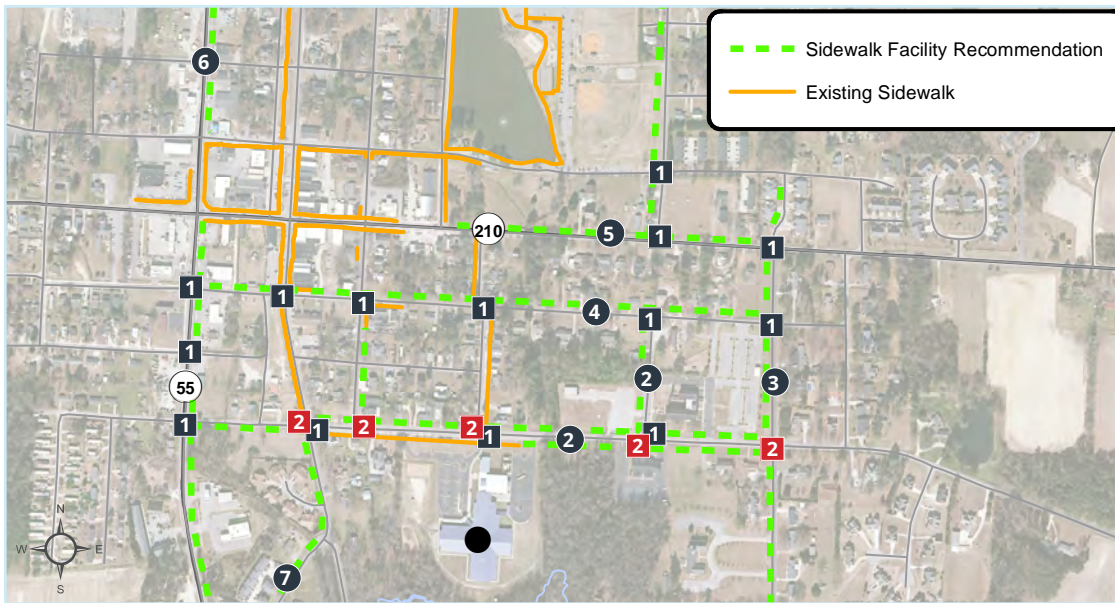
Angier Elementary School



School crossing at west McIver St entrance



Crosswalk at the vehicular exit on McIver St



Address: 130 E McIver Street, Angier

Grade Levels: K-5

Current Enrollment: 457

Capacity: 750

Arrival / Dismissal Times: 7:55 am / 3:10pm

Identified Concerns

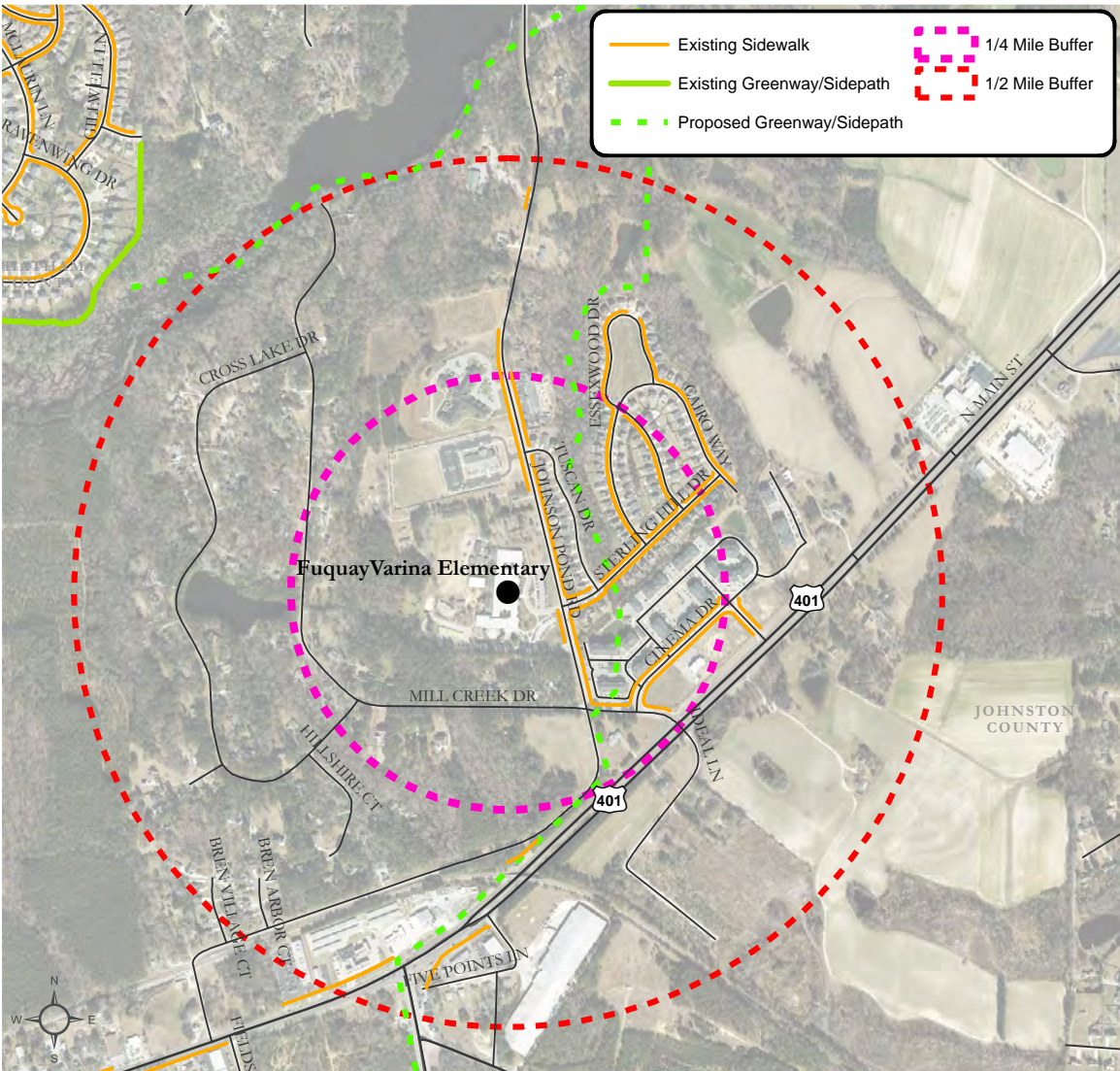
Angier Elementary is just south of the downtown area. The school is bordered by Hwy 55 and 210. A small amount of sidewalks are located within the immediate vicinity of the school. There is also a lack of crosswalk and accessibility ramps at intersections located with 1/4 mile of the school as well as the driveways onto school property. A mid block crossing is present at one entrance of the school. This crossing is a standard transverse crosswalk. A more visible and pronounced crosswalk could attract the attention of drivers when students are crossing. Two pedestrian crashes and one bicycle crash have been reported in the area over the last ten years.

Summary of Recommendations

Intersections within 1/4 mile of school should be equipped with compliant accessibility ramps and crosswalks. The crosswalks adjacent to the school site should be furnished with high visibility ladder style crossings. Entrances to school should have marked crossings. Sidewalks are recommended on McIver St where currently lacking, as well as most of the connector streets to the school.

Map ID No.	Recommendation	Cost
1	Crosswalks	\$10,700
2	High visibility crosswalks	\$5,000
3	Sidewalks along Wilma St	\$400,000
4	Sidewalks along Lillington St	\$492,000
5	Sidewalks along Depot St	\$276,000
6	Sidewalks along Hwy 55	\$512,000
7	Sidewalks along Broad St	\$220,000

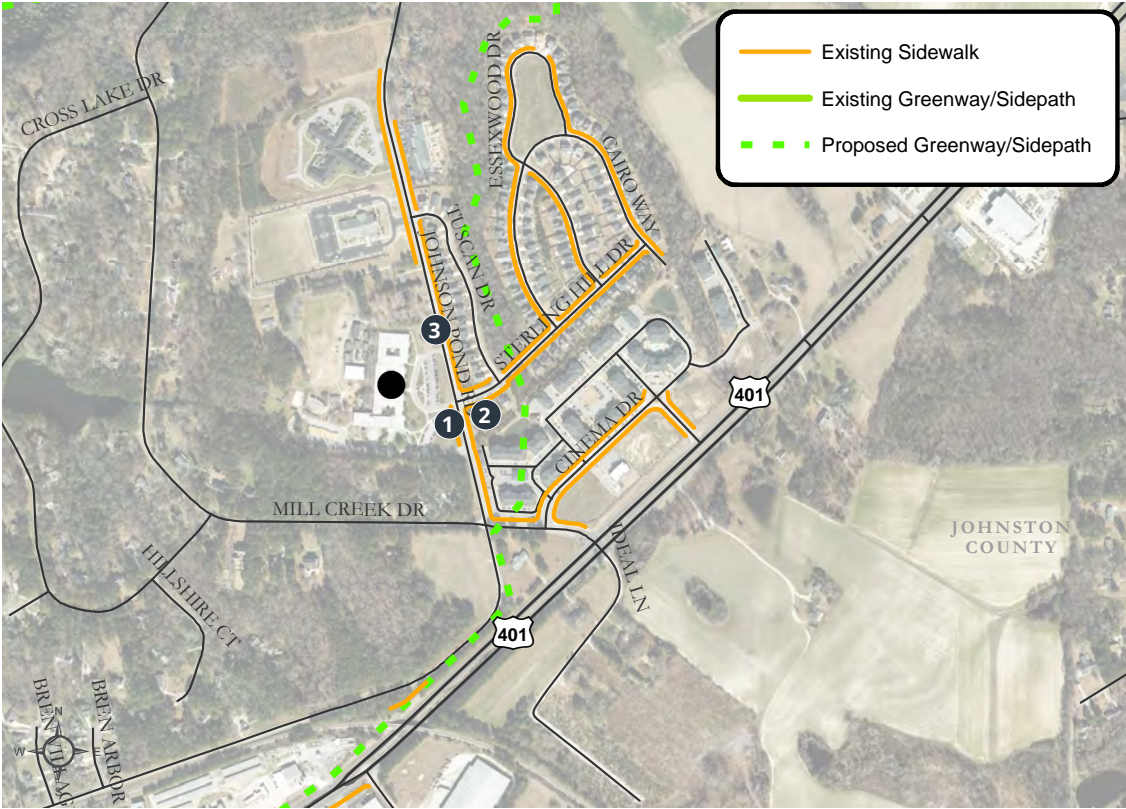
Fuquay-Varina Elementary School



Current conditions between Sterling Ridge and F-V Elementary



No crosswalks are located within the school zone



Address: 6600 Johnson Pond Road, Fuquay-Varina
Grade Levels: K-5
Current Enrollment:832
Capacity: 655
Arrival / Dismissal Times: 9:15am / 3:45pm

Identified Concerns

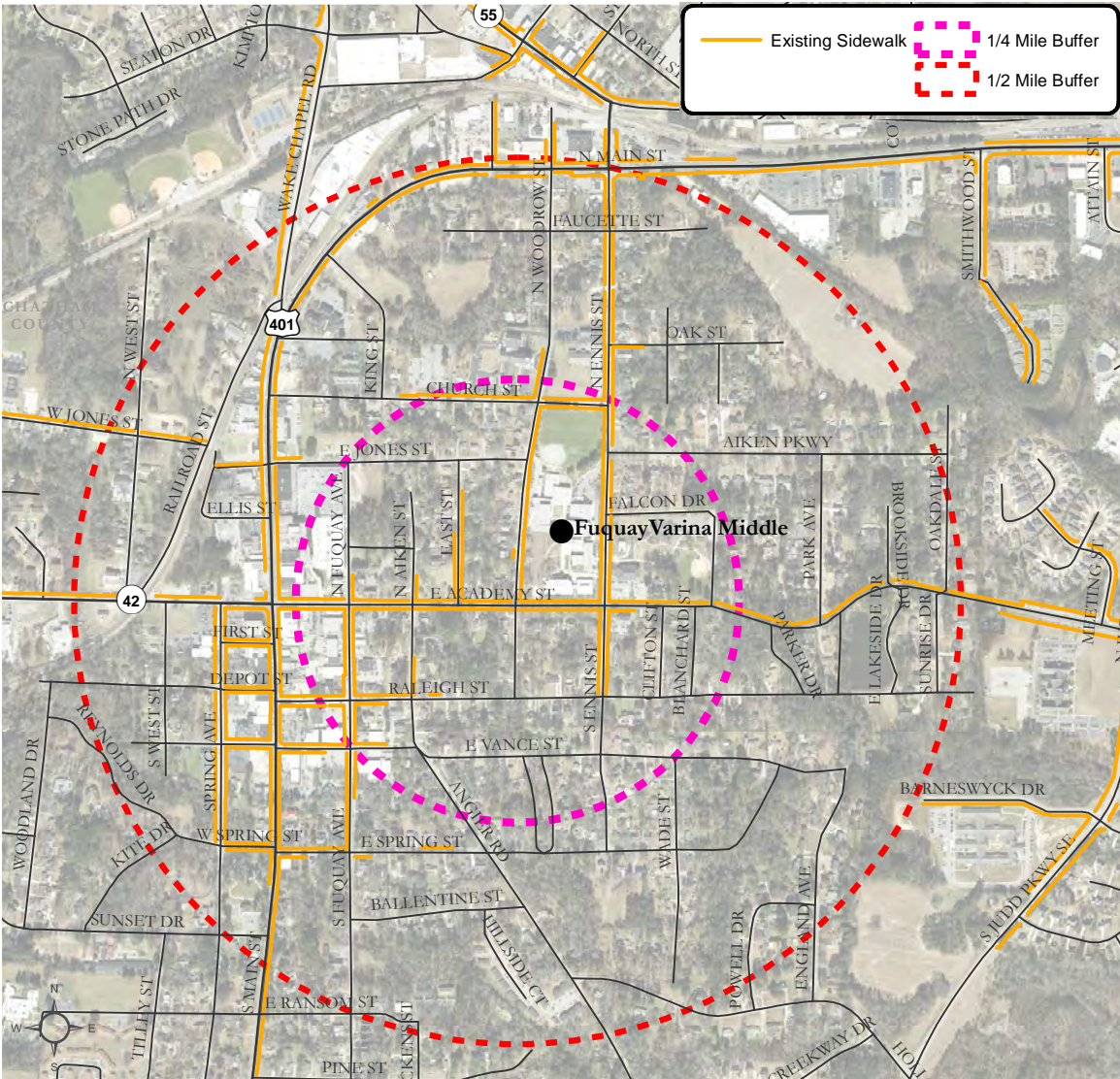
Fuquay-Varina Elementary is located off Johnson Pond Rd in the fast growing community of Fuquay-Varina. The school is currently capped to new students for several grade levels. A large residential development is located directly across the street as well as new development is occurring to the north of the school site. Local and school officials should anticipate a rise on walkers and cyclists to increase as development finalizes in the area. Vehicular stacking is occurring on Johnson Pond Road.

Summary of Recommendations

Completion of sidewalk gaps are needed along Johnson Pond Rd in front of the school. Local government should ensure future development included sidewalks and crosswalks. High Visibility crosswalks are needed at the school entrance and Sterling Hill Dr. Safety programs are encouraged each school year to ensure students (new and returning) understand appropriate safety measures when biking and / or walking to and from school. Vehicle stacking options outside of the right-of-way. Coordination to do so is necessary between the Wake County School System and Wake County Parks.

Map ID No.	Recommendation	Cost
1	High Visibility Crosswalk	\$5,080
2	High Visibility Crosswalk	\$5,080
3	Sidewalk on Johnson Pond Rd	\$186,000

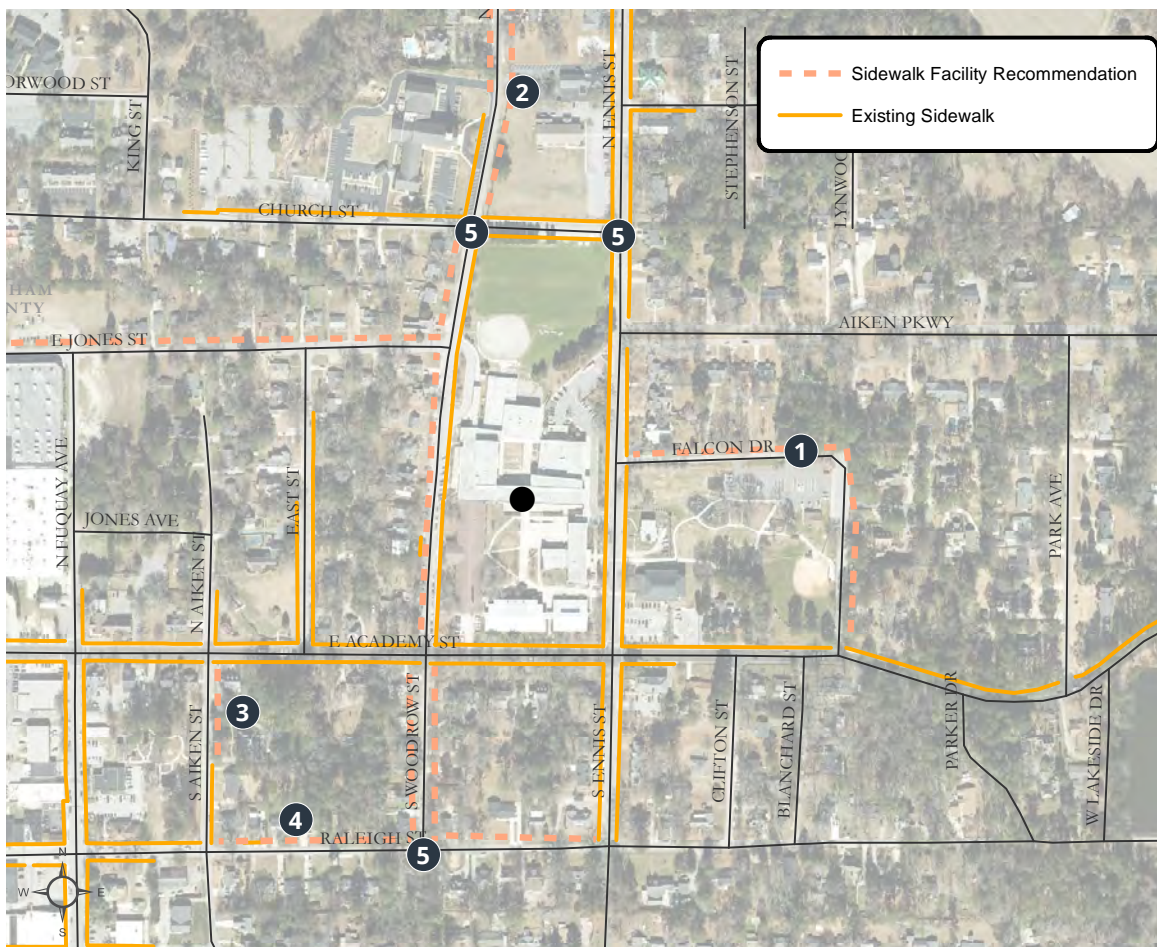
Fuquay-Varina Middle School



Sidewalk conditions along Academy Street



Fuquay-Varina Middle School front entrance crosswalk



Address: 109 North Ennis Street, Fuquay-Varina

Grade Levels: 6-8

Current Enrollment: 896

Capacity: 903

Arrival / Dismissal Times: 8:15am / 3:00pm

Identified Concerns

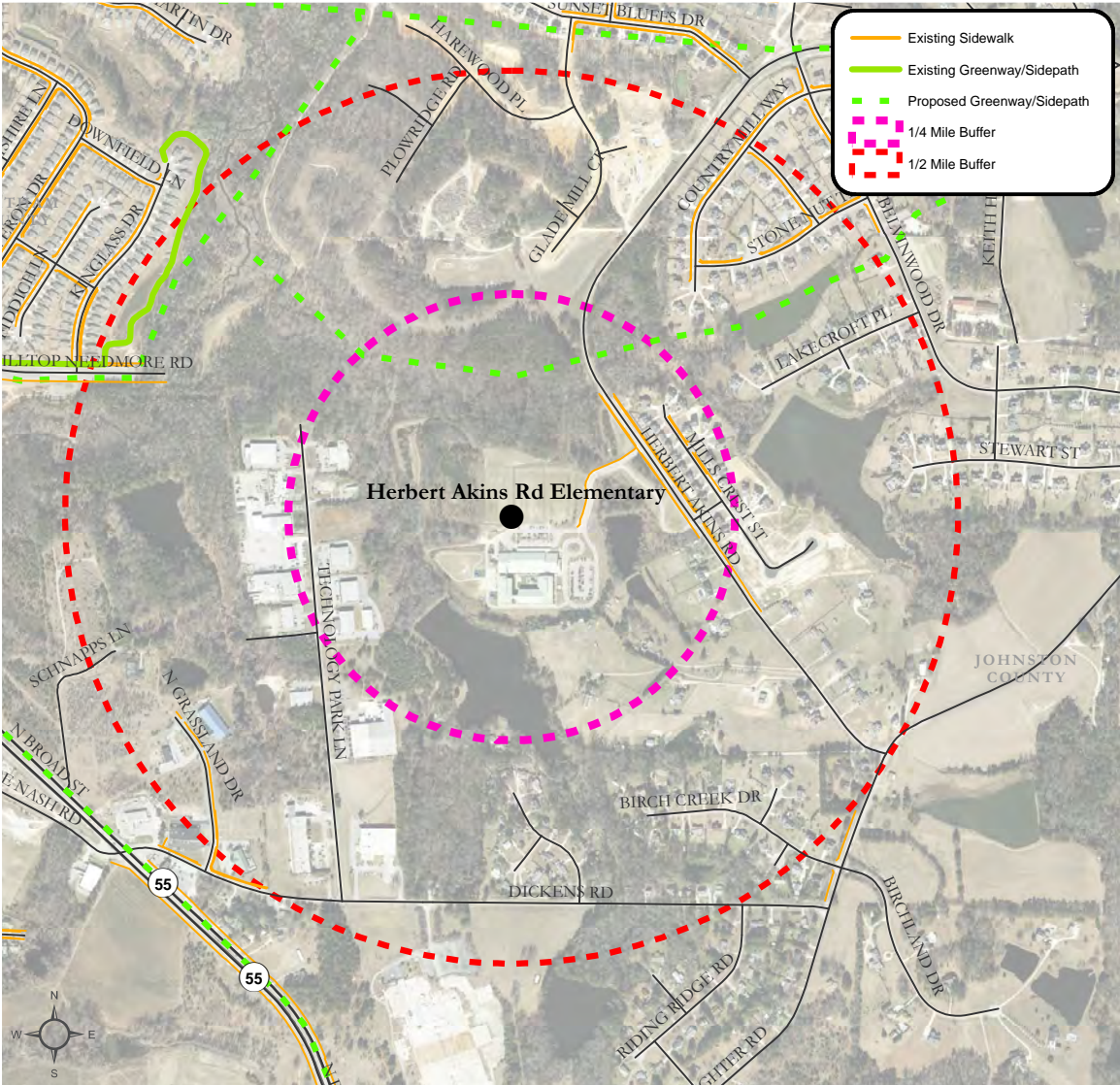
Sidewalks are present within the school site, yet a full connection is not available on the west side of the school as well as the south. Recent work has been completed at many of the intersections to install pedestrian signals and high visibility crossings. Two pedestrian accidents have been reported along Woodrow Street by the school.

Summary of Recommendations

Work should continue along at intersections adding pedestrian signals where appropriate, crosswalks, and accessibility compliant ramps. Additional sidewalks are needed along Woodrow St, Raleigh St, Ennis St, Falcon Dr and Jones Street. Bicycle racks should be included on school property.

Map ID No.	Recommendation	Cost
1	Sidewalks along Falcon Dr	\$208,000
2	Sidewalks along Woodrow St	\$787,000
3	Sidewalks along Raleigh St and Aiken St	\$228,000
4	High Visibility Crosswalks along Raleigh St	\$10,000
5	Crosswalk	\$770

Herbert Akins Road Elementary School



Southern entrance to Herbert Akins Road Elementary School



Herbert Akins Road Elemenentary School Site



Address: 2255 Herbert Akins Road, Fuquay-Varina

Grade Levels: K-5

Current Enrollment: 1,044

Capacity: 1,078

Arrival / Dismissal Times: 9:15am / 3:45pm

Identified Concerns

Herbert Akins Road Elementary is located in a rural Fuquay-Varina. Residential development is occurring in the immediate area. In 2017, a residential development opened across the street recently from the school and for the first time, the school has student walkers for the 2018-2019 school year. Sidewalks are limited in the area and found mainly in new development and on school property. Vacant land is located within 1/2 mile of the property that is ripe for development. As the area grows, the amount of traffic in the area increases and walkers and cyclists are more prone to face dangerous situations.

Summary of Recommendations

Additional sidewalk are needed along Herbert Akins Road. Future roadways and development in the area should be equipped with a complete sidewalk network. Pedestrian beacon motion signs are recommended at the crossing from Mill Ridge South subdivision to the school. Safety programs are strongly encouraged for Herbert Akins as it is new to having additional modes of travel to and from school.

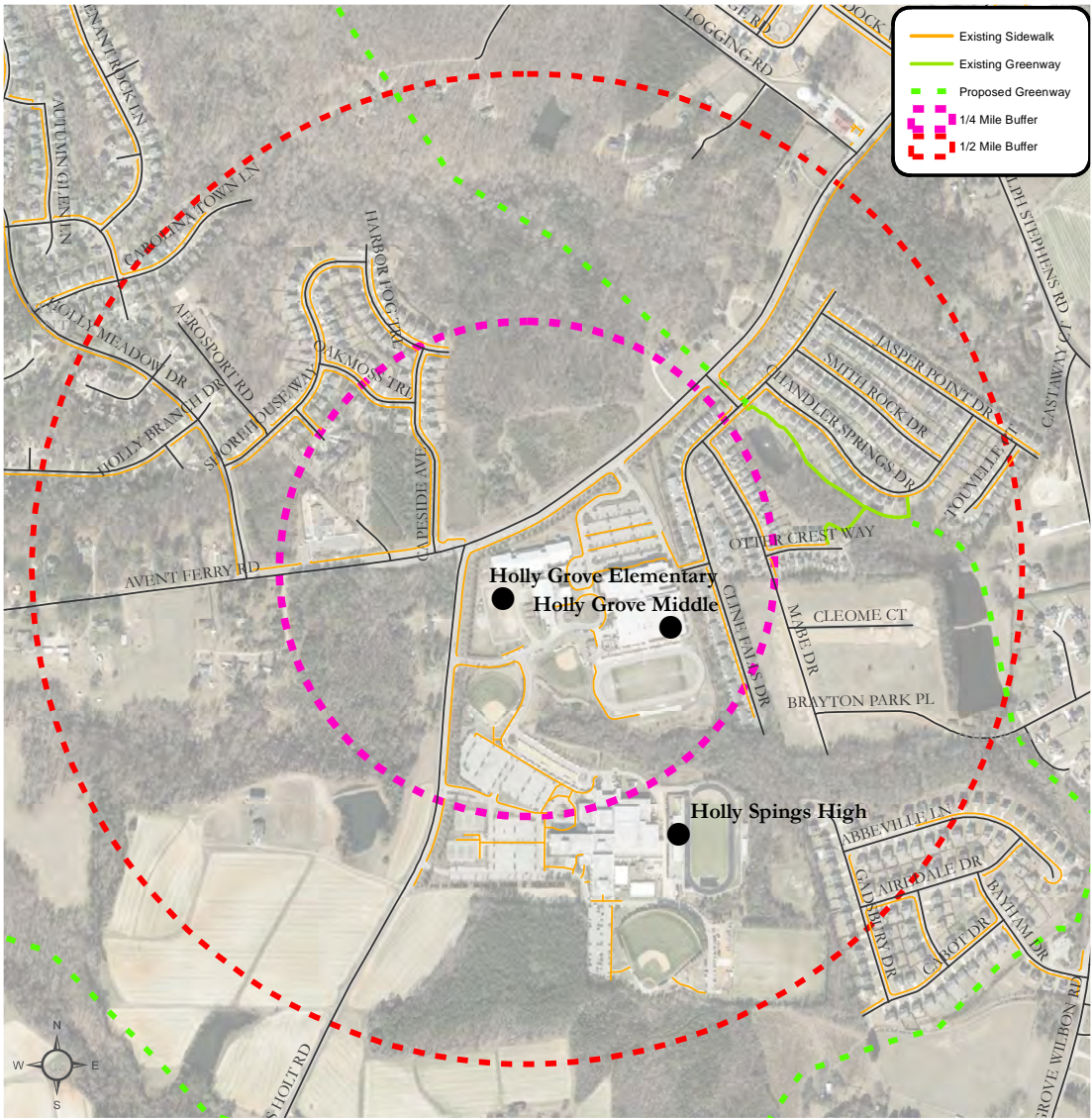
**Map ID
No.**

Recommendation

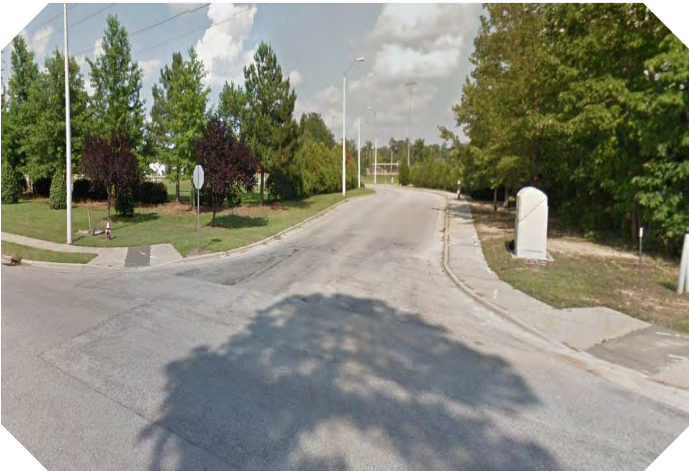
Cost

1	Flashing beacon motion signs	\$20,000
2	Off-road path connecting two neighborhoods	\$25,800
3	Sidewalks along Herbert Akins Rd	\$1,100,000

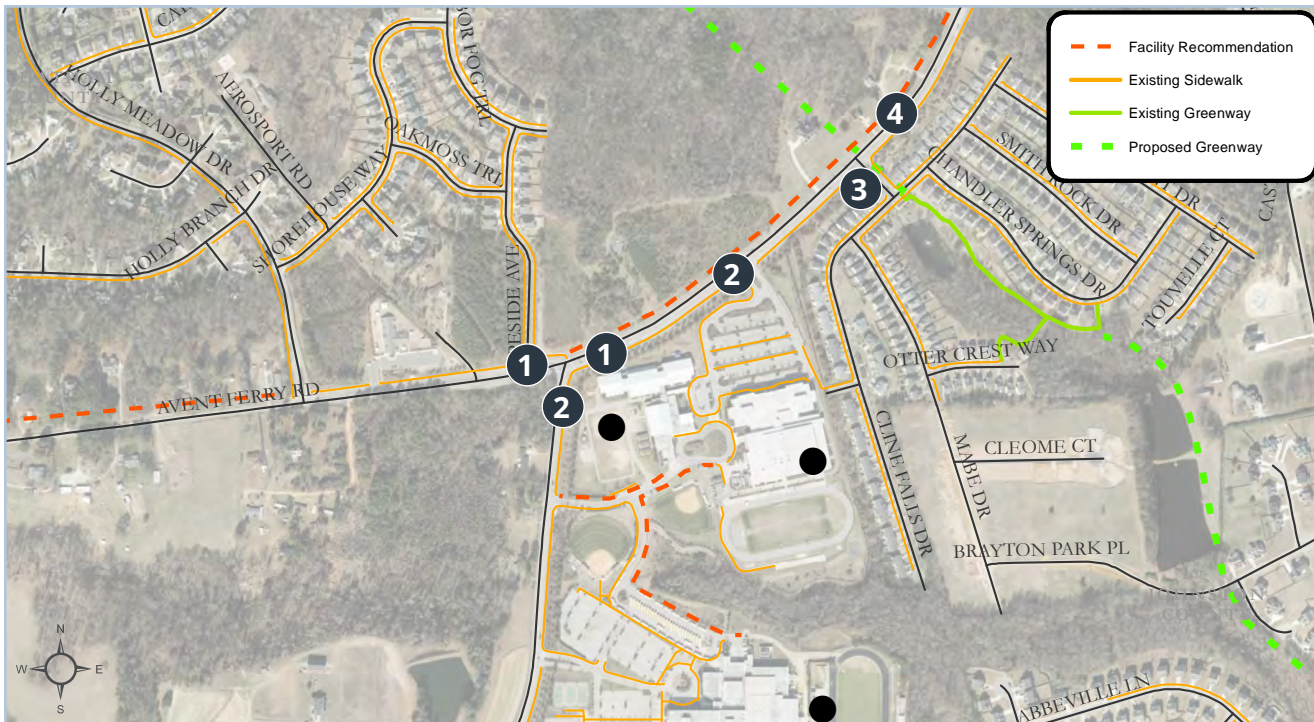
Holly Grove Elementary / Middle & Holly springs High School



Holly Grove Middle at Avent Ferry Road



Holly Grove Elementary Entrance at Cass Holt Road



Address: 1451 Avent Ferry Rd, Holly Grove Elementary & Middle / 5329 Cass Holt Rd, Holly Springs High School

Grade Levels: K-5- Elementary / 6-8 - Middle / 9-12 - High

Current Enrollment: 1,143-Elementary / 1,595-Middle / 2,103-High

Capacity: 963 -Elementary / 1,623-Middle / 1,735-High

Arrival / Dismissal Times: Elementary - 9:15am / 3:45pm Middle - 8:15am / 3:00pm

Identified Concerns

Holly Grove Elementary, Middle, and Holly Springs High School are located within the same parcel at the intersection of Cass Holt Rd and Avent Ferry Rd. Previous surveys completed by Wake County Active Routes to School identifies needs from parents and staff including more sidewalks, crossing guard needs and the amount of traffic on Avent Ferry Rd makes walking and biking unsafe. Officials from Holly Springs Planning Department noted a large amount of trips made daily to the school sites for carpool. Sidewalks are primarily located near the school site and only on one side of Avent

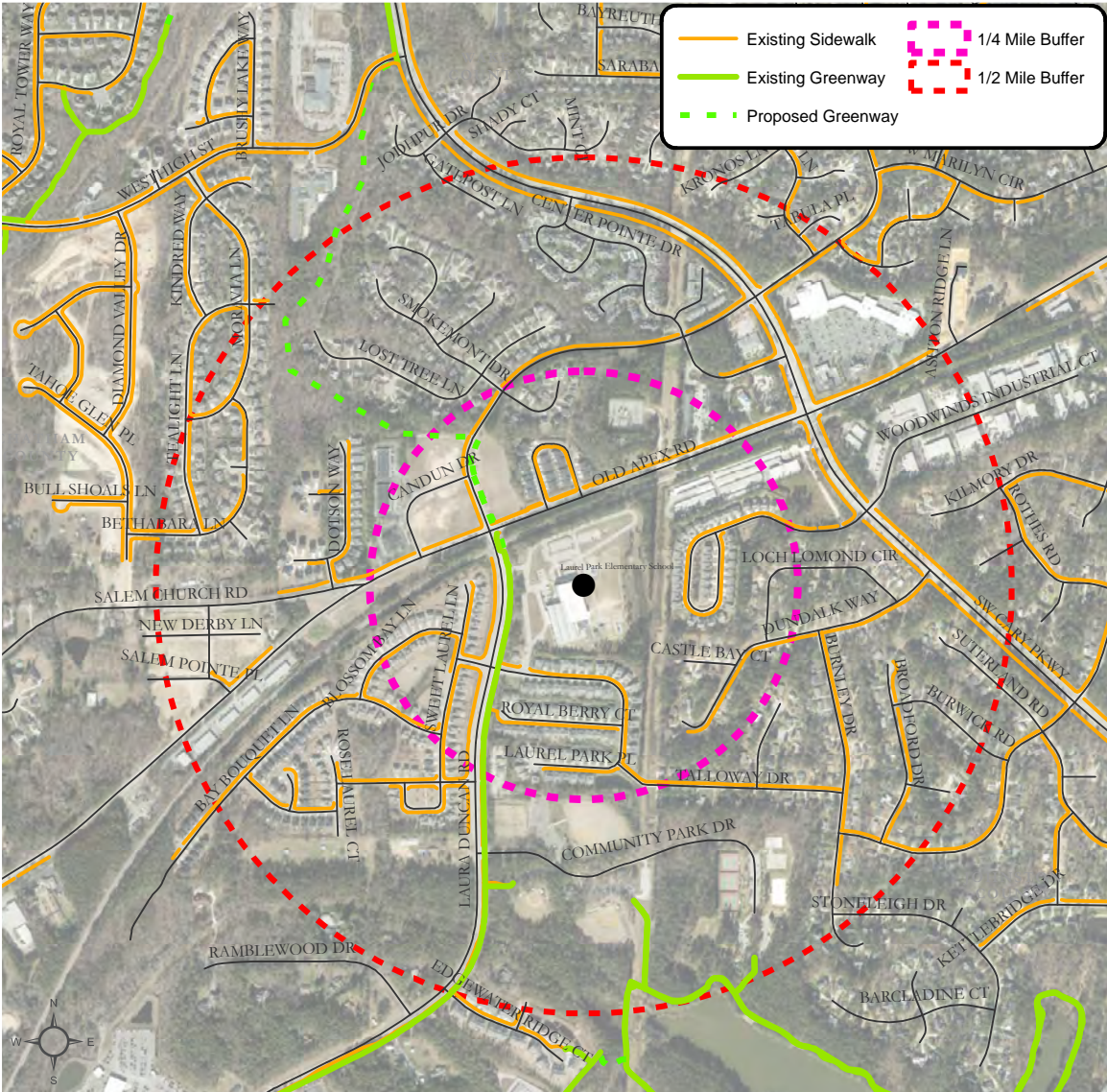
Ferry Rd and Cass Holt Rd. Crosswalks are lacking at school driveways. Sidewalk paths on school property should provide full connectivity from all entrances to school doors.

Summary of Recommendations

Additional sidewalks are needed along corridors as well as on school property. Driveways on school property should include high visibility sidewalks. Safety programs are encouraged with students and to encourage more walking and biking.

Map ID No.	Recommendation	Cost
1	Flashing beacon motion signs	\$20,000
2	High visibility crosswalks	\$5,000
3	Crosswalk at Autumn Park Ave	\$770
4	Sidewalk along Avent Ferry Rd	\$857,000

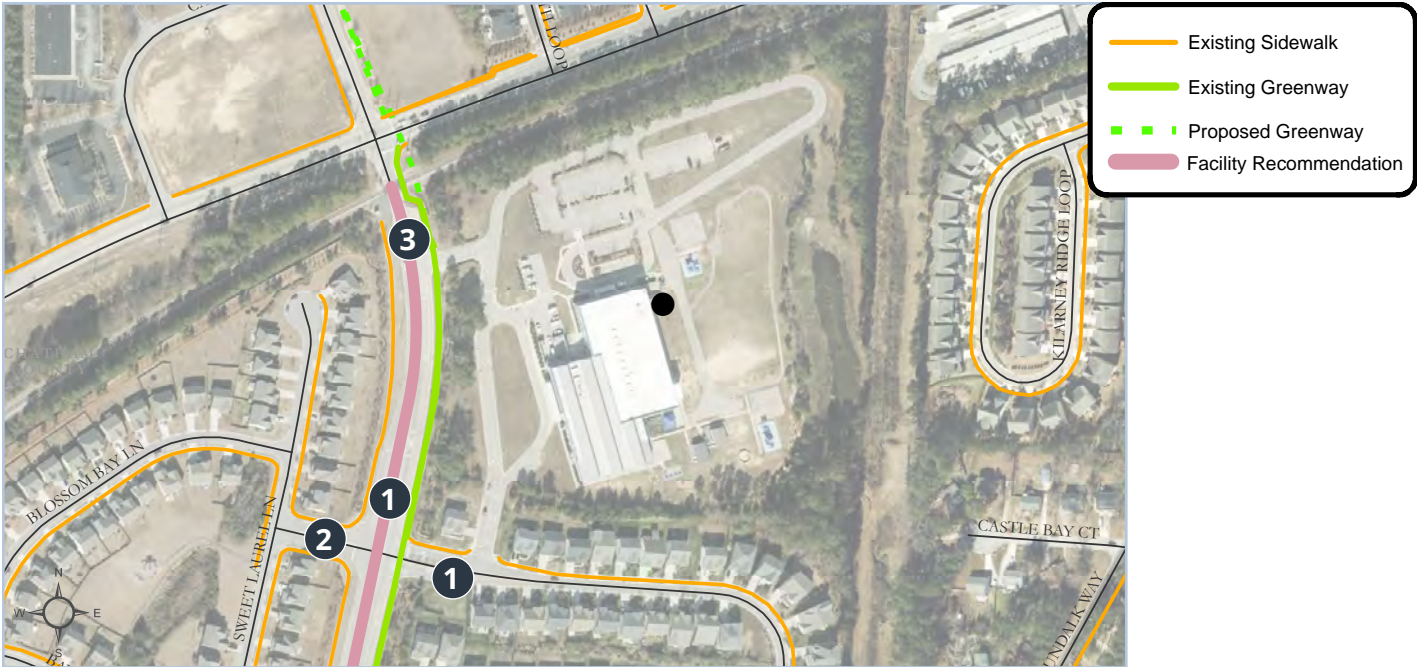
Laurel Park Elementary School



Laurel Park Elementary at Laura Duncan Road



Laurel Park Elementary Entrance at Laurel Park Place



Address: 2450 Laura Duncan Rd, Apex
Grade Levels: K-5
Current Enrollment: 962
Capacity: 986
Arrival / Dismissal Times: 9:15am / 3:45pm

Identified Concerns

Laurel Park Elementary is located in a heavily developed residential area of Apex. Laura Duncan Rd is a thoroughfare connecting to Old Apex Rd. A major concern for students and residents in the area is the difficult challenge of crossing Laura Duncan Rd. As vacant land continues to develop in the area, additional traffic in the area will impact continued problems for school traffic. A student was involved in a pedestrian crash in 2017 leaving school walking home.

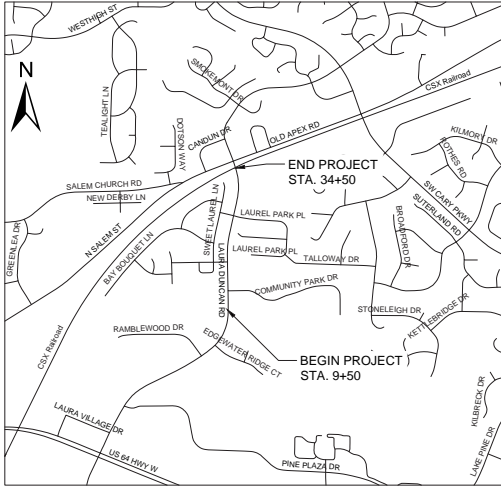
Summary of Recommendations

A concrete median is recommended along Laura Duncan Rd to provide refuge for pedestrians crossing the roadway. An increase in curb-radii at the intersection of Laura Duncan Rd and Laurel Park Pl by the school entrance will provide a

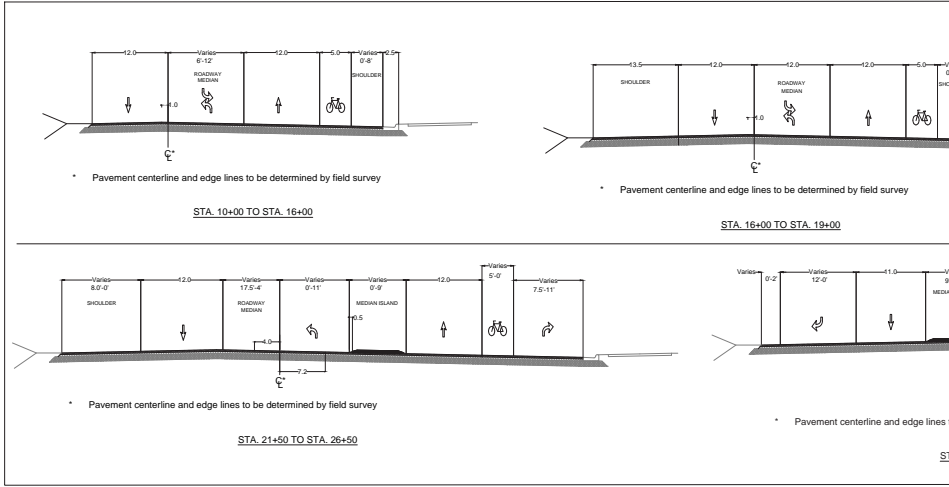
safer place for pedestrians to cross. High visibility crosswalks should be included at all intersections adjacent to the school as well as flashing beacon motion pedestrian crossing signs on Laura Duncan Rd. Bicycle lanes are also recommend to provide a safe, separate area for cyclists to travel. During the Plan development discussions were held with Town of Cary Planning staff, Apex Police Department, Apex Planning staff and Planning staff with Wake County Public schools to understand the needs and to share ideas on the recommendations for improvements by the school. Additional design features may include: moving the bike lanes against the curb and gutter and use the variable width space between the bike lane and lane as a buffer, proposed crosswalk at Wine Berry Rd. *This design is still in draft design stage and final design is subject to change.*

Map ID No.	Recommendation	Cost
1	High visibility crosswalks	\$5,000
2	Crosswalk	\$750
3	Re-design including bike lanes, medians, restriping (see following page)	\$554,000

PROJECT LOCATION MAP



TYPICAL SE



* Pavement centerline and edge lines to be determined by field survey

STA. 19+00 TO STA. 21+50

to be determined by field survey

STA. 26+50 TO STA. 31+50

* Pavement centerline and edge lines to be determined by field survey

STA. 31+50 TO STA. 35+00

PLAN VIEW SCALE: 1" = 50'

TYPICALS SCALE: 1" = 8'

LAURA DUNCAN ROAD

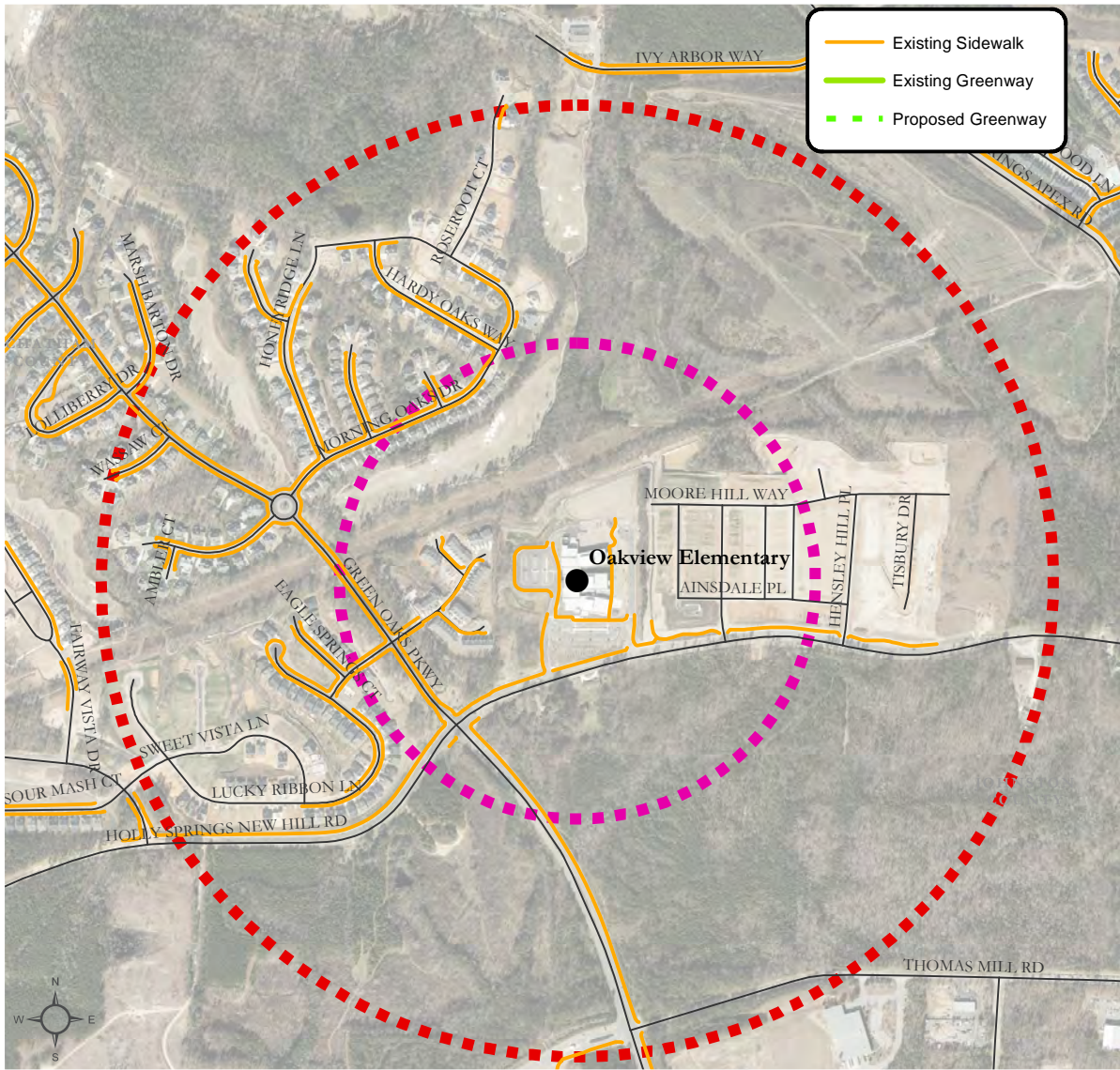
PEDESTRIAN CROSSWALK AND PAVEMENT RESTRIPING PLAN

TOWN OF APEX
PUBLIC WORKS & TRANSPORTATION
ENGINEERING DIVISION
73 HUNTER STREET
APEX, NC 27502
919-249-3417

DRAFT



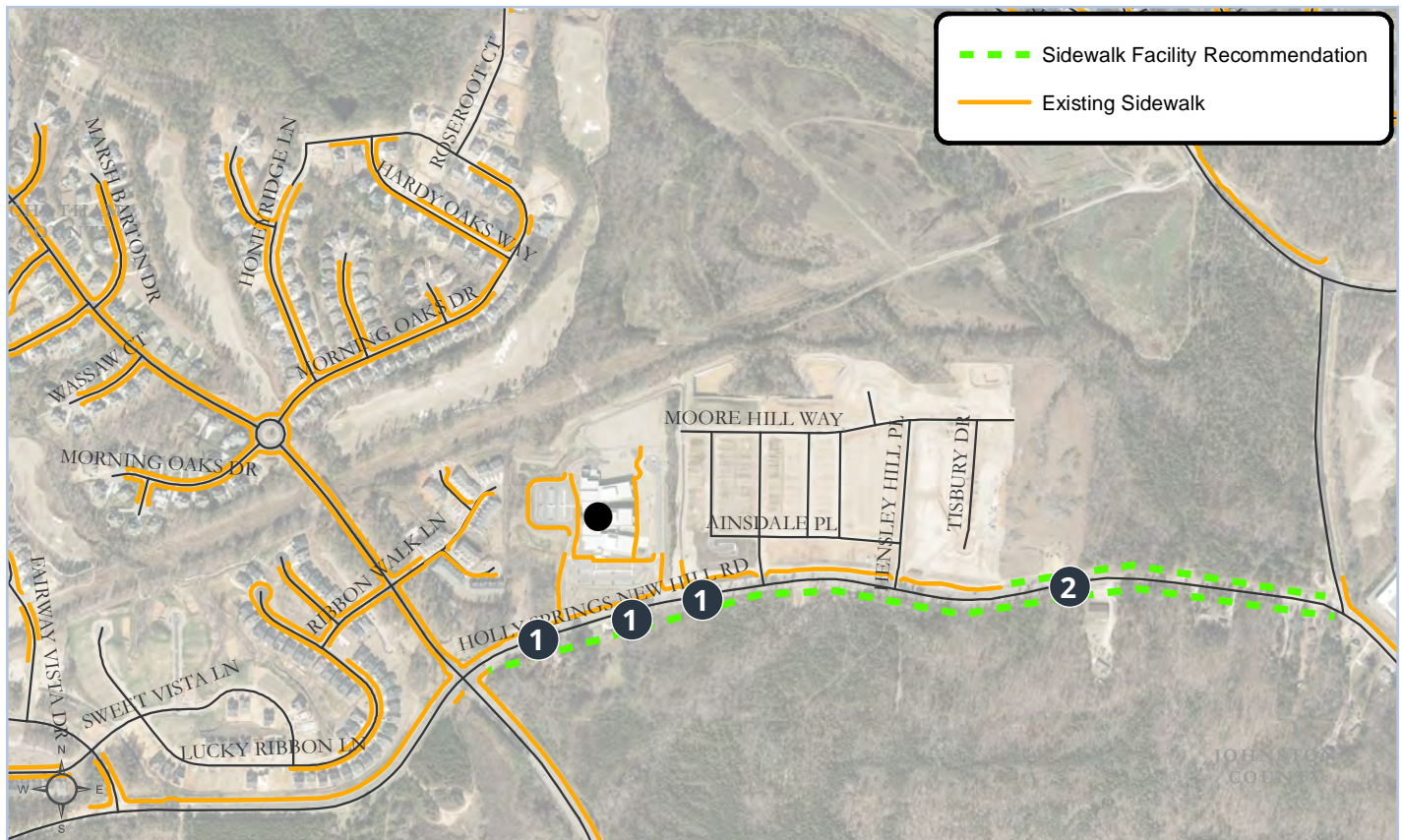
Oakview Elementary School



Oakview Elementary west entrance on Holly Springs New Hill Rd



Oakview Elementary east entrance on Holly Springs New Hill Rd



Address: 11500 Holly Springs New Hill Rd, Apex

Grade Levels: K-5

Current Enrollment: 698

Capacity: 872

Arrival / Dismissal Times: 9:15am / 3:45pm

Identified Concerns

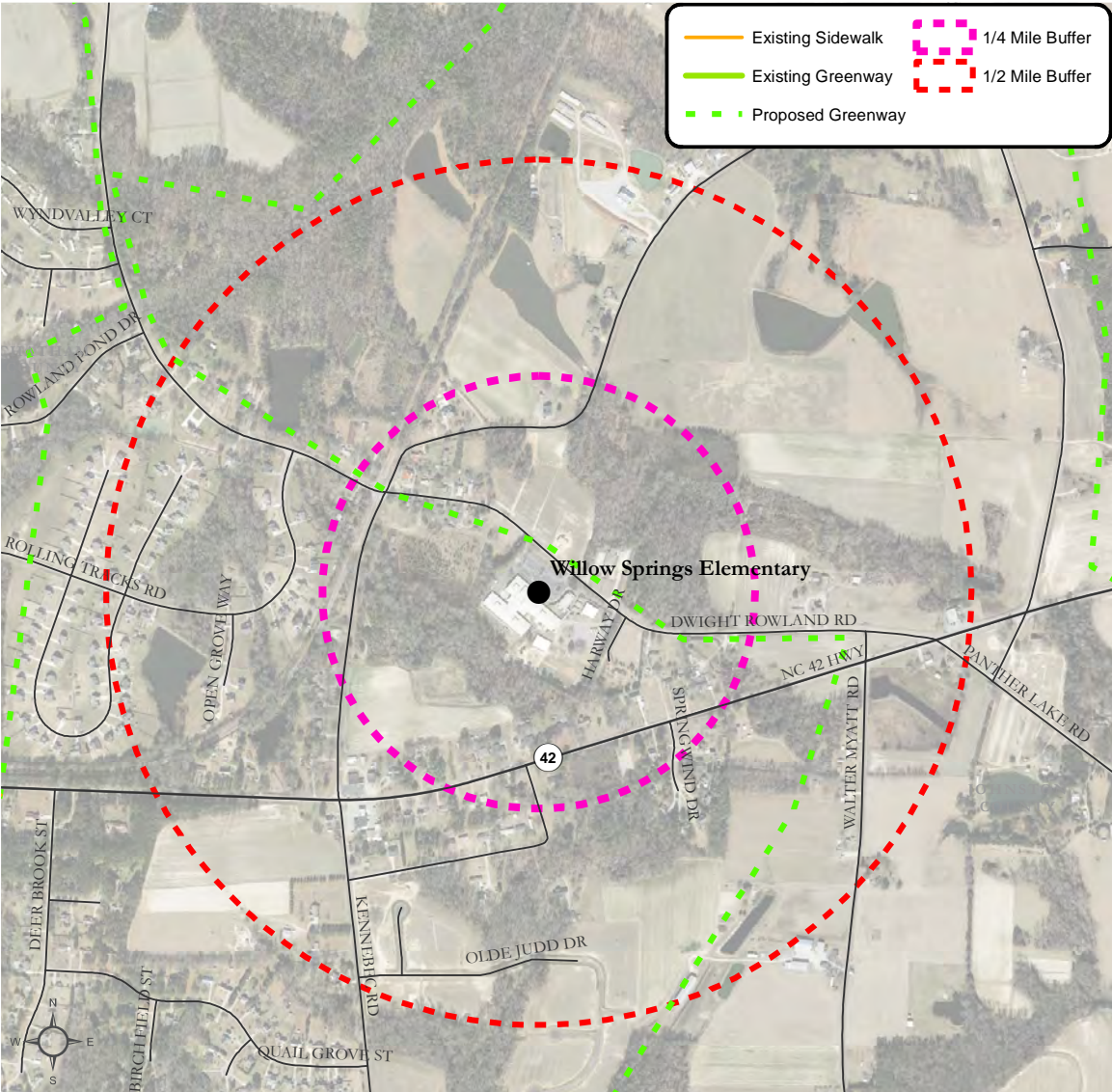
Oakview Elementary opened in 2017. Around 9% of the school population walks to bikes to school currently and enter the school from two directions. School administration noted additional crosswalks are needed on both sides. Crosswalks are present at driveways of the school property but are not high visibility.

Summary of Recommendations

Crosswalk on school property should be converted to high visibility. Safety programs are strongly encouraged for Oakview as the potential of additional walkers and bikers can increase each school year. If future development occurs on New Hill Rd, high visibility crosswalks and flashing beacon motion signs are recommended.

Map ID No.	Recommendation	Cost
1	Flashing beacon motion signs	\$30,000
2	Sidewalks along New Hill Rd	\$1,000,000

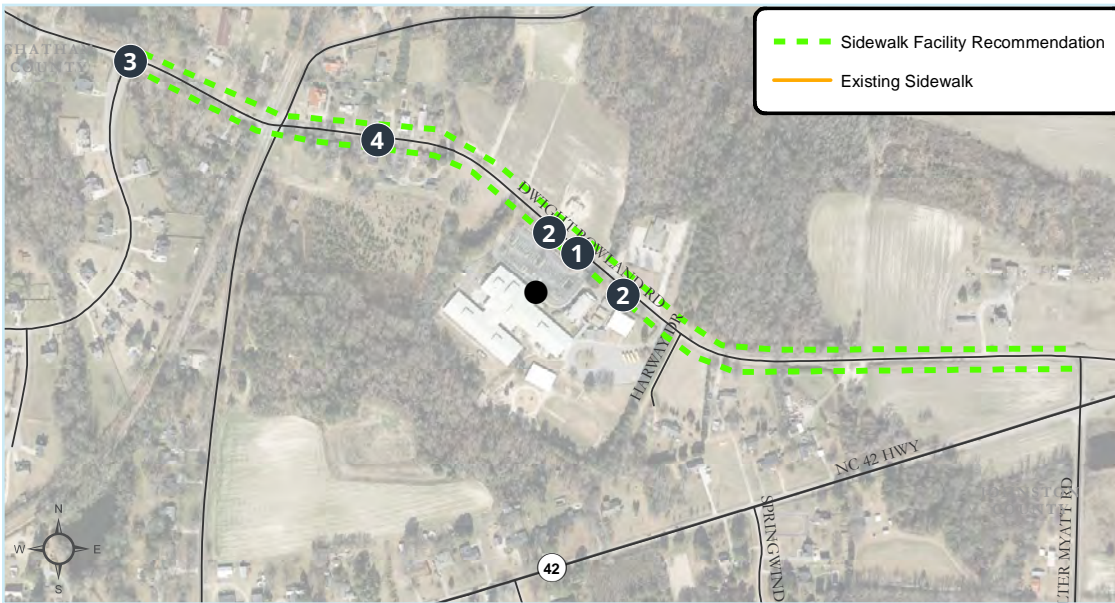
Willow Springs Elementary School



Willow Springs Elementary main entrance



Willow Springs Elementary bus entrance



Address: 6800 Dwight Rowland Rd, Willow Spring
Grade Levels: K-5
Current Enrollment: 1,070
Capacity: 744
Arrival / Dismissal Times: 9:15am / 3:45pm

Identified Concerns

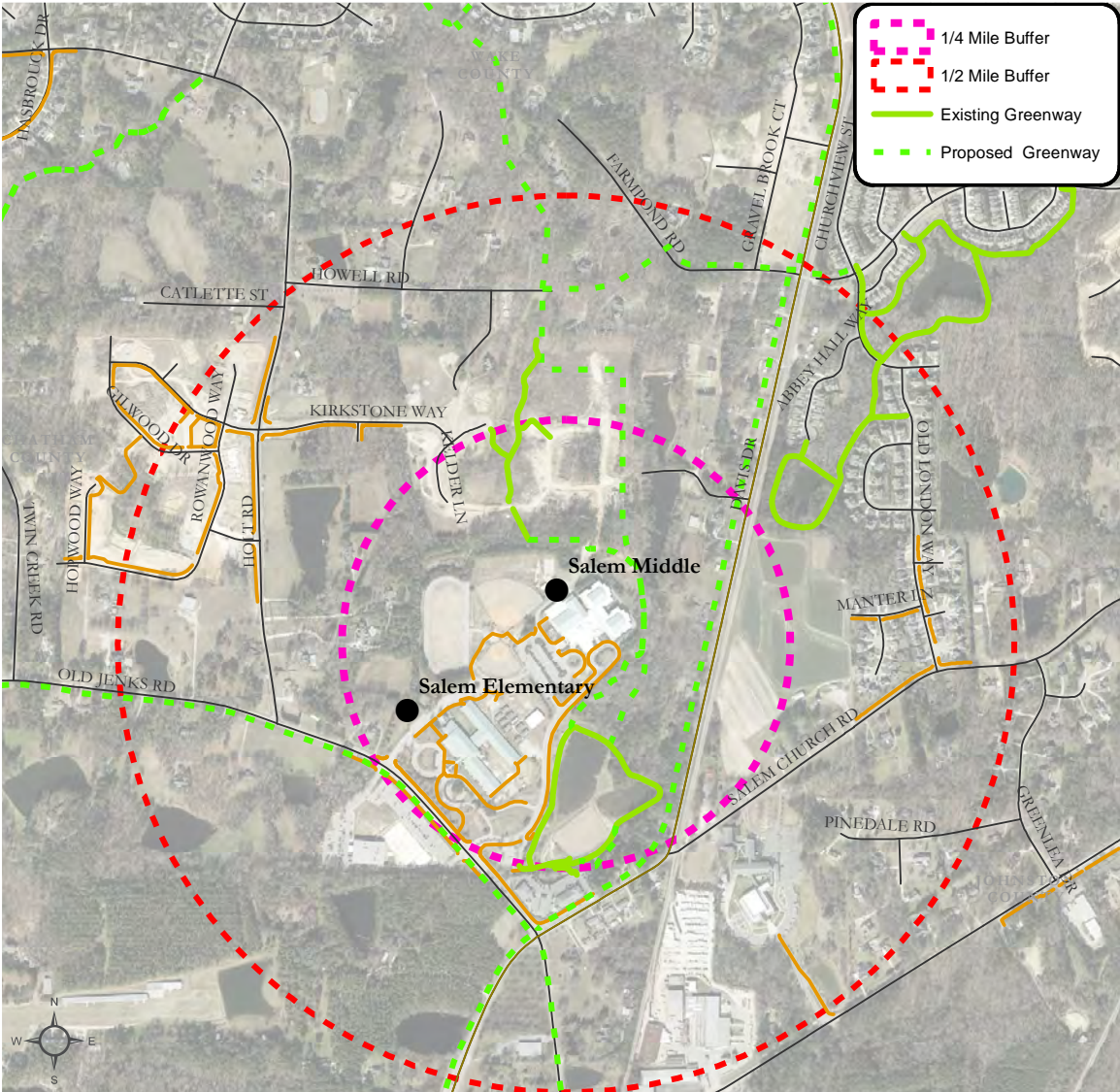
Willow Springs Elementary is located in rural southern Wake County. Development is occurring in the area at a high rate. The area lacks sidewalks. Sidewalks on school property are present but do not provide access to Dwight Rowland Rd. Crosswalks are missing from the driveways on school property as well as accessibility ramps. Tracts of undeveloped land within 1/4 mile are currently being developed or have the opportunity for development in the near future. A railroad crossing is located less than 1/4 mile from the school.

Summary of Recommendations

Sidewalks are needed along Dwight Rowland Rd on both side of the road and provide a connection to the sidewalks on school property. When development occurs on Dwight Rowland Rd, flashing beacon motion signs are recommended for safe crossing from the school property. Railroad track improvements are needed to improve pedestrian and cyclist crossing.

Map ID No.	Recommendation	Cost
1	High visibility crossings at school driveway and across the Dwight Rowland Rd	\$5,000
2	Flashing beacon motion signs	\$20,000
3	Crosswalks at Rolling Track Rd and Dwight Rowland Rd	\$1,500
4	Sidewalks along Dwight Rowland Rd (both sides)	\$3,000,000

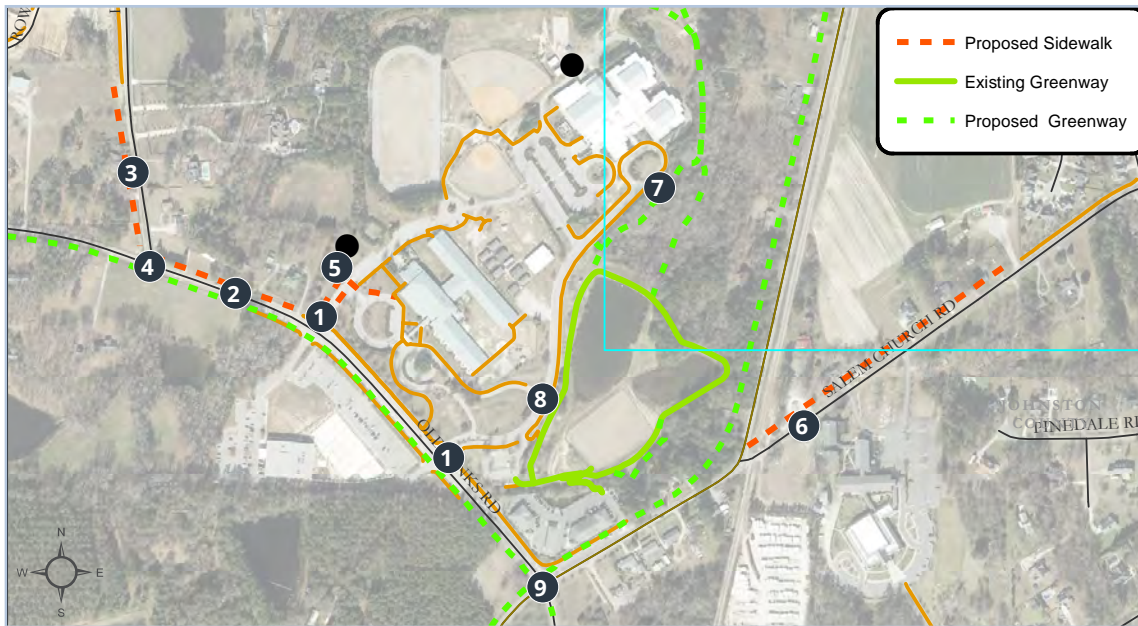
Salem Elementary / Salem Middle



North Entrance of Salem School Property from Old Jenks Rd



Old Jenks Rd at Hope Chapel across from school site



Address: 6150 Old Jenks Road Apex 27523

Grade Levels: Elementary - K-5 Middle - 6-8

Current Enrollment: Elementary -588 Middle - 1,110

Capacity: Elementary - 843 Middle - 1,215

Arrival / Dismissal Times: Elementary - 9:15am / 3:45pm Middle - 8:15am / 3:00pm

Identified Concerns

Salem Elementary and Middle School are located within the same parcel. Sidewalks are present in the area and are primarily found near the school grounds. The existing sidewalks do not provide a full connection to nearby residential areas. Both entrances to the school property lack crosswalks.

Summary of Recommendations

High visibility crosswalks should be added to both the entrances of school property. The proposed

greenways and multi-use paths in the area will provide safe routes for walkers and bikers. Additional sidewalks and crosswalks along Holt Rd and Old Jenks Rd are recommended to provide a full connection along both sides of the roadway along the perimeter of the school. Conversations were held with the Principal of Salem Elementary, Apex Planning staff and Wake County Schools Planning staff to define the problems with travel to and from the school and review the recommendations.

Map ID No.	Recommendation	Cost
1	Crosswalks across both entrances of school property	\$2,250
2	Sidewalk along Old Jenks Rd between school and Holt Rd	\$111,000
3	Sidewalk along west side of Holt Rd	\$115,000
4	Crosswalk at Old Jenks Rd and Holt Rd	\$750
5	Sidewalk from Old Jenks Rd on school property to front door	\$111,000
6	Sidewalk along Salem Church Rd	\$228,000
7	Greenway connection from school to Middleton Subdivision	\$400,000
8	Additional crosswalk and crosswalk improvement	\$1,500
9	Intersection crosswalks across Davis Dr at Old Jenks Rd	\$5,000

Overweight and Obesity Among Children and Adolescents in North Carolina

Fact Sheet

What are overweight and obesity?

- Overweight and obesity are conditions that result from excess body fat and/or abnormal body fat distribution.
- For children and adolescents, the amount of body fat is usually estimated by using weight and height to calculate a number called the body mass index (BMI). For a child and teen BMI calculator, visit nccd.cdc.gov/dnpabmi/Calculator.aspx. BMI is not a direct measure of body fat, but it is a reasonable indicator of the amount of body fat for most children and adolescents.
- Overweight and obesity in children and adolescents are generally defined using an age- and sex-specific percentile for BMI rather than the BMI categories used for adults because children's body composition varies with age and between boys and girls.

After a child or adolescent's BMI has been calculated from his/her weight and height, it is compared to a standard growth chart to determine the percentile in which his/her BMI falls and his/her weight status. Standard growth charts are derived by aggregating the BMI of thousands of children and adolescents according to age and sex. For standard growth charts used by the Centers for Disease Control and Prevention (CDC), visit www.cdc.gov/growthcharts/cdc_charts.htm. Table 1 shows how BMI-for-age and sex percentile is generally used to classify weight status for children and adolescents.

Table 1. Classification of weight status by BMI-for-age and sex percentile for children and adolescents

Body Mass Index (BMI)-for-age and sex percentile	Weight Status
Below 5	Underweight
5 to less than 85	Healthy weight
85 to less than 95	Overweight
95 or higher	Obese

Created based on information from www.cdc.gov/obesity/childhood/basics.html.

- A variety of factors play a role in overweight and obesity including: behavior, environment, genetics, some health conditions, medications, psychological factors, culture, socioeconomic status and others.

How many children and adolescents are overweight or obese?

- North Carolina has the 27th highest overweight and obesity rates among children age 10 to 17 in the nation.¹
- About one in three (31%) high school students in North Carolina are either overweight or obese.²

- Among North Carolina children ages 2–4 who participate in the Supplemental Nutrition Program for Women, Infants and Children (WIC), the prevalence of overweight and obesity is 31%.³



3 out of 10 children age 10 to 17 in North Carolina are either overweight or obese.

What are the complications of obesity?

- Overweight or obesity in children and adolescents increases the risk of several conditions including:
 - Hypertension (high blood pressure).
 - Hyperlipidemia including high cholesterol.
 - Abnormal glucose tolerance including type 2 diabetes.
 - Liver and gallbladder disease, sleep apnea, asthma and other respiratory problems.
 - Joint, muscle and bone problems.
 - Social and psychological problems (e.g., discrimination, poor self-esteem).
- Overweight or obese children and adolescents are more likely to become severely overweight or obese adults. For more information about overweight and obesity in adults, visit communityclinicalconnections.com/Data.

What are the risk factors for overweight and obesity?

- The basic cause of overweight and obesity is calorie (energy) imbalance whereby calorie intake is greater than calorie use. Consequently, diet (calorie intake) and physical activity (calorie use) are major determinants of overweight and obesity.
- Time of onset, duration and exclusivity of breastfeeding, as well as consumption of sugar-sweetened beverages and television viewing and screen time are also important risk factors for overweight and obesity in children and adolescents.
- Environments that lack places for physical activity or have limited access to healthy food options also contribute to overweight and obesity. For example, a child or adolescent's ability to be physically active may be limited because he or she doesn't have access to convenient, safe places to play.
- In certain rare disorders, genes can directly cause overweight and obesity. More commonly however, multiple genes may increase one's susceptibility for overweight or obesity but require outside factors, such as excess calorie intake and/or insufficient physical activity, for overweight or obesity to actually develop.

What options are available to prevent or manage overweight and obesity?

- The main objectives for the management of overweight and obesity are gradual and steady weight loss until a healthy weight is achieved, and thereafter, maintenance of a healthy weight. Even modest weight loss may lead to significant health benefits and the prevention or delay of complications.

- Maintaining a healthy diet and engaging in regular physical activity are the underpinnings of any successful weight loss plan. (See Table 3 for detailed physical activity guidelines for children and adolescents.) For general information on physical activity, healthy eating and strategies for healthy weight loss in children and adolescents, please visit

—www.cdc.gov/HealthyYouth/physicalactivity/guidelines.htm.

—cdc.gov/healthyweight.

- **North Carolina's Plan to Address Obesity: Healthy Weight and Healthy Communities: 2013–2020⁴** identifies the following core behaviors to address overweight and obesity in children and adolescents:

- Increase physical activity.
- Increase consumption of fruits and vegetables.
- Decrease consumption of sugar-sweetened beverages.
- Reduce consumption of energy-dense foods.
- Decrease television viewing and screen time.
- Increase breastfeeding initiation, duration and exclusivity.

To learn how strategies related to these behaviors can be applied in eight different community settings, please visit EatSmartMoveMoreNC.com.

- Creating environments that make it easier to engage in physical activity and healthy eating in community, home, child care, school, health care and workplace settings is a proven strategy in controlling overweight and obesity. To learn more about the North Carolina Division of Public Health's efforts to promote environments that foster physical activity and healthy eating, please visit communityclinicalconnections.com/What_We_Do/improve.html.

- In some cases, medication and surgical procedures may be needed to complement lifestyle changes for weight loss.
- Children or adolescents on medications or with health conditions that may lead to weight gain should talk to their health care provider about how to best manage their condition and prevent obesity.

Table 2: Risk Factors for Overweight and Obesity among High School Students, North Carolina, 2017²

Risk Factor	Students
Did not meet physical activity recommendations	77.7%
Spent 3 or more hours per day watching TV	23.1%
Spent 3 or more hours per day playing video games or using computer	41.6%
Drank soda or pop at least once per day	22.3%

Table 3: Key Physical Activity Guidelines for Children and Adolescents

Children and adolescents should do 60 minutes or more of physical activity daily.

Aerobic: Most of the 60 or more minutes a day should be either moderate- or vigorous-intensity aerobic physical activity, and should include vigorous-intensity physical activity at least 3 days a week.

Muscle-strengthening: As part of their 60 or more minutes of daily physical activity, children and adolescents should include muscle-strengthening physical activity on at least 3 days of the week.

Bone-strengthening: As part of their 60 or more minutes of daily physical activity, children and adolescents should include bone-strengthening physical activity on at least 3 days of the week.

It is important to encourage young people to participate in physical activities that are appropriate for their age, that are enjoyable and that offer variety.

Source: www.health.gov/paguidelines/guidelines/chapter3.aspx

REFERENCES

1. Child and Adolescent Health Measurement Initiative. Data Resource Center for Child and Adolescent Health. 2016 National Survey of Children's Health (NSCH) data query. Accessed at: www.childhealthdata.org/browse/survey on March 29, 2018.
 2. Youth Risk Behavioral Survey (High School Survey Results). North Carolina Healthy Schools. Department of Public Instruction and Department of Health and Human Resources. 2017. Accessed at: cdc.gov/healthyyouth/data/yrbs/pdf/2017/ss6708.pdf on July 17, 2018.
 3. Division of Public Health, Nutrition Services Branch. North Carolina Pediatric Nutrition and Epidemiology Surveillance System (NC-PedNESS). 2016 Report produced upon request, July 03, 2018.
 4. Eat Smart, Move More North Carolina Leadership Team. 2013. North Carolina's Plan to Address Obesity: Healthy Weight and Healthy Communities 2013–2020. Eat Smart, Move More NC, Raleigh, NC. Available at: www.EatSmartMoveMoreNC.com.
- In addition to the above references, this fact sheet was developed with heavy reliance on information from the Centers for Disease Control and Prevention website: www.cdc.gov/obesity/childhood/index.html.

If you have any questions about data used in this fact sheet or about healthy eating and physical activity efforts in North Carolina, please email info@eatsmartmovemorenc.com.

For more information on Eat Smart, Move More North Carolina, please visit EatSmartMoveMoreNC.com.



School Encouragement Programs

The Importance of School Encouragement Programs

The recommended improvements on the following pages alone will not create or encourage a health walking and biking environment around schools. A variety of programs should also be implemented to create and support a multi-modal culture. Such a culture has several different characteristics:

- The behavior of people when they are walking and cycling,
- The attitude of motorists in the community towards pedestrians and cyclists, and
- The role of police and other law officials to enforce pedestrian safety.

To address all of these elements, programs are often created to address education, encouragement, and enforcement.

Education programs teach others about safe pedestrian and cycling behaviors, the benefits of choosing alternative modes of travel, 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 alternative modes. Encouragement programs, like education programs, can promote walking and cycling friendly behavior through various activities and incentives. Finally, enforcement programs provide the “teeth” of a safe and legal pedestrian and cycling environment. When law enforcement officers and other officials protect pedestrians and cyclists a clear message is sent that the presence of pedestrians and cyclists is a legitimate and permanent condition in the area’s transportation network. Additional resources for educational and enforcement resources are available at www.pedbikeinfo.org. The education programs teach others about safe travel behaviors, the benefits of walking and cycling, and can assist people in

getting acquainted with their “new” way of travel. It is recommended that the school’s leaders implement programs that fit in the context of the particular culture and needs.

Walk & Bike to School Day

As part of the local Safe Routes to School program, it is recommended that municipalities and counties in SWAS work with community members and local schools to promote an annual or bi-annual Walk and or Bike to School Day; some schools in the study area do this now. This event could be held on National Bike to School Day in May and National Walk to School Day in October and help to kick-off other Safe Routes to School programs by encouraging parents, teachers, students and community members to get involved. More at: www.walkto-school.org and www.biketoschool.org.

Volunteer Organizations

The League of American Bicyclists (LAB) promotes bicycle safety to children and adults nationwide. Volunteers, who have been trained directly or indirectly by LAB instructors, conduct on-site safety clinics that work directly with children to learn hand signals, helmet use, basic bicycle safety checks, and practices that will help them enjoy a safe ride. More information to get started can be found here: www.CAMPO-NC.us and Scott Lane (LAB Certified Master Instructor) at jslanempo@gmail.com.

Safe Routes to School

Safe Routes to School is a national and international movement to enable and encourage children, including those with disabilities, to walk and bicycle to school. Successful Safe Routes to School programs involve the whole community and take a comprehensive approach to improving safety, which benefits all pedestrians and bicyclists.

Through a joint partnership between NCDOT's Safe Routes to School Program and NC Division of Public Health, Active Routes to School Regional Coordinators help to implement Safe Routes to School strategies in partnership with local communities across North Carolina. School safety audits should be conducted with the Active Routes to School Regional Coordinator for each participating school. Information on Active Routes to School is available at www.communityclinicalconnections.com/activeroutes.

