NORTH HARNETT Transit Study

EXECUTIVE SUMMARY REPORT

ADOPTED AUGUST 2025

NC Capital Area Metropolitan Planning Organization

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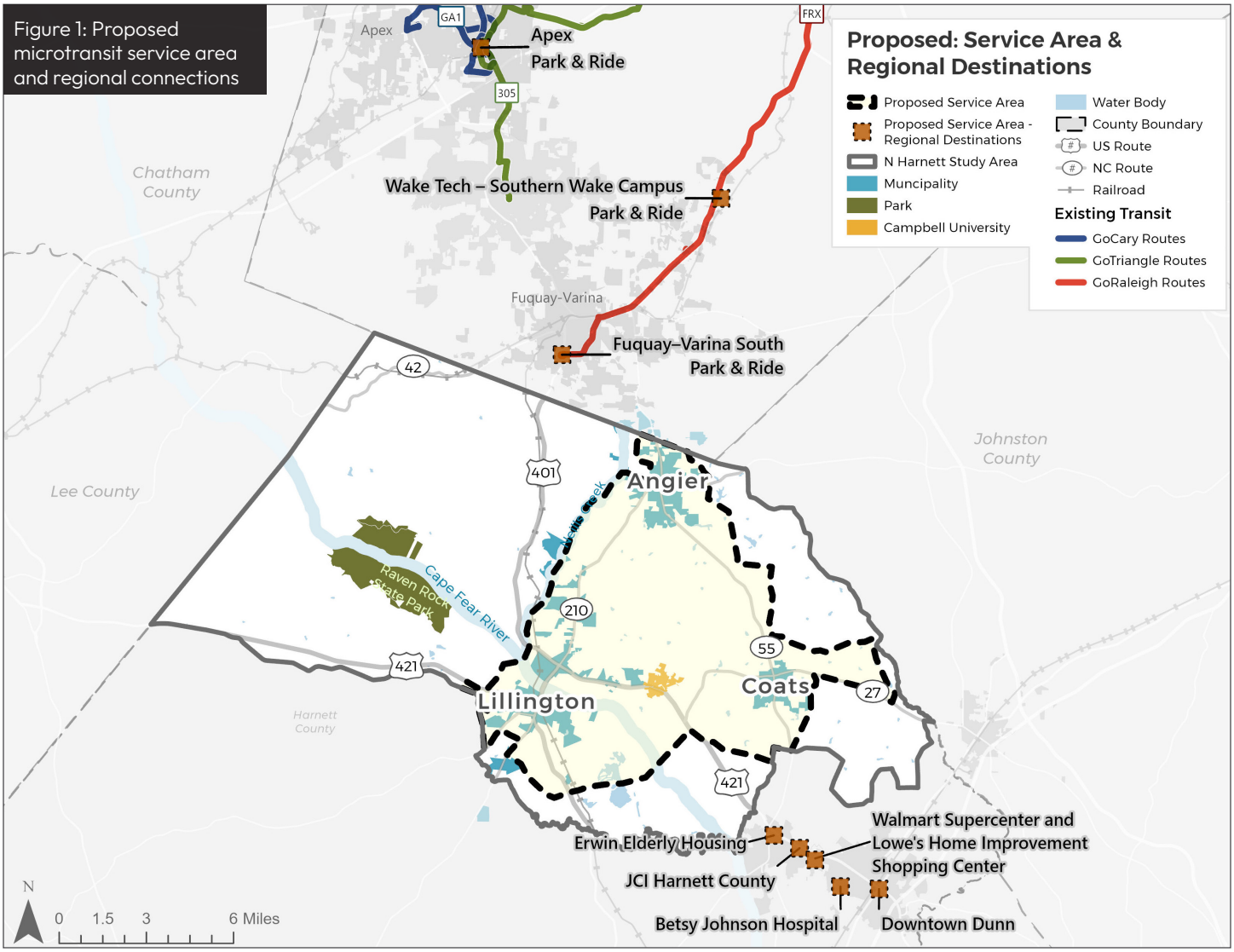
1. EXECUTIVE SUMMARY

- The study area includes the part of Harnett County within Capital Area Metropolitan Planning Organization (CAMPO) boundaries, roughly corresponding to the northern half of the county.
- The study was divided into two phases – the first phase included assessing the demand and desire for transit in the study area – and after the favorable outcome of the first phase, the second phase delved deeper into exploring appropriate service types and developing the final recommendation and implementation plan.
- Curb-to-curb microtransit within the service area **(Figure 1)** with connections to targeted regional access points outside the service area is the recommended service for northern Harnett County.
- Potential to repurpose a portion of the existing fleetof Harnett Area Rural Transit System (HARTS) while using a Software-as-a-Service (SaaS) vendor to facilitate trip requests and fare payment.
- Annual operating costs for this type of service may range from $562,000 to $937,000 (for three to five vehicles respectively) assuming no additional capital cost for vehicles.

Figure 1: Proposed microtransit service area and regional connections



2. STUDY BACKGROUND

Growth in the capital region of North Carolina has continued to extend further out into regions generally regarded as rural. These regions are now witnessing many new residential and commercial developments at a rate never experienced before. Harnett County, located between Raleigh and Fayetteville, is experiencing development induced from both sides of the county. This intensity of growth and the potential for more growth in the near future led the County officials to undertake this study to answer two key questions:

Is there a need and desire amongst the residents and decision-makers to implement transit in Harnett County?

If yes, then what is the appropriate transit service that would suit the needs of the County?

This study was undertaken by Capital Area Metropolitan Planning Organization (CAMPO) at the request of Harnett County. The study area includes the portion of Harnett County within CAMPO's boundaries which roughly corresponds to the northern half of the county as shown in **Figure 2**.

Harnett Area Rural Transit System (HARTS) currently provides paratransit services within and outside the county and is operating at capacity.

This study aims to understand the need and recommend appropriate transit service to complement HARTS' paratransit service.

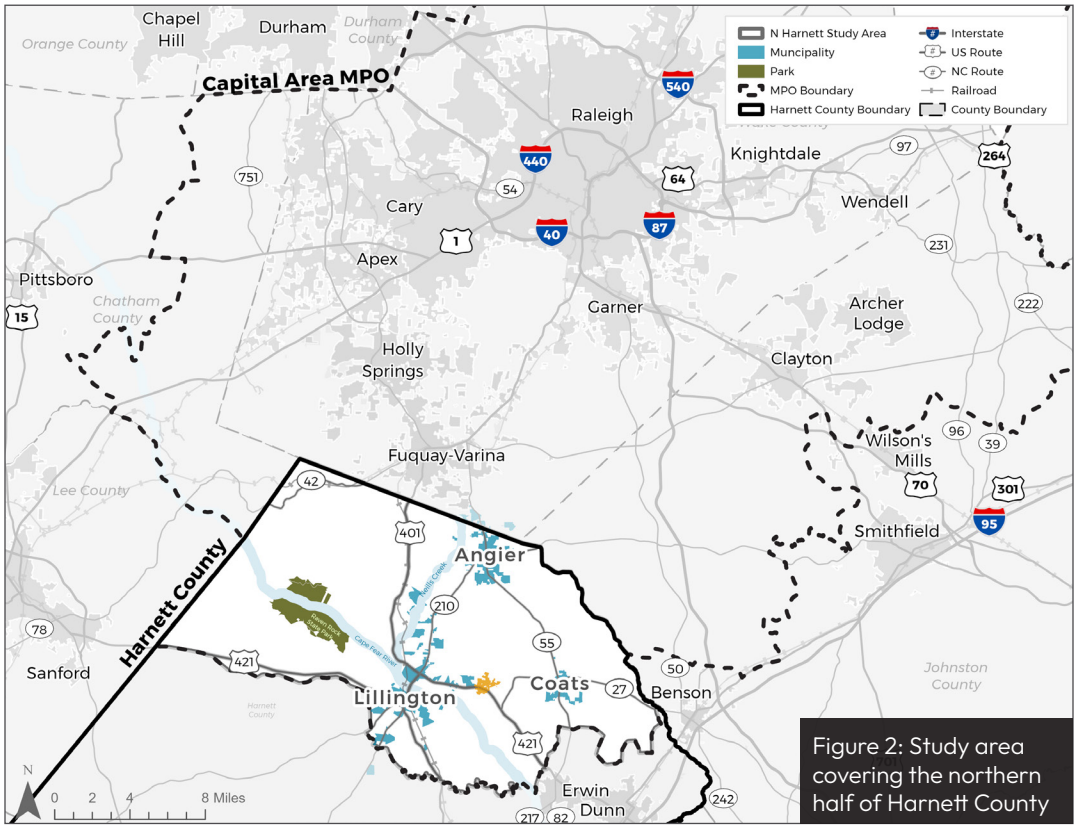
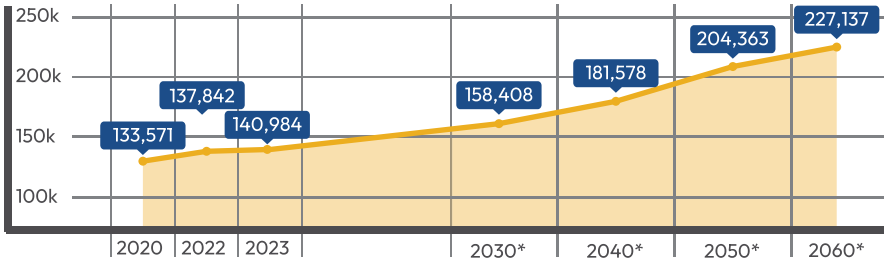


Figure 2: Study area covering the northern half of Harnett County

Figure 3: Harnett County paratransit fleet

Figure 4: Harnett County population



* Projected population

Source: NC Office of State Budget and Management

3. TRANSIT DEMAND ANALYSIS

Demographics

Growth in the capital region of North Carolina has continued to extend further out into regions generally regarded as rural. These regions are now witnessing many new residential and commercial developments at a rate never experienced before. Harnett County, located between Raleigh and Fayetteville, is facing development approaching from both sides.

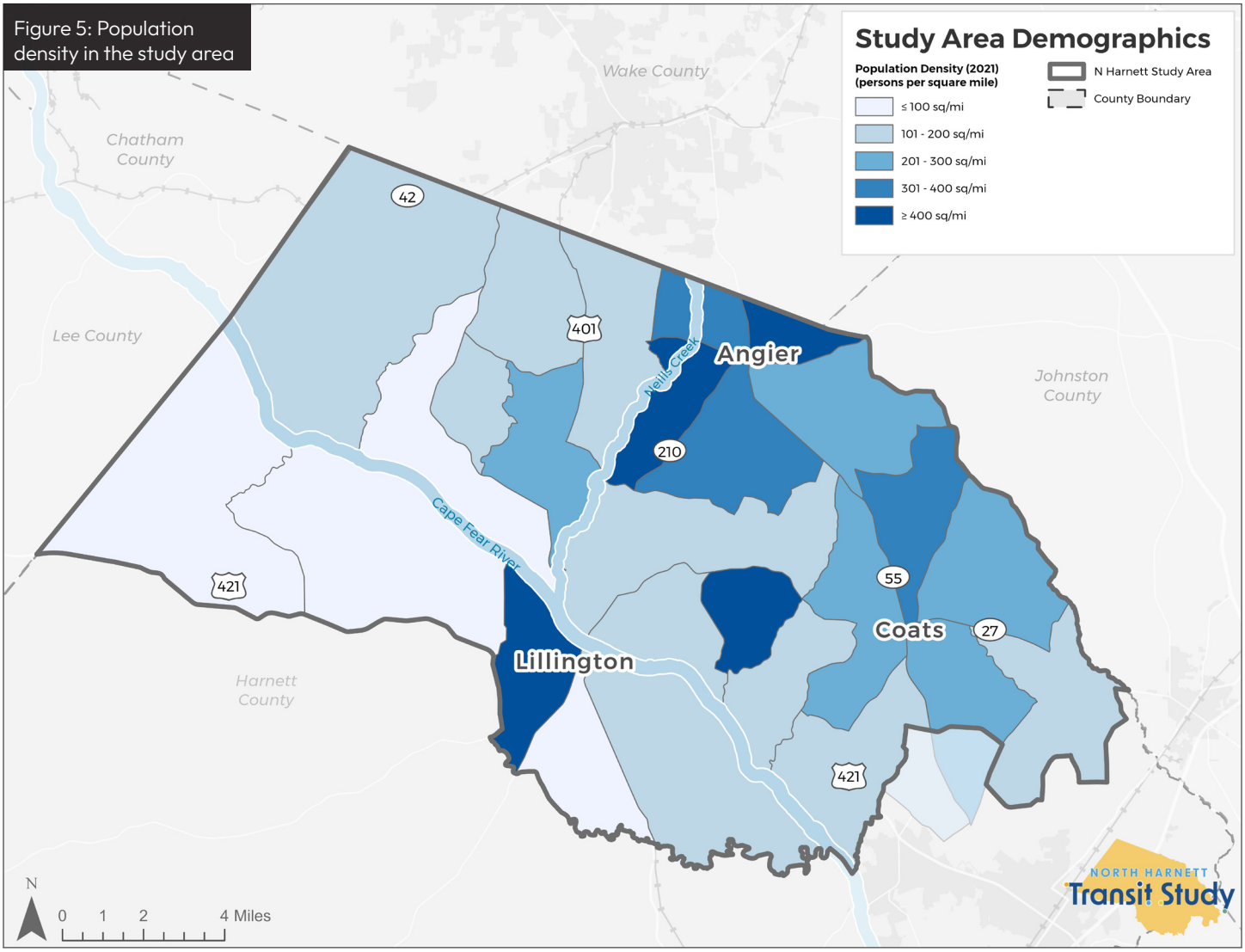
Figure 5 shows population density by Census Block Group (CBG) within the study area. The regions closer to Wake and Johnston Counties have higher overall density than the rest of the study area, except Campbell University and Lillington.

49,442 Total Population

18,471 Total Households	**10%** Car Deficient Household	**20.1%** Youth
18.3% Below Poverty Line	**4.4%** Zero Car Household	**15.2%** Elderly

Source: American Community Survey data (ACS) 5-year estimates from the years 2017-2021 for 26 CBGs within the study area

Figure 5: Population density in the study area

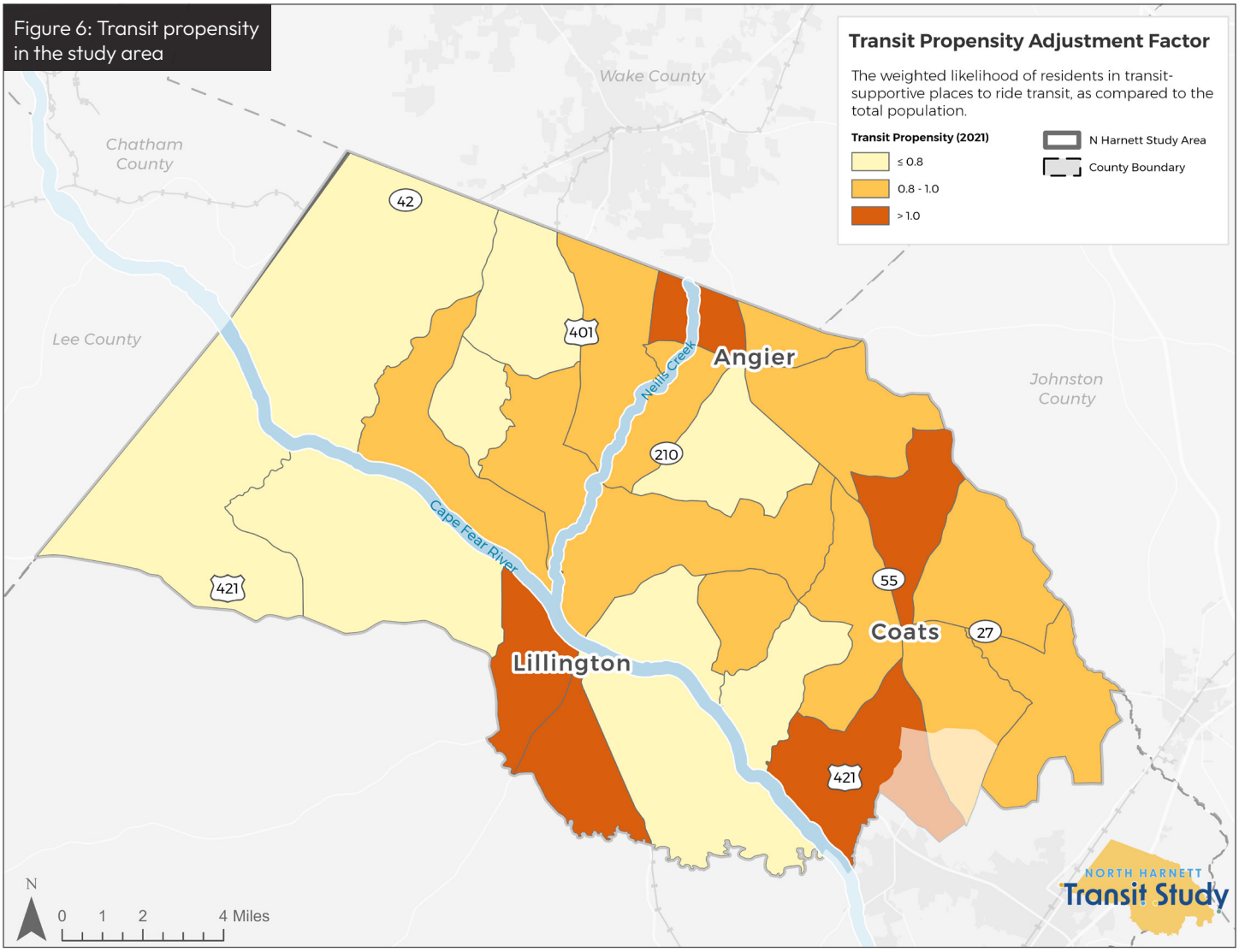


Transit Propensity

Different population groups have different likelihood to ride transit. For example, a person in a household without vehicles is 15.8 times more likely to use transit than an average person (from Wake Transit Plan Vision Update 2020) in the Triangle. The composite likelihood to use transit in a given area is called **transit propensity,** and it is shown in **Figure 6** for the study area. Parts of Lillington, Angier, and Coats have a higher transit propensity than the rest of the study area.

Additional details and explanation of transit propensity are provided in the **Demographic Analysis** section of **Memo 1.**

Figure 6: Transit propensity in the study area



Transportation Market Review

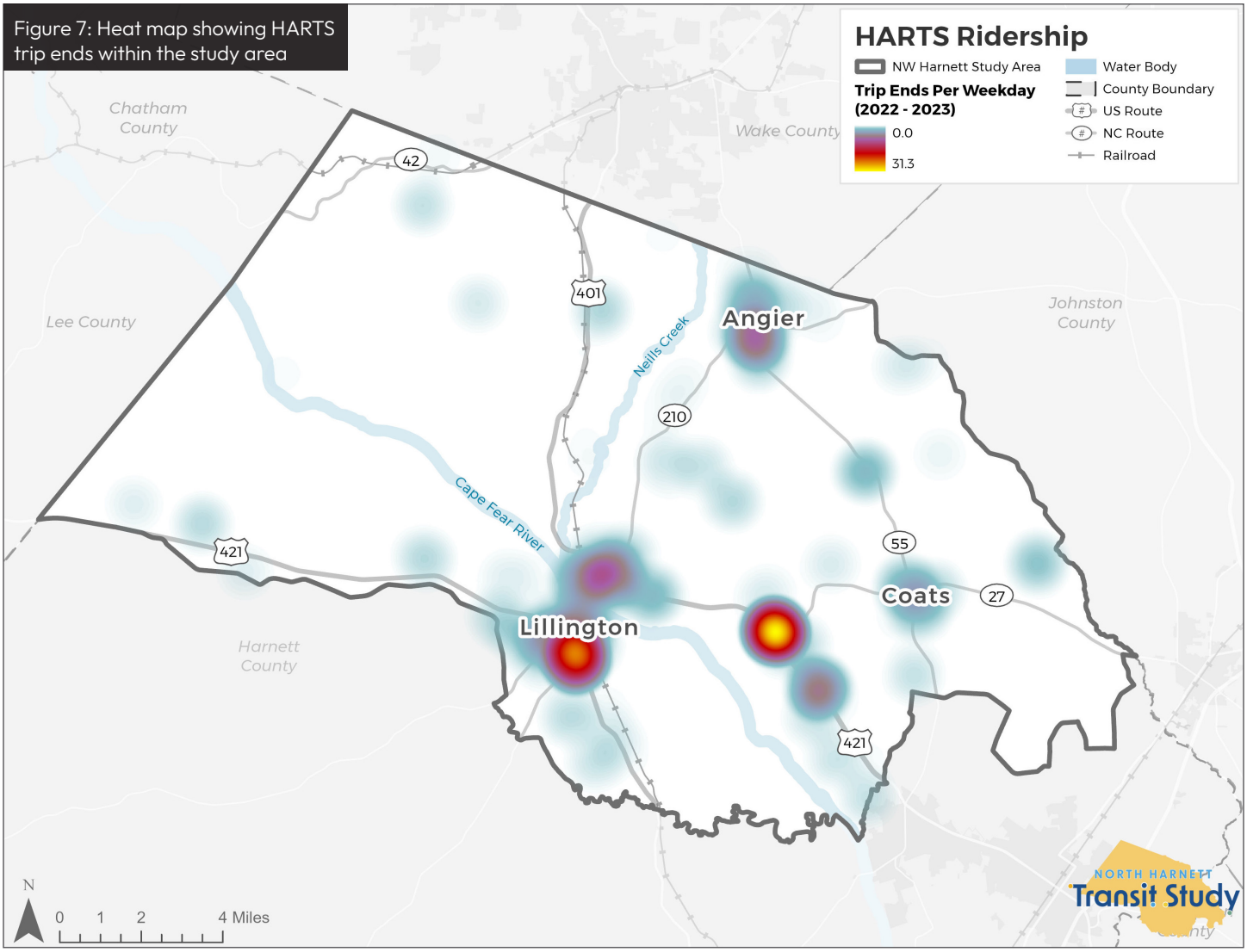
The existing transportation market provides insight into the travel habits and interests of the community to help inform future transit planning. In order to better understand the interests of those traveling in and through North Harnett County, this section reviewed trips that were internal and external to the study area, along with key destination and employment locations within the study area.

North Harnett County's rural disposition is reflected in the distribution of key destinations and employment locations throughout the study area and their concentration in the municipal limits. Important destinations and notable employers in the area can be categorized as retail, civic, medical, commercial, or recreation centers.

Typical service hours for HARTS are between 8 a.m. and 5 p.m. Monday through Friday. HARTS allows for users to schedule rides by phone, but rides must be scheduled at least two business days in advance of the requested trip.

In 2022 and 2023, **HARTS had approximately 60,000 trips each year, with the highest concentration of trip ends located in Lillington and along US-421.** Most of the trips are characterized as medical; and subsequently, the most frequented destinations are the Harnett County EMS Base/Mental Health Center on US-421 and Fresenius Kidney Care in Lillington and Angier.

Figure 7: Heat map showing HARTS trip ends within the study area



Trip Distribution

In Spring 2023, there were approximately 136,800 daily trips starting and/or ending in the study area (Source: Replica). These trips were further subdivided into three types, shown in **Figure 8** to the right.

The internal trip distribution patterns based on Replica Data and aggregated to Census Block Groups (CBGs) reveal that a higher concentration of interzonal trips (trips between CBGs) and intrazonal (trips within CBGs) are made along the central band roughly corresponding to the NC 210 corridor. This forms a sound basis to develop transit along that corridor.

Additional details and explanation of trip distribution are provided in the Trip Distribution section of **Memo 1.**

Figure 8: Trip types

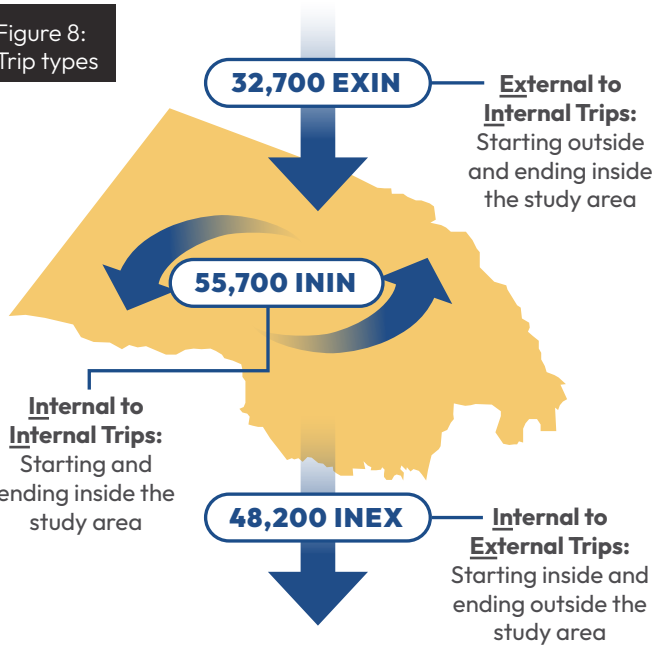
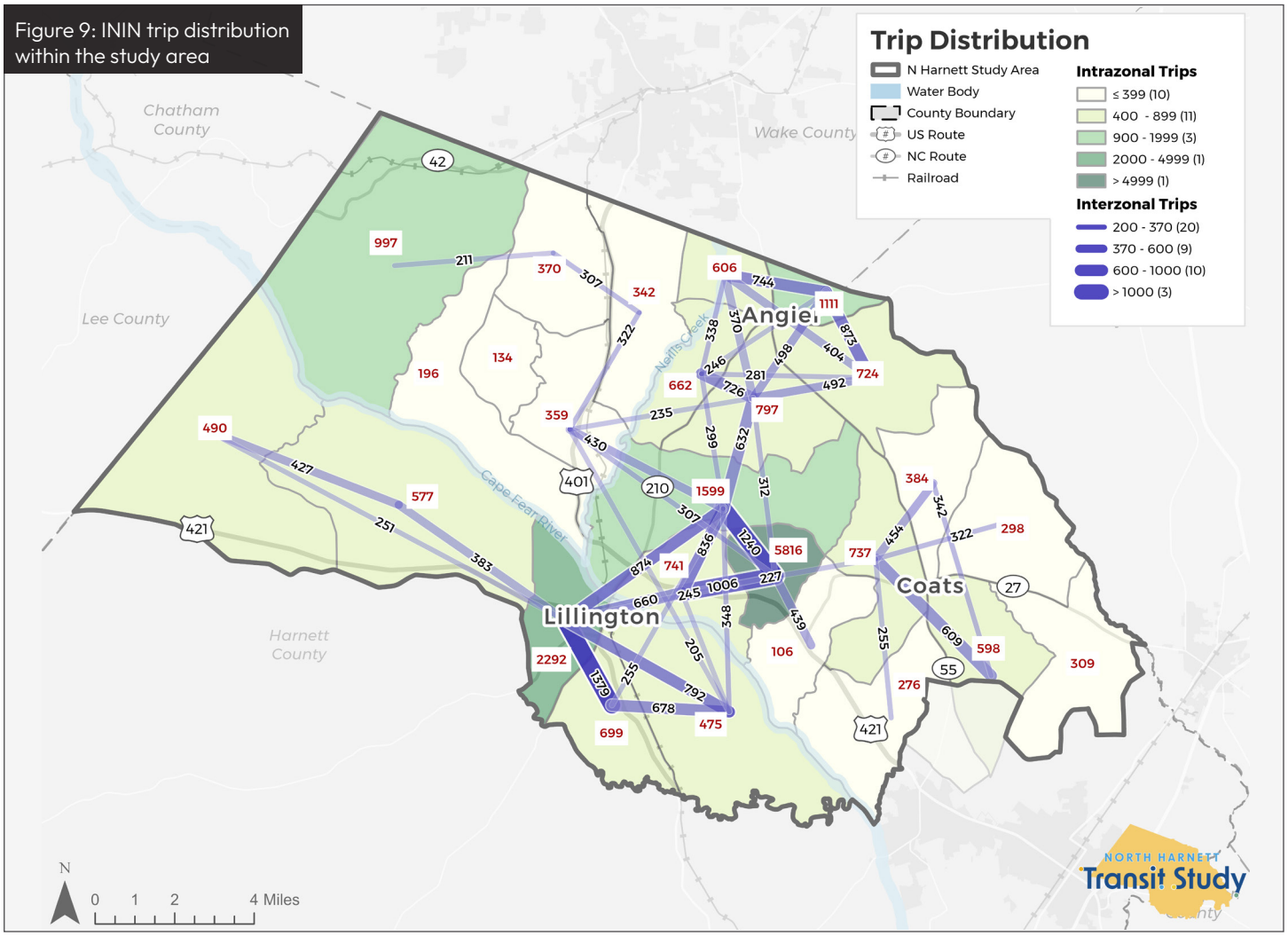


Figure 9: ININ trip distribution within the study area



Trip Purposes

The trips are further divided into two broad types based on their purpose – non-discretionary (work and school) and discretionary (all other types) – based on their dependence on fixed start time and frequency time.

Discretionary trips made up the majority of travel for all three trip types. ININ trips have the highest percentage (75 %) of discretionary trips. These types of trips with more flexibility are well suited for non-fixed schedule transit service such as deviated fixed route, or microtransit. Of all INEX and EXIN trips reported, approximately 70% and 58% are discretionary trips, respectively.

Additional details in the **Transportation Market Review** section of **Memo 1.**

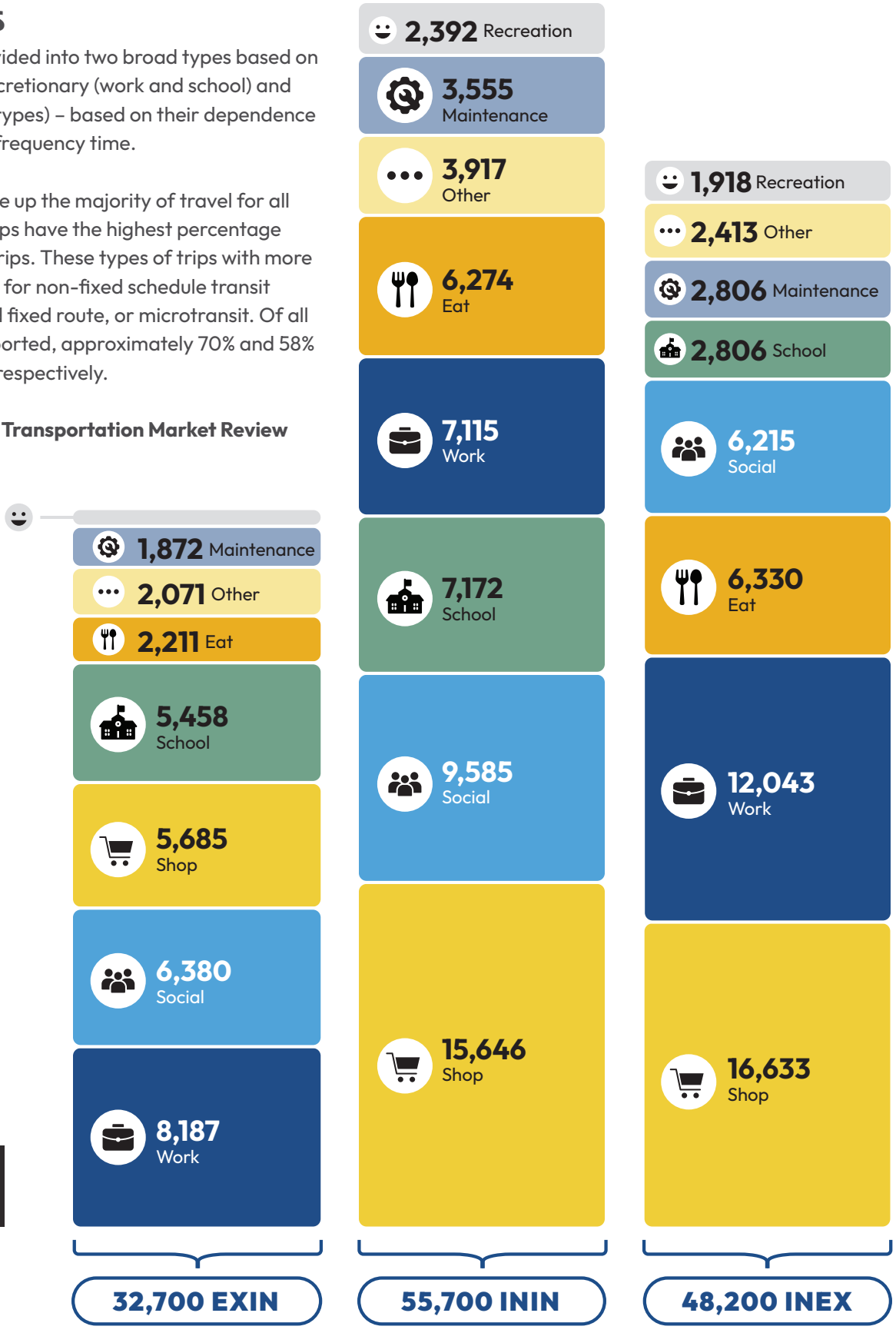


Figure 10: Distribution of trip purpose within ININ, INEX, and EXIN trips

Land Use and Policy Analysis

The trips are further divided into two broad types based on their purpose – non-discretionary (work and school) and discretionary (all other types) – based on their dependence on fixed start time and frequency time.

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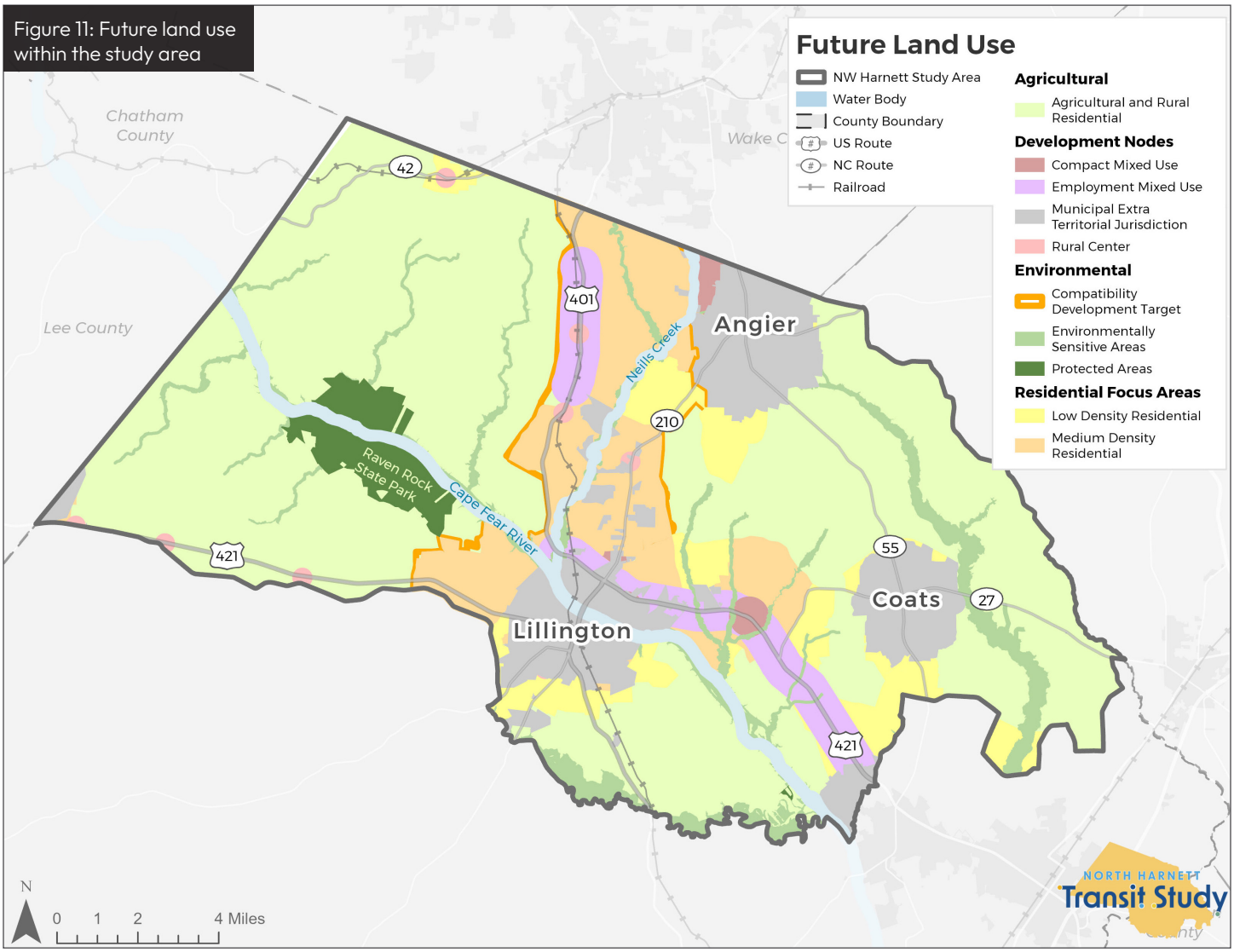
Additional details in the **Transportation Market Review** section of **Memo 1.**

The County updated their Comprehensive Plan since the development of this memo and as a part of this update, the plan incorporates higher density at certain nodes to improve transit suitability within the County. However, the new plan has not been analyzed as a part of this study.

Figure 11: Future land use within the study area



4. PUBLIC AND STAKEHOLDER ENGAGEMENT

Stakeholder Coordination

The North Harnett Transit Study development process is rooted in extensive public and stakeholder involvement. Through Core Technical Team, Elected Officials, Focus Groups, bus driver interviews, community pop-up events, and online surveys, the study received broad input from public agencies, private organizations, and community members. The study was developed in close coordination with a range of committed stakeholder representatives, who provided strategic guidance and oversight of the planning process.

This plan was steered using the inputs of four groups:

1 **Core Technical Team (CTT)** comprised of representatives from Harnett County planning, transit, Department of Aging, and public schools Wake County planning, NCDOT Division 6, CAMPO, planning personnel from the towns of Angier, Coats, and Lillington, GoTriangle, and Campbell University. Five meetings were held through the course of the plan development at key milestones. Key subjects discussed in each of these meetings are shown in the photos to the right.

2 **Public Officials** group included Harnett County Board of Commissioners, public officials from Dunn, Angier, Lillington, Erwin, and Coats, and Mid-Carolina Council.

3 **Focus Groups** comprised of one group containing developers, builders, realtors, and landowners, a second group of schools, institutions, and parks and recreation representatives, and a third group including representatives from local civic organizations.

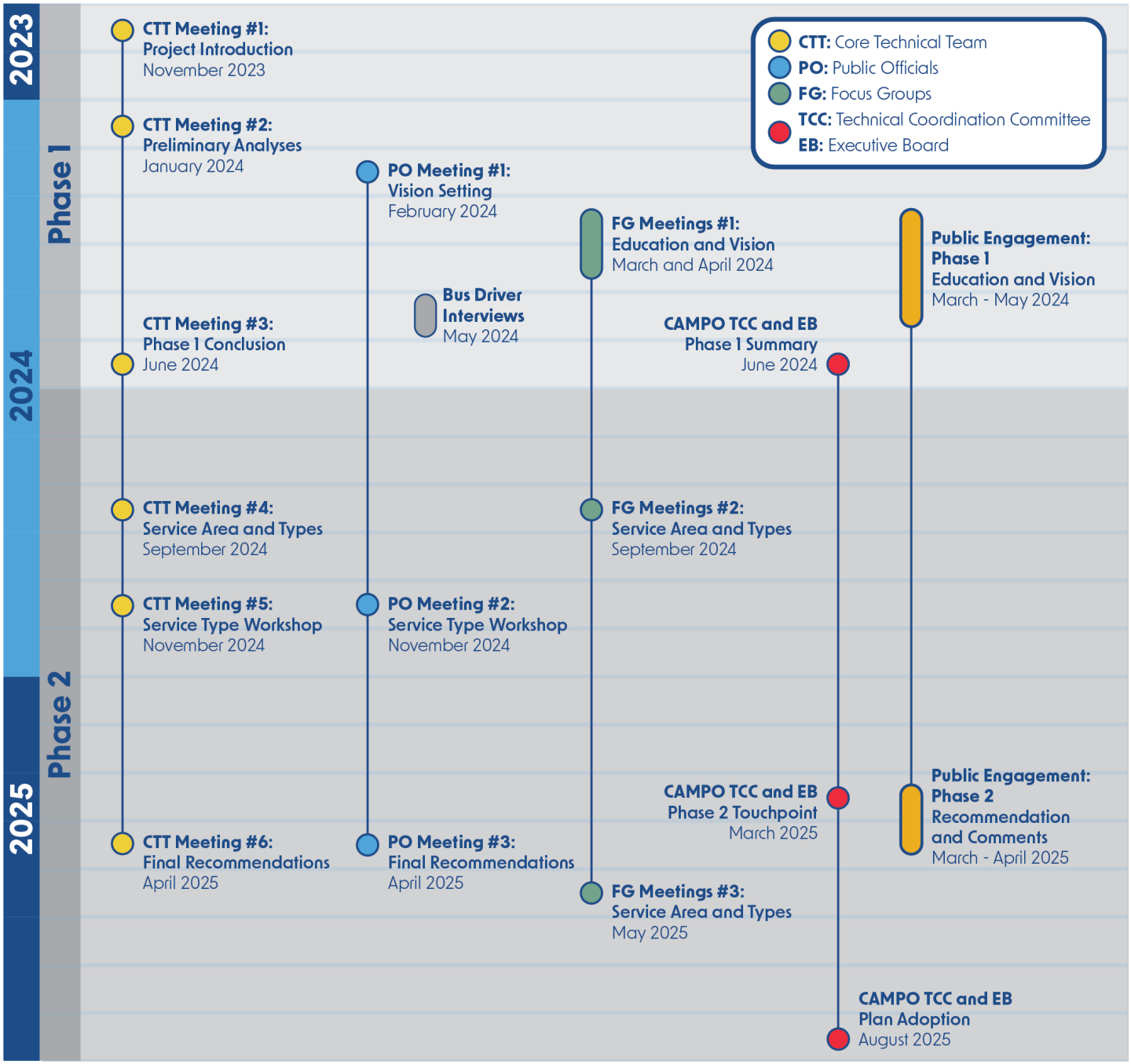
4 **Bus Driver** interviews were conducted to ask questions and take input regarding operations, demand, and concerns.

Figure 14: Live polling during CTT meeting

Figure 12: Meeting with CTT and Public Officials


Figure 13 (above and below): Meeting with CTT and Public Officials

Engagement Timeline and Outcomes



Key Outcomes of Phase 1 Engagement

The engagement efforts around education, awareness, and the need for transit concluded with a favorable view towards further exploring the feasibility of transit in the study area in Phase 2. The stakeholders and the members of the **public viewed transit favorably** with concerns regarding service hours, service types, and funding streams, which were planned to be touched upon in Phase 2 of the study.

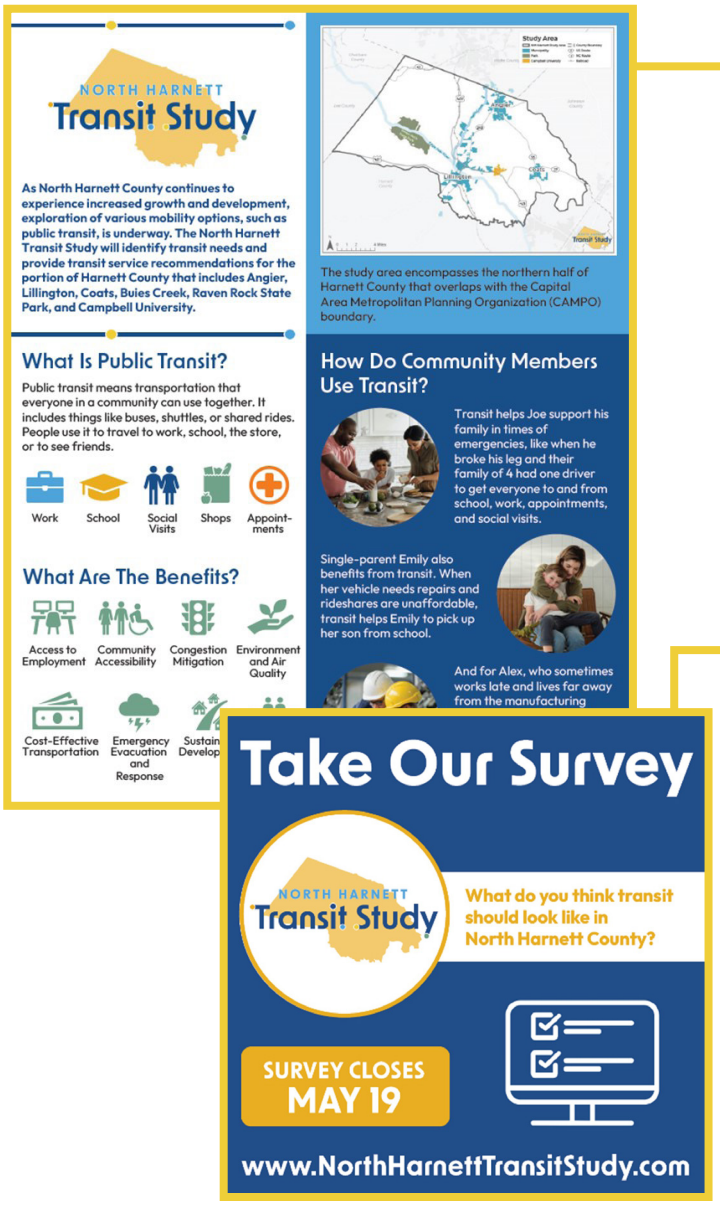
Key Outcomes of Phase 2 Engagement

This phase focused on establishing an appropriate service type and area through an iterative education and consultation with the CTT and the Public Officials. The resultant **service type of Microtransit with external connections was reconfirmed by the members of the public** as the appropriate service type for northern Harnett County. These confirmations led to endorsements from local jurisdictions and CAMPO's Technical Core Committee and Executive Board.

Public Engagement

Phase I

Phase I public engagement (March to May 2024) focused on raising awareness, gathering input, and shaping a community-driven vision for transit in North Harnett County. Feedback from residents, students, seniors, and workers across key communities showed strong support for expanded, reliable service—emphasizing the need for both consistent fixed routes and flexible, on-demand options to improve access, reduce traffic, and support growth.



Engagement Strategy Tools

A variety of outreach tools were used to engage the community and gather input.

The project website attracted over 787 unique visitors and provided updates, educational content, and feedback opportunities. A bilingual press release and e-blast (48.5% open rate) helped raise awareness, while social media outreach on platforms like Facebook, Instagram, and Reddit expanded the study's reach. Printed materials, including bilingual flyers, handouts, and activity boards, were distributed at events and in public spaces.

The "Transit 101" campaign further supported engagement by offering clear, accessible information about rural transit to help residents provide informed feedback.

Survey Insights

The study's public survey received 356 responses from Harnett and nearby counties. While most respondents currently drive, over half showed interest in using transit if it met their needs.

Key insights included strong interest from seniors, people with disabilities, low-income households, and minority groups. Priorities included fixed-route shuttles, weekend and peak-hour service, and improved job access.

Top benefits cited were mobility for non-drivers and job connectivity, while main concerns included reliability, taxpayer cost, and ease of use. Respondents also highlighted the value of tech features like real-time tracking and app-based booking.

In-Person Engagement

Four pop-up events at community festivals and a senior center engaged residents through interactive activities like mapping and transit-themed games. Participants expressed strong support for flexible, local transit and better access to key destinations. At the Coats Senior Center, seniors emphasized the need for improved service, citing limitations with HARTS, including capacity and restricted hours.

Phase 2

Phase II of the study's public engagement (March to April 2025) brought awareness to the proposed microtransit recommendation and its benefits, challenges and usage scenarios. The engagement aimed to confirm microtansit's feasibility, address community concerns, and refine the implementation planning. Phase II provided questions and positive feedback on microtransit as a transit service in Harnett County.

Engagement Summary

4 **Pop-Up Events:** Held at Coats Senior Center, Campbell University, The Groves at 421, and the Angier Spring Fling

150+ **Survey Responses:** Gathered online and in-person

Broad Outreach: Website updates, social media ads, print/digital promotion, and material distribution to community centers and libraries

Key Takeaways

Strong support: Residents appreciated the flexibility of microtransit, its accessibility, and connections to key destinations. Support for low-cost rides for seniors, students, and underserved populations.

Integration: Microtransit will complement not replace existing HARTS services.

Interest: In improved regional mobility and job access.

Top Concerns: Scalability, long wait times, funding sustainability, and need for expanding outreach to offline residents.

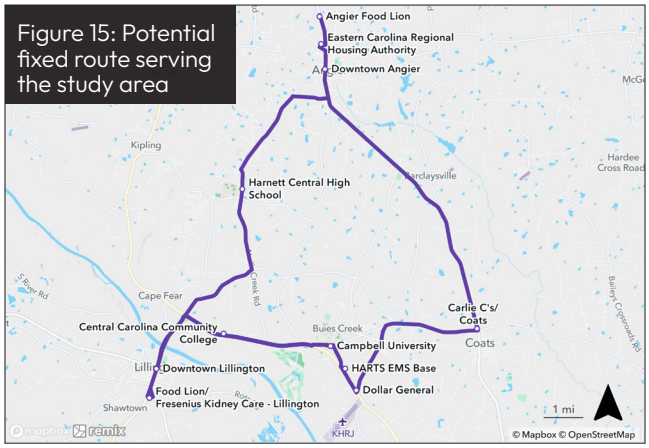
5. TRANSIT SERVICE OPTIONS

Building off the proposed service area and data from earlier phases of the study, four transit service options were identified for further consideration. These service options include:

Fixed Route:

Potential routing of an hourly, bi-directional loop between Lillington, Coats, and Angier, connecting key destinations using primary routes in the area. This service ensures higher reliability but requires infrastructure investments like bus stops and sidewalks.

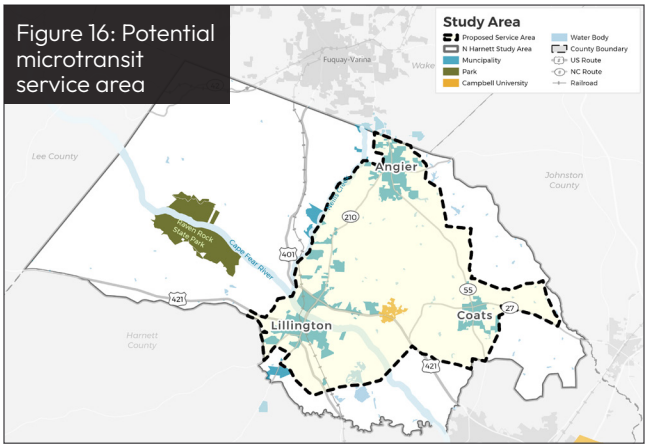
Figure 15: Potential fixed route serving the study area



Microtransit:

This is a technology-enabled, shared, on-demand transit service that allows for dynamic routing and schedule overcoming many challenges of fixed route in a suburban setting. The service area is designed to include locations of high trip density and is flexible.

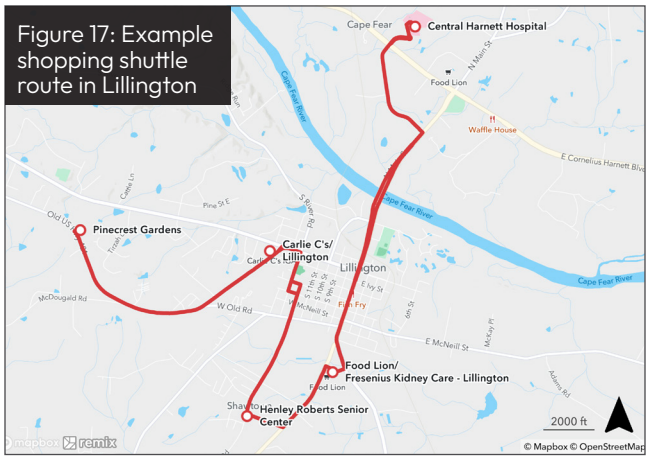
Figure 16: Potential microtransit service area



Senior/Shopping Shuttles:

A variation of fixed route, shuttles operate on shorter routes on fixed days of the week catering to specific trips and demographics (e.g. shopping for seniors or students). We explored three such routes in the study area each operating two days a week.

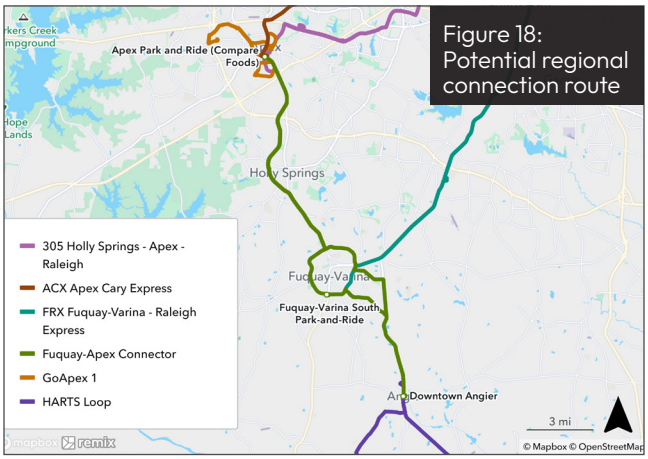
Figure 17: Example shopping shuttle route in Lillington



Regional Connection:

This commuter-focused route intends to provide access from Angier to the wider transit network in Wake County with connections in Fuquay-Varina and Holly Springs. This route can also work in conjunction with local fixed route or microtransit service.

Figure 18: Potential regional connection route



Service Type Comparisons

Each of the four service options have their own benefits and challenges when it comes to implementation. They also can be implemented for varying purposes and/or to address different transportation challenges. The tables on this page encompass the implementation considerations, benefits, and challenges associated with each type.

These were discussed with the stakeholders before finalizing the recommended service type.

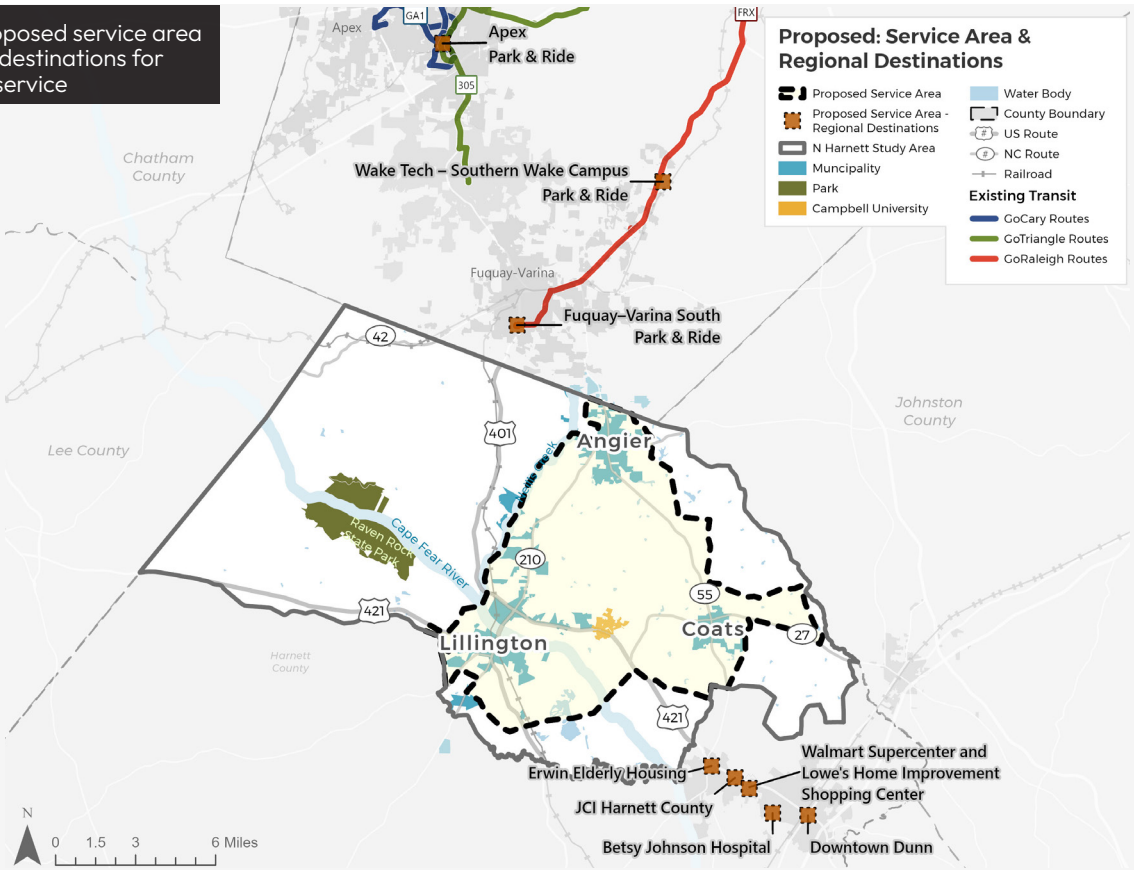
Additional details about determination of service area and evaluation of transit service options are available in Memo 3 and Memo 4 respectively.

	Fixed Route	Microtransit	Senior Shuttle	Regional Connection
Operating Cost Estimates	$$	$$$	$	$
Capital Costs	$	$	$	$
Potential Ridership				
Implementation Effort				
Service Area				
Service Span				
Frequency				
Convenience / Flexibility				
Benefits	• Consistent timetable and routing; ease of understanding for passengers • No reservations needed • Provides connections to key destinations • No external operator required	• Flexibility in destination choices • Limits distance people need to travel to access transit • On-demand rides • Can be more efficient than fixed route transit in low density areas • Smartphone application facilitates easy booking and ability to track ride	• Consistent timetable and routing; ease of understanding for passengers • Direct access to essential goods and services for seniors • No reservations needed • No external operator required	• Consistent timetable and routing; ease of understanding for passengers • Access to other transit systems; regional connections • No reservations needed • No external operator required
Challenges	• Predetermined destinations • Relatively low density may result in lower ridership • Some destinations may require passengers to walk from the stop to their destination	• Some passengers may not have access to or be comfortable using smartphone applications. • High operating costs • Longer wait times during peak hours	• Limited flexibility in destination choice for passengers • Limited connectivity to other parts of Harnett County • Relatively low density and limited locations may result in lower ridership • Limited ridership pool	• Relatively low density and limited locations may result in lower ridership • Limited ridership pool • Longer service hours required • Not a direct connection to regional destinations/ employment centers • Limited number of trips per day

6. RECOMMENDATIONS AND IMPLEMENTATION PLAN

Microtransit with connections to access points outside the service area

Figure 19: Proposed service area and regional destinations for microtransit service



Service Area: The proposed service area includes the majority of the towns of Angier, Coats, and Lillington. Key regional destinations outside the study area shown on the map will also be served as long as the trips either start or end in the service area.

Service Span: Keep the same service span as HARTS's existing dial-a-ride service during the initial pilot phase (8 a.m. to 5 p.m.) and consider expanding service days and/or hours based on demand, public feedback, and funding availability.

Fleet Size: Begin with a fleet size of three (3) to five (5) vehicles, which would allow HARTS to use existing vehicles and establish a successful program before evaluating whether there is a need to scale up.

Service Delivery Model: Utilize a Software-as-a-Service (SaaS) delivery model to leverage existing vehicles and resources, lower vendor costs, and maintain control over the management of operating service.

Implementation Plan

The phased implementation plan includes a high-level overview of key steps needed to implement microtransit service. The actions are divided into three phases: Pre-Pilot; Pilot Implementation, Monitoring, and Evaluation; and Transition to Permanent Program. In addition to the actions listed below, it is recommended that HARTS continues to coordinate and engage with stakeholders throughout the process.

Pre-Pilot (YEAR 0-2)

- Final Program Design
- Develop Branding
- Identify Funding Sources
- Obtain local approvals
- Select a microtransit vendor (or expand scope of current vendor)
- Procure any third party equipment and hire staff
- Coordinate with vendor for system implementation
- Identify Key Performance Metrics (KPIs)

Pilot Implementation YEAR 3

- Conduct promotional activities
- Launch Pilot Program
- Monitor Program
- Evaluate based on KPIs established at the onset

Transition to Permanent Program (YEAR 4+)

- Service changes based on evaluation
- Identify additional capital or operating needs
- Identify and secure additional funding
- Follow local procurement to make program permanent
- Public outreach informing the transition
- Continue evaluating the program

Service Area:

- Curb-to-curb service provides highest accessibility and avoids the cost of installing supporting infrastructure (sidewalks and bus shelters).
- Flexible trip booking and payment system with online and offline capabilities should be provided so that riders with limited financial and digital access can take advantage of the service

Cost and Funding:

- Estimated annual operating costs range from $562,000 (3 vehicles) to $937,000 (5 vehicles)
- Federal and State formula and grant funding can limitedly aid the pilot implementation.
- Post pilot, consistent local and community funding will be needed to ensure long-term viability of the service.

Fleet and Workforce:

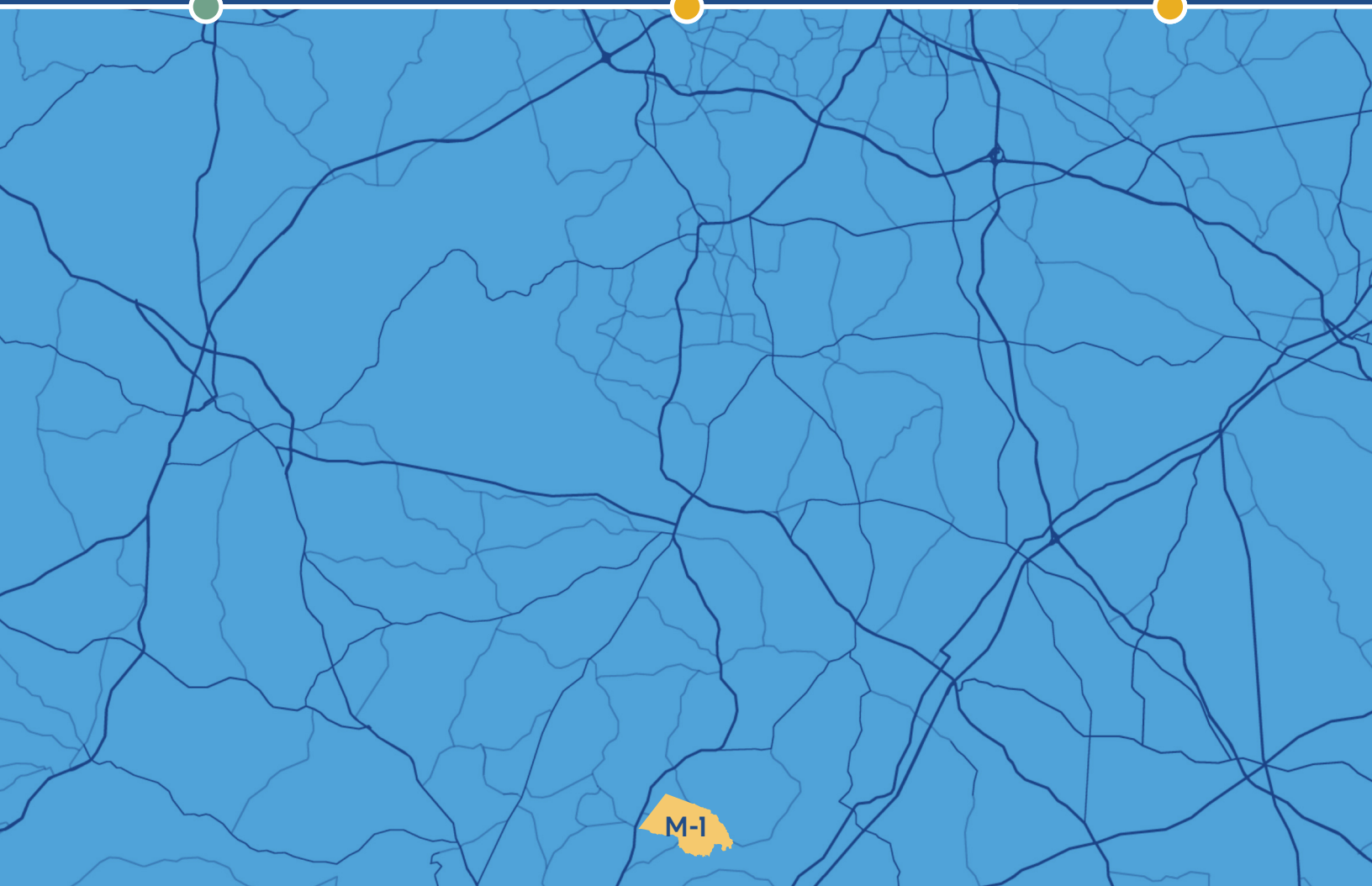
- In the short-term, part of HARTS' existing fleet can be repurposed to provide the recommended microtransit service.
- Flexible trip booking and payment system with online and offline capabilities should be provided so that riders with limited financial and digital access can take advantage of the service

Regional Coordination:

- Coordination between local communities, county leadership, and regional and state partners will be key to successful implementation.
- Partnering with regional agencies in Wake and Johnston counties who are leading efforts for ticketing integration between discreet microtransit services.

NORTH HARNETT
Transit Study

Technical Memoranda



NORTH HARNETT

Transit Study

Technical Memoranda

MEMO 1:
Transit Demand Analysis

Transit Demand Analysis Memorandum

Table of Contents

Introduction

The Study Area of the North Harnett Transit Study comprises of the part of Harnett County that is under jurisdiction of the North Carolina Capital Area Metropolitan Planning Organization (CAMPO). This area is approximately 252 square miles and occupies most of the northern half of Harnett County. Major municipalities in the area include the Town of Lillington, the Town of Angier, and the Town of Coats which have populations of 4,389, 5,312, and 2,109, respectively, according to 2017-2021 American Community Survey (ACS) data. The Study Area is located immediately south of Wake County with a direct connection to Raleigh via US-401 and an east-west connection via US-421, which provides connections to Sampson County and Lee County. North Harnett County is also home to Campbell University. Figure 1 highlights the portion of Harnett County included in the Study Area.

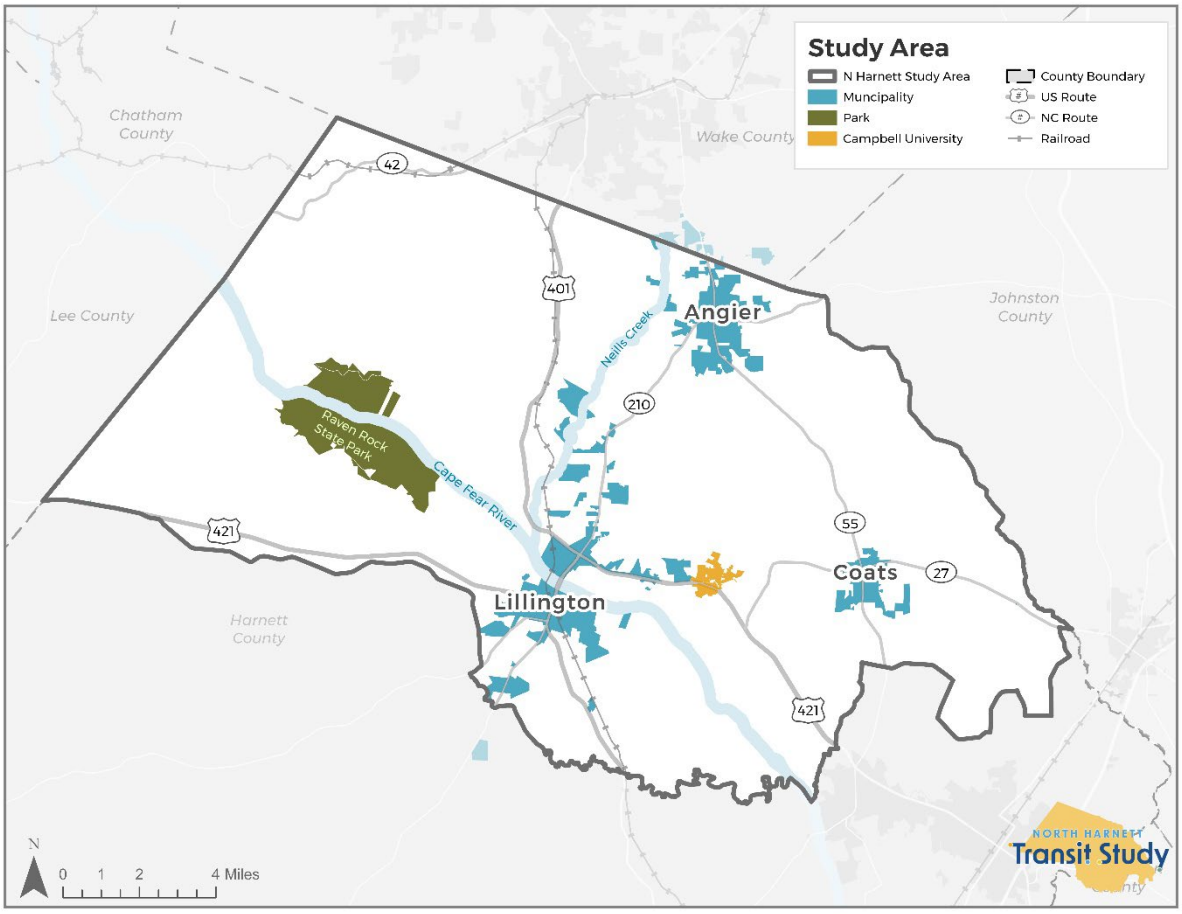


Figure 1. North Harnett Transit Study (Study Area)

Existing and Future Transit Service

Existing Transit Service

The Study Area receives service from the Harnett Area Rural Transit System (HARTS) which provides public transportation to the entire Harnett County. HARTS provides paratransit (Dial-A-Ride) and local demand responsive service trips for residents in the county with occasional trips out-of-county for medical appointments. Out of county transportation includes rides to the surrounding counties: Chatham, Cumberland, Durham, Lee, Johnston, Moore, Sampson, Orange, and Wake County.

Within the County, HARTS serves as the sole public transit provider option for Harnett County and is a community transportation program that operates as a human services agency. Given HARTS' role as a human services agency, the program provides essential transportation services to medical, employment, and educational destinations as well as personal trips. HARTS services are Curb-to-Curb, allowing for boarding and alighting for passengers at the curb or roadside. HARTS provides transportation through a variable fare system pending destinations and need. HARTS collaborates with the Council on Aging which provides funded transportation services for applicable Harnett County residents 60 years or older to be used for medical and general transportation needs. The Elderly and Disabled Transportation Assistance Program (EDTAP) is another funded transportation program for Harnett County that provides citizens rides if deemed eligible by a physician, medical professional, or social worker. Citizens of all ages are permitted to ride HARTS, but minors (riders under 18-years of age) must be accompanied by an adult.

Typical service hours for HARTS are between 8 a.m. and 5 p.m. Monday through Friday. HARTS allows for users to schedule rides by phone, but rides must be scheduled at least two business days in advance of the requested trip. HARTS provides targeted transportation services for seniors who are attending senior centers in the county, students attending Central Carolina Community College (Harnett Main Campus), and those seeking dialysis treatment.

Outside the Study Area, existing transit offers potential future connections between transit in North Harnett County to regional transit systems. GoRaleigh operates the Fuquay-Varina Raleigh Express (FRX) – a commuter bus with four daily departures per direction, which connects GoRaleigh Station to the Fuquay-Varina Community Center Park-and-Ride. Figure 2 clarifies the proximity of the existing and planned transit routes to the Study Area.

Ridership

HARTS collects origin and destination ridership data that reveals transit use travel patterns within the Study Area. Figure 3 shows the concentration of origins and destinations for trips sourced from 2022-2023 average weekday trips. In 2022 and 2023, HARTS had approximately 60,000 trips each year, with the highest concentration of trip ends located in Lillington and along US-421. Most of the trips are characterized as medical; and subsequently, the most frequented destinations are the Harnett County EMS Base/Mental Health Center on US-421 and the Fresenius Kidney Care in Lillington and Angier.

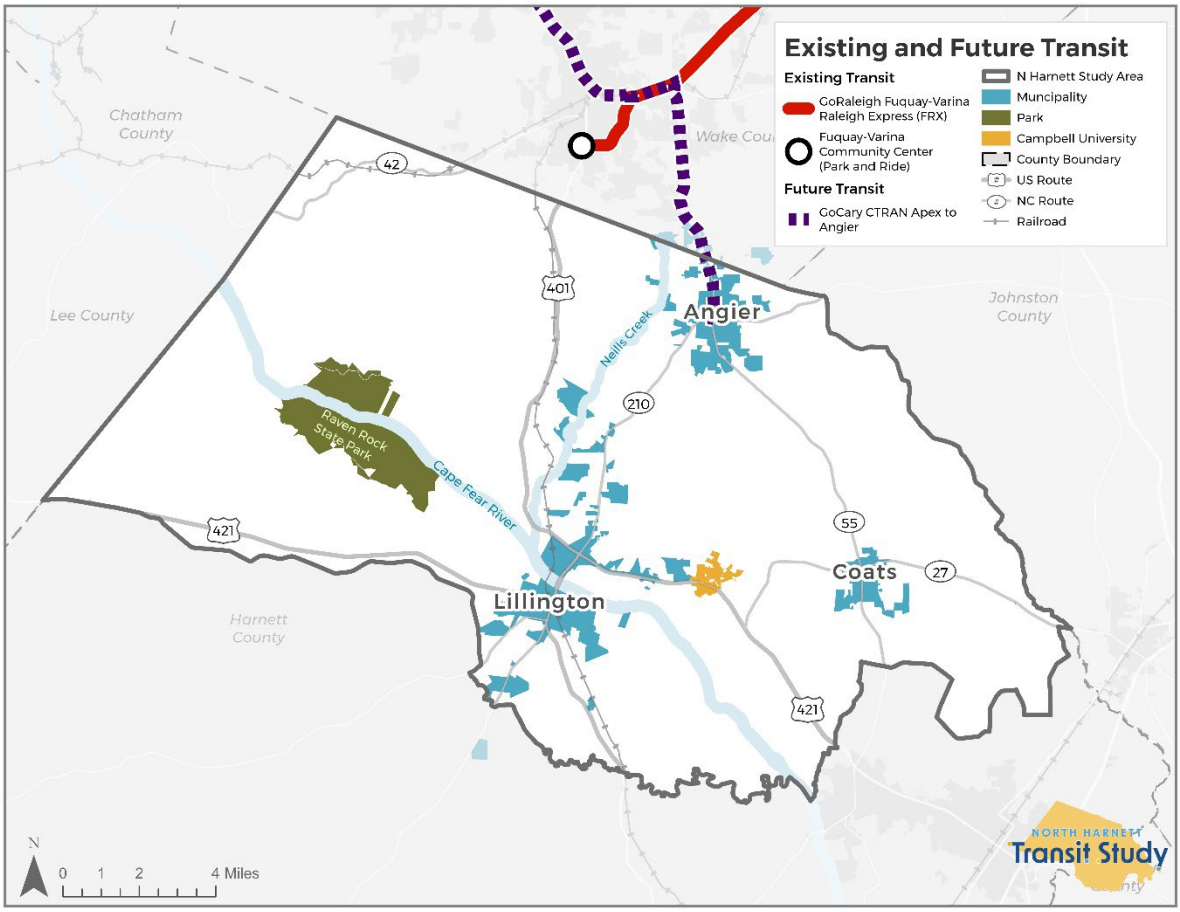


Figure 2. Existing and Future Ridership

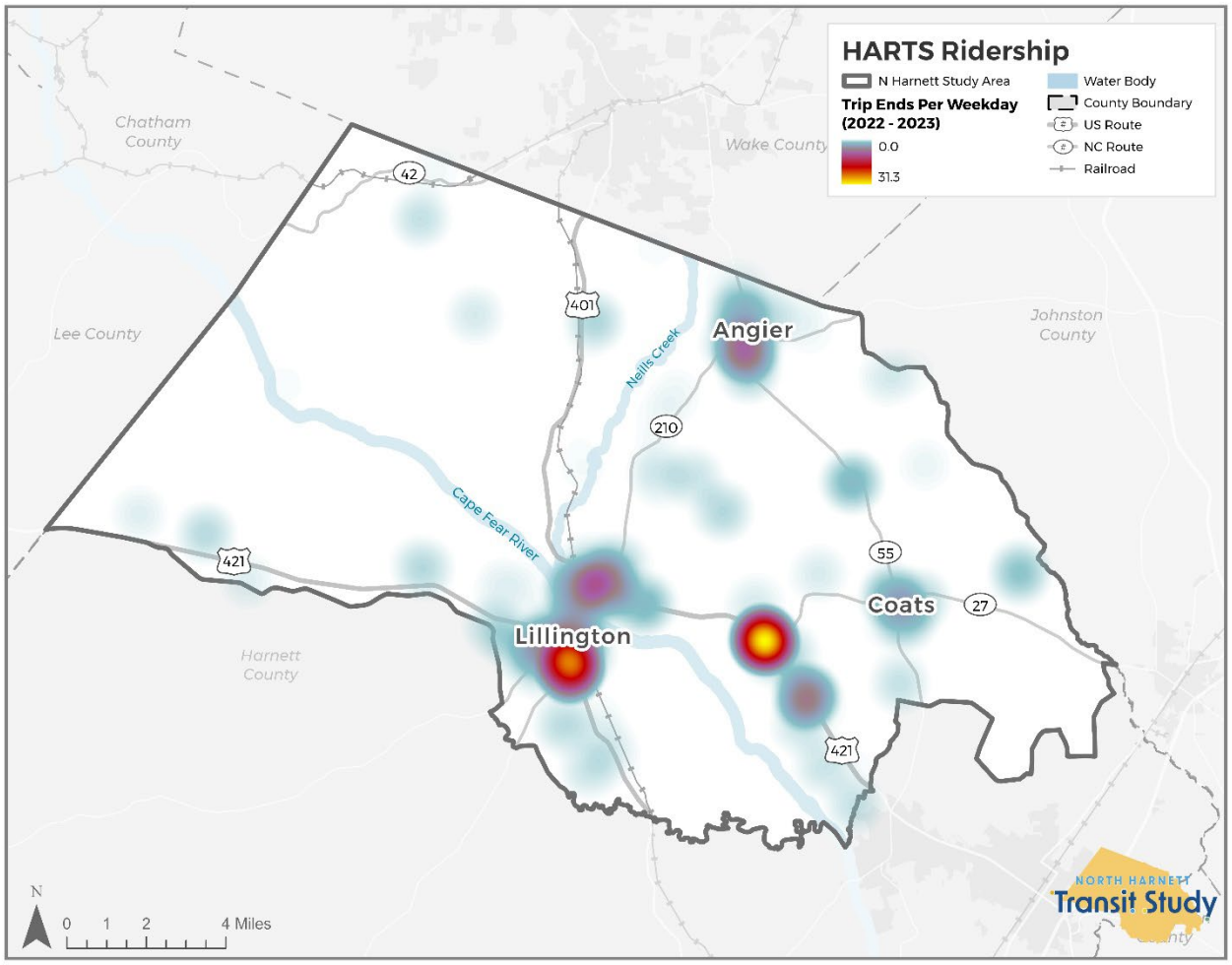


Figure 3. HARTS Ridership

Future Transit Service

Identified in the CAMPO 2050 Metropolitan Transportation Plan, the transit corridor (T119) identified as CTRAN Apex to Angier is a bus project proposed to be operated by GoCary and will be able to provide a regional connection to the Study Area. This service is proposed to run at a peak headway of 30 minutes. This route would travel from south Apex to Angier primarily via NC-55 for both northbound and southbound routes. Currently, the timeframe for project implementation has not been determined.

Transportation Market Review

The existing transportation market provides insight into the travel habits and interests of the community to help inform future transit planning. In order to better understand the interests of those travelling in and through North Harnett County, this section reviewed trips that were internal and external to the Study Area, along with key destination and employment locations within the Study Area.

Key Destinations and Employment Locations

North Harnett County's rural disposition is reflected in the distribution of key destinations and employment throughout the Study Area and their concentration in the municipal limits. Important destinations and notable employers in the area can be categorized as retail, civic, medical, commercial, or recreation centers. These key destinations were identified as places currently served by HARTS including dialysis centers, senior centers, and Central Carolina Community College (Harnett Main Campus). Grocery stores/shopping centers, government services, hospitals, and recreational locations were also captured as important destinations in the area. Sources that informed the key employment locations include the Grow Harnett County 2021 Economic Development Plan, Harnett County website, and those identified through the Research Triangle Partnership.

Figure 4 and Figure 5 show the key destinations and employment locations within the Study Area.

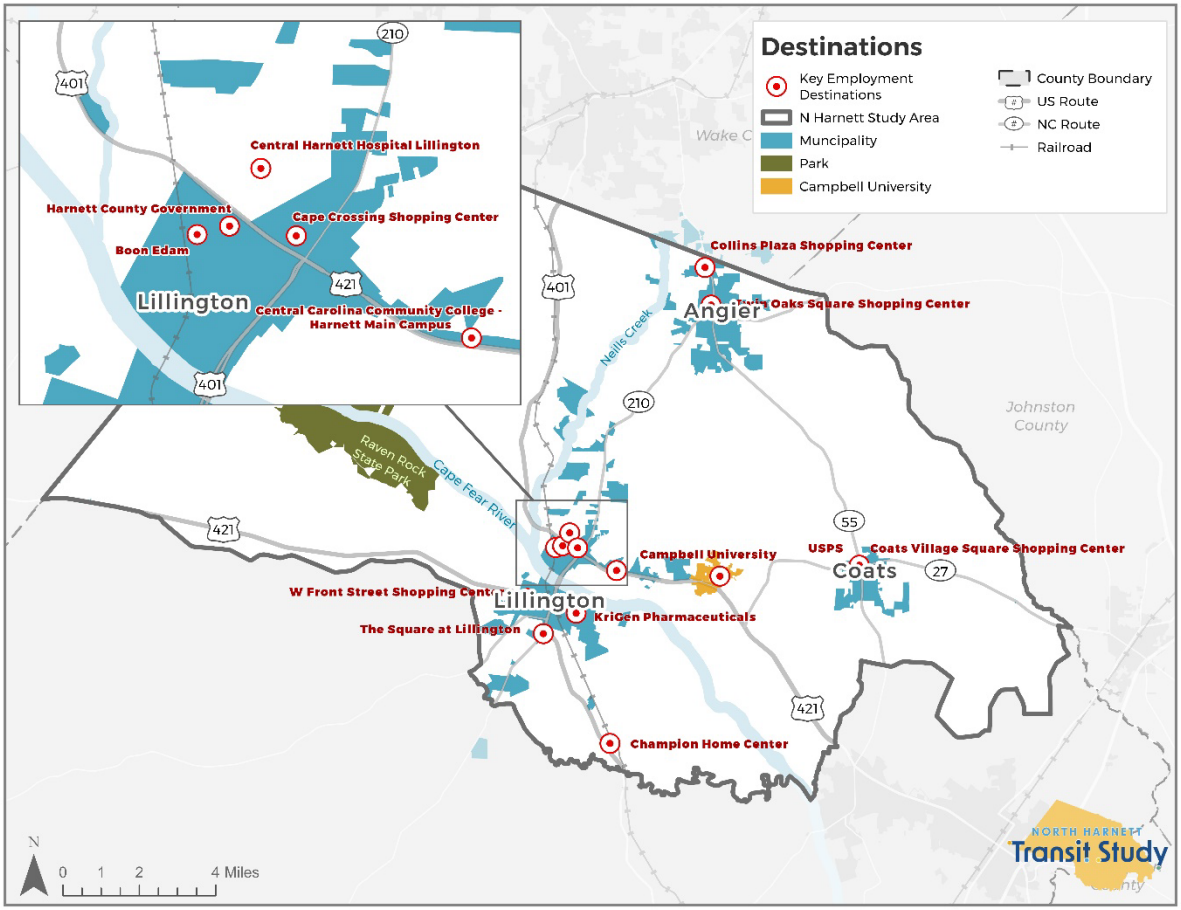


Figure 4. Key Employment Destinations

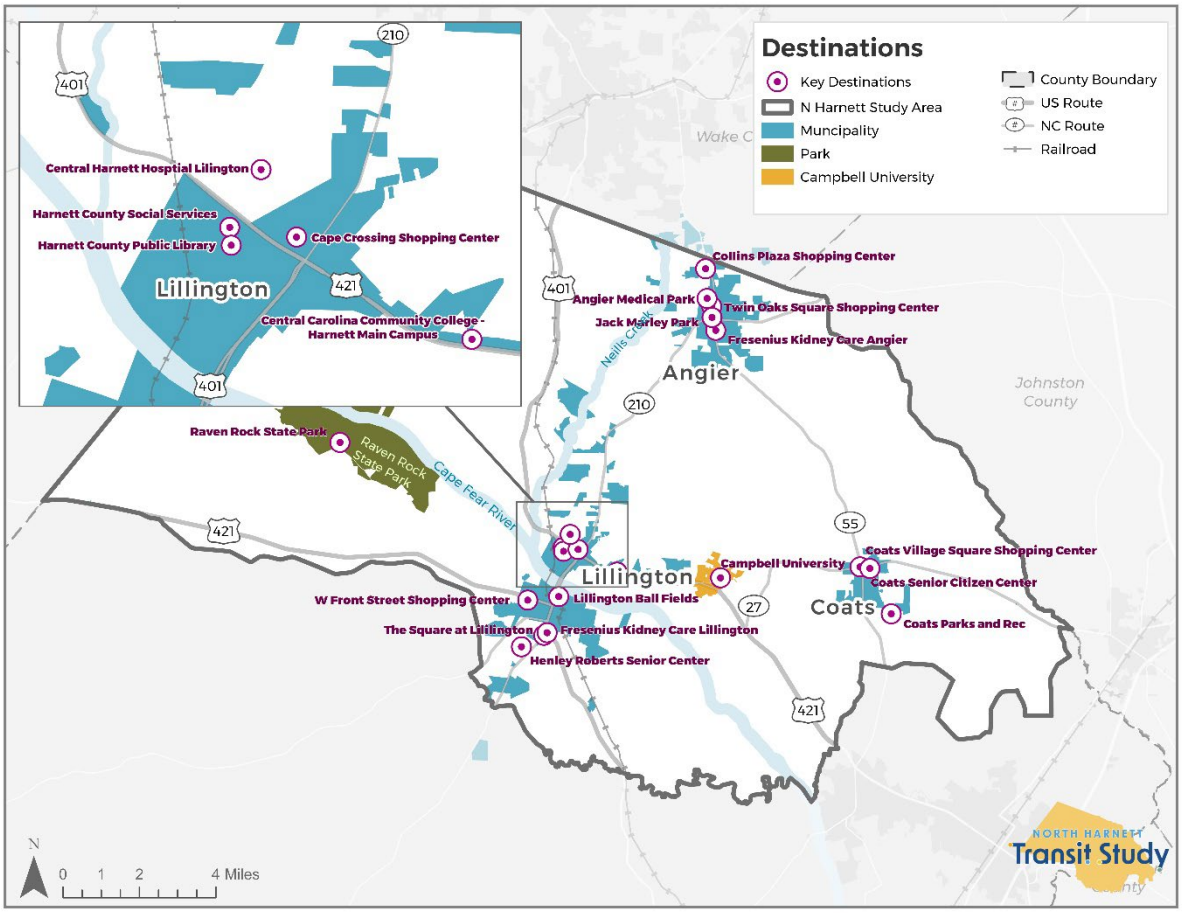


Figure 5. Key Destinations

Trip Distribution

In addition to understanding where employers and major destinations are located, it is critical to understand the travel characteristics of those moving throughout North Harnett County to ensure transit service meets their needs. Replica data for Spring 2023 trips was used to analyze trip origin and destinations in the Study Area.

The observed trip data accounts for all non-freight travel, and where destinations of the travelers were not travelling home, hotels, or airports. In totality, there were approximately 136,800 trips starting and/or ending in the Study Area. These trips were further delineated by trip sources and destinations identified in as follows:

- **Internal to Internal (ININ) Trips** – Starting and ending inside the Study Area
- **Internal to External (INEX) Trips** – Starting inside the Study Area and ending outside the Study Area
- **External to Internal (EXIN) Trips** – Starting outside the Study Area and ending inside the Study Area

Figure 6 illustrates the number of trips within the Study Area that were ININ (55,700), INEX (48,200), and EXIN (32,700).

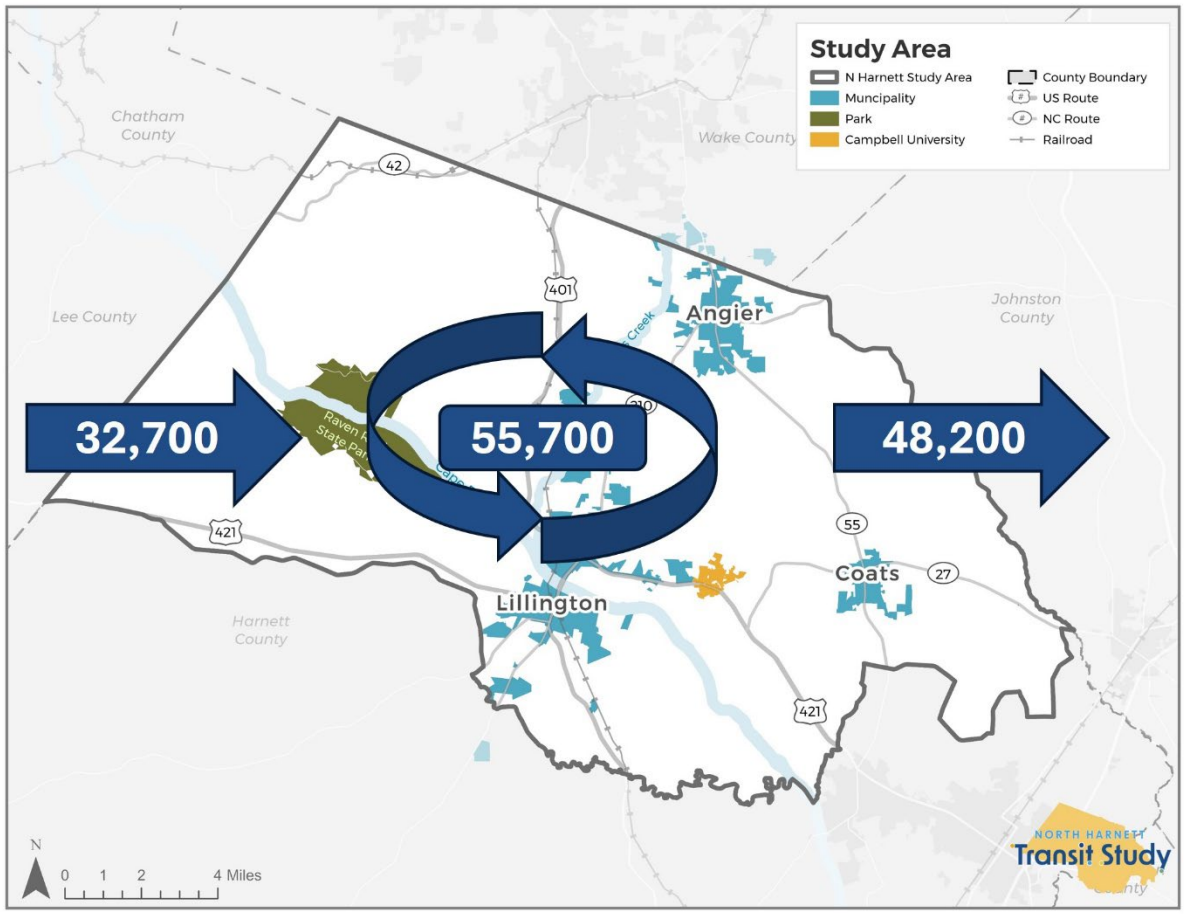


Figure 6. Trip Distribution

The trips are further divided into two broad types based on their purpose – non-discretionary and discretionary. The non-discretionary trips are regular trips with fixed origin and destination that need to start at a certain time. Work and school trips fall into this category. Discretionary trips are, as the name suggests, at the discretion of the trip taker. These trips have more flexibility in terms of start time, regularity, and origins and destinations. Most other trips – shopping, social, food, errands, recreation, etc.- fall into this category. Discretionary trips made up the majority of travel for all three trip types as shown in Figure 7. Of the three trip types, ININ has the highest percentage of discretionary trips (75 %) and is the only type with a greater percentage of discretionary trips when compared to trips in North Carolina (70%). Of all INEX and EXIN trips reported, approximately 70% and 58% are discretionary trips, respectively.

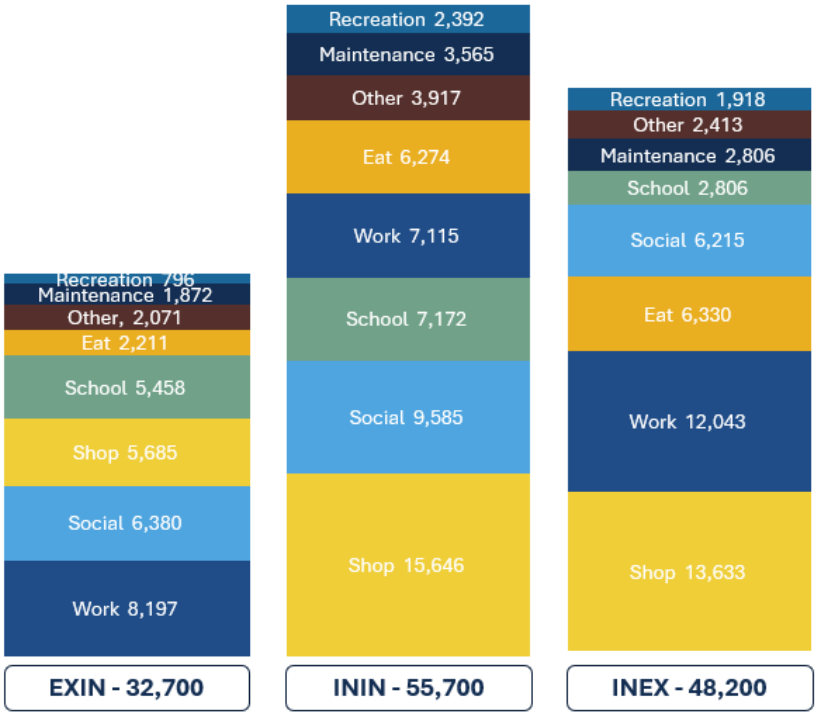


Figure 7. Trip Purpose

ININ Trips

Most of trips taken by the travelers in the Study Area (41% of all trips) were ININ trips. Figure 8 shows the median distance and travel time for these trips were 2.2 miles and 10 minutes respectively. The percentage of all ININ trips driving alone and by car, was 60%, compared to the 67% state average.

Figure 9 shows the pattern of intrazonal trips (trips that started and ended inside the same census block groups (CBG)). An estimated 39% of all ININ trips were intrazonal trips. Campbell University and Lillington have the highest concentration of intrazonal trips in the Study Area. For example, the CBG that hosts Campbell University had 5,816 intrazonal trips –trips that started and end within the block group.

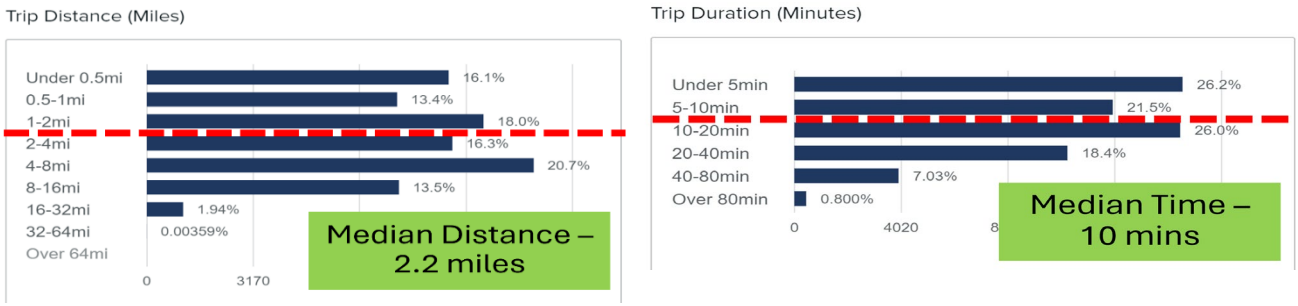


Figure 9. ININ Trip Distance and Duration

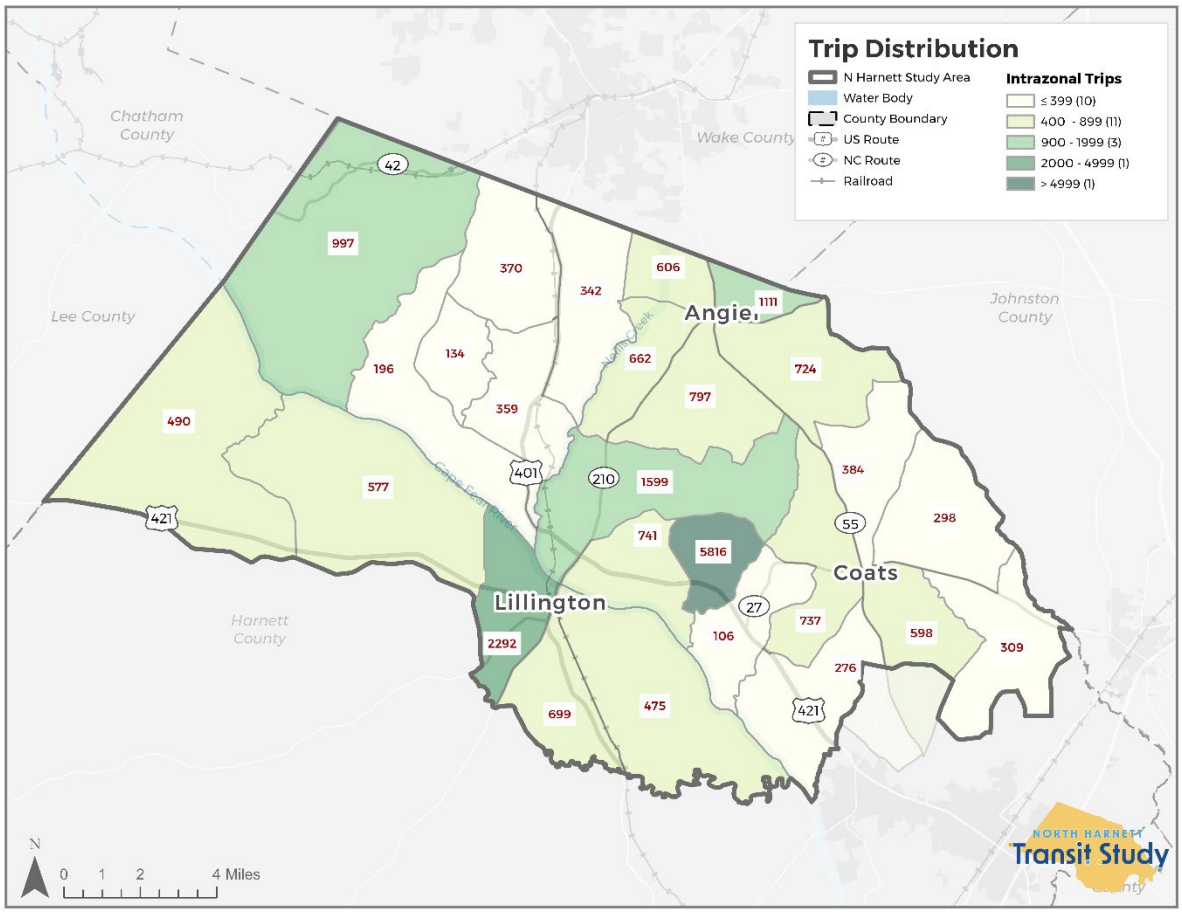


Figure 8. Intrazonal Trips

Figure 10 highlights the interzonal trips, which were CBG to CBG within the Study Area. Interzonal trips made up approximately 34,000 daily trips, that is 61% of the total ININ trips. There were 676 unique origin-destination (OD) pairs between the 26 census block groups, but most of those OD pairs were low enough to be not considered for the initial implementation of transit. 42 of these OD pairs had over 200 daily interzonal trips each, and together they made approximately 20,500 daily trips. These OD pairs are shown as purple lines in Figure 10. This means that 42 out of 676 OD pairs (6%) represented 20,500 out of 34,000 trips (60%). Since these OD pairs were high enough in volume and constituted the majority of the interzonal travel in the Study Area, they are considered as ideal locations for initial implementation of transit. Approximately 61% of these trips started and ended in different CBGs. There were 676 unique intrazonal trip patterns between the 26 census block groups, but only 42 of these trip patterns had over 200 trips made between the CBGs.

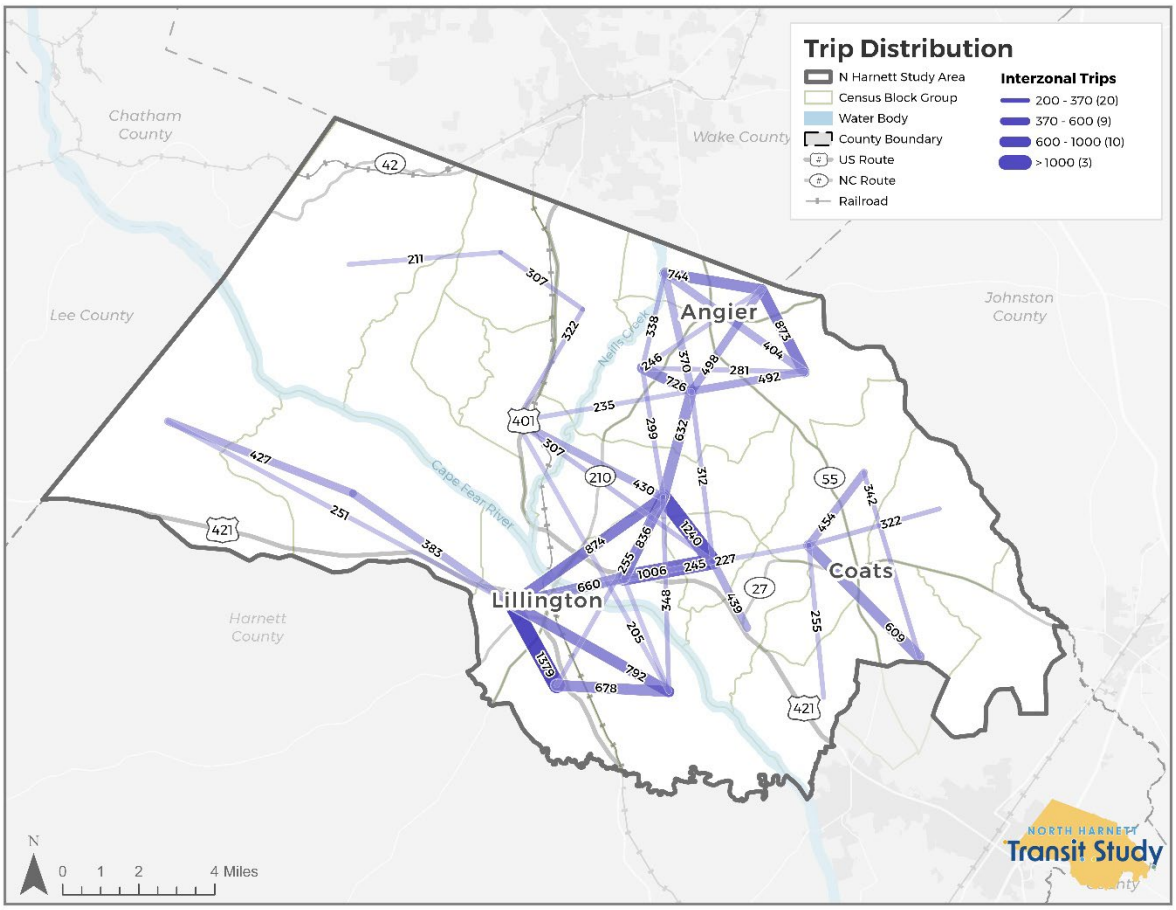


Figure 10. Interzonal Trips

Figure 11 overlays interzonal and intrazonal trips within the Study Area. Most trips were concentrated in the central band of the Study Area capturing Angier and Lillington. The significant concentration of intra- and inter-zonal travel supports the possibility of implementing transit within the highlighted central area.

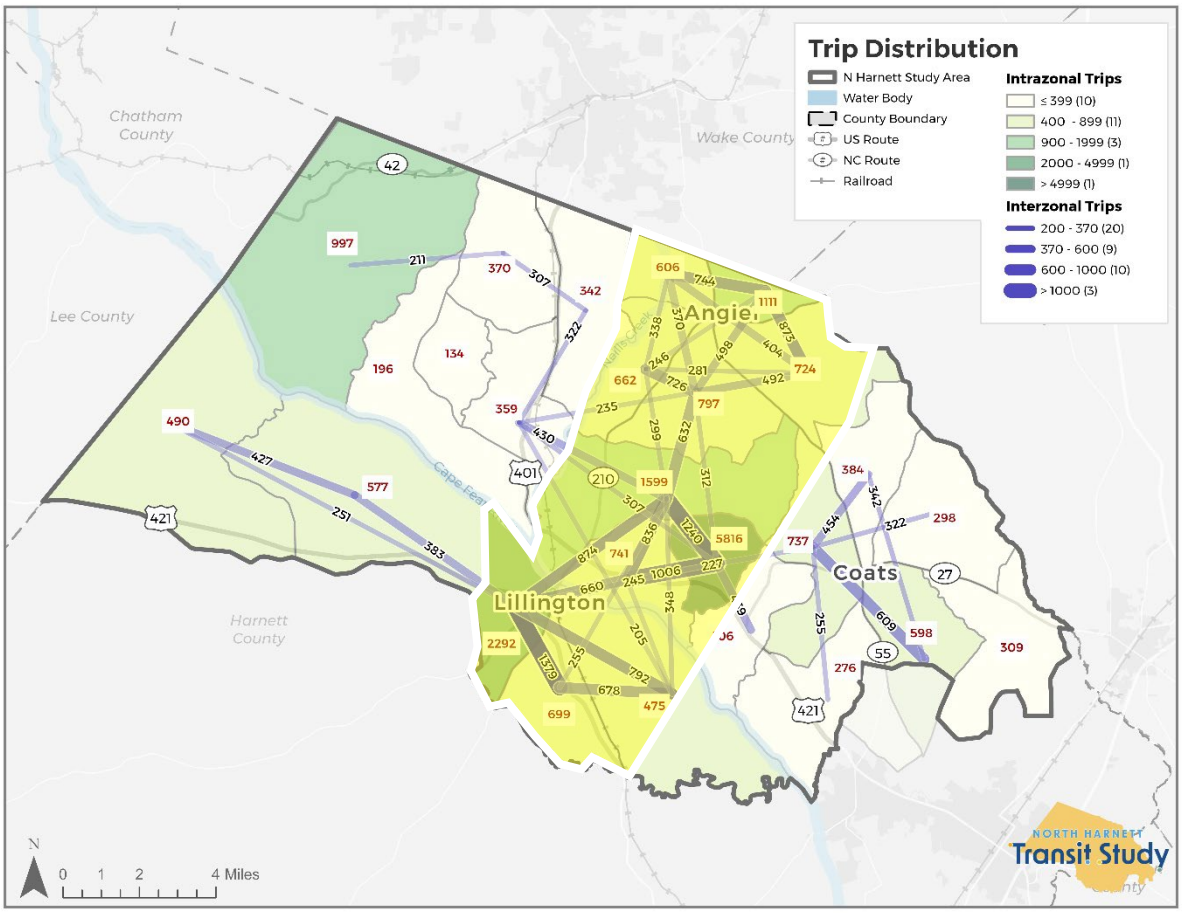


Figure 11. Intra- and Interzonal Trips

INEX Trips

INEX trips were the second most frequent trip type (35% of all trips). The majority of INEX trips traveled to Wake County, NC, of which most trips ended south of Wake Technical Community College. The majority of these trips drove alone by car (70%). Figure 12 illustrates the median travel distance and time were 14 miles and 35 minutes, respectively. Figure 13 shows the number of trips and the direction of travel outside of the Study Area. The top 3 most highly travelled places include Wake County, Johnston County, and the remainder of Harnett County. It should be noted that two-thirds of all the trips destined to Wake County ended approximately 10 miles within Wake County, roughly south of NC 540 and US 1.

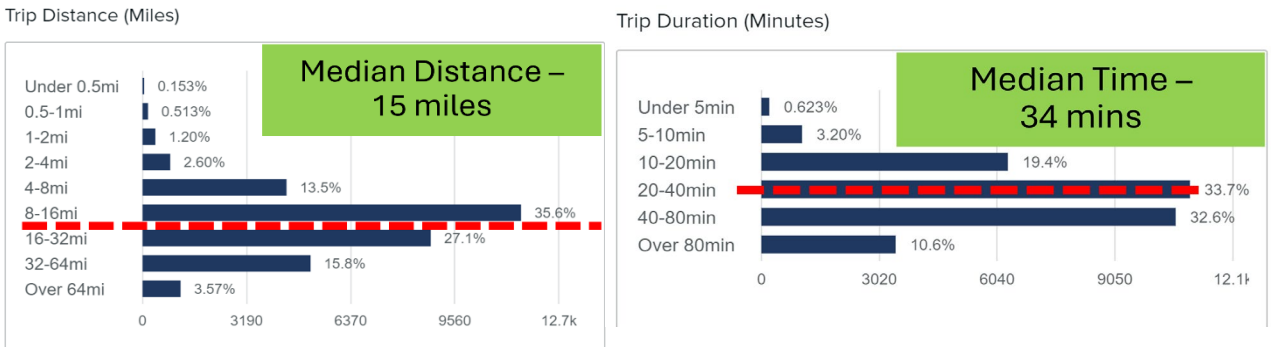


Figure 12. INEX Trip Distance and Duration

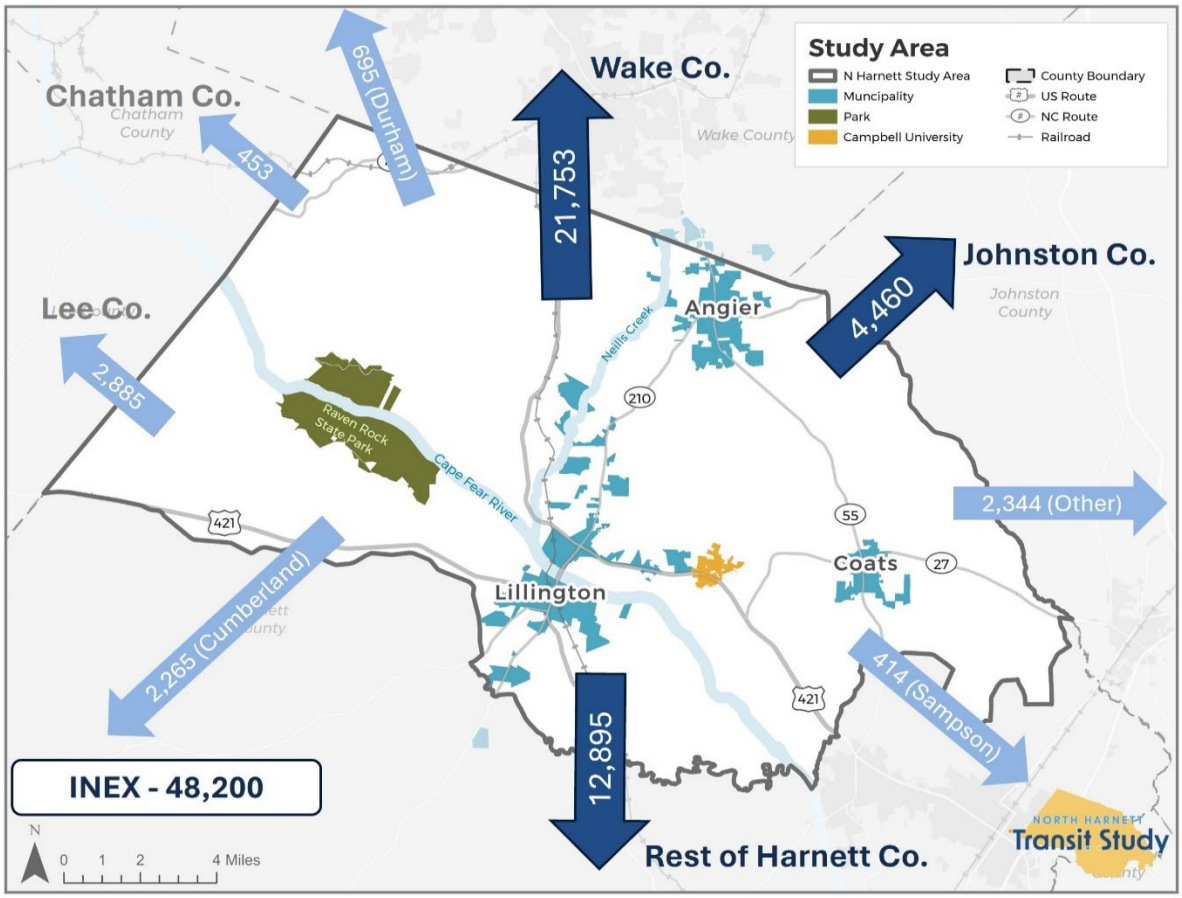


Figure 13. INEX Trip Direction

EXIN Trips

EXIN trips occurred the least (24% of all trips). The majority of the incoming trips originated from Harnett County and traveled within the Study Area, Wake County was the second most common origin. Of the EXIN trips, 70% drove alone by car. Figure 14 shows the median travel distance and time of 15 miles and 34 minutes, respectively. The three most common counties of origin for trips that travelled into the Study Area are Wake, Johnston, and the remainder of Harnett County, as shown in Figure 15.

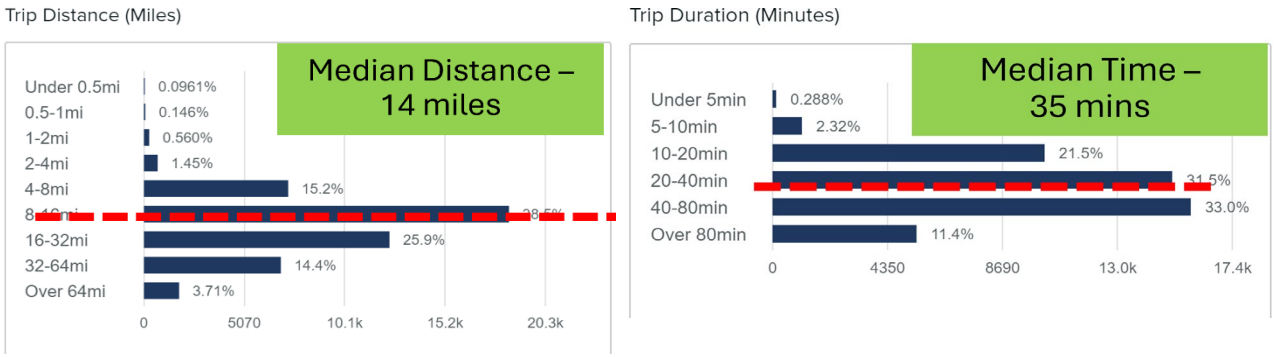


Figure 14. INEX Trip Distance and Duration

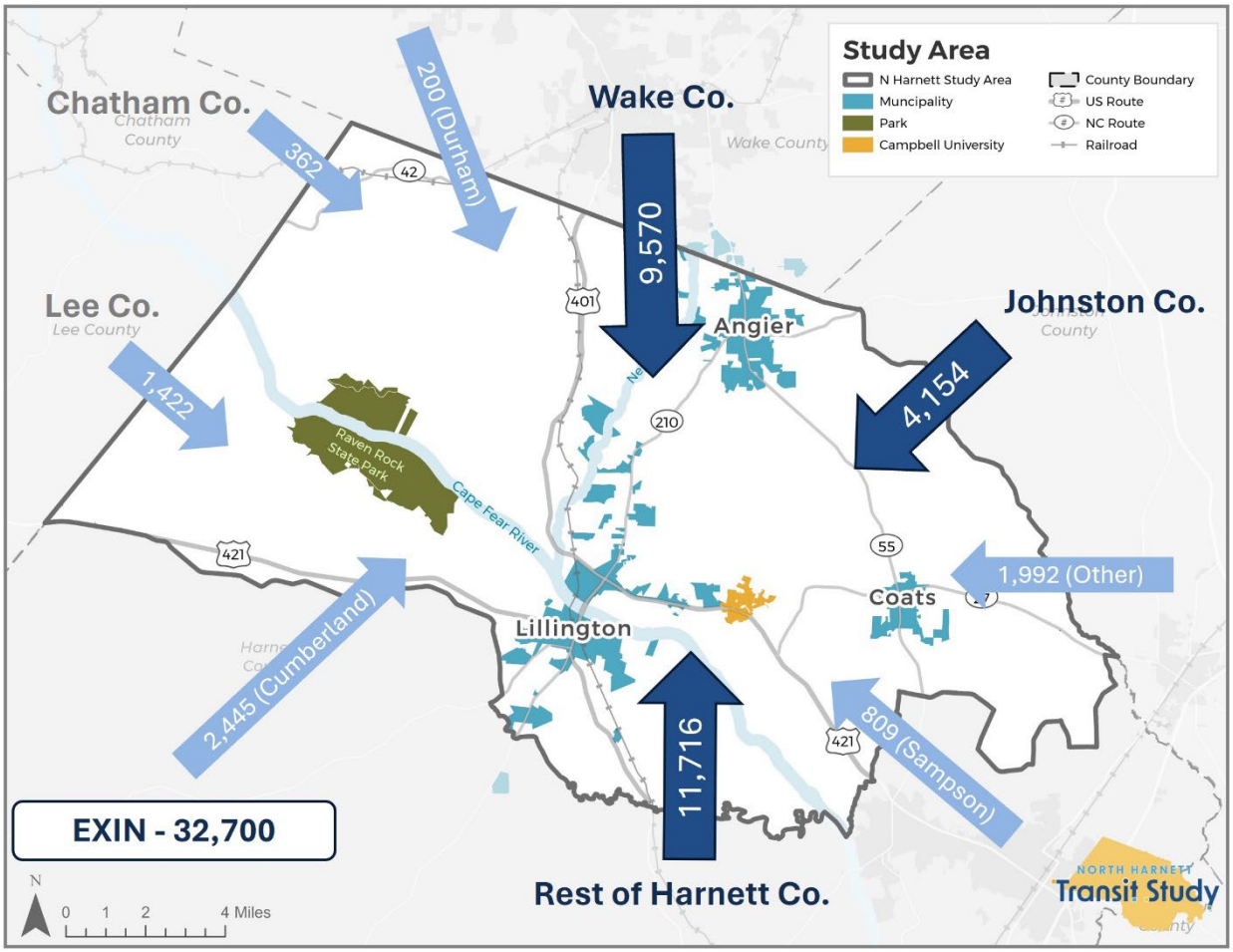


Figure 15. EXIN Trip Distribution

Key Takeaways from Trip Distribution Analysis

The travel patterns exhibited by ININ trips illustrate characteristics that are suitable to guide the first step of transit implementation in Harnett County. As the majority of ININ trips are discretionary, this allows for more flexible travel in terms of wait times as compared to the constraints from work and school travel that are most notably present in EXIN trips. Additionally, most travel is concentrated along the central band of the Study Area, as highlighted in Figure 11; this would be more conducive to deviated fixed route service along the busy corridor of NC-210. Nearly half (40%) of ININ trips are either via carpool or pedestrian as compared to the 70% who drive alone for INEX and EXIN travel, which implies a population that would have a higher proportion of beneficiaries to transit. ININ trips report the shortest median travel time and distance of the three trip types which supports short, reliable transit service to provide access to destinations that are too long to walk or bike as compared to longer distance that require more fleet to ascertain reliable trips. While INEX and EXIN trips are not ideal to form the first step of transit implementation, these trips can be addressed during subsequent phases of implementation.

Demographic Analysis

This section provides an analysis of existing population and demographic data within the Study Area. Understanding the distribution of socioeconomic markers within the area allows for transit planning that meets the needs of the most transit dependent population in the area. Population, household, and demographic data was sourced from the North Carolina Department of Transportation (NCDOT) Snapshot Tool. The tool uses block group data sourced from the American Community Survey data (ACS) 5-year estimates from the years 2017-2021. Table 1 provides additional demographic data for the 26 total census block groups (CBG) within the Study Area.

Table 1. Study Area Block Groups

Census Block Group	Total Population	Total Households	% Minority	% Below Poverty Line	% Zero Car Household	% Youth	% Elderly
370850704011	1541	688	33%	22%	7%	23%	21%
370850704012	2148	848	19%	16%	0%	26%	13%
370850704021	1999	855	58%	15%	0%	17%	14%
370850704022	1164	485	20%	15%	11%	17%	19%
370850704023	2126	888	37%	15%	3%	17%	17%
370850704024	2018	725	38%	10%	0%	25%	26%
370850707001	3450	1217	51%	11%	12%	25%	15%
370850707002	672	309	42%	15%	6%	3%	25%
370850707003	1662	308	45%	6%	0%	8%	10%
370850708011	2097	907	26%	17%	7%	24%	14%
370850708021	995	363	44%	5%	4%	6%	27%
370850708022	924	382	16%	15%	0%	15%	21%
370850708023	3334	849	24%	48%	4%	6%	3%
370850709011	3351	1149	49%	3%	4%	25%	12%
370850709021	2257	1025	26%	17%	3%	22%	25%
370850709031	2642	974	29%	8%	3%	19%	12%
370850709041	1323	567	45%	14%	10%	15%	21%
370850709042	2772	1010	37%	12%	9%	25%	11%
370850710021	2942	1147	18%	80%	3%	24%	18%
370850710022	891	341	16%	12%	0%	14%	12%
370850710031	1100	419	11%	10%	0%	19%	15%
370850710032	2234	798	12%	19%	1%	29%	17%
370850710033	444	205	0%	0%	0%	13%	0%
370850710041	1768	655	36%	12%	6%	19%	9%
370850711011	1824	641	12%	3%	7%	31%	9%
370850711012	1764	716	13%	9%	4%	20%	25%
Study Area	**49,442**	**18,471**	**31.0%**	**18.3%**	**4.4%**	**20.1%**	**15.2%**

Population

As shown in Figure 16, the Study Area has a significant variation in population density, ranging from a generally low population in the majority of the census block groups, to higher concentrations in and around the towns. The census block groups in the Study Area range from a minimum of 79 to 1,117 people per square mile as compared to the NC average of 215 people per square mile. The population is most heavily concentrated within the municipal boundaries of Angier, Coats, and Lillington, and in the vicinity of Campbell University. Additionally, population clusters can be found along major transportation corridors in the area such as NC-55, NC-27, and US-421. These routes provide internal connections throughout the Study Area and to external counties, including significant access to Wake County.

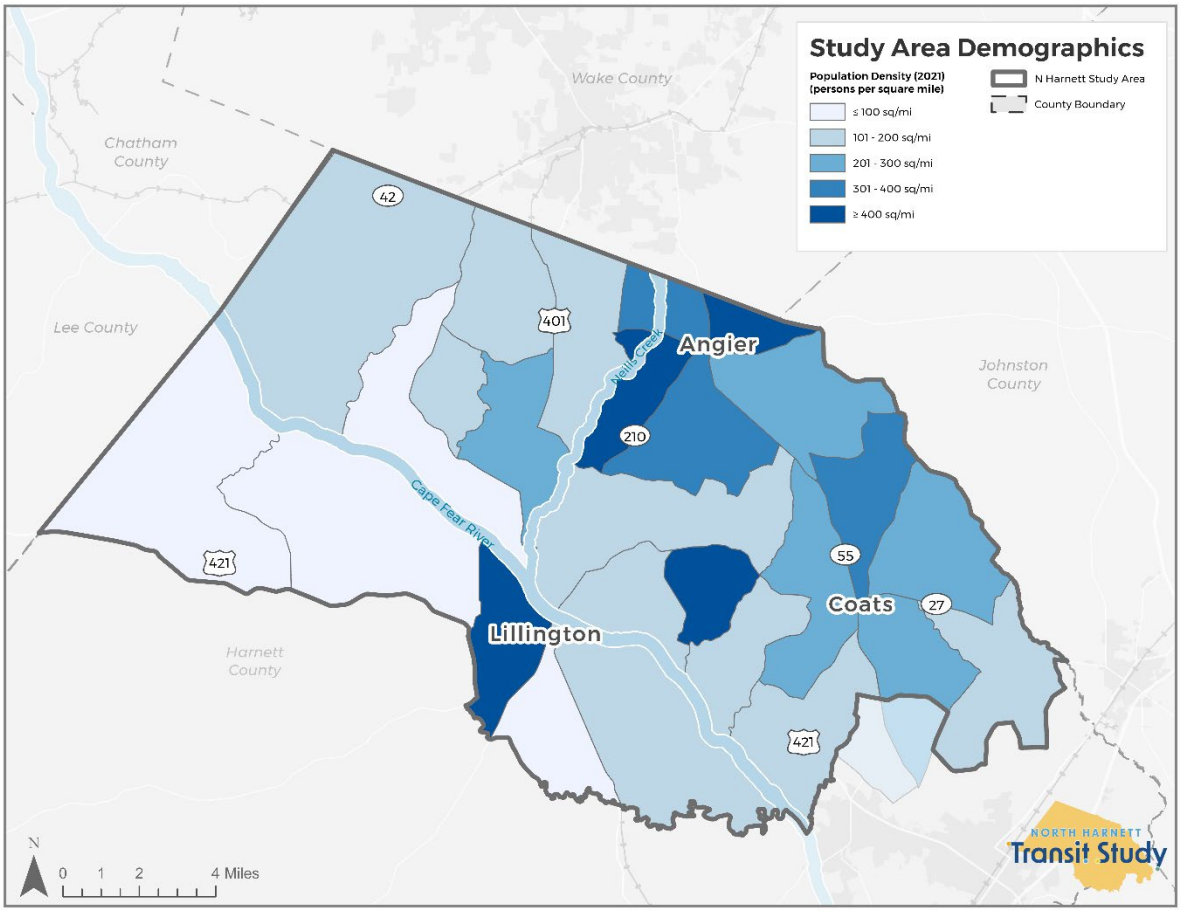


Figure 16. Population Density

Minority Population

For the purpose of this report, minority populations refer to those who do not identify as “White Alone” and includes Hispanic and Latino populations. Within the Study Area, the percentage of minority populations within a block group range from 0% to 49.7%. The Study Area overall has a minority population of 31% compared to the statewide average of 38.4%. Figure 17 identifies the minority population as primarily located east of Neill’s Creek; Northeast Angier, North Coats and West Lillington census block groups exhibit the highest concentration of minority populations.

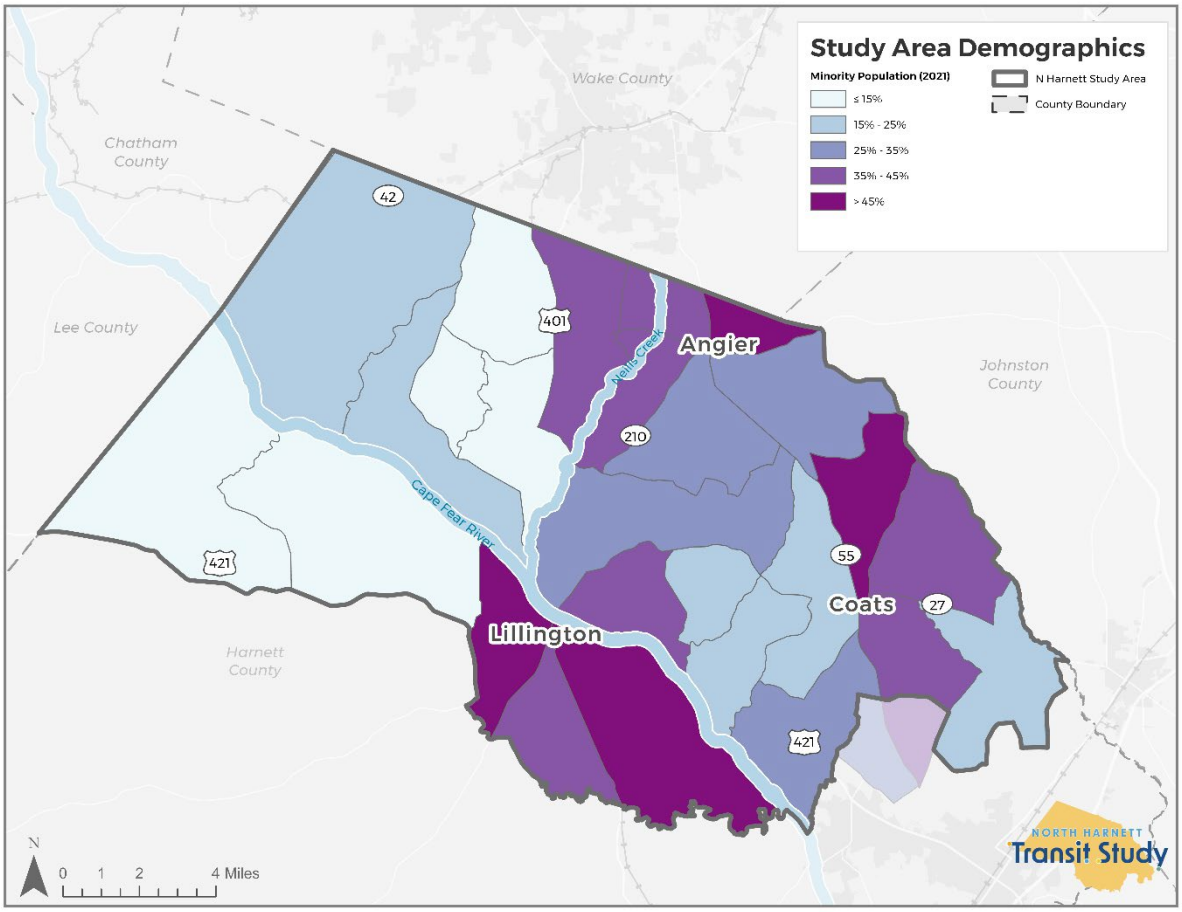


Figure 17. Minority Population

Persons Below the Poverty Line

Figure 18 highlights the persons in the Study Area with incomes that fall below the poverty line. These populations reside primarily in the eastern portion of the Study Area with the highest concentration found south of Coats around US-421 and Campbell University, which is likely made up largely by the student population. The percentage of individuals living below the poverty line in the Study Area's census block groups range from 0% to 48.4%. The Study Area overall has 18% of the population living below poverty line compared to the NC average of 13.7%.

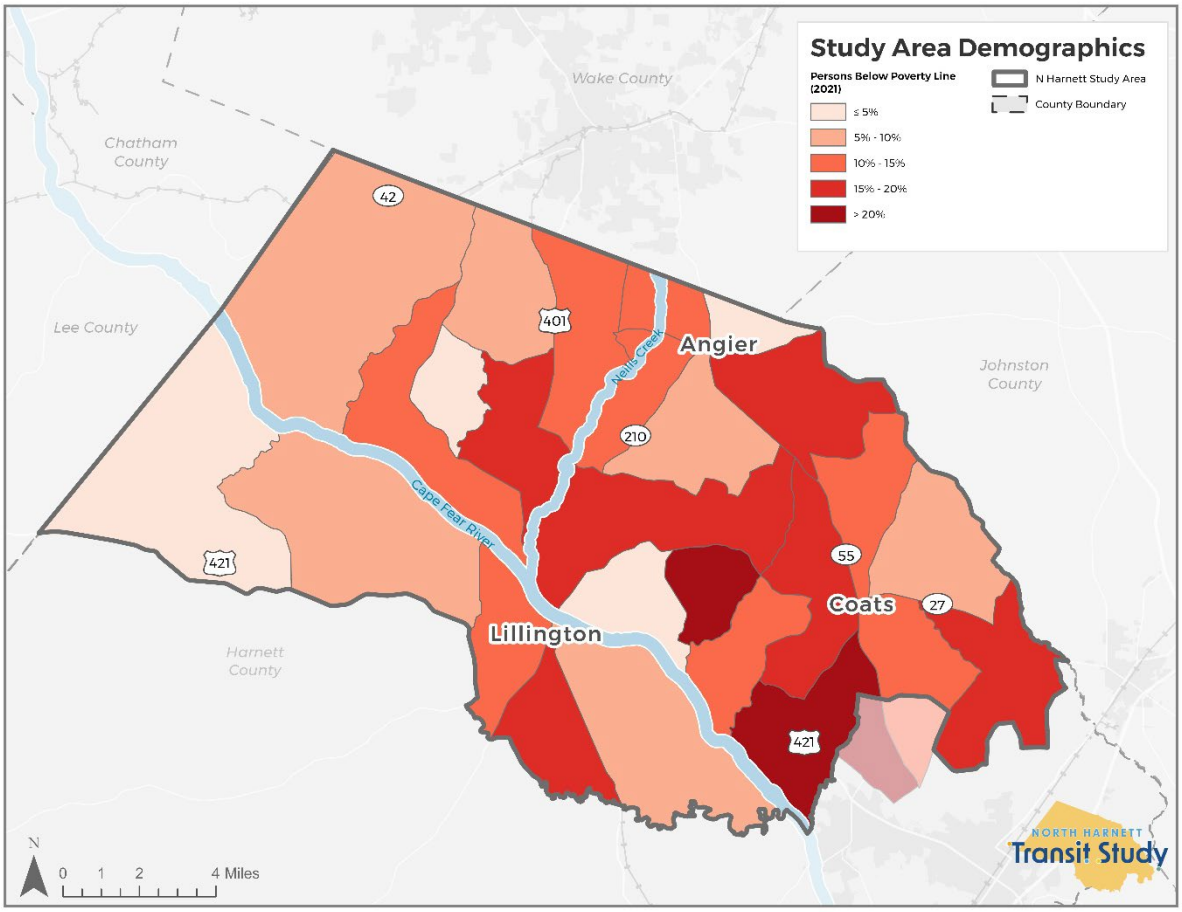


Figure 18. Persons Below the Poverty Line

Zero Car Households

The concentration of zero car households has a near even distribution in the Study Area. Figure 19 illustrates that the concentration of zero-vehicle households can be found east within Angier's and Lillington's municipal boundaries as well as the eastern most part of the Study Area. The block groups within the Study Area range from 0% to 12.1% of households without a vehicle. The Study Area has 4.4% zero-vehicle households, compared with the state average of 2.2%.

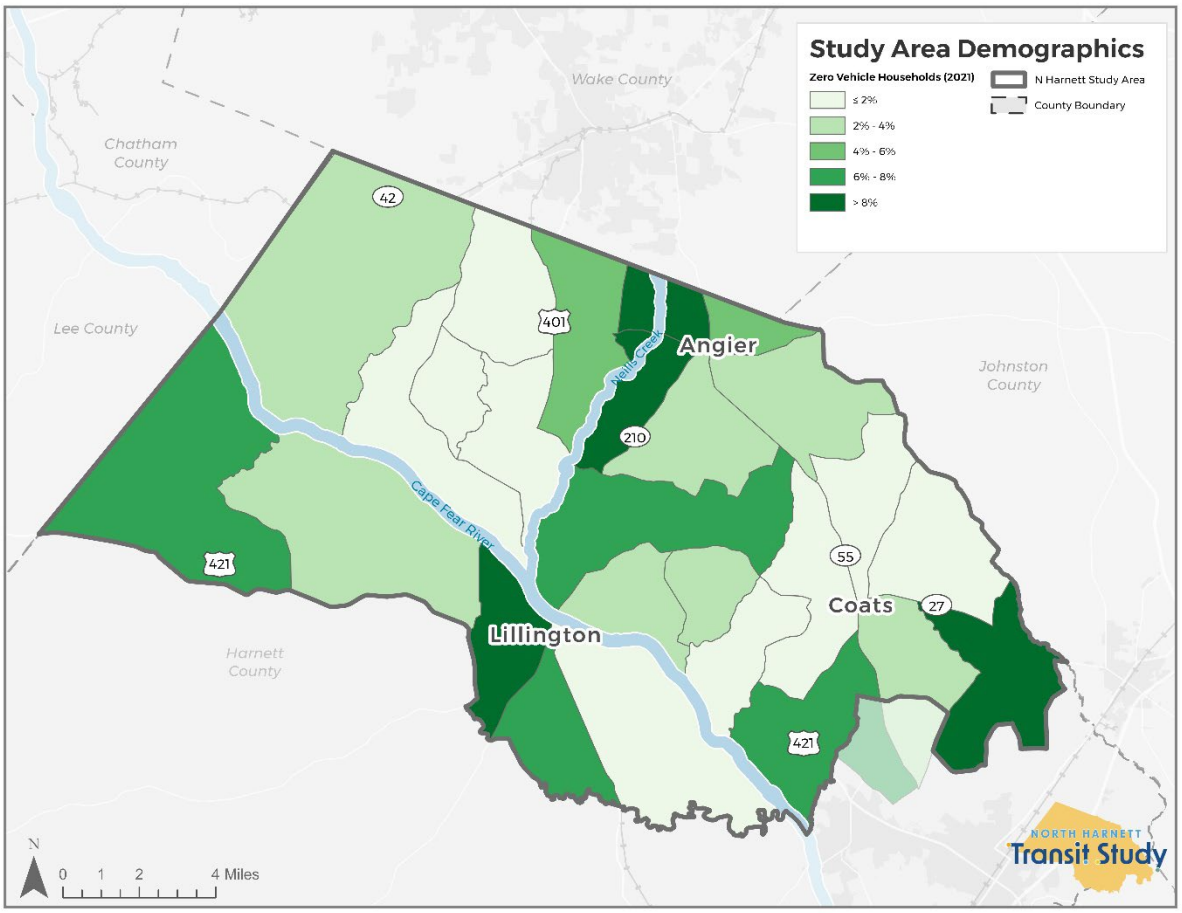


Figure 19. Zero Vehicle Households

Youth Population

This report defines youth populations as those younger than 18 years of age. Figure 20 shows the distribution of the described population is even across the Study Area. The youth population in the Study Area ranges from 2.8% to 30.8%, compared to the statewide average of 22.1%.

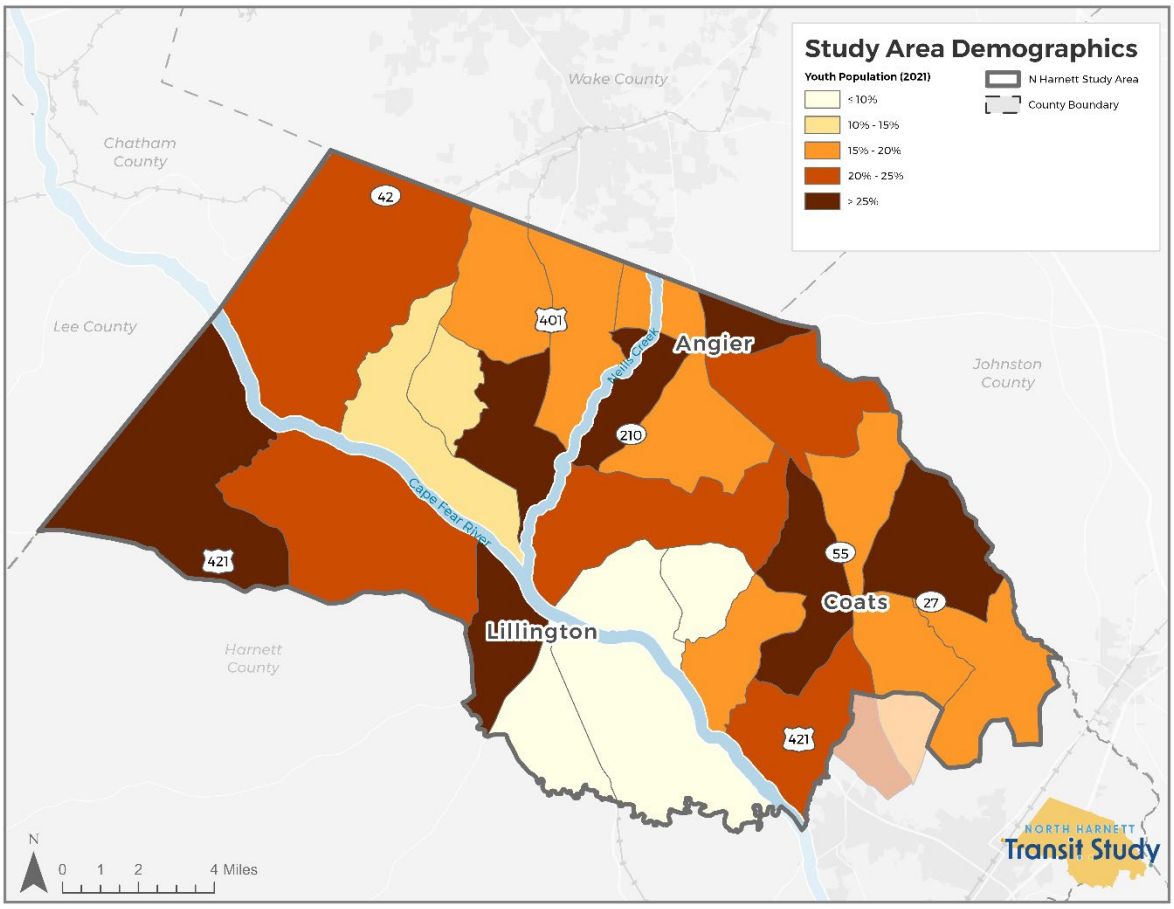


Figure 20. Youth Population

Elderly Population

The distribution of elderly population (Figure 21) - those 65 years of age or older - in the Study Area is distributed evenly across the Study Area, similar to distribution of the youth population. Census block groups range from 0% to 26.7% of elderly individuals. The statewide average for the demographic group is 16.3 %.

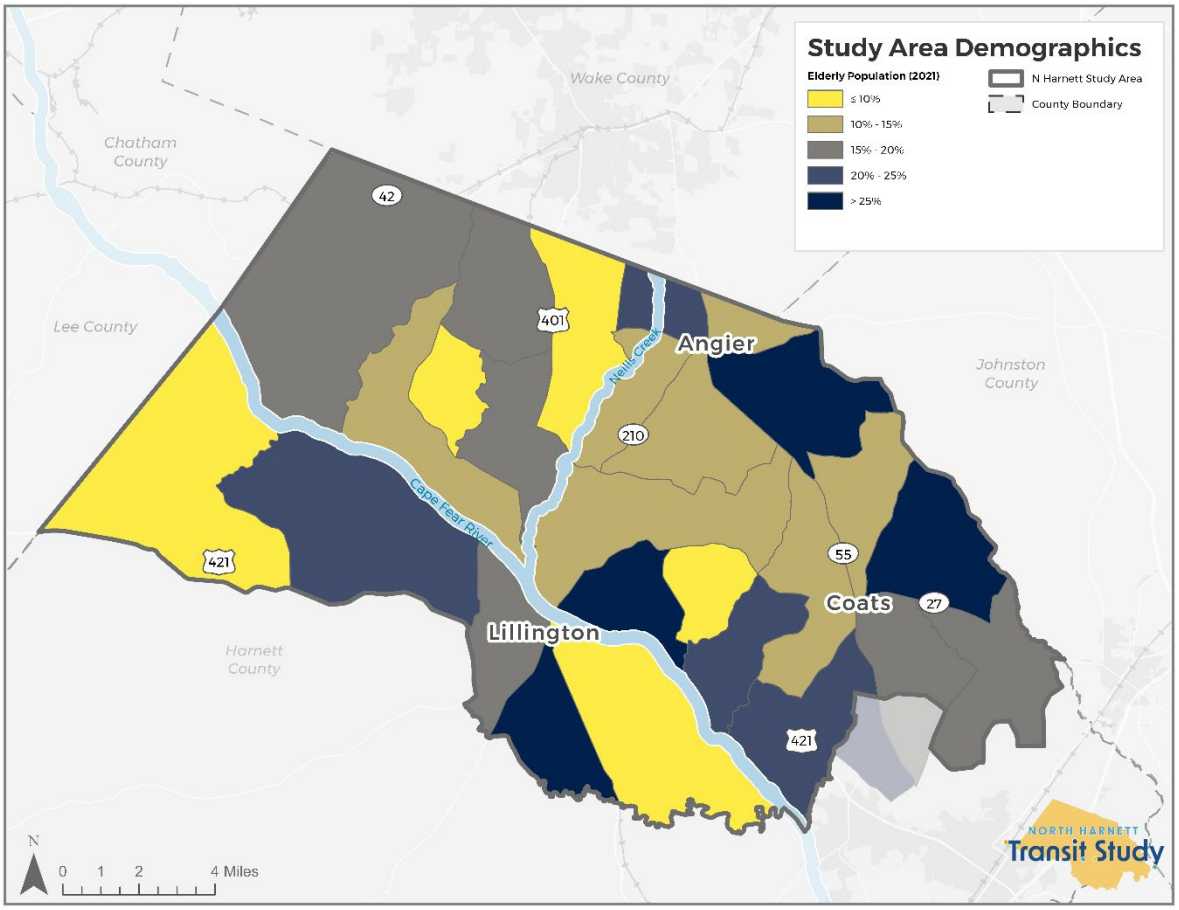


Figure 21. Elderly Population

Transit Propensity Adjustment Factor (TPAF)

Transit propensity is used to understand the likelihood of residents in an area to use transit. For this analysis, the calculation for the transit propensity utilized demographic groups described previously in this memo, on a census block group scale. The Transit propensity adjustment factor (TPAF) from the Wake Transit Plan was used for this area due to the lack of available data on the demographics of transit riders in Harnett County. The TPAF measures the relative demand for transit in different areas of the region based on demographic characteristics. Table 2 shows the transit propensity among different groups. The calculated factor number means that the group is x times more likely to use transit than the average population, with x signifying the value of the factor.

Table 2. Transit Propensity Adjustment Factor

Demographic Group	Transit Propensity
Race/Ethnicity	
White, non-Hispanic	0.5
Hispanic or Latino	1.4
Black	2.1
Native American	3.0
Asian	1.4
Other	1.6
Native/Foreign Born	
Native-Born	0.9
Foreign-Born	1.5
Poverty Level	
<100% Poverty Line	4.2
100 - 149% Poverty Line	3.4
>150% Poverty Line	0.7
Vehicle Availability	
No Vehicles	15.8
1 Vehicle	3.4
2 or More Vehicles	0.7

The resulting TPAF calculation identifies the likelihood of the block groups within the Study Area to utilize transit, if available, as compared to the general population. The NCDOT Demographic Snapshot Tool and ACS (2021) 5-year estimates were used to calculate the TPAF. The propensity is captured independent of population and employment density. The calculation for transit propensity represents an aggregation across multiple socio-demographic groups. The TPAF calculation considered race/ethnicity, native/foreign born residents, poverty level, and vehicle availability.

Figure 22 shows that the block groups inside and surrounding Lillington, Angier, and Coats exhibit higher TPAF than the rest of the Study Area. When considering transit for the Study Area, understanding the potential for residents to use transit across the Study Area is critical to establishing a system that efficiently serves those that would benefit from it the most.

Due to data limitations, the populations for native-born and foreign-born populations were extrapolated from the census tract level and applied to a census block group level.

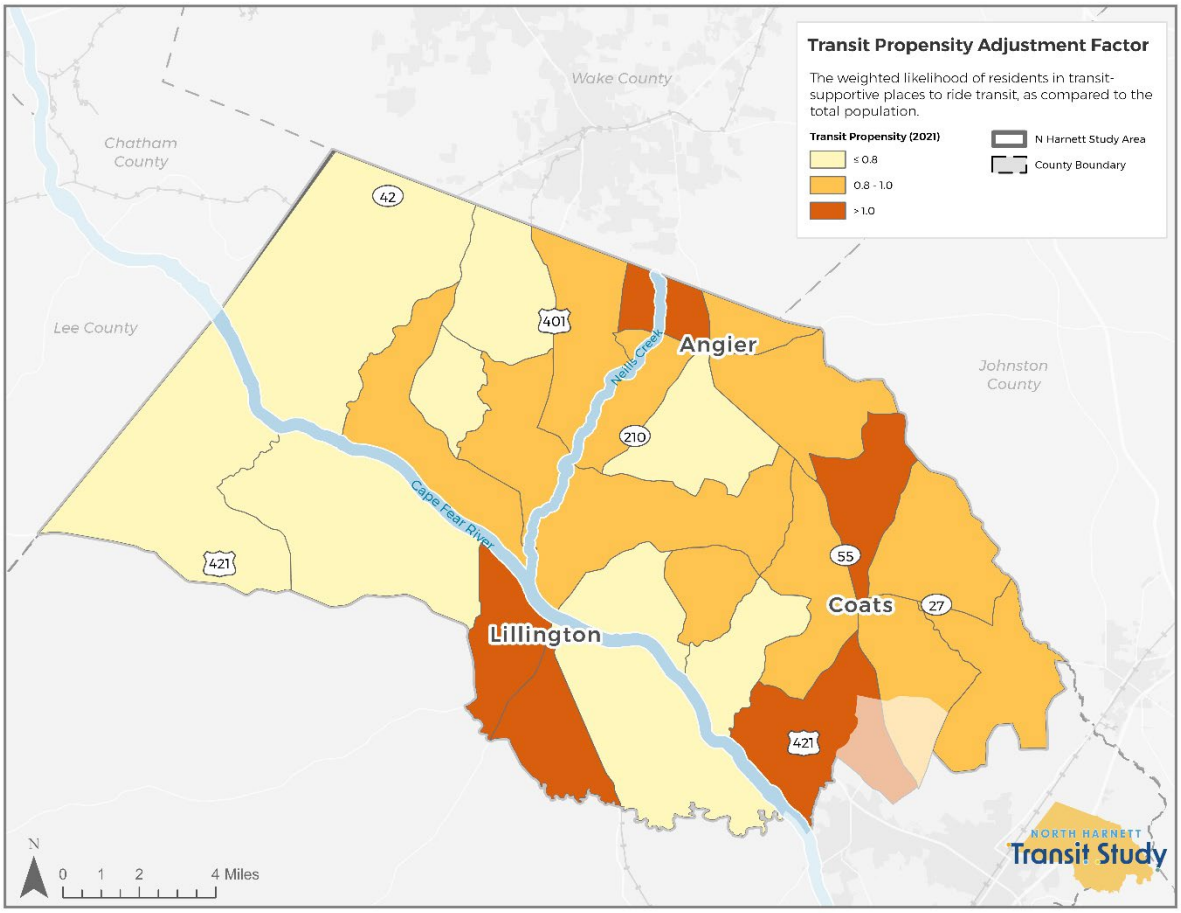


Figure 22. Transit Propensity

Conclusion of Findings

The existing conditions captured in this report illustrate North Harnett County's potential demand for implementing new transit services in the area. The analysis of the demographic distribution and transit propensity in the Study Area displays a higher concentration of populations within the eastern portion of North Harnett County that would likely have the greatest benefit from the mobility and access provided by new transit services. Any new transit services have the opportunity to enhance regional connectivity to the Triangle by connecting to existing and planned regional transit services. The travel patterns unveiled in this report highlighted the need for transit planning to consider the most important destinations for riders and meets their travel needs. These findings, along with additional review of land use and public engagement, will contribute to the holistic understanding of how transit can best serve North Harnett County.

NORTH HARNETT

Transit Study

Technical Memoranda

MEMO 2:

Land Use and Policy Analysis

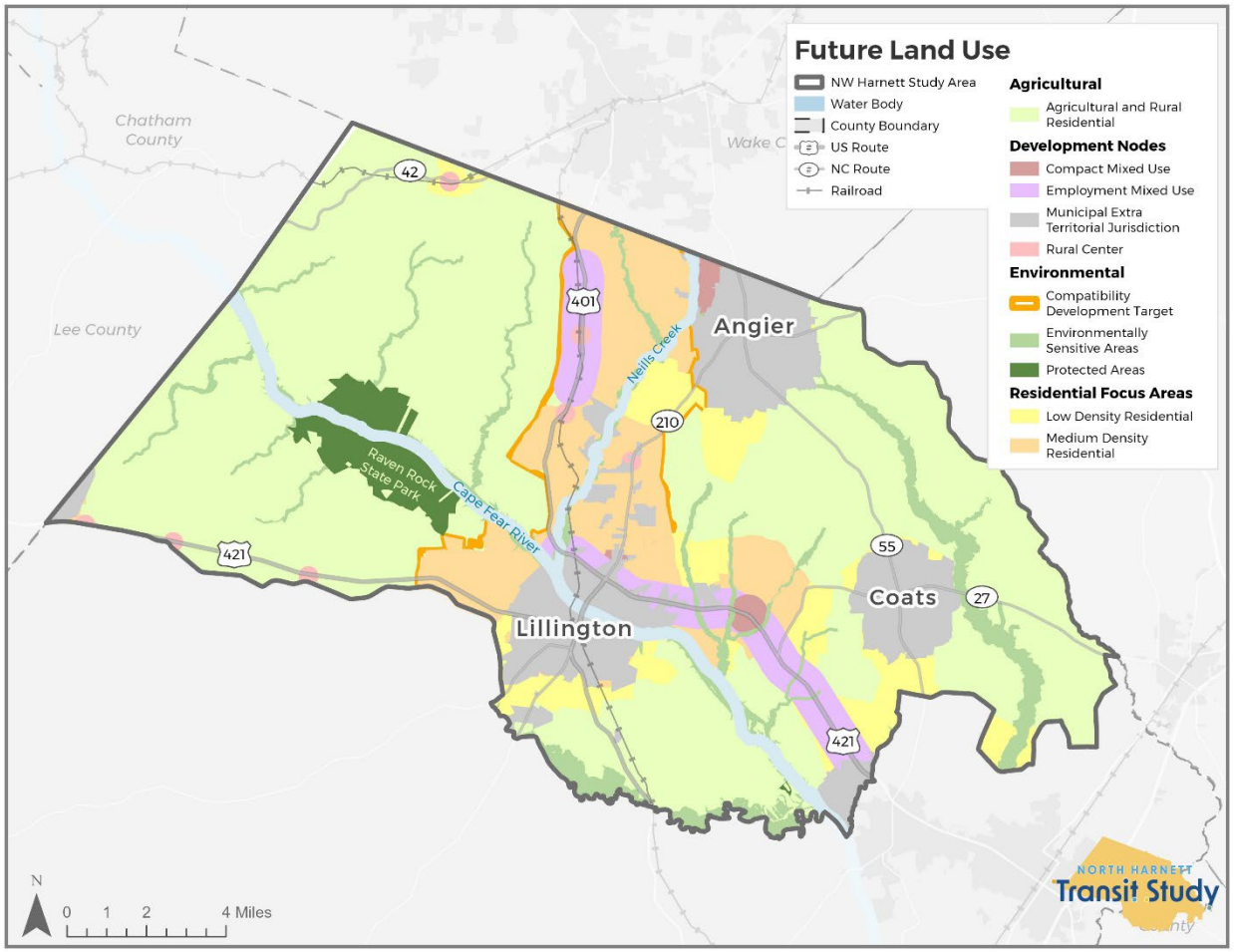
Transit Supportive Land Use Strategies Memorandum

Table of Contents

Introduction

This memo offers a summary of the review and assessment of existing land use development policies in Harnett County to understand the general transit-supportiveness of existing policies and codes. This memo also provides various strategies to consider to make the County, and primarily certain areas of the County more transit-supportive. The land use assessment involved a review of the Harnett County Unified Development Ordinance (UDO), most recently amended in October 2023.

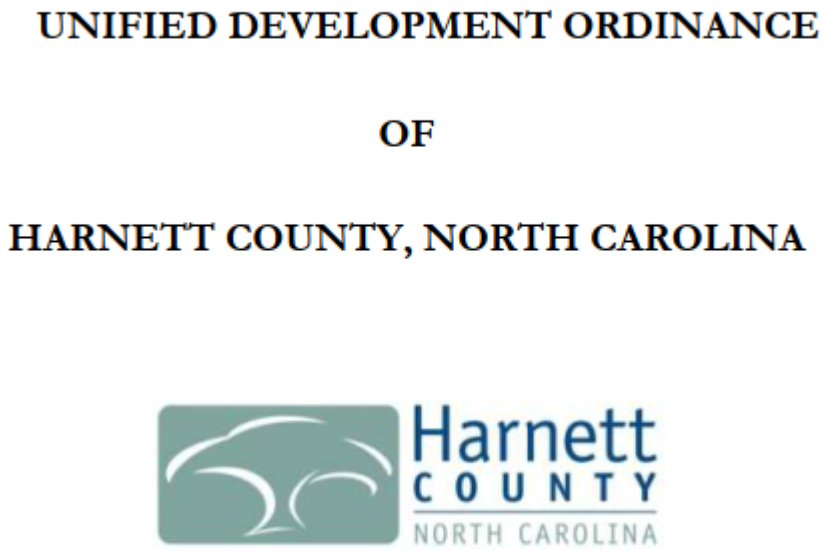
The figure below shows the Future Land Use map based on the comprehensive plan adopted by Harnett County in 2016. The map shows that majority of the development is planned to be concentrated along the central band of the study area, between US 401 and NC 210. Additional commercial corridors are planned along US 421.



Review and Assessment of Harnett County Unified Development Ordinance

Transit-Supportive Assessment Introduction

A review of the Harnett County Unified Development Ordinance (UDO), most recently amended in October 2023, was undertaken to understand its general level of transit-supportiveness. In order to assess the UDO's transit-supportiveness, a spreadsheet was prepared that scores each zoning district based on requirements that are widely accepted across the country to be supportive of enhanced transit.



The following zoning districts in the Harnett County UDO were assessed:

- Industrial District – IND
- Light Industrial – LI
- Commercial – COMM
- Office & Institutional – O&I
- Residential/ Agricultural District – RA-20M
- Residential/ Agricultural District – RA-20R
- Residential/ Agricultural District – RA-30
- Residential/ Agricultural District – RA-40
- Conservation – CONS
- Highway Corridor Overlay District – HCO
- Military Corridor Overlay District – MCO

- Planned Unit Development – PUD

The Highway Corridor Overlay District was created to provide enhanced and contextual building design, uniform landscaping, specific development standards, and vehicular access control measures for development within a corridor. There are two corridors identified as falling under the Highway Corridor Overlay District:

- Highway 87 Corridor – which aims to create an attractive gateway that supports traffic patterns along NC 87 in Harnett County.
- "Ed-Med" Highway Corridor – which aims to create specific development standards that are applicable only to certain areas along US 421 in Harnett County's jurisdiction between the Town of Lillington and the Town of Erwin. Within the "Ed-Med" Highway Corridor are two distinct sub-areas:
    - Campus Sub-Area – which recognizes the unique character and interrelated development in proximity to Campbell University.
    - Airport Sub-Area – which lies in the vicinity of the Harnett County Regional Jetport to provide protection from encroachment of incompatible development to airport operations.

Transit-Supportive Assessment Methodology

The elements that were used in factoring transit-supportiveness for Harnett County UDP zoning districts include:

- Building Form
    - Activated ground floor space facing existing or potential transit corridors.
    - Upper floor uses.
    - Standards to minimize impacts of auto-dependent uses.
    - Standards to minimize impacts of drive-thru facilities.
    - Allows for a mix of uses, including residential, retail/ restaurant, institutional, and commercial uses.
    - Allows for live/work units or flex-space.
- Lot Coverage
    - No to minimal front and side yard setbacks (build-to line).
    - No to minimal required lot size.
    - High percentage of building lot coverage.
- Active Transportation
    - Wide sidewalks (greater than 6 feet) along frontage facing existing or potential transit corridors.
    - On-site pedestrian and bicycle facilities.
- Access to Transit
    - Buildings are oriented toward transit stops.
    - Plazas and open space are pedestrian friendly and easily accessible to/from transit.
- Streetscape (Building Line to Edge of Pavement)
    - Public realm improvements or amenity zone adjacent to transit corridor.
    - Public seating areas.
    - Pedestrian scale lighting and signage.
    - Planting of trees and/or placement of shade structures along sidewalks and in pedestrian plazas.

    - Art component integrated on-site.
- Parking
    - Parking is located behind buildings, underground, or incorporated into building, but not as building frontage.
    - On-street parking is provided where appropriate.
    - No minimum parking requirements.
    - There is a maximum parking requirement.
    - Provides for shared parking.
- Layout
    - Access control to minimize number of driveways accessing adjacent roadways.
    - Large developments are broken up by streets into pedestrian-scaled blocks.

Included in the Appendix is a matrix outlining the scoring of transit-supportiveness categories for each zoning district. Within the body of the matrix are values from 0 to 2 that were used to evaluate the transit-supportive elements of the specific zoning district (0 = that element is not permitted or restricted, or isn't specifically mentioned, 1 = element isn't restricted but zoning code does not have specific language surrounding it, meaning it is permitted but not required, and 2 = the element is required).

The "summary" column provides a summation of the transit-supporting values for each zoning district. The sum of the transit supportive values places each zoning district into a category as follows:

Assessment Score	Level of Transit-Supportiveness
30+	Most Transit Supportive
20-29	Transit Supportive
10-19	Less Transit Supportive
<10	Not Transit Supportive

Note: Out of 50 Possible Points

Results of Transit-Supportive Assessment

The below table summarizes the transit-supportiveness of each zoning district reviewed and assessed.

Zoning Code	Zoning District	Transit-Supportive Score
IND	Industrial District	9
LI	Light Industrial	9
COMM	Commercial	13
O&I	Office & Institutional	15
RA-20M	Residential/ Agricultural District RA-20M	9
RA-20R	Residential/ Agricultural District RA-20R	9
RA-30	Residential/ Agricultural District RA-30	9
RA-40	Residential/ Agricultural District RA-40	9
CONS	Conservation	5
HCO	Highway Corridor Overlay District	23
MCO	Military Corridor Overlay District	10
PUD	Planned Unit Development	20

Based on the transit-supportive assessment of zoning districts, the Highway Corridor Overlay District and Planned Unit Development district score the best for being transit-supportive. These would be expected to be the most transit-supportive districts since the intent of each is to produce high-quality, more mixed-use development. The Commercial, Office & Institutional, and Military Corridor Overlay Districts fall under the Less Transit Supportive scoring. The Military Corridor Overlay is not intended to be transit-supportive, as it is meant to reflect the context-sensitivity of the Fort Liberty Base. There likely can be some improvements made to the Commercial and Office & Institutional districts since each attract working class who may require alternative transportation. The other industrial and residential districts typically don't score well because of their lower density, lack of mixed-uses, and sensitivity to their respective users.

Transit-Supportive Strategies to Consider

Based on the assessment in the previous section, the implementation of transit-supportive land use strategies should be focused on the areas of Harnett County that will support the growth of employment, retail and service sector, medical and education, and higher density housing uses that are more likely to generate transit demand. Implementing transit-supportive land use strategies comes with a two-pronged approach:

1. Focus on improving the transit-supportive policies of existing zoning districts in the updated UDO that can begin as a starting point for improving transit-supportiveness. These would include the Commercial, Office & Institutional, Highway Corridor Overlay, and PUD districts.
2. Focus on improving the transit-supportiveness of areas outlined in the Future Land Use Map as Compact Mixed Use or Employment Mixed Use. This would be done by either expanding the Commercial, Office & Institutional, and/or Highway Corridor Overlay districts to cover these future land use areas, creating a new Mixed Use district, or by implementing a new transit overlay district to mesh with Compact Mixed Use and Employment Mixed Use areas of the Future Land Use Map.

These areas are identified throughout this memo as "Transit-Supportive Focus Areas."

Strategies to improve the transit-supportiveness of Harnett County are focused on Building Form, Lot Coverage, Active Transportation, Access to Transit, Streetscape, Parking, and Layout to match the elements that went into the assessment of UDO districts discussed previously. The following matrix lays out several strategies that can be adopted and implemented by Harnett County to begin building a transit-supportive environment.

UDO Category	Transit-Supportive Strategy	Description
Building Form	Expand Permitted Uses	Expand the list of Permitted Uses in Table 1.2 to allow Multifamily Residential uses as permitted by right in the COMM district, and eventually expand to the focus areas of transit-supportive development. Require Special Use Permit for Vehicle Services uses in the COMM and O&I districts to ensure compliance with creating a walkable environment. Amongst the Permitted Uses should be the allowance for mixed uses on the same site as well as within a single building. Permitting upper floor residential, live/work spaces, and flex spaces improves activation near transit.
	Activation of Building Frontage	Building upon the HCO district which requires that buildings front major thoroughfares and contain façade features that break long expansive walls, require all buildings fronting major thoroughfares at

UDO Category	Transit-Supportive Strategy	Description
		Compact Mixed Use and Employment Mixed Use nodes (identified in the Future Land Use Plan) to contain active building frontage and design features that create a storefront streetscape. Including activation elements such as business entries, patios, shopfront windows, public art, etc. help create a comfortable environment for pedestrians and transit riders.
	Reduce Impact of Drive-Thru Facilities	The language for drive-thru facilities outlined in the HCO district should be applied to all of the focus areas of transit-supportive development.
Lot Coverage	Minimal Front and Side Setbacks	Building a transit-supportive environment requires creating a streetscape consisting of minimal front setbacks where the build-to line follows a sidewalk. Where a roadway is proposed for widening, the build-to line should reflect the future right-of-way needs. Minimizing or allowing zero side setbacks allows for the close placement of buildings needed to build a continuous streetscape and avoid large gaps that deteriorate walkability.
Active Transportation	Require On-Site Bicycle Facilities	At a minimum, require development in the transit-supportive focus areas to contain dedicated bike parking. Additionally, in the Compact Mixed Use and Employment Mixed-Use nodes of the Future Land Use Plan, require development to incorporate additional bicycle facilities, such as personal storage, repair station, connectivity to bike paths, lighting, etc.
	Require Wide Sidewalks	Follow HCO district guidelines and require 10’ wide sidewalks along major thoroughfares in all transit-supportive focus areas.
Streetscape/ Placemaking	Require an “Amenity Zone”	Upon completion of the NW Harnett County Transit Feasibility Study, the UDO should reflect a requirement to place amenity zones at nodes where transit is proposed to service. The amenity zone can include seating, lighting, landscaping, public art, information signage, and other amenities that would generate a comfortable transit use experience.

UDO Category	Transit-Supportive Strategy	Description
Parking	Remove Minimum Parking Requirements in Focus Areas	Table 1.2 Use Types & Regulations of the UDO establishes minimum parking requirements for uses permitted by right and special use permit uses. Establishing minimum parking requirements forces developers to dedicate space to vehicles rather than allowing the market to dictate parking. Removing parking minimums in focus areas along with allowing for shared parking and establishing parking maximums will help reduce the amount of land area dedicated to parking. Allow parking to be met through shared parking agreements and/or on-street parking.
Layout	Require Pedestrian-Scaled Development	Building upon the guidance in the HCO district, incorporate pedestrian-scaled requirements into all transit-supportive focus areas. This would entail pedestrian-scaled blocks and building frontages that encourage the creation of walkable streetscapes rather than long blocks and building frontage that lend themselves to automobile use.
Transit-Supportive Incentives	Density Bonus	The use of a density bonus can be used to encourage developers to build more transit-supportive projects. Density bonuses can be used to allow increased density, building height, and/or lot coverage in exchange for additional transit-supportive amenities. A transit-supportive density bonus is usually applied at a major transit stop or transfer location.

Next Steps

Harnett County adopted the Harnett Horizons 2040 Comprehensive Land Use Plan on April 29, 2025, which introduces higher density in certain 'nodes' within the County. This increase in density would positively impact transit within the study area. As next steps towards implementing transit-supportive land use policies, Harnett County can take the following actions:

1. ***Review Transit-Supportive Strategies to determine a timeline for implementation.*** The desire to become a more transit-supportive community is a good first step. Not all communities are ready to implement transit-supportive strategies across the board, or to a great extent until transit is in

place. As a starting point, Harnett County should identify which strategies have the public and elected official support to move forward.

2. ***Incorporate transit-supportive focus areas and language into the update of the Comprehensive Plan.*** Harnett County is in the process of updating its Comprehensive Plan, with completion expected in summer 2024. The Comprehensive Plan should include transit-supportive strategies that will guide future UDO updates and identify areas where transit-supportive policies should be implemented. Creating transit-supportive development aligns with the County's vision to develop "15-minute communities".
3. ***Revise UDO to include transit-supportive standards.*** Harnett County just recently updated their UDO and there are many features of the Highway Corridor Overlay district that begin to enhance transit-supportiveness. There are still several revisions that could be made to the UDO that would make certain areas that are the focus of more intense, mixed uses more transit supportive.

NORTH HARNETT

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MEMO 3:

Service Area and Demand Determination

Service Area and Demand Memorandum

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Introduction

The proposed service area is located within the central area of the North Harnett County Study Area, capturing Angier, Coats, and Lillington. The area is approximately eight-six (86) square miles and includes the majority of the named municipalities. Identification of the service area allows for a more focused evaluation of transit service options to improve access and mobility throughout the community.

The service area was designed based on analyses of demographics, key destinations, key employers, as well as input from the community. Using trip distribution patterns, the service area captures common travel patterns in the area. Community feedback, including the target demographic for transit service and locations served, also informed the proposed service area to fit the community's needs. The proposed service area also aims to complement and enhance the existing Harnett Area Rural Transit System (HARTS). This comprehensive approach effectively addresses both quantitative insights and local desire to improve access and mobility in the area.

Figure 1 highlights the proposed service area within the Study Area.

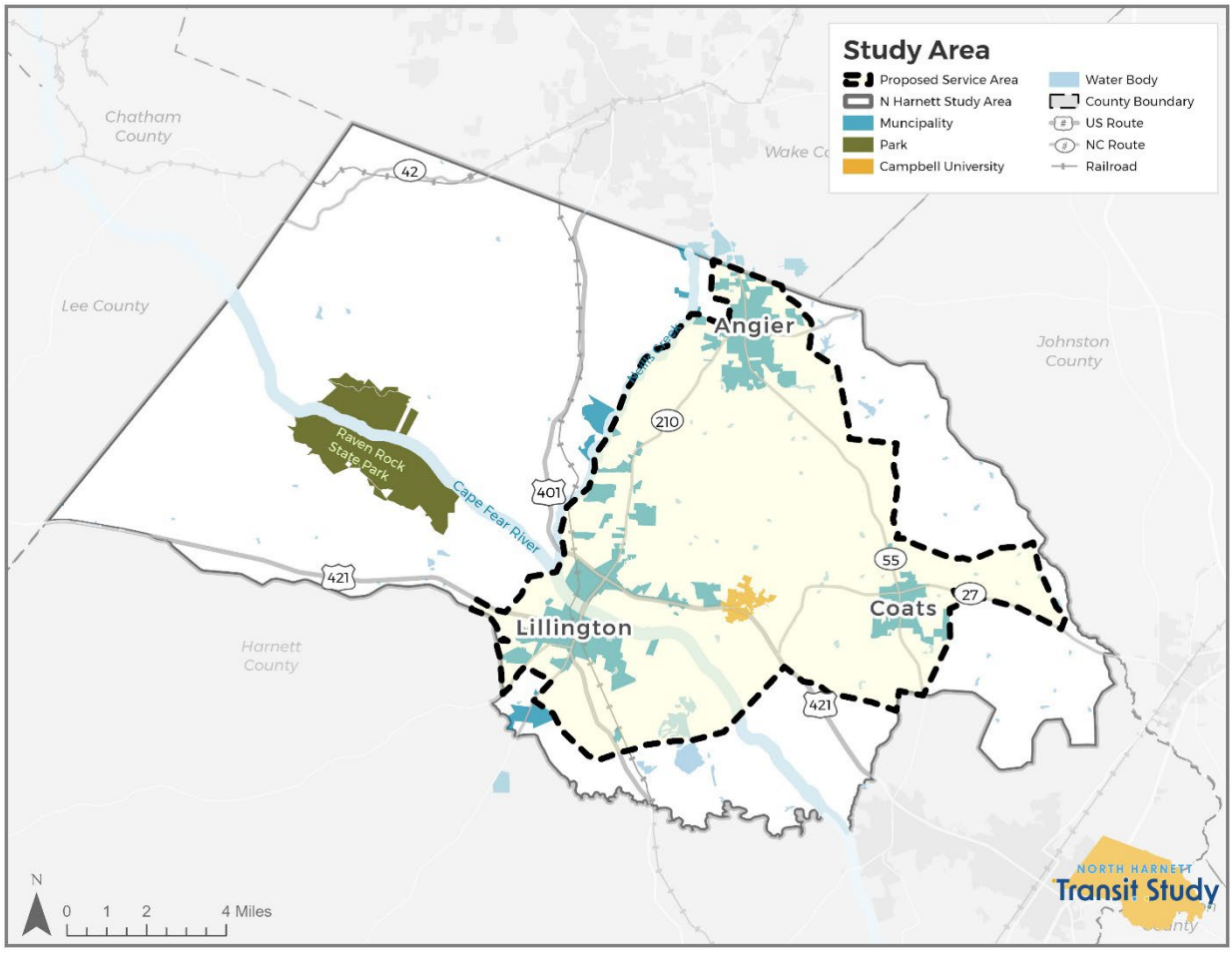

Figure 1. North Harnett Proposed Service Area

Service Area Coverage

Major factors that contributed to the design of the proposed service area include existing conditions related to key destinations within the Study Area, trip distribution, and ridership patterns for existing transit. These highlight areas where there is existing ridership today and where there is a desire for transit service.

Key Destinations and Employment Locations

The proposed service area is anticipated to provide significant coverage to important destinations and notable employers within the Study Area. Identified in the previous Transit Analysis memo, key destinations such as dialysis centers, senior centers, and Central Carolina Community College (Harnett Main Campus) are served by HARTS, but other identified key destinations such as grocery stores/shopping centers, government services, hospitals, and recreational locations are destinations where the community would benefit from transit service. These eighteen (18) destinations are spread across the proposed service area with a significant concentration in and around Lillington. These destinations are essential to include in the service area due to the social, educational, and recreational opportunities they provide. Figure 2 shows the key destinations relative to the proposed service area.

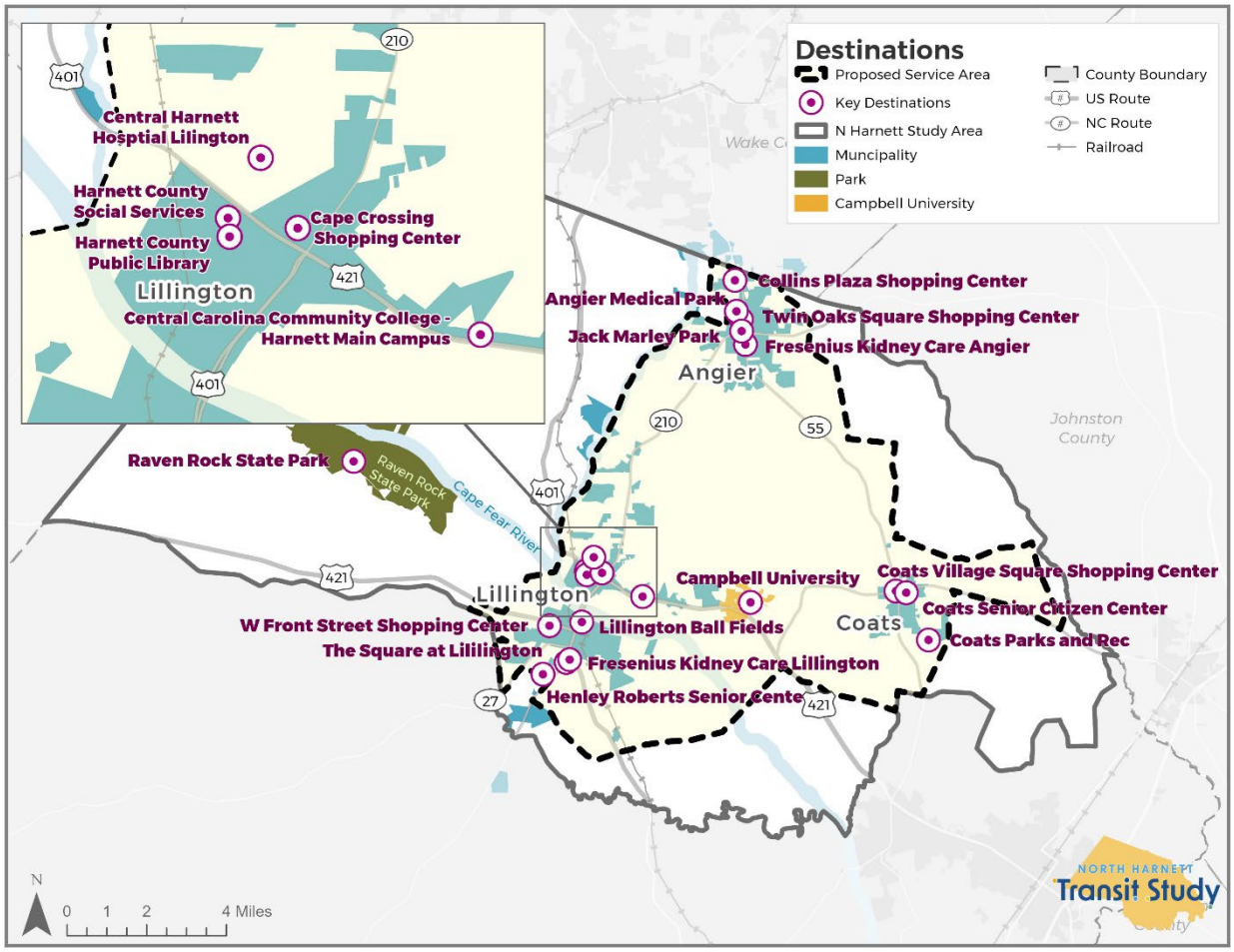

Figure 2. Key Destinations

Dispersed throughout the proposed service area, there are fourteen (14) key employers that support the economic well-being of the County. As described in the Transit Analysis memo, key employers in the area can be categorized as retail, civic, medical, commercial, or recreational centers. Employment opportunities are primarily located within municipal boundaries of Angier, Coats, and Lillington, with the greatest number found within Lillington.

Figure 3 highlights the key employment destinations within the proposed service area.

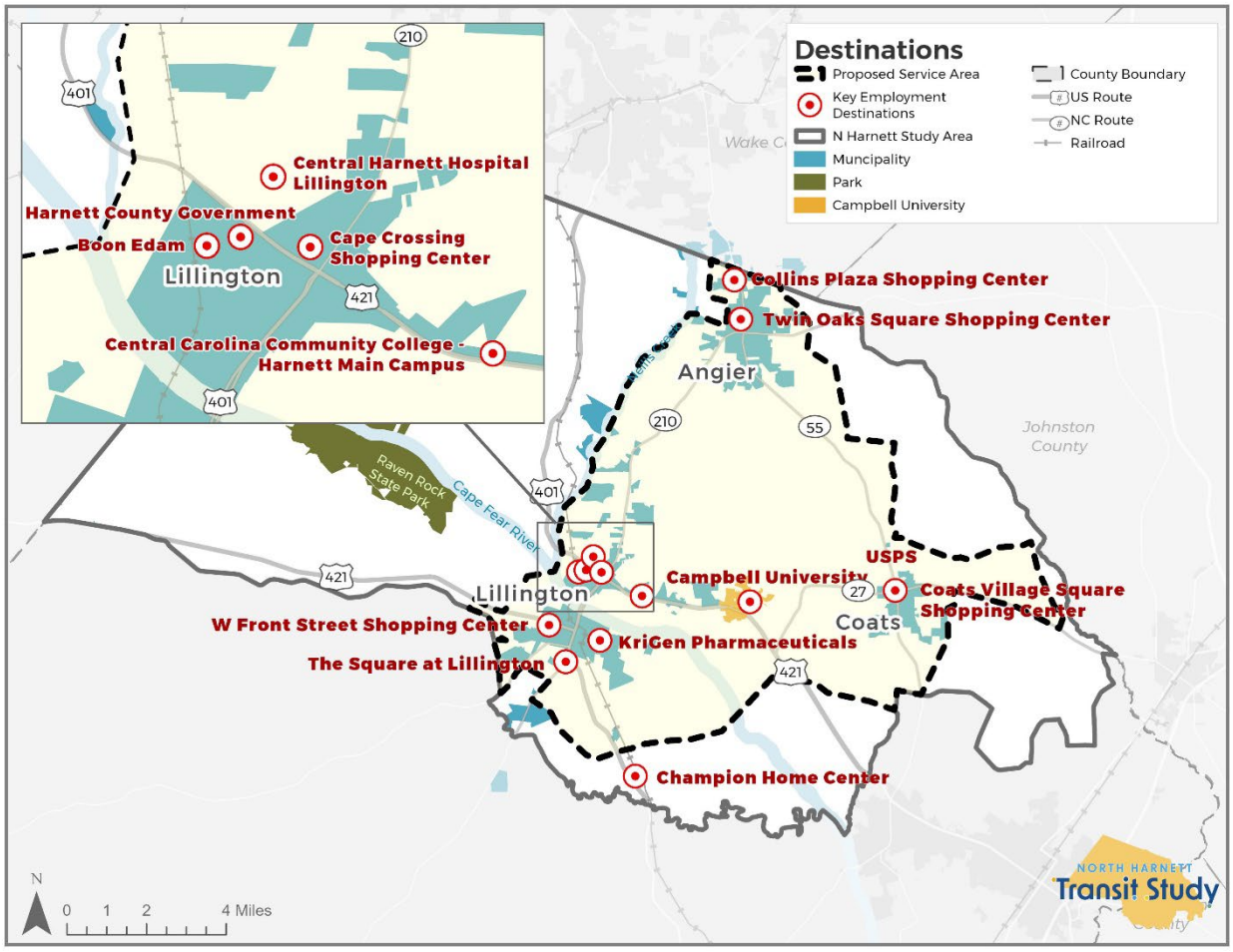

Figure 3. Key Employment Destinations

Trip Distribution

Observed in the Transit Analysis memo, the majority of trips have both the origin and destination of the trip within the North Harnett County Study Area (Figure 4). In addition to accounting for popular destinations, the proposed service area also acknowledges the trip patterns of the community. The analysis of both intrazonal (trips that start and end inside the same census block group (CBG)) and interzonal (trips that travel between CBGs), identifies the central area of the Study Area as having the most significant concentration of travel.

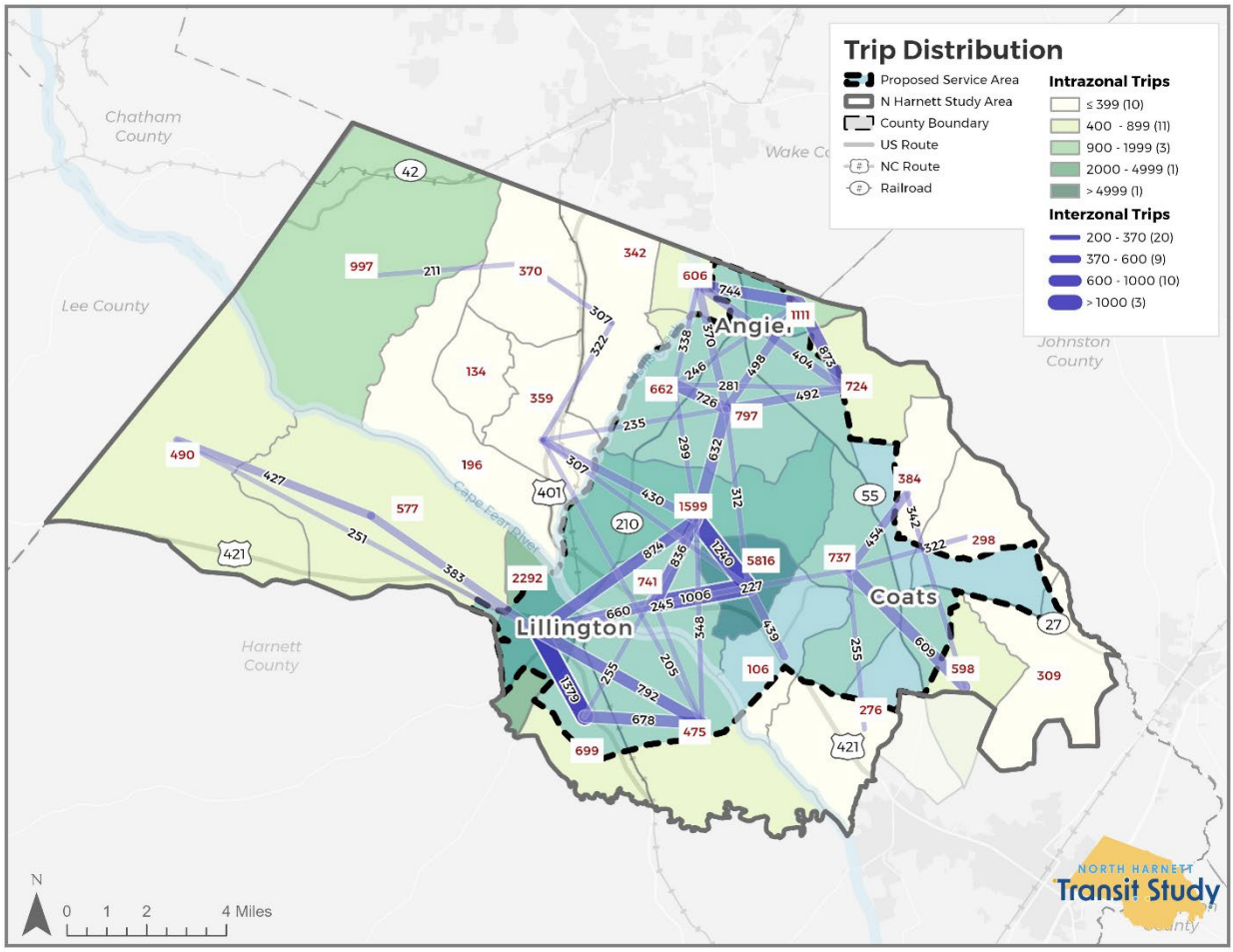

Figure 4. Trip Distribution

Ridership

Ridership patterns observed by HARTS revealed that the distribution of rider trips span across the Study Area (Figure 5), but riders most frequent locations within the triangular area between Angier, Coats, and Lillington. The proposed service area accounted for the existing ridership patterns, allowing future transit service options to integrate with existing HARTS services and improve connectivity, reduce wait times, and create a more cohesive transit experience for the community.

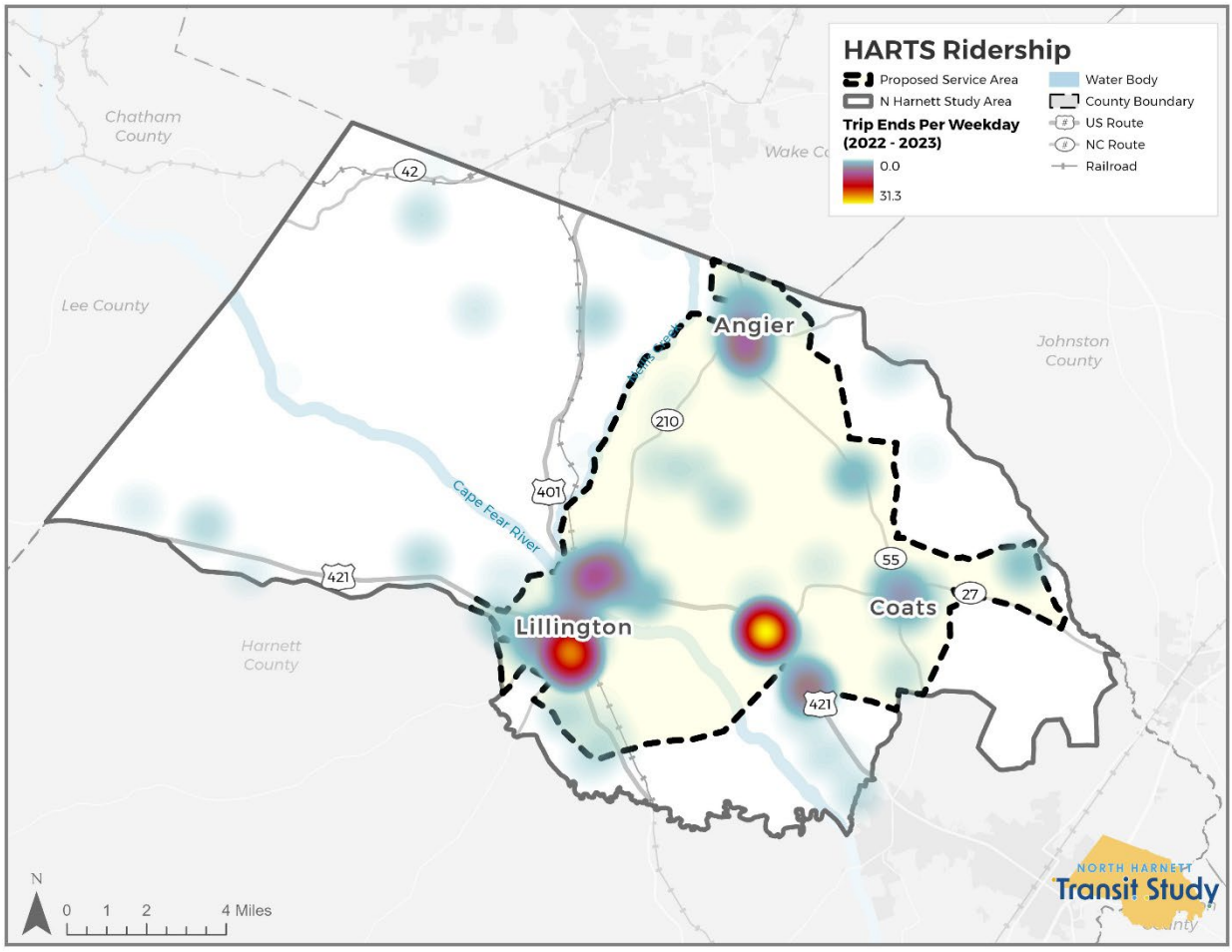

Figure 5. HARTS Ridership

Future Land Use - Comprehensive Land Use Plan

Harnett Horizons 2040, is an update to Harnett County's comprehensive land use plan pending board adoption in Winter 2024. The plan details updates to future land use zoning within the Study Area and throughout the County. Considering future land use in transit service planning ensures that transit service is aligned with existing community needs and future growth. Figure 6 illustrates the proposed service area with the future land use within the Study Area. In addition to the Lillington, Angier, and Coats municipalities, the proposed service area overlaps with many of the higher intensity uses within the Study Area. This includes the Village and Village Center uses around Campbell University, Commercial Mixed Use and Employment uses along US 421 and US 401, and Medium Density Residential use along US 421 and NC 210.

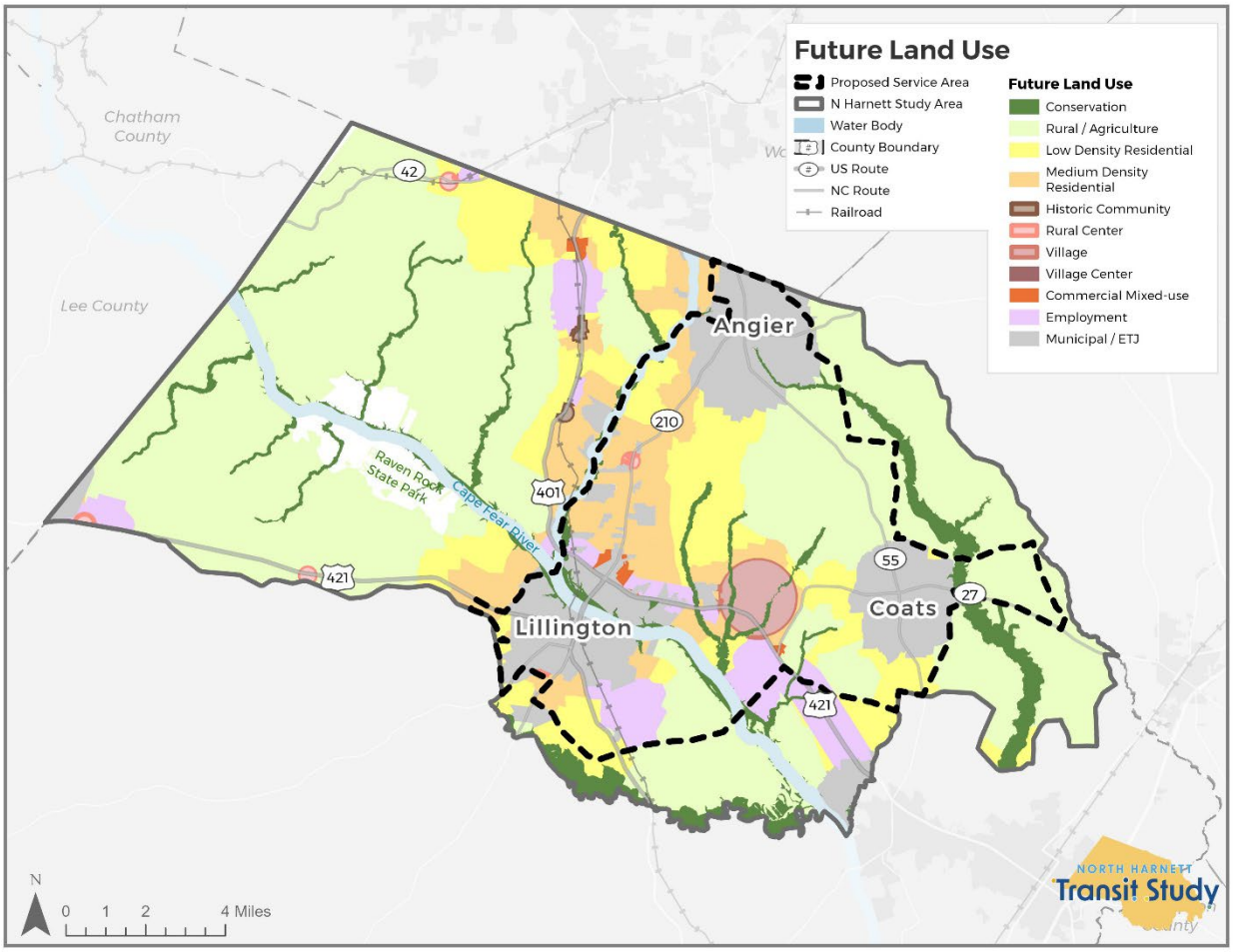

Figure 6. Future Land Use

Transit Demand

engagement is essential when planning future transit service options to ensure the service is designed to meet the community's needs and to foster support of the service. Phase 1 sought to understand how participants would use transit in North Harnett County and the survey asked respondents what their top priorities are for a North Harnett Transit system.

Findings for Phase 1 engagement identified that the majority of community participants positively favor public transportation as shown in Figure 7, and the majority of community members (53 percent) stated they would use transit frequently if their desires were prioritized, which supports further investigating other transit service options in the area as shown in Figure 8. The community demand to utilize transit that provides access to shopping, recreational, and medical trips is captured in the proposed service area as the majority of key destinations are aligned within these categories.

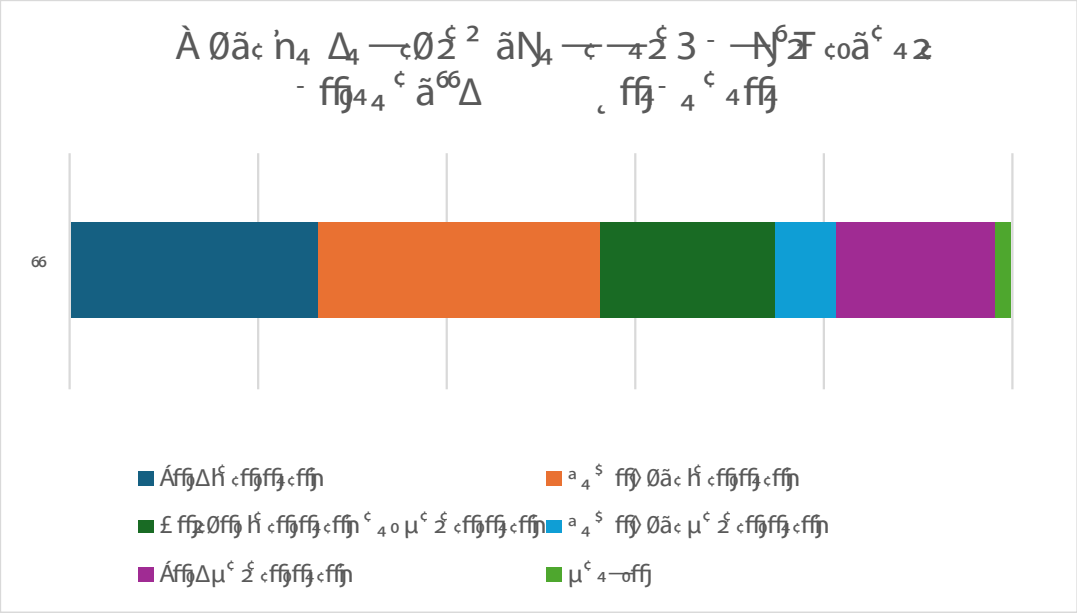

Figure 7. Personal Perspective on Transit

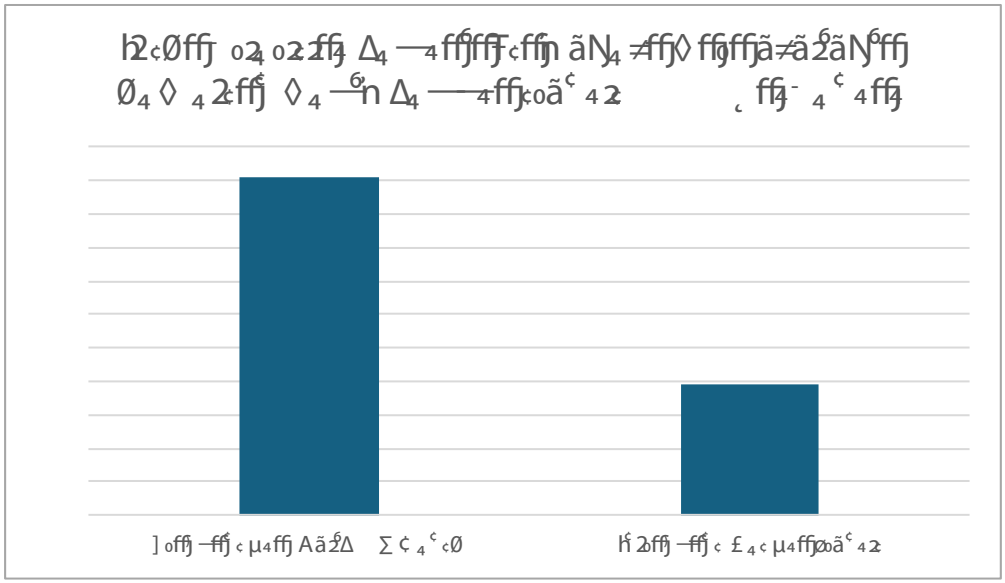

Figure 8. Transit Usage

As shown in Figure 9, the majority of participants would prefer to have a shuttle bus that operators along the same route at the same scheduled time, as compared to a service that can be reserved on-demand or in advance and would provide a door-to-door service. Shown in Figure 10, the second priority question allowed participants to select up to three choices that provided options for different service options spoke to service characteristic preferences, such as locations destinations and scheduling service hours. The top three choices were serving job centers, service that runs on weekends, and service that operates during peak hours (6AM – 9AM and 4PM – 6PM).

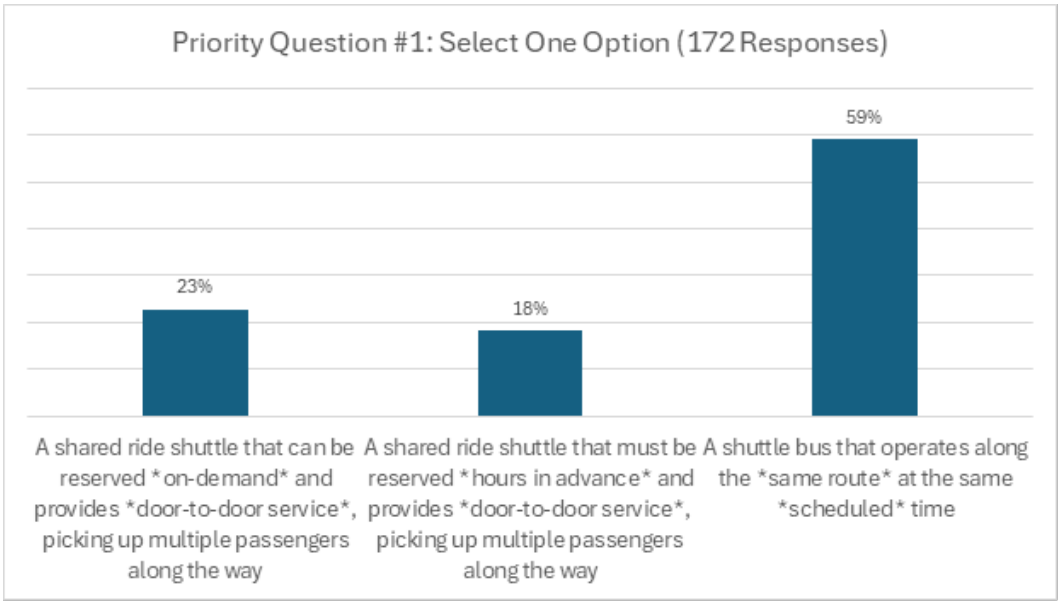

Figure 9. Priority Question #1

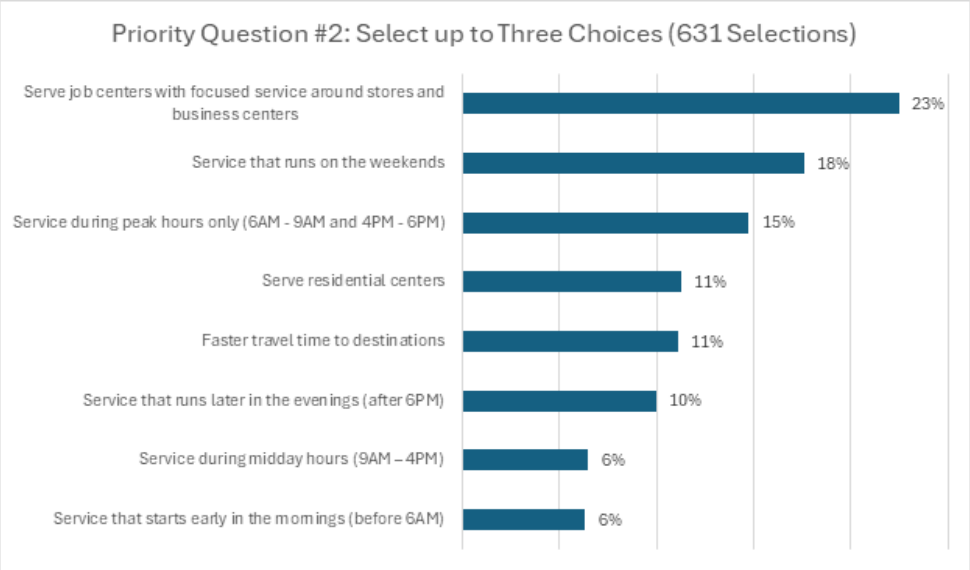

Figure 10. Priority Question #2

Figure 11 shows the results to the third priority question asking if participants would prefer to have local service or regional service. The responses were split 50/50 for this question.

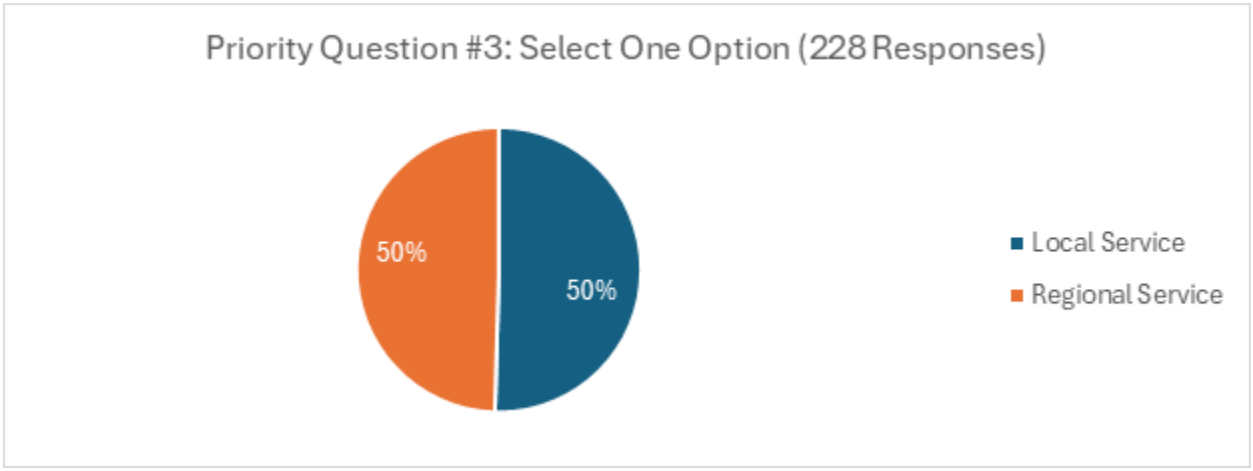

Figure 11. Priority Question #3

Community Mobility

An analysis of the transit propensity throughout the Study Area identifies areas within North Harnett County where residents most likely to use transit are located. Described in the Transit Analysis memo, transit propensity considers demographic factors such **race/ethnicity, native/foreign born residents, poverty level, and vehicle availability** to succinctly identify block groups where residents have a higher likelihood of using transit. The proposed service area captures significant portions of all census blocks with the greatest transit propensity, as shown in Figure 12. Coupled with quantitative findings, the service area also satisfies community preferences to provide service to specific populations such as those unable to get around with a vehicle.

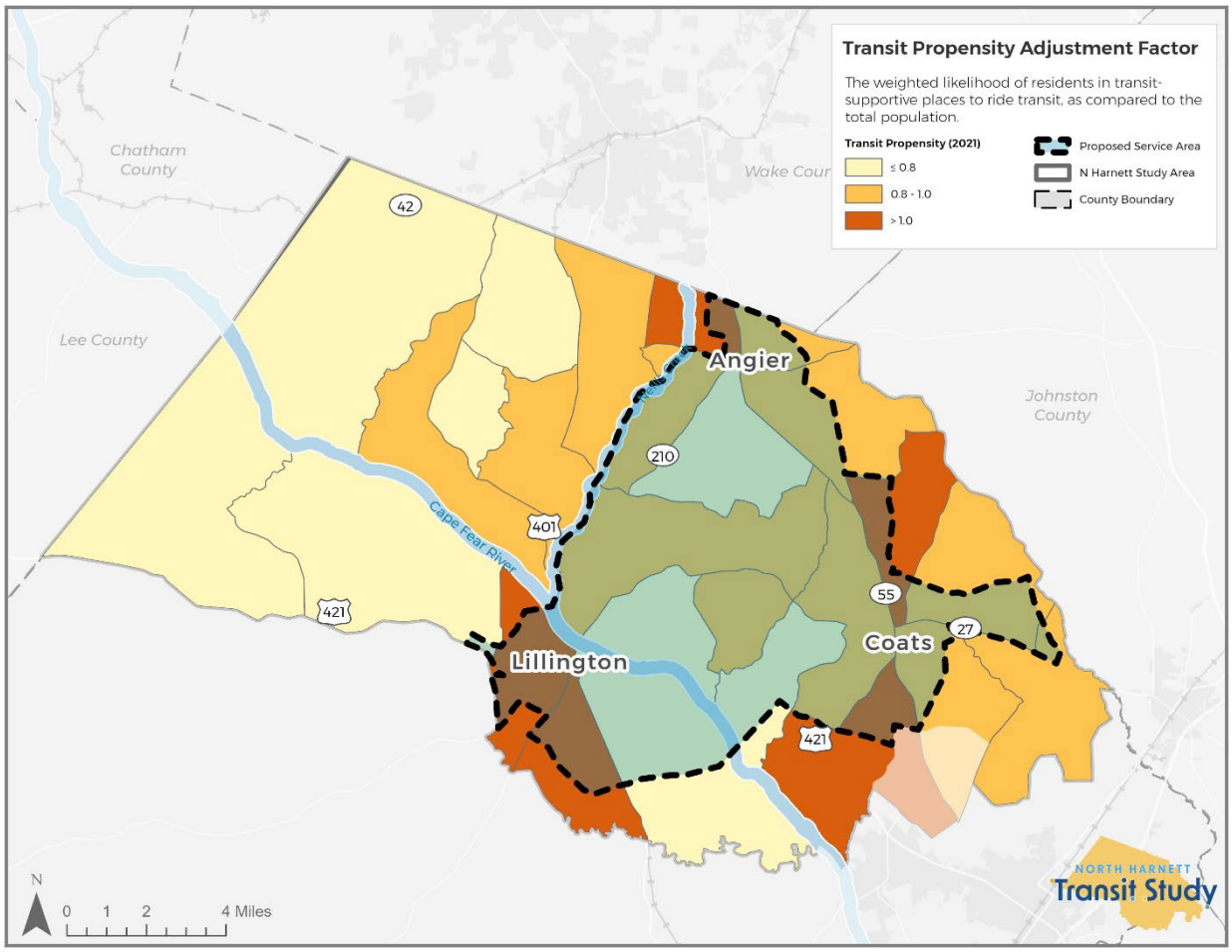

Figure 12. Transit Propensity

Next Steps

Overall, the proposed service area responds to the existing destinations and destinations where the community noted where they would want to get to by using transit within the Study Area. The proposed service area also incorporates the demand for transit expressed by the community and the mobility needs of the community. The proposed service area is well suited to support investigating transit service options that can help to improve connectivity, reduce wait times, and create a more cohesive transit experience, and foster a supportive and effective transit system for North Harnett County. In addition to complementing existing HARTS service, the transit service options provide the opportunity to for HARTS to extend its reach to a broader range of riders by providing new transit options.

NORTH HARNETT

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MEMO 4:
Transit Service Options

NORTH HARNETT Transit Study

Transit Service Options Memorandum

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Introduction

Building off the proposed service area and data from earlier phases of the study, there are key takeaways that will help to inform the potential transit service options. Those takeaways include:

- HARTS existing service is at capacity and there **is demand for other types of transit services** with more connectivity, flexibility, and increased service times.
- Most respondents, from public engagement efforts, said they would use transit for **shopping, recreational, and medical trips** with a slightly less emphasis on work/school trips.
- Existing travel patterns strongest between **Lillington and Angier**. Existing HARTS ridership strongest near Lillington and between **Lillington and Coats**.
- **56%** of survey respondents were **very interested and somewhat interested** in using transit.
- Stakeholders recognized the need for **updated infrastructure** and **increased land-use density** in order for transit to be useful.
- Support from public and stakeholders for **more enhanced local services** and **connecting to areas locally**.

With these takeaways in mind, four (4) transit service options were identified for further consideration. These service options include:

- Fixed Route
- Microtransit
- Regional Connection to Other Transit Systems
- Senior Shuttle / Shopping Trip Route

Fixed Route

Background

Fixed route transit is a common transit service type implemented in transit systems across the world. A “fixed route” is one that follows one path from its origin to its destination, making stops along the way. They operate on a predetermined route and schedule, connecting key points of interest are identified as stops that best serve riders. Passengers do not have to reserve a ride and are able to wait at the predetermined stop for service. Fixed-route transit is best operated in higher density environments to efficiently transport large quantities of people.

Potential Routing

A potential concept for a fixed route service in the Study Area was created to help understand some of the potential benefits and impacts to implementing a fixed route service. Below is an example of a fixed-route transit concept for Northwest Harnett County connecting medical facilities, educational institutions, grocery stores, and other key points of interest in Angier, Coats, and Lillington, shown in Figure 1.

This example service concept contains two routes, a clockwise loop and counterclockwise loop, with each loop operating hourly, one at the top of the hour and the other at half-past the hour. This combines

for 30-minute service between the Angier, Coats, and Lillington, with no reservations needed. The combination of both routes provides consistent travel times between all stops.

Table 1 below provides a high-level snapshot of the operational requirements for this example service. The first row uses HARTS existing hours of operation, 8:00 am to 5:00 pm, and existing operating costs to calculate the snapshot. The second row uses expanded hours of operations, such as 6:00am – 9:00pm and existing operating costs to calculate the snapshot.

Table 1: Operational Requirements of Fixed Route Service

Hours of Per Day	Vehicles Needed	Daily Revenue Hours	Cost Per Hour[1]*	Cost Per Day	Annual Cost**
9	3	27	50.00	$1,350	$337,000
15	3	45	50.00	$2,250	$561,000

** Rounded*

*** Calculated using 249 weekdays; 249 weekdays is the number of non-holiday weekdays in 2024*

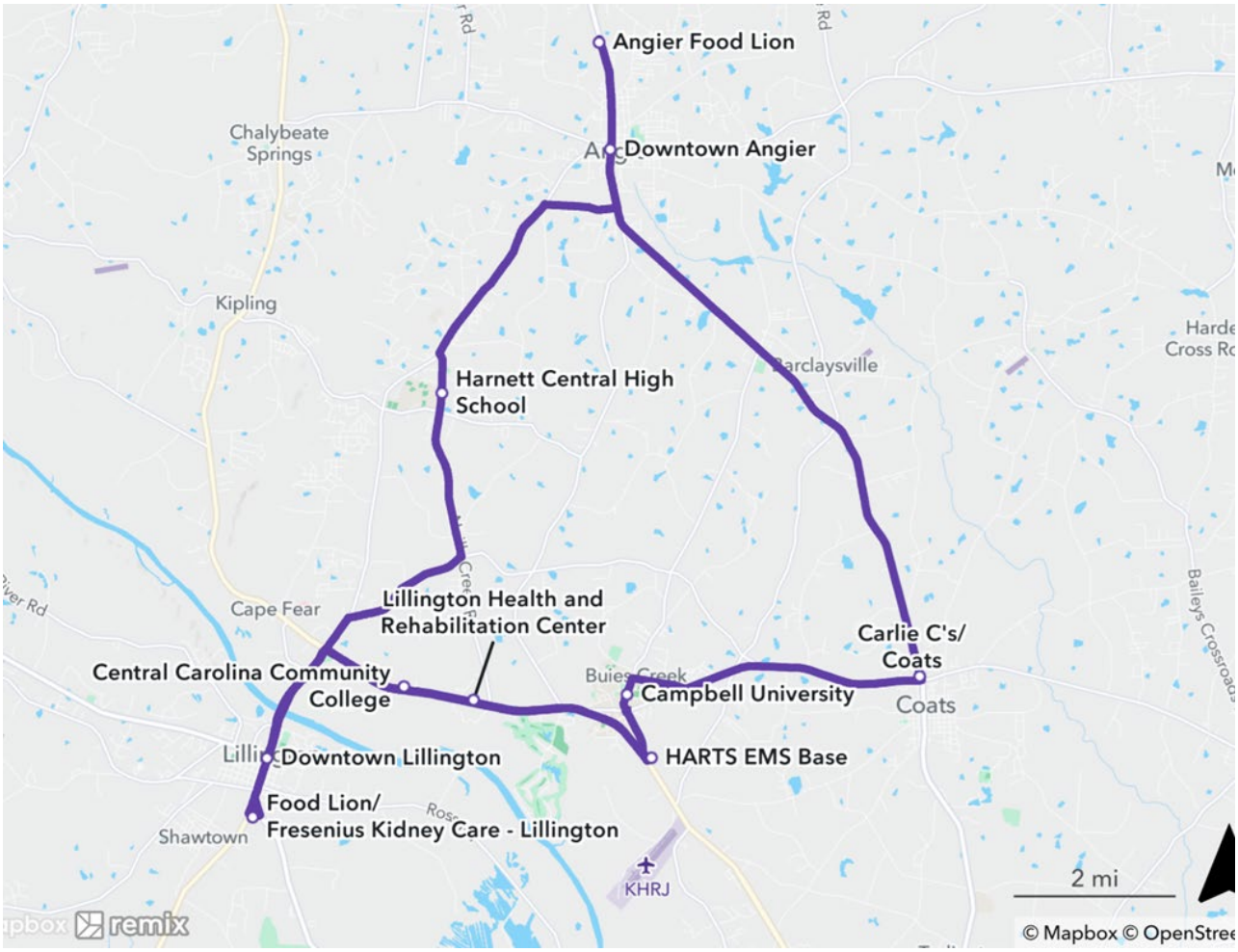


Figure 1: HARTS Loop

[1] 2022 Annual Agency Profile - Harnett County (NTD ID 41119)

Considerations for Implementation

Based on FTA's National Transit Database (NTD) data and stakeholder engagement with HARTS, they currently have a fleet of vehicles larger than what is needed to operate their maximum service, which could allow HARTS to utilize their existing fleet to operate a fixed route service without the need of purchasing additional vehicles or other equipment. However, it may require hiring additional drivers if HARTS does not have enough drivers to operate an additional route. Additionally, providing a service that has expanded hours of operations may also have staffing implications with the need to hire additional HARTS staff or adjust shift schedules. Table 2 below also describes additional benefits and challenges of HARTS adding a fixed route service.

Table 2: Benefits and Challenges of Fixed Route Service

Service Type	Benefits	Challenges
Fixed Route	• Consistent timetable and routing; ease of understanding for passengers • No reservations needed • Provides connections to key destinations • No external operator required	• Predetermined destinations • Relatively low density may result in lower ridership • Some destinations may require passengers to walk/bike from the stop to their destination

Operating Parameters

There are operating parameters to be considered when contemplating fixed route service that include:

- **Service Area:** When determining the boundaries of a service area, transit agencies should consider factors such as the major trip destinations and length of the route. Longer routes may be able to serve a bigger population and increase potential trip destinations, but this may impact on frequency, increase cost, and/or require more vehicles to meet frequency goals. Shorter routes may be able to facilitate increased frequencies but will serve less people and limit trip destinations.
- **Service Span:** When determining the days and hours that the service will operate, agencies should consider whether the population has a significant need for service beyond typical operating hours, such as on evenings, late nights, and weekends.
- **Pick Up and Drop Off Locations:** Passengers are required to walk to a bus stop. Depending on where bus stops are located, additional pedestrian infrastructure, like sidewalks and crosswalks, may be needed.
- **Trip Booking:** Passengers are not required to book a trip in advance. Passengers are able to wait at a bus stop, according to the published schedule, and can get on the bus when it arrives.

Microtransit

Background

Microtransit, or on-demand transit, is a technology-enabled public transit service that provides shared on-demand transportation with dynamic routing and scheduling. The emerging transit service offers an alternative to fixed route and traditional demand response services. Microtransit is generally provided within a designated service area or zones where customers can request rides through a smartphone application, online web portal, or call center. Depending on the operating parameters of the service, customers may be picked up at their location and dropped off at their destination (curb to curb) or they may be asked to walk a short distance to their pickup/drop off location (node to node) in order to maximize route efficiency. The microtransit software typically includes functionality for on-demand scheduling, dynamic routing, a customer-facing application, onboard interface, fare payment, and vehicle tracking.

Microtransit Definitions:

Technology-enabled: customers can book rides through a smartphone application in addition to more traditional methods such as an online web portal or call center

Shared: rides may be shared with other customers

On-demand: customers can book trips in real time and do not have to reserve their ride ahead of time

Dynamic routing and schedule: do not follow fixed route or schedule but are instead flexible based on customer demand

There are a variety of reasons why an agency may want to implement microtransit service depending on their existing needs, challenges, goals. Some common examples include:

- To provide first-mile and last-mile connections to fixed route service
- To replace existing service that is inefficient or not cost effective
- To establish transit service in a rural or low-density area that is not conducive to traditional fixed route service
- To address gaps in existing service by providing service on days or times when other services are unavailable
- To expand on-demand service to the general population, beyond existing need-based demand response service
- To address customer needs and improve customer experience by offering flexible, technology-enabled ride booking options

Service Delivery Models

Microtransit service can be broken down into three primary service delivery models: Transportation as a Service (TaaS), Software as a Service (SaaS), and separate contracts for the technology, drivers, and vehicles. Each service delivery model has its own benefits and challenges including:

- **Software as a Service (SaaS)/Technology Acquisition**
    - In a SaaS/Technology Acquisition model, the transit agency operates the service and contracts with a vendor who is only responsible for providing the microtransit software, including the scheduling software, customer-facing application, and on-board system. Under SaaS models, the transit agency typically owns, operates, and maintains the

vehicles. The call center and dispatch could be operated by the transit agency or the vendor.

- **Transportation as a Service (Taas)/Turnkey**
  - In a TaaS/turnkey model, the selected microtransit vendor provides all aspects of the microtransit service through a single contract. In addition to providing the microtransit software, the vendor also provides the vehicles and drivers, operates the call center and dispatch, maintains the customer-facing application and/or website, and maintains the vehicles.
- **Separate Contracts**
  - As an alternative to a strict SaaS or TaaS model, some agencies may choose to utilize separate contracts for technology and drivers/vehicles. Similar to SaaS, the microtransit vendor only provides the software. However, instead of the transit agency providing all other elements of the transit service in house, some or all other aspects of service are contracted out through separate vendors.

Microtransit Examples

A number of transit agencies in North Carolina have recently implemented microtransit service. Several examples near Harnett County are JCATS in Johnston County (QuickRide), the City of Wilson (RIDE), and the Town of Morrisville (Smart Shuttle). There are differences between the size, purpose and contract types of each example that help to provide an example of types of microtransit services available to HARTS.

JCATS, QuickRide

- **Johnston County Population:** 215,999
- **Service Began:** Began on March 2023 as pilot program
- **Reason for Microtransit:** Wanted to enhance existing service by providing riders with technology-based method of requesting rides in real time.
- **Operating Days:** Monday – Friday
- **Service Area:** Smithfield/Selma area
- **Microtransit Fleet Size:** 5
- **Vehicle Type:** Transit Passenger Van (all ADA accessible)
- **Fare:** $6.00
- **Service Delivery Model:** Software as a Service through existing scheduling software vendor, CTS Software
- **Stops:** Curb to curb

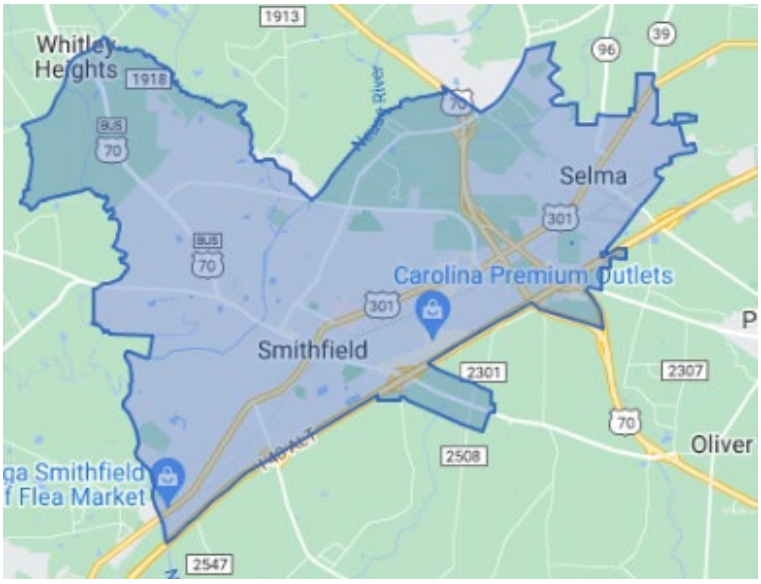


Figure 2: QuickRide Service Area

- **Annual Ridership:** Over 12,000 rides from March 2023 – December 2023 [2]
- **Annual Operating Expenses:** $715,000 [3]
- **Cost per Hour:** $50 [4]
- **Funding Sources:** Local Government (Johnston County), 5311 capital funding for initial investment in replacement vans, NCDOT-funded rural operating grant funds

Wilson, RIDE

- **City of Wilson Population:** 47,851
- **Service Began:** September 2020
- **Reason for Microtransit:** Replaced fixed route bus system
- **Operating Days:** Monday – Saturday
- **Service Area:** City limits and nearby large employers
- **Microtransit Fleet Size:** 26
- **Vehicle Type:** Van
- **Fare:** $2.50
- **Service Delivery Model:** Turnkey contract with Via
- **Stops:** Corner to corner or virtual bus stops
- **2022 Annual Ridership:** 156,887 [5]
- **2022 Annual Operating Expenses:** $1,609,052 [6]
- **2022 Cost per Revenue Hour:** $72.92 [7]

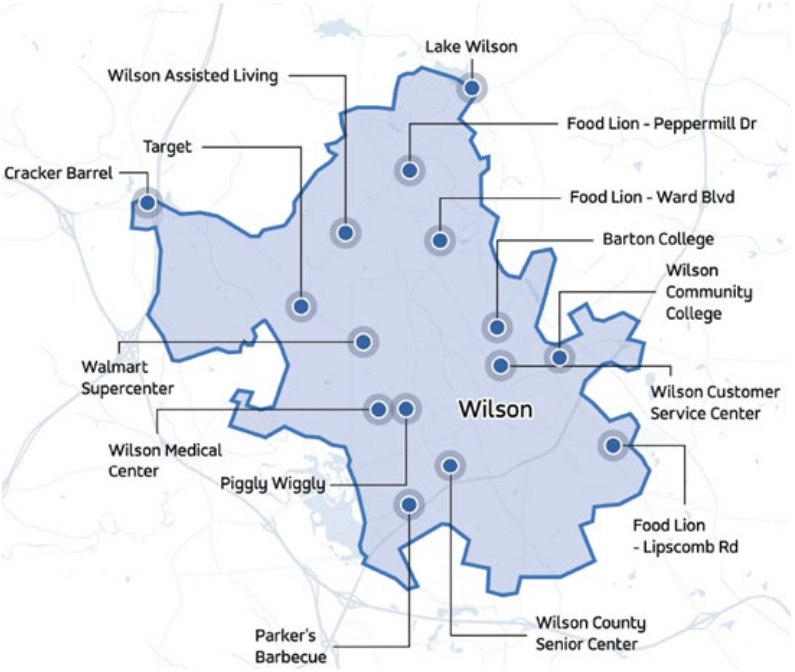


Figure 3: RIDE Service Area

Figure 4: RIDE Van

[2] Johnston County Board of Commissioners Meeting Minutes, June 3, 2024
[3] https://restorationnewsmedia.com/articles/local-news-johnstonian/ride-hailing-service-to-continue/
[4] Ibid
[5] Public Microtransit Pilots in the State of North Carolina: Operational Characteristics, Costs, and Lessons Learned
[6] Ibid.
[7] Ibid.

- **Funding Sources:** Federal Government (5311 Funding and Accelerating Innovative Mobility Grant), State Government (Consolidation and Coordination of Public Transit Systems Grant), Directly Generated, Local Government

Morrisville, Smart Shuttle

- **Town of Morrisville Population:** 29,630
- **Service Began:** October 2021
- **Reason for Microtransit:** Alternative to fixed route service, which did not make sense due to the jurisdictional boundaries and development patterns
- **Operating Days:** Monday – Sunday
- **Service Area:** Defined shuttle stops through Town of Morrisville
- **Microtransit Fleet Size:** 2
- **Vehicle Type:** Cutaway
- **Fare:** Free
- **Service Delivery Model:** Software As a Service with Via; GoCary (with MV Transportation) provides vehicles and drivers
- **Stops:** 17 shuttle stops
- **2022 Annual Ridership:** 11,122 [8]
- **2022 Annual Operating Expenses:** $425,940 [9]
- **2022 Cost Per Revenue Hour:** $95.43 [10]
- **2022 Funding Sources:** Local Government (50% from Town of Morrisville and 50% from Wake Transit Plan)

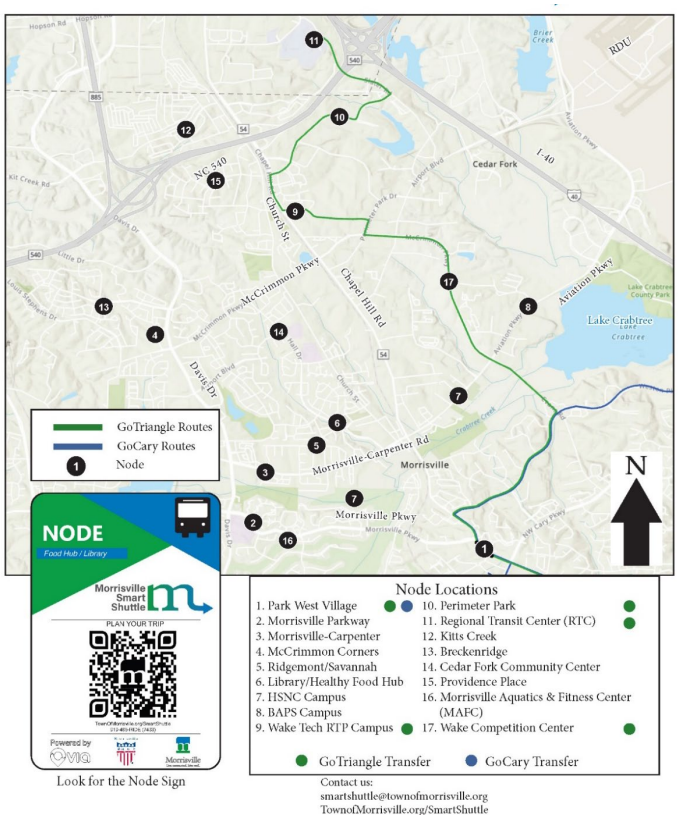


Figure 5: Smart Shuttle Stops

Considerations for Implementation

Service Delivery Model

Transit agencies have to consider many factors when choosing a service delivery model, such as budget, existing staff and vehicle availability, desired level of control over service, capacity for oversight, and implementation timeline. Table 3 below describes the benefits and challenges of each service delivery model, which can be used to help guide transit agencies as they select a service delivery model.

Agencies that operate existing demand response service but want to transition to, or add, a microtransit service might be more inclined to choose the SaaS option, so that they can reduce costs by leveraging existing staff and resources. However, a transit agency that is implementing transit service for the first

[8] Ibid.
[9] Ibid.
[10] Ibid.

time may find it more convenient and cost effective to contract out the service, either through a single contract or separate contracts. As HARTS falls into the former category, selecting a SaaS service delivery model could enable HARTS to implement microtransit service without needing to purchase additional vehicles. At the same time, if additional staff need to be hired, this would impact cost and the implementation timeline.

Table 3: Service Delivery Model Benefits and Challenges

Service Delivery Model	Benefits	Challenges
SaaS/Technology Acquisition	• Transit agency has more control over managing and operating service • Lower vendor costs • Can make use of existing resources if transit agencies already has necessary staff, vehicles, and equipment	• Higher start-up capital costs if agency does not already own vehicles and equipment (i.e., tablets) • Transit agency may need to hire more staff to manage and operate the service • Slower implementation if transit agency needs to procure vehicles and/or hire staff • Overall costs may be higher when accounting for compensation and benefits of drivers and staff
TaaS/Turnkey	• Faster implementation • Vendor has expertise that in house staff may lack • Convenience of not having to procure/own/maintain vehicles, recruit and train drivers, and coordinate daily operations • Single point of contact • Vendor takes on risk of accidents and claims	• Less direct control over service delivery (driver training, drug screening, vehicle maintenance, safety, etc.); contract to outline requirements for service delivery • More oversight required than SaaS to ensure quality and performance targets are met and service is in compliance with federal regulations • Service rates may change based on market demand
Separate Contracts	• Convenience of not having to procure/own/maintain vehicles, recruit and train drivers, and/or coordinate daily operations • Can select specialized vendors rather than relying on one vendor who may have expertise in one area (i.e., microtransit technology) but not another (i.e., vehicle maintenance)	• Requires coordination and communication among service providers • More oversight required than SaaS to ensure quality and performance targets are met and service is in compliance with federal regulations

Operating Parameters

In addition to the service type, there are operating parameters to be considered when contemplating microtransit service that include:

- **Service Area:** When determining the boundaries of a service area, transit agencies should consider factors such as the propensity for microtransit, major trip destinations, and size of the service area. Larger zones serve a bigger population and increase potential trip destinations, but this may impact on time performance, increase cost, and/or require more vehicles to meet response time goals. Smaller zones can facilitate shorter wait times but will serve less people and limit trip destinations.
- **Service Span:** When determining the days and hours that the service will operate, agencies should consider whether the population has a significant need for service beyond typical operating hours, such as on evenings, late nights, and weekends.
- **Pick Up and Drop Off Locations:** There are several options for how transit agencies can operate microtransit service to pick up and drop off passengers.
    - ***Curb to Curb:*** Passengers are picked up at their location and dropped off at their destination.
    - ***Corner to Corner:*** Passengers are picked up and dropped off at nearby intersections.
    - ***Virtual Bus Stop:*** Passengers are required to walk a short distance to a dynamically created stop (created by microtransit software). The purpose of this option is to increase route efficiency and limit out of direction trips.
    - ***Hybrid:*** Transit agencies may also a combination of options depending on pre-specified criteria, such as the type of passenger (i.e., ambulatory vs non-ambulatory) or distance from a fixed route bus stop.
- **Trip Booking:** A key component of microtransit service is that the technology enables passengers to book rides in real time through an app. However, some passengers may not have access to a smartphone or be comfortable using a smartphone application. Many agencies also offer the ability to book trips through a web platform as well as through a call center.
- **Response Time:** Transit agencies should establish response time goals, as convenience for customers is a key element of microtransit service. Response time is impacted by factors such as the size and boundaries of the service area, the local street network, the number of vehicles and operators available, vehicle garage locations, and anticipated demand. Meeting response time goals may be particularly challenging in areas where agencies anticipate significant demand during peak hours.
- **Fare Structure:** When establishing a fare structure, agencies should consider how the fare for microtransit service compares to the fare for any existing service, what passengers are willing to pay, and whether they want to provide discounted fares for disadvantaged groups. Some agencies may also choose to make their microtransit service fare free. For agencies that partner with Transportation Network Companies (TNC) and offer passengers a voucher to use their services, the amount of the subsidy per trip would need to be determined.

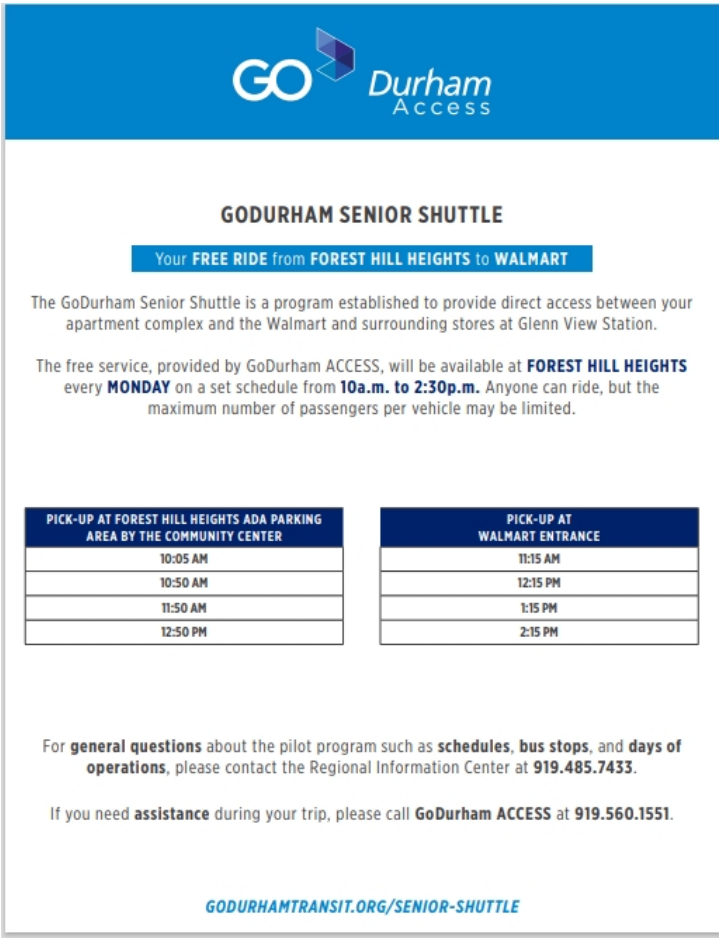
Additionally, transit agencies will need to determine how passengers will pay the fare. Many microtransit services allow passengers to pay their fare through the ride booking app or website. However, certain populations may not have access to or feel comfortable using electronic payment options. Agencies may allow customers to also pay their fare in cash through a farebox on the vehicle or by purchasing a ticket

or pass at the transit facility or other designated locations. For example, RIDE in Wilson does not accept cash payments on board the vehicles, so customers who want to pay cash have to purchase credits in person at the Customer Service Center.

Senior Shuttle / Shopping Shuttle Route

Background

A senior shuttle is similar to a fixed route, in that it serves predetermined stops at predetermined times, However, the purpose of a senior shuttle is to directly connect senior citizens with essential goods and services in the community. The routing of a senior shuttle focuses on serving senior living facilities and senior centers. These routes also often operate for shorter time periods during the day and may not operate every day of the week. For areas with larger senior populations, a senior shuttle could aid, not replace, existing paratransit services. A similar service, a shopping shuttle, could be designed with the purpose of serving shopping destinations. Shopping shuttles often serve concentrated residential areas, such as apartment complexes, college/university residential housing, or senior living facilities.



GO Durham Access

GODURHAM SENIOR SHUTTLE

Your **FREE RIDE** from **FOREST HILL HEIGHTS** to **WALMART**

The GoDurham Senior Shuttle is a program established to provide direct access between your apartment complex and the Walmart and surrounding stores at Glenn View Station.

The free service, provided by GoDurham ACCESS, will be available at **FOREST HILL HEIGHTS** every **MONDAY** on a set schedule from **10a.m. to 2:30p.m.** Anyone can ride, but the maximum number of passengers per vehicle may be limited.

PICK-UP AT FOREST HILL HEIGHTS ADA PARKING AREA BY THE COMMUNITY CENTER
10:05 AM
10:50 AM
11:50 AM
12:50 PM

PICK-UP AT WALMART ENTRANCE
11:15 AM
12:15 PM
1:15 PM
2:15 PM

For **general questions** about the pilot program such as **schedules**, **bus stops**, and **days of operations**, please contact the Regional Information Center at **919.485.7433**.

If you need **assistance** during your trip, please call **GoDurham ACCESS** at **919.560.1551**.

GODURHAMTRANSIT.ORG/SENIOR-SHUTTLE

Figure 6: Example of GoDurham Senior Shuttle Schedule

There are several examples of senior shuttles in the larger Triangle region that may provide a good example for HARTS. An example of such exists in Durham, as a pilot program, known as the GoDurham Senior Shuttle. Operated by GoDurham ACCESS, the shuttle transports residents from 10 senior living facilities across Durham to Walmart in northeast Durham. This service operates five days a week with one paratransit vehicle serving two facilities per day. No reservations are required, and the service is fare-free to passengers. The pilot program is a partnership among the City of Durham, End Hunger Durham and GoTriangle and funded through the Durham Transit Plan but came about through the request from the grassroots organization End Hunger Durham to improve access to grocery stores for seniors. Figure 6 shows an example of the GoDurham Senior Shuttle's schedule.

The Town of Chapel Hill also has a free senior shuttle, open to all seniors, and is operated by Chapel Hill Transit along the same route Monday through Friday. The route serves four senior living facilities, two shopping centers with grocery stores, the library and a community center. Every location is served hourly from 8:00am to 4:00pm. Trips on the shuttle are not reserved, operating on a first-come, first-serve basis and trips provide curb-to-curb service.

Examples

Three potential concepts for senior shuttles, one for each of the towns in the proposed Service Area, were created to help understand some of the potential benefits and impacts to implementing a senior shuttle route. Each service concept assumes a fixed, hourly schedule serving multiple senior living facilities, medical facilities, and grocery stores. The shuttles are designed to serve seniors exclusively and not the general public. A service span of 9:00am to 2:00pm was used, similar to the Durham example that focuses on a shorter service span but serves different routes throughout the week. Similar to a traditional fixed-route service, the shuttle would follow a consistent schedule, operating hourly during HARTS service hours and would not require reservations. However, there would not be any intermediate stops served. The three potential routes and the destinations served include:

- The Angier Senior Shuttle concept (Figure 7) would include Oak Hill Assisted Living, Absolute Care Assisted Living, Angier Senior Center, Fresenius Kidney Care Center, and Carlie C's.
- The Lillington Senior Shuttle concept (Figure 8) would include Pinecrest Gardens Assisted Living, Green Leaf Care Center, Central Harnett Hospital, Carlie C's and Food Lion.
- The Coats-Lillington Senior Shuttle concept (Figure 9) would include Coats Senior Citizens Center, HARTS EMS Base, Lillington Health and Rehabilitation Center, Central Harnett Hospital, and Carlie C's.

Table 4 below provides a high-level snapshot of the operational requirements for these example services, using HARTS existing operating costs to calculate the snapshot for service 5 days a week. Table 5 also provides a snapshot if each senior shuttle were operated one day per week.

Table 4: Operational Requirements of Senior Shuttle Service

Service	Hours Per Day	Vehicles Needed	Daily Revenue Hours	Cost Per Hour[11]*	Cost Per Day	Annual Cost**
Angier	5	1	5	50.00	$250	$63,000
Lillington	5	1	5	50.00	$250	$63,000
Coats/Lillington	5	1	5	50.00	$250	$63,000

**Rounded*

***Calculated using 249 weekdays; 249 weekdays is the number of non-holiday weekdays*

Table 5: Operational Requirements of Senior Shuttle Service

Service	Hours Per Day	Vehicles Needed	Weekly Revenue Hours	Cost Per Hour[12]*	Cost Per Week	Annual Cost**
Each Senior Shuttle (1x per Week)	5	1	15	50.00	$750	$117,000

**Rounded*

***Calculated using 156 weekdays*

[11] 2022 Annual Agency Profile - Harnett County (NTD ID 41119)

[12] 2022 Annual Agency Profile - Harnett County (NTD ID 41119)

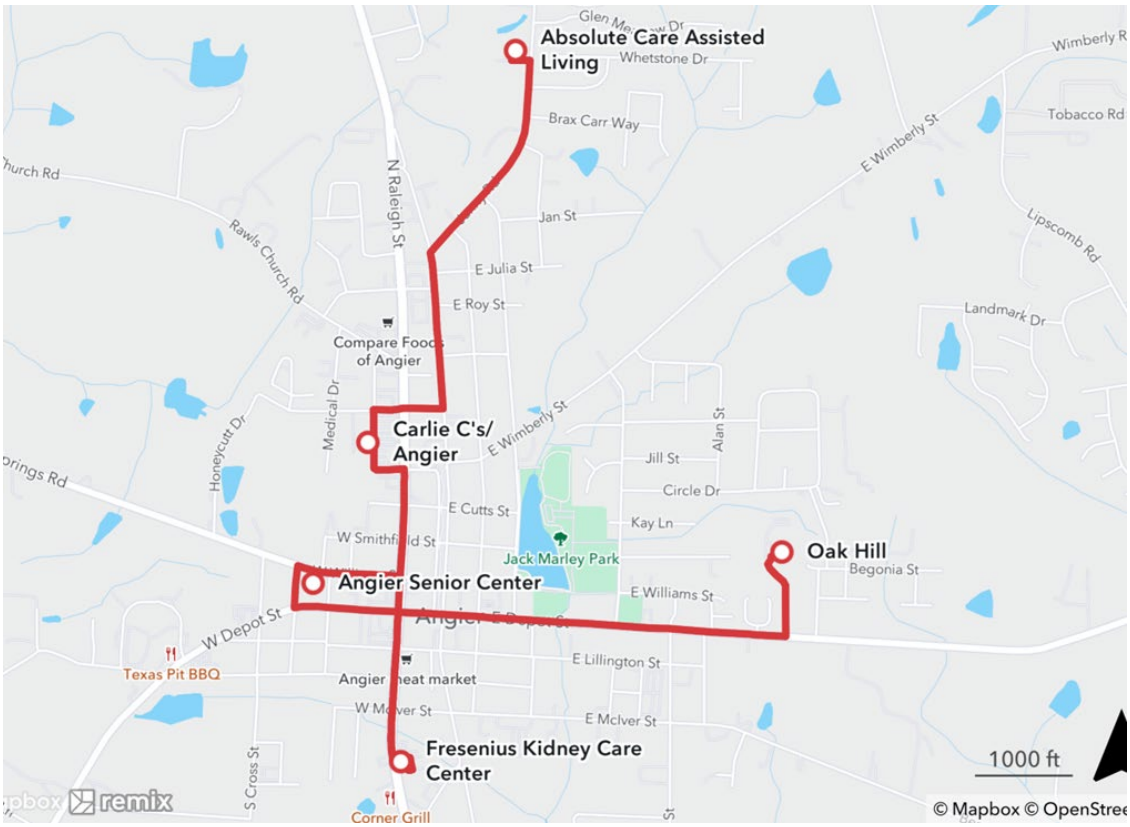


Figure 7: Angier Senior Shuttle

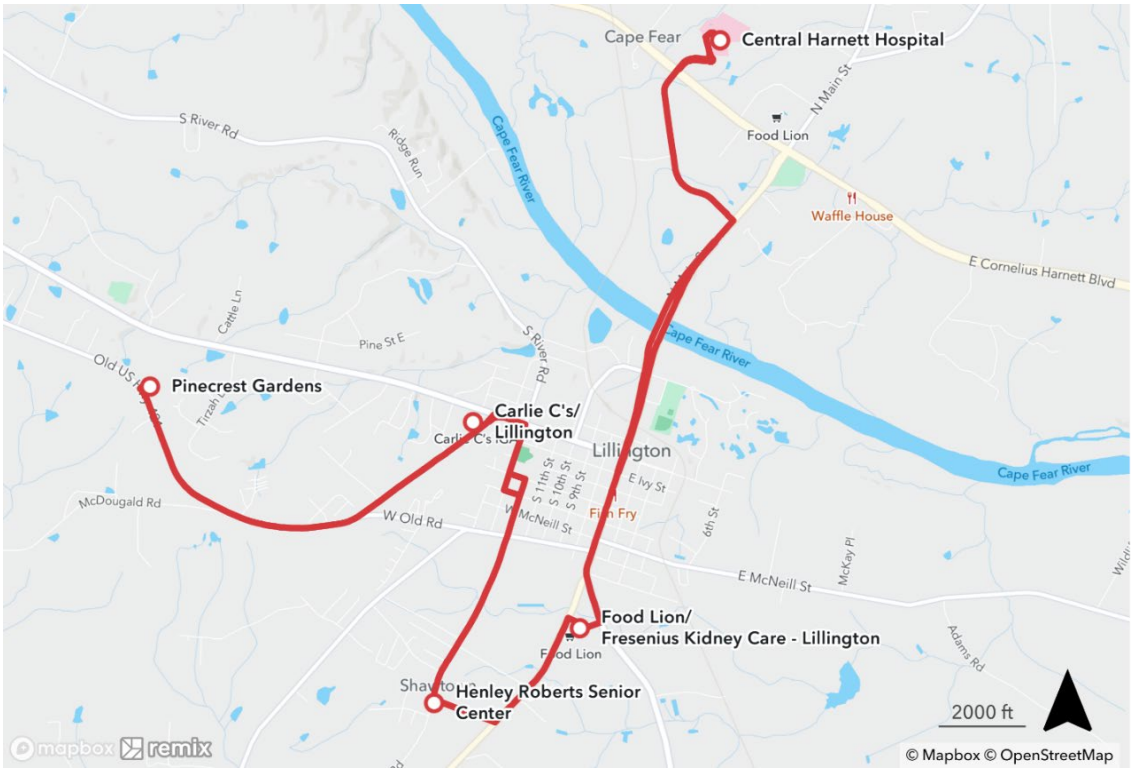


Figure 8: Lillington Senior Shuttle

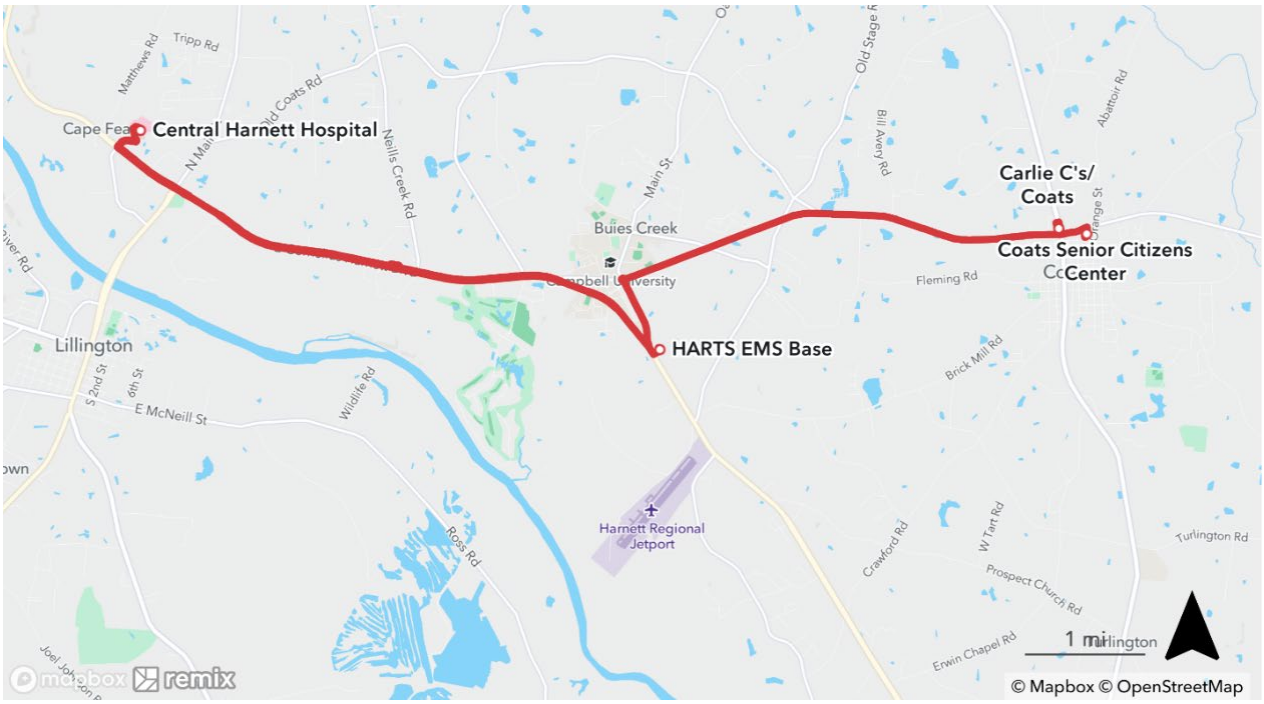


Figure 9: Coats-Lillington Senior Shuttle

Considerations for Implementation

Based on NTD data and stakeholder engagement with HARTS, they currently have a fleet of vehicles larger than what is needed to operate their maximum service, which could allow HARTS to utilize their existing fleet to operate a senior shuttle service without the need of purchasing additional vehicles or other equipment. However, it may require hiring additional drivers if HARTS does not have enough drivers to operate an additional route. Compared to a fixed route, senior shuttles may allow HARTS to provide additional transit options within fewer revenue hours, but the more limited routes may also limit the ridership seen on these routes. Table 6 below also describes additional benefits and challenges of HARTS adding a senior shuttle service.

Table 6: Benefits and Challenges of Senior Shuttle Service

Service Type	Benefits	Challenges
Senior Shuttle	• Consistent timetable and routing; ease of understanding for passengers • Direct access to essential goods and services for seniors • No reservations needed • No external operator required	• Limited flexibility in destination choice for passengers • Limited connectivity to other parts of Harnett County • Relatively low density and limited locations may result in lower ridership • Limited ridership pool

Operating Parameters

There are operating parameters to be considered when contemplating a senior shuttle service that include:

- **Service Area:** When determining the boundaries of a service area, transit agencies should consider factors such as the major trip destinations and length of the route. Longer routes may be able to serve a bigger population and increase potential trip destinations, but this may impact on frequency, increase cost, and/or require more vehicles to meet frequency goals. Shorter routes may be able to facilitate increased frequencies but will serve less people and limit trip destinations.
- **Service Span:** When determining the days and hours that the service will operate, agencies should consider whether the population has a need for service throughout the entire day or could be accommodated with a shorter service span. In addition, agencies should consider whether the population has a need for service every day of the week or could the need be accommodated across fewer days.
- **Pick Up and Drop Off Locations:** Passengers are picked up at their location and dropped off at their destination.
- **Trip Booking:** Passengers are not required to book a trip in advance and often operate on a first-come, first-serve basis. However, GoDurham encourages the senior community offices to offer a sign-up sheet to make sure there's room for everyone who wants to ride the shuttle.

Regional Connections

Background

Currently, there are no connections to other transit agencies within the Study Area and no connections provided by HARTS to neighboring transit systems that could provide opportunities to regional transit connections. Identified in the CAMPO 2050 Metropolitan Transportation Plan, there is a proposed route from Apex to Angier, to be operated by GoCary, that would provide a regional connection to the Study Area, but a timeframe for project implementation has not been determined.

Similar to a fixed route transit, a route focused on providing regional connections would operate on a predetermined route and schedule. Passengers would not have to reserve a ride and are able to wait at the predetermined stop for service. While not comparable to a commuter route that serves key employment destinations directly from outlying areas, a route focused on regional connections, would allow HARTS to provide service to regional transit connections, allowing passengers to then connect to other transit systems and the larger Triangle Region.

Example

A potential concept for a regional connection service in the Study Area was created to help understand some of the potential benefits and impacts to implementing a similar service. Figure 10 provides an example of a concept that connects North Harnett with the following transit routes in Wake County:

- **GoTriangle's Route 305**: operates hourly, from 6:30am to 10:00pm, Monday - Friday between Apex and Raleigh via Cary on with peak hour service extending to Holly Springs.

- **GoApex's Route 1**: a circulator service operating hourly from 6:00am to 10:00pm Monday through Saturday.
- **GoCary's Route ACX:** operates hourly, during peak hours, Monday – Friday between Apex and Cary.
- **GoRaleigh's FRX:** operates hourly, during peak hours, Monday - Friday between Fuquay-Varina and Raleigh.

The potential concept would connect Angier to Fuquay-Varina and Apex running every two hours. During peak hours, the route would deviate to stop at the Fuquay-Varina South Park-and-Ride to connect to GoRaleigh's FRX route during its service windows. Running this service every two hours would require one vehicle. To create connections with route FRX, the service would need to run beyond HARTS' typical hours of operation.

Table 7 below provides a high-level snapshot of the operational requirements for this example service, assuming a 6:00am to 8:00pm service window, and existing operating costs to calculate the snapshot.

Table 7: Operational Requirements of Regional Connection Service

Hours of Per Day	Vehicles Needed	Daily Revenue Hours	Cost Per Hour[13]*	Cost Per Day	Annual Cost**
14	1	13	$50.00	$700	$175,000

**Rounded*

***Calculated using 249 weekdays; 249 weekdays is the number of non-holiday weekdays*

[13] 2022 Annual Agency Profile - Harnett County (NTD ID 41119)

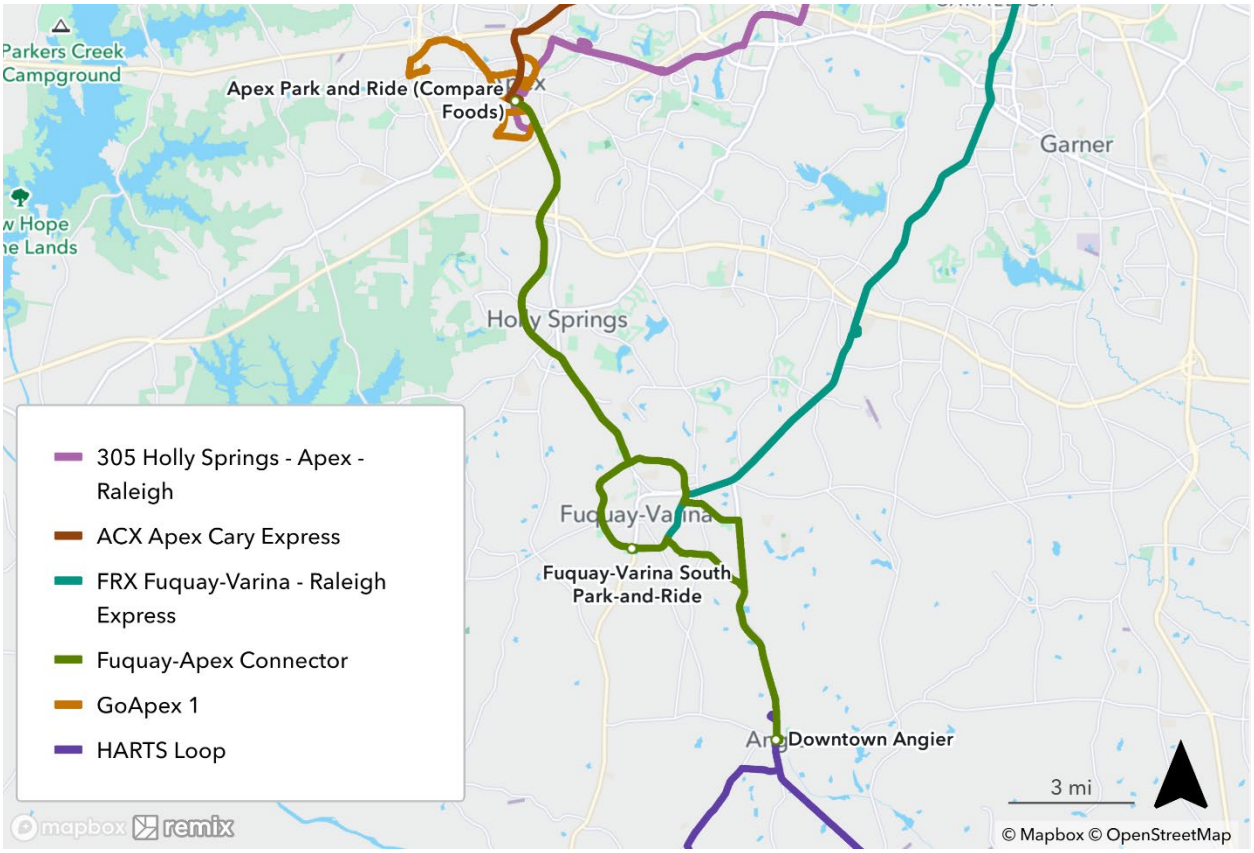


Figure 10: Fuquay-Apex Connector

Considerations for Implementation

Similarly to a fixed-route or senior shuttle, HARTS could likely utilize their existing fleet to operate a regional connection service without the need of purchasing additional vehicles or other equipment but may require hiring additional drivers. In order to provide connections to other routes that operate during peak hours, such as GoRaleigh's FRX route, a regional connection service would need to run beyond HARTS' typical hours of operation. This would likely also result in the need for longer hours for additional HARTS staff outside of the drivers operating the route.

Table 8 below also describes additional benefits and challenges of HARTS adding a senior shuttle service.

Table 8: Benefits and Challenges of Regional Connection Service

Service Type	Benefits	Challenges
Regional Connection	• Consistent timetable and routing; ease of understanding for passengers • Access to other transit systems; regional connections • No reservations needed • No external operator required	• Relatively low density and limited locations may result in lower ridership • Limited ridership pool • Longer service hours required • Not a direct connection to regional destinations / employment centers

Service Type	Benefits	Challenges
		• Limited number of trips per day

Operating Parameters

There are operating parameters to be considered when contemplating a regional connection service that includes:

- **Service Area:** When determining the boundaries of a service area, transit agencies should consider factors such as the major trip destinations and length of the route. Longer routes may be able to serve a bigger population and increase potential trip destinations with more regional connections, but this may impact on frequency, increase cost, and/or require more vehicles to meet frequency goals. Shorter routes may be able to facilitate increased frequencies but could serve less people and limit trip destinations to fewer regional connections.
- **Service Span:** When determining the days and hours that the service will operate, agencies should consider whether the population has a need for service during throughout the entire day or could be accommodated with a shorter service span, such as only operating to meet peak hour schedules of other regional connections.
- **Pick Up and Drop Off Locations:** Passengers are required to walk to a bus stop. If the service is focused on passengers commuting to work, consideration should be given to the ability of a park-and-ride location at the stops within Harnett County.
- **Trip Booking:** Passengers are not required to book a trip in advance and often operate on a first-come, first-serve basis. However, GoDurham encourages the senior community offices to offer a sign-up sheet to make sure there's room for everyone who wants to ride the shuttle.

Comparison of Service Types

Each of the four service options have their own benefits and challenges when it comes to implementation. They also can be implemented for varying purposes and/or to address different transportation challenges. It will be important to consider what the goals are for transit service in the Study Area when considering which service types to explore further and the feasibility of each service type. Table 9 provides a comparison of implementation considerations between the service types, considering how they compare to each other in terms of cost, ridership potential, and ease of implementation. Table 10 recaps the benefits and challenges of each service type, as discussed earlier.

There are likely additional considerations for implementation that are not directly related to operations but could impact the quality of service provided. For example, a fixed route likely requires passengers to walk/bike from the bus stop to their destination, so it will be important to consider what pedestrian infrastructure currently exists to allow riders to safely access a bus stop. For service types with a fixed stop location, considering the infrastructure available for waiting riders, such as benches or shelters, could also be consideration.

Table 9: Implementation Considerations for Each Service Type

Service Type	Operating Cost Estimates	Capital Costs	Potential Ridership	Implementation Effort	Service Area	Service Span	Frequency	Convenience / Flexibility
Microtransit	**$$$ - $$$$**	**$**		**üü - üüüü**	**üüüü**	**üü - üüü**	**üüü**	**üüüü**
Fixed Route	**$$**	**$**		**ü**	**üüü**	**üü**	**üü**	**üü**
Senior Shuttle	**$**	**$**		**ü**	**ü**	**ü**	**üü**	**üü**
Regional Connection	**$$**	**$**		**üü**	**üü**	**üüü**	**ü**	**ü**

Table 10: Benefits and Challenges of Each Service Type

Service Type	Benefits	Challenges
Microtransit *(General)*	• Flexibility in destination choices • Limits distance people need to travel to access transit • On-demand rides • Can be more efficient than fixed route transit in low density areas • Smartphone application facilitates easy booking and ability to track ride	• Some passengers may not have access to or be comfortable using smartphone application • High operating costs • Longer wait times during peak hours
Microtransit *(SaaS/Technology Acquisition)*	• Transit agency has more control over managing and operating service • Lower vendor costs • Can make use of existing resources if transit agencies already has necessary staff, vehicles, and equipment	• Higher start-up capital costs if agency does not already own vehicles and equipment (i.e., tablets) • Transit agency may need to hire more staff to manage and operate the service • Slower implementation if transit agency needs to procure vehicles and/or hire staff • Overall costs may be higher when accounting for compensation and benefits of drivers and staff
Microtransit *(TaaS/Turnkey)*	• Faster implementation than SaaS • Vendor has expertise that in house staff may lack • Convenience of not having to procure/own/maintain vehicles,	• Less direct control over service delivery (driver training, drug screening, vehicle maintenance, safety, etc.); contract to outline requirements for service delivery

Service Type	Benefits	Challenges
	recruit and train drivers, and coordinate daily operations • Single point of contact • Vendor takes on risk of accidents and claims	• More oversight required than SaaS to ensure quality and performance targets are met and service is in compliance with federal regulations • Service rates may change based on market demand
Microtransit *(Separate Contracts)*	• Convenience of not having to procure/own/maintain vehicles, recruit and train drivers, and/or coordinate daily operations • Can select specialized vendors rather than relying on one vendor who may have expertise in one area (i.e., microtransit technology) but not another (i.e., vehicle maintenance)	• Requires coordination and communication among service providers • More oversight required than SaaS to ensure quality and performance targets are met and service is in compliance with federal regulations
Fixed Route	• Consistent timetable and routing; ease of understanding for passengers • No reservations needed • Provides connections to key destinations • No external operator required	• Predetermined destinations • Relatively low density may result in lower ridership • Some destinations may require passengers to walk/bike from the stop to their destination
Senior Shuttle	• Consistent timetable and routing; ease of understanding for passengers • Direct access to essential goods and services for seniors • No reservations needed • No external operator required	• Limited flexibility in destination choice for passengers • Limited connectivity to other parts of Harnett County • Relatively low density and limited locations may result in lower ridership • Limited ridership pool
Regional Connection	• Consistent timetable and routing; ease of understanding for passengers • Access to other transit systems; regional connections • No reservations needed • No external operator required	• Relatively low density and limited locations may result in lower ridership • Limited ridership pool • Longer service hours required • Not a direct connection to regional destinations / employment centers • Limited number of trips per day

Conclusion

In November 2024, the study's Core Technical Team and Public Officials met to discuss the proposed service types and to determine which service type(s) to move forward with to investigate further in an implementation plan. At the beginning of the discussion, meeting participants were asked which of the service types should move forward to the implementation plan. Microtransit was the top recommendation with regional transit ranked second, fixed route ranked third, and senior shuttle ranked fourth.

In discussing the reasoning behind participants' choices, there was discussion around not wanting to exclude parts of one service type in choosing one type versus the other. For example, there was discussion and desire to include destinations outside of the study area to allow for regional connections, while focusing on a more local service like fixed route or microtransit. It was noted that microtransit service can offer flexibility in the design to provide connections outside of the service area.

Questions were raised about the logistical and financial feasibility of microtransit, versus a fixed route, but the discussion highlighted local transit examples where microtransit has replaced low performing fixed routes noting that microtransit can often be more cost effective than fixed route because of higher ridership. After the discussion among the meeting participants, they were asked once again which of the service types should move forward to the implementation plan. The rankings of the service types remained the same with microtransit being the top recommendation, regional transit being second, fixed route being third, and the senior shuttle ranking fourth.

Based on the desire to provide regional connections and the top ranking of the microtransit service option, it is recommended that **a microtransit service type, that includes connections to regional destinations, be the option further investigated in the implementation plan**.

NORTH HARNETT

Transit Study

Technical Memoranda

MEMO 5:
Implementation Plan

NORTH HARNETT Transit Study

Transit Service Options Memorandum

Table of Contents

Introduction

Building off the proposed service area and data from earlier phases of the study, there are key takeaways that will help to inform the potential transit service options. Those takeaways include:

- HARTS existing service is at capacity and there **is demand for other types of transit services** with more connectivity, flexibility, and increased service times.
- Most respondents, from public engagement efforts, said they would use transit for **shopping, recreational, and medical trips** with a slightly less emphasis on work/school trips.
- Existing travel patterns strongest between **Lillington and Angier**. Existing HARTS ridership strongest near Lillington and between **Lillington and Coats**.
- **56%** of survey respondents were **very interested and somewhat interested** in using transit.
- Stakeholders recognized the need for **updated infrastructure** and **increased land-use density** in order for transit to be useful.
- Support from public and stakeholders for **more enhanced local services** and **connecting to areas locally**.

With these takeaways in mind, four (4) transit service options were identified for further consideration. These service options include:

- Fixed Route
- Microtransit
- Regional Connection to Other Transit Systems
- Senior Shuttle / Shopping Trip Route

Fixed Route

Background

Fixed route transit is a common transit service type implemented in transit systems across the world. A “fixed route” is one that follows one path from its origin to its destination, making stops along the way. They operate on a predetermined route and schedule, connecting key points of interest are identified as stops that best serve riders. Passengers do not have to reserve a ride and are able to wait at the predetermined stop for service. Fixed-route transit is best operated in higher density environments to efficiently transport large quantities of people.

Potential Routing

A potential concept for a fixed route service in the Study Area was created to help understand some of the potential benefits and impacts to implementing a fixed route service. Below is an example of a fixed-route transit concept for Northwest Harnett County connecting medical facilities, educational institutions, grocery stores, and other key points of interest in Angier, Coats, and Lillington, shown in Figure 1.

This example service concept contains two routes, a clockwise loop and counterclockwise loop, with each loop operating hourly, one at the top of the hour and the other at half-past the hour. This combines for 30-minute service between the Angier, Coats, and Lillington, with no reservations needed. The combination of both routes provides consistent travel times between all stops.

Table 1 below provides a high-level snapshot of the operational requirements for this example service. The first row uses HARTS existing hours of operation, 8:00 am to 5:00 pm, and existing operating costs to calculate the snapshot. The second row uses expanded hours of operations, such as 6:00am – 9:00pm and existing operating costs to calculate the snapshot.

Table 1: Operational Requirements of Fixed Route Service

Hours of Per Day	Vehicles Needed	Daily Revenue Hours	Cost Per Hour[1]*	Cost Per Day	Annual Cost**
9	3	27	50.00	$1,350	$337,000
15	3	45	50.00	$2,250	$561,000

** Rounded*

*** Calculated using 249 weekdays; 249 weekdays is the number of non-holiday weekdays in 2024*

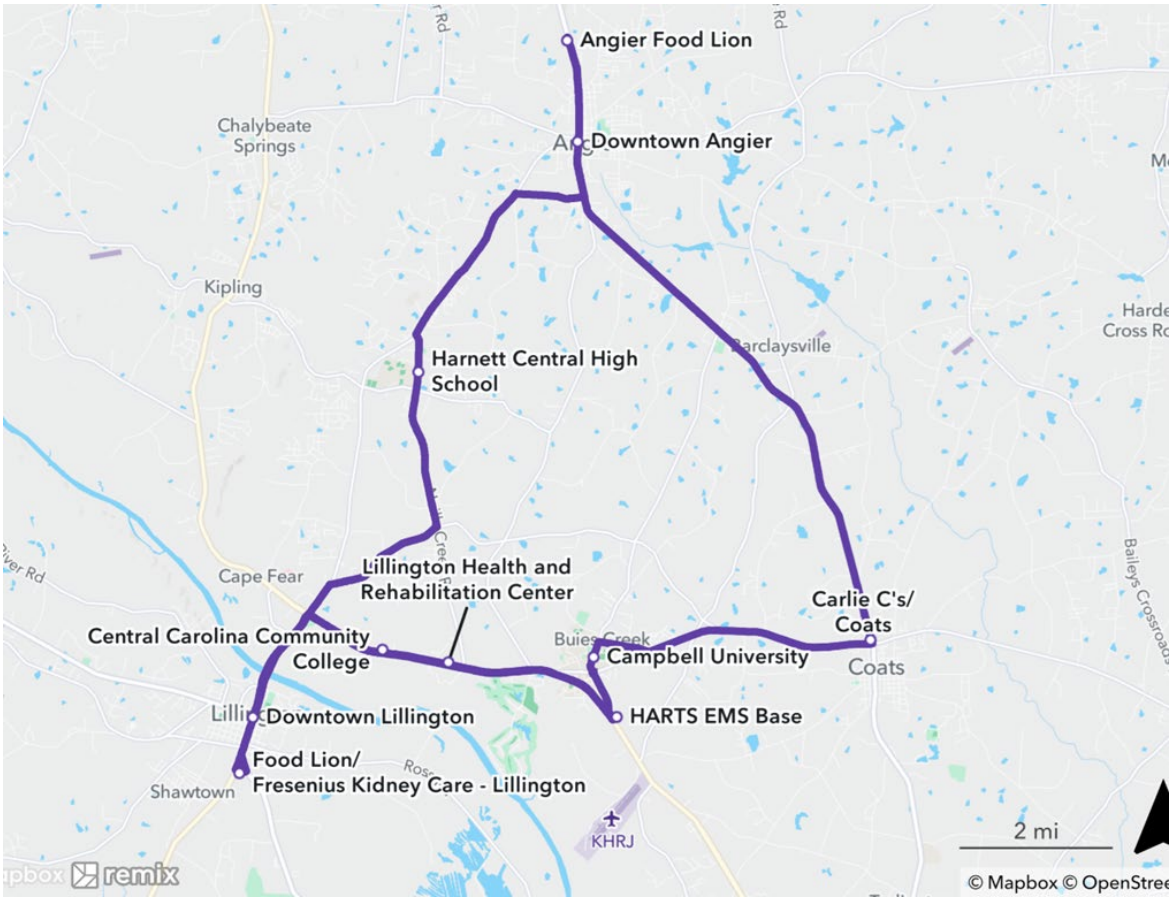


Figure 1: HARTS Loop

[1] 2022 Annual Agency Profile - Harnett County (NTD ID 41119)

Considerations for Implementation

Based on FTA's National Transit Database (NTD) data and stakeholder engagement with HARTS, they currently have a fleet of vehicles larger than what is needed to operate their maximum service, which could allow HARTS to utilize their existing fleet to operate a fixed route service without the need of purchasing additional vehicles or other equipment. However, it may require hiring additional drivers if HARTS does not have enough drivers to operate an additional route. Additionally, providing a service that has expanded hours of operations may also have staffing implications with the need to hire additional HARTS staff or adjust shift schedules. Table 2 below also describes additional benefits and challenges of HARTS adding a fixed route service.

Table 2: Benefits and Challenges of Fixed Route Service

Service Type	Benefits	Challenges
Fixed Route	• Consistent timetable and routing; ease of understanding for passengers • No reservations needed • Provides connections to key destinations • No external operator required	• Predetermined destinations • Relatively low density may result in lower ridership • Some destinations may require passengers to walk/bike from the stop to their destination

Operating Parameters

There are operating parameters to be considered when contemplating fixed route service that include:

- **Service Area:** When determining the boundaries of a service area, transit agencies should consider factors such as the major trip destinations and length of the route. Longer routes may be able to serve a bigger population and increase potential trip destinations, but this may impact on frequency, increase cost, and/or require more vehicles to meet frequency goals. Shorter routes may be able to facilitate increased frequencies but will serve less people and limit trip destinations.
- **Service Span:** When determining the days and hours that the service will operate, agencies should consider whether the population has a significant need for service beyond typical operating hours, such as on evenings, late nights, and weekends.
- **Pick Up and Drop Off Locations:** Passengers are required to walk to a bus stop. Depending on where bus stops are located, additional pedestrian infrastructure, like sidewalks and crosswalks, may be needed.
- **Trip Booking:** Passengers are not required to book a trip in advance. Passengers are able to wait at a bus stop, according to the published schedule, and can get on the bus when it arrives.

Microtransit

Background

Microtransit, or on-demand transit, is a technology-enabled public transit service that provides shared on-demand transportation with dynamic routing and scheduling. The emerging transit service offers an alternative to fixed route and traditional demand response services. Microtransit is generally provided within a designated service area or zones where customers can request rides through a smartphone application, online web portal, or call center. Depending on the operating parameters of the service, customers may be picked up at their location and dropped off at their destination (curb to curb) or they may be asked to walk a short distance to their pickup/drop off location (node to node) in order to maximize route efficiency. The microtransit software typically includes functionality for on-demand scheduling, dynamic routing, a customer-facing application, onboard interface, fare payment, and vehicle tracking.

Microtransit Definitions:

Technology-enabled: customers can book rides through a smartphone application in addition to more traditional methods such as an online web portal or call center

Shared: rides may be shared with other customers

On-demand: customers can book trips in real time and do not have to reserve their ride ahead of time

Dynamic routing and schedule: do not follow fixed route or schedule but are instead flexible based on customer demand

There are a variety of reasons why an agency may want to implement microtransit service depending on their existing needs, challenges, goals. Some common examples include:

- To provide first-mile and last-mile connections to fixed route service
- To replace existing service that is inefficient or not cost effective
- To establish transit service in a rural or low-density area that is not conducive to traditional fixed route service
- To address gaps in existing service by providing service on days or times when other services are unavailable
- To expand on-demand service to the general population, beyond existing need-based demand response service
- To address customer needs and improve customer experience by offering flexible, technology-enabled ride booking options

Service Delivery Models

Microtransit service can be broken down into three primary service delivery models: Transportation as a Service (TaaS), Software as a Service (SaaS), and separate contracts for the technology, drivers, and vehicles. Each service delivery model has its own benefits and challenges including:

- **Software as a Service (SaaS)/Technology Acquisition**
    - In a SaaS/Technology Acquisition model, the transit agency operates the service and contracts with a vendor who is only responsible for providing the microtransit

software, including the scheduling software, customer-facing application, and on-board system. Under SaaS models, the transit agency typically owns, operates, and maintains the vehicles. The call center and dispatch could be operated by the transit agency or the vendor.

- **Transportation as a Service (Taas)/Turnkey**
  - In a TaaS/turnkey model, the selected microtransit vendor provides all aspects of the microtransit service through a single contract. In addition to providing the microtransit software, the vendor also provides the vehicles and drivers, operates the call center and dispatch, maintains the customer-facing application and/or website, and maintains the vehicles.
- **Separate Contracts**
  - As an alternative to a strict SaaS or TaaS model, some agencies may choose to utilize separate contracts for technology and drivers/vehicles. Similar to SaaS, the microtransit vendor only provides the software. However, instead of the transit agency providing all other elements of the transit service in house, some or all other aspects of service are contracted out through separate vendors.

Microtransit Examples

A number of transit agencies in North Carolina have recently implemented microtransit service. Several examples near Harnett County are JCATS in Johnston County (QuickRide), the City of Wilson (RIDE), and the Town of Morrisville (Smart Shuttle). There are differences between the size, purpose and contract types of each example that help to provide an example of types of microtransit services available to HARTS.

JCATS, QuickRide

- **Johnston County Population:** 215,999
- **Service Began:** Began on March 2023 as pilot program
- **Reason for Microtransit:** Wanted to enhance existing service by providing riders with technology-based method of requesting rides in real time.
- **Operating Days:** Monday – Friday
- **Service Area:** Smithfield/Selma area
- **Microtransit Fleet Size:** 5
- **Vehicle Type:** Transit Passenger Van (all ADA accessible)

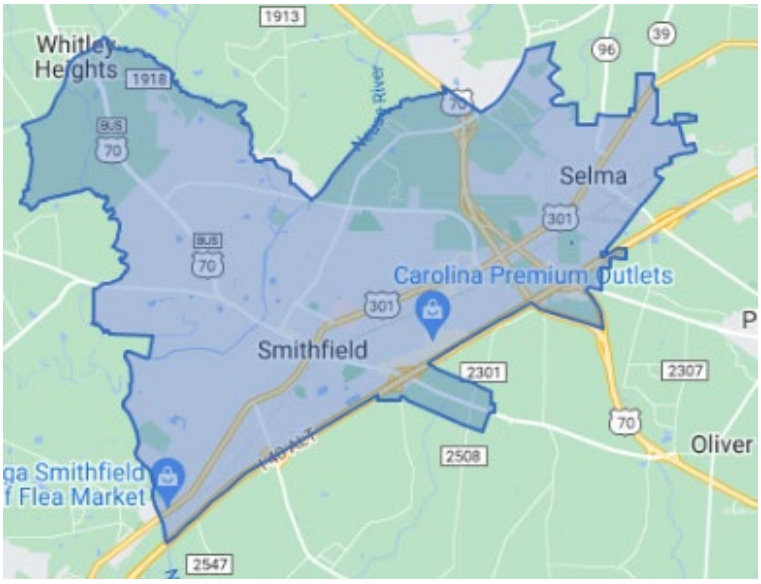


Figure 2: QuickRide Service Area

- **Fare:** $6.00
- **Service Delivery Model:** Software as a Service through existing scheduling software vendor, CTS Software
- **Stops:** Curb to curb
- **Annual Ridership:** Over 12,000 rides from March 2023 – December 2023[2]
- **Annual Operating Expenses:** $715,000[3]
- **Cost per Hour:** $50[4]
- **Funding Sources:** Local Government (Johnston County), 5311 capital funding for initial investment in replacement vans, NCDOT-funded rural operating grant funds

Wilson, RIDE

- **City of Wilson Population:** 47,851
- **Service Began:** September 2020
- **Reason for Microtransit:** Replaced fixed route bus system
- **Operating Days:** Monday – Saturday
- **Service Area:** City limits and nearby large employers
- **Microtransit Fleet Size:** 26
- **Vehicle Type:** Van
- **Fare:** $2.50
- **Service Delivery Model:** Turnkey contract with Via
- **Stops:** Corner to corner or virtual bus stops

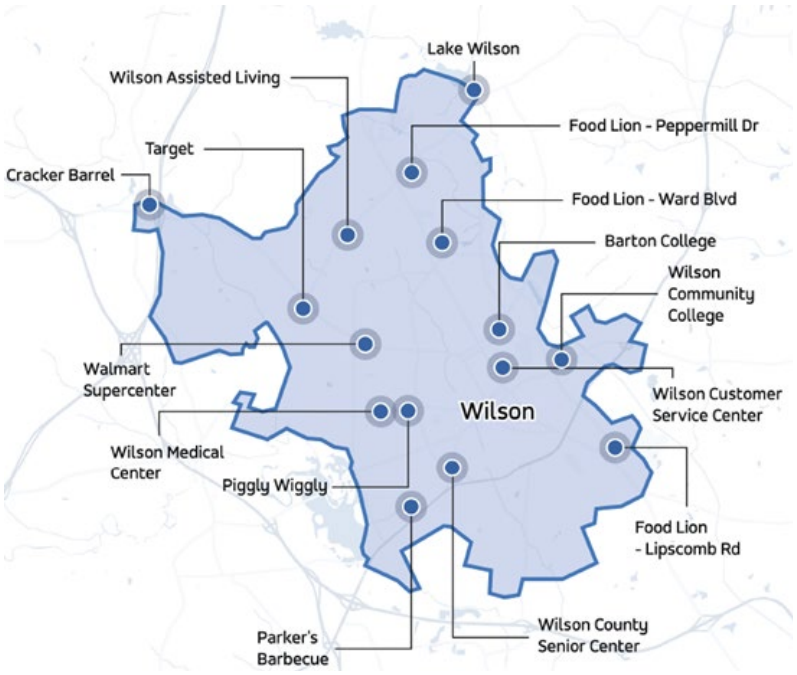


Figure 3: RIDE Service Area

Figure 4: RIDE Van

[2] Johnston County Board of Commissioners Meeting Minutes, June 3, 2024
[3] https://restorationnewsmedia.com/articles/local-news-johnstonian/ride-hailing-service-to-continue/
[4] Ibid

- **2022 Annual Ridership:** 156,887[5]
- **2022 Annual Operating Expenses:** $1,609,052[6]
- **2022 Cost per Revenue Hour:** $72.92[7]
- **Funding Sources:** Federal Government (5311 Funding and Accelerating Innovative Mobility Grant), State Government (Consolidation and Coordination of Public Transit Systems Grant), Directly Generated, Local Government

Morrisville, Smart Shuttle

- **Town of Morrisville Population:** 29,630
- **Service Began:** October 2021
- **Reason for Microtransit:** Alternative to fixed route service, which did not make sense due to the jurisdictional boundaries and development patterns
- **Operating Days:** Monday – Sunday
- **Service Area:** Defined shuttle stops through Town of Morrisville
- **Microtransit Fleet Size:** 2
- **Vehicle Type:** Cutaway
- **Fare:** Free
- **Service Delivery Model:** Software As a Service with Via; GoCary (with MV Transportation) provides vehicles and drivers
- **Stops:** 17 shuttle stops
- **2022 Annual Ridership:** 11,122[8]
- **2022 Annual Operating Expenses:** $425,940[9]
- **2022 Cost Per Revenue Hour:** $95.43[10]
- **2022 Funding Sources:** Local Government (50% from Town of Morrisville and 50% from Wake Transit Plan)

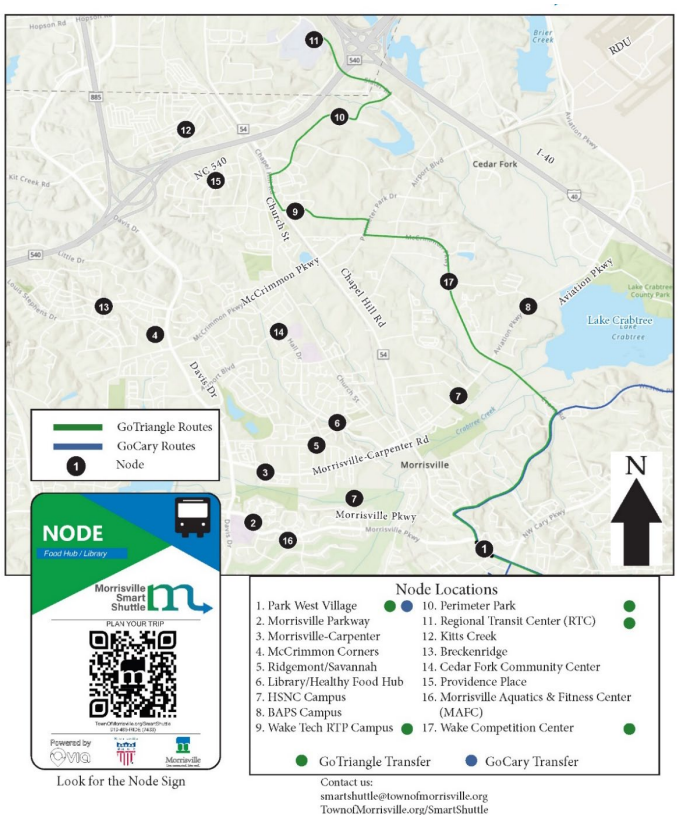


Figure 5: Smart Shuttle Stops

[5] Public Microtransit Pilots in the State of North Carolina: Operational Characteristics, Costs, and Lessons Learned
[6] Ibid.
[7] Ibid.
[8] Ibid.
[9] Ibid.
[10] Ibid.

Considerations for Implementation

Service Delivery Model

Transit agencies have to consider many factors when choosing a service delivery model, such as budget, existing staff and vehicle availability, desired level of control over service, capacity for oversight, and implementation timeline. Table 3 below describes the benefits and challenges of each service delivery model, which can be used to help guide transit agencies as they select a service delivery model.

Agencies that operate existing demand response service but want to transition to, or add, a microtransit service might be more inclined to choose the SaaS option, so that they can reduce costs by leveraging existing staff and resources. However, a transit agency that is implementing transit service for the first time may find it more convenient and cost effective to contract out the service, either through a single contract or separate contracts. As HARTS falls into the former category, selecting a SaaS service delivery model could enable HARTS to implement microtransit service without needing to purchase additional vehicles. At the same time, if additional staff need to be hired, this would impact cost and the implementation timeline.

Table 3: Service Delivery Model Benefits and Challenges

Service Delivery Model	Benefits	Challenges
SaaS/Technology Acquisition	• Transit agency has more control over managing and operating service • Lower vendor costs • Can make use of existing resources if transit agencies already has necessary staff, vehicles, and equipment	• Higher start-up capital costs if agency does not already own vehicles and equipment (i.e., tablets) • Transit agency may need to hire more staff to manage and operate the service • Slower implementation if transit agency needs to procure vehicles and/or hire staff • Overall costs may be higher when accounting for compensation and benefits of drivers and staff
TaaS/Turnkey	• Faster implementation • Vendor has expertise that in house staff may lack • Convenience of not having to procure/own/maintain vehicles, recruit and train drivers, and coordinate daily operations • Single point of contact • Vendor takes on risk of accidents and claims	• Less direct control over service delivery (driver training, drug screening, vehicle maintenance, safety, etc.); contract to outline requirements for service delivery • More oversight required than SaaS to ensure quality and performance targets are met and service is in compliance with federal regulations • Service rates may change based on market demand

Service Delivery Model	Benefits	Challenges
Separate Contracts	• Convenience of not having to procure/own/maintain vehicles, recruit and train drivers, and/or coordinate daily operations • Can select specialized vendors rather than relying on one vendor who may have expertise in one area (i.e., microtransit technology) but not another (i.e., vehicle maintenance)	• Requires coordination and communication among service providers • More oversight required than SaaS to ensure quality and performance targets are met and service is in compliance with federal regulations

Operating Parameters

In addition to the service type, there are operating parameters to be considered when contemplating microtransit service that include:

- **Service Area:** When determining the boundaries of a service area, transit agencies should consider factors such as the propensity for microtransit, major trip destinations, and size of the service area. Larger zones serve a bigger population and increase potential trip destinations, but this may impact on time performance, increase cost, and/or require more vehicles to meet response time goals. Smaller zones can facilitate shorter wait times but will serve less people and limit trip destinations.
- **Service Span:** When determining the days and hours that the service will operate, agencies should consider whether the population has a significant need for service beyond typical operating hours, such as on evenings, late nights, and weekends.
- **Pick Up and Drop Off Locations:** There are several options for how transit agencies can operate microtransit service to pick up and drop off passengers.
    - ***Curb to Curb:*** Passengers are picked up at their location and dropped off at their destination.
    - ***Corner to Corner:*** Passengers are picked up and dropped off at nearby intersections.
    - ***Virtual Bus Stop:*** Passengers are required to walk a short distance to a dynamically created stop (created by microtransit software). The purpose of this option is to increase route efficiency and limit out of direction trips.
    - ***Hybrid:*** Transit agencies may also a combination of options depending on pre-specified criteria, such as the type of passenger (i.e., ambulatory vs non-ambulatory) or distance from a fixed route bus stop.
- **Trip Booking:** A key component of microtransit service is that the technology enables passengers to book rides in real time through an app. However, some passengers may not have access to a smartphone or be comfortable using a smartphone application. Many agencies also offer the ability to book trips through a web platform as well as through a call center.

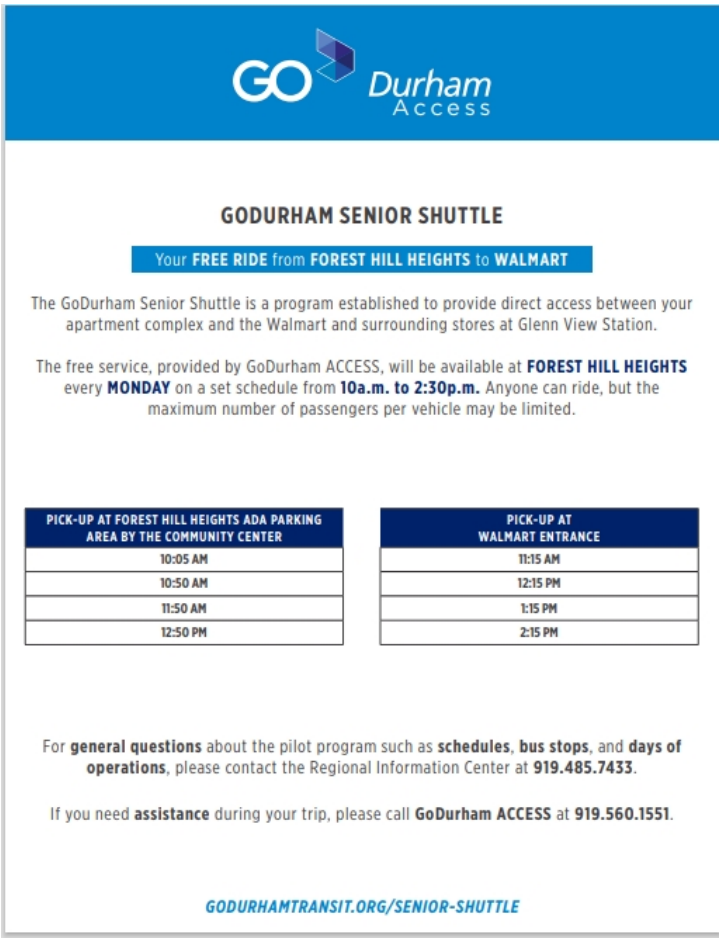
- **Response Time:** Transit agencies should establish response time goals, as convenience for customers is a key element of microtransit service. Response time is impacted by factors such as the size and boundaries of the service area, the local street network, the number of vehicles and operators available, vehicle garage locations, and anticipated demand. Meeting response time goals may be particularly challenging in areas where agencies anticipate significant demand during peak hours.
- **Fare Structure:** When establishing a fare structure, agencies should consider how the fare for microtransit service compares to the fare for any existing service, what passengers are willing to pay, and whether they want to provide discounted fares for disadvantaged groups. Some agencies may also choose to make their microtransit service fare free. For agencies that partner with Transportation Network Companies (TNC) and offer passengers a voucher to use their services, the amount of the subsidy per trip would need to be determined.

Additionally, transit agencies will need to determine how passengers will pay the fare. Many microtransit services allow passengers to pay their fare through the ride booking app or website. However, certain populations may not have access to or feel comfortable using electronic payment options. Agencies may allow customers to also pay their fare in cash through a farebox on the vehicle or by purchasing a ticket or pass at the transit facility or other designated locations. For example, RIDE in Wilson does not accept cash payments on board the vehicles, so customers who want to pay cash have to purchase credits in person at the Customer Service Center.

Senior Shuttle / Shopping Shuttle Route

Background

A senior shuttle is similar to a fixed route, in that it serves predetermined stops at predetermined times, However, the purpose of a senior shuttle is to directly connect senior citizens with essential goods and services in the community. The routing of a senior shuttle focuses on serving senior living facilities and senior centers. These routes also often operate for shorter time periods during the day and may not operate every day of the week. For areas with larger senior populations, a senior shuttle could aid, not replace, existing paratransit services. A similar service, a shopping shuttle, could be designed with the purpose of serving shopping destinations. Shopping shuttles often serve concentrated residential areas, such as apartment complexes, college/university residential housing, or senior living facilities.



GO Durham Access

GODURHAM SENIOR SHUTTLE

Your **FREE RIDE** from **FOREST HILL HEIGHTS** to **WALMART**

The GoDurham Senior Shuttle is a program established to provide direct access between your apartment complex and the Walmart and surrounding stores at Glenn View Station.

The free service, provided by GoDurham ACCESS, will be available at **FOREST HILL HEIGHTS** every **MONDAY** on a set schedule from **10a.m. to 2:30p.m.** Anyone can ride, but the maximum number of passengers per vehicle may be limited.

PICK-UP AT FOREST HILL HEIGHTS ADA PARKING AREA BY THE COMMUNITY CENTER	PICK-UP AT WALMART ENTRANCE
10:05 AM	11:15 AM
10:50 AM	12:15 PM
11:50 AM	1:15 PM
12:50 PM	2:15 PM

For **general questions** about the pilot program such as **schedules**, **bus stops**, and **days of operations**, please contact the Regional Information Center at **919.485.7433**.

If you need **assistance** during your trip, please call **GoDurham ACCESS** at **919.560.1551**.

GODURHAMTRANSIT.ORG/SENIOR-SHUTTLE

Figure 6: Example of GoDurham Senior Shuttle Schedule

There are several examples of senior shuttles in the larger Triangle region that may provide a good example for HARTS. An example of such exists in Durham, as a pilot program, known as the GoDurham Senior Shuttle. Operated by GoDurham ACCESS, the shuttle transports residents from 10 senior living facilities across Durham to Walmart in northeast Durham. This service operates five days a week with one paratransit vehicle serving two facilities per day. No reservations are required, and the service is fare-free to passengers. The pilot program is a partnership among the City of Durham, End Hunger Durham and GoTriangle and funded through the Durham Transit Plan but came about through the request from the grassroots organization End Hunger Durham to improve access to grocery stores for seniors. Figure 6 shows an example of the GoDurham Senior Shuttle's schedule.

The Town of Chapel Hill also has a free senior shuttle, open to all seniors, and is operated by Chapel Hill Transit along the same route Monday through Friday. The route serves four senior living facilities, two shopping centers with grocery stores, the library and a community center. Every location is served hourly from 8:00am to 4:00pm. Trips on the shuttle are not reserved, operating on a first-come, first-serve basis and trips provide curb-to-curb service.

Examples

Three potential concepts for senior shuttles, one for each of the towns in the proposed Service Area, were created to help understand some of the potential benefits and impacts to implementing a senior shuttle route. Each service concept assumes a fixed, hourly schedule serving multiple senior living facilities, medical facilities, and grocery stores. The shuttles are designed to serve seniors exclusively and not the general public. A service span of 9:00am to 2:00pm was used, similar to the Durham example that focuses on a shorter service span but serves different routes throughout the week. Similar to a traditional fixed-route service, the shuttle would follow a consistent schedule, operating hourly during HARTS service hours and would not require reservations. However, there would not be any intermediate stops served. The three potential routes and the destinations served include:

- The Angier Senior Shuttle concept (Figure 7) would include Oak Hill Assisted Living, Absolute Care Assisted Living, Angier Senior Center, Fresenius Kidney Care Center, and Carlie C's.
- The Lillington Senior Shuttle concept (Figure 8) would include Pinecrest Gardens Assisted Living, Green Leaf Care Center, Central Harnett Hospital, Carlie C's and Food Lion.
- The Coats-Lillington Senior Shuttle concept (Figure 9) would include Coats Senior Citizens Center, HARTS EMS Base, Lillington Health and Rehabilitation Center, Central Harnett Hospital, and Carlie C's.

Table 4 below provides a high-level snapshot of the operational requirements for these example services, using HARTS existing operating costs to calculate the snapshot for service 5 days a week. Table 5 also provides a snapshot if each senior shuttle were operated one day per week.

Table 4: Operational Requirements of Senior Shuttle Service

Service	Hours Per Day	Vehicles Needed	Daily Revenue Hours	Cost Per Hour[11]*	Cost Per Day	Annual Cost**
Angier	5	1	5	50.00	$250	$63,000
Lillington	5	1	5	50.00	$250	$63,000
Coats/Lillington	5	1	5	50.00	$250	$63,000

**Rounded*

***Calculated using 249 weekdays; 249 weekdays is the number of non-holiday weekdays*

Table 5: Operational Requirements of Senior Shuttle Service

Service	Hours Per Day	Vehicles Needed	Weekly Revenue Hours	Cost Per Hour[12]*	Cost Per Week	Annual Cost**
Each Senior Shuttle (1x per Week)	5	1	15	50.00	$750	$117,000

**Rounded*

***Calculated using 156 weekdays*

[11] 2022 Annual Agency Profile - Harnett County (NTD ID 41119)

[12] 2022 Annual Agency Profile - Harnett County (NTD ID 41119)

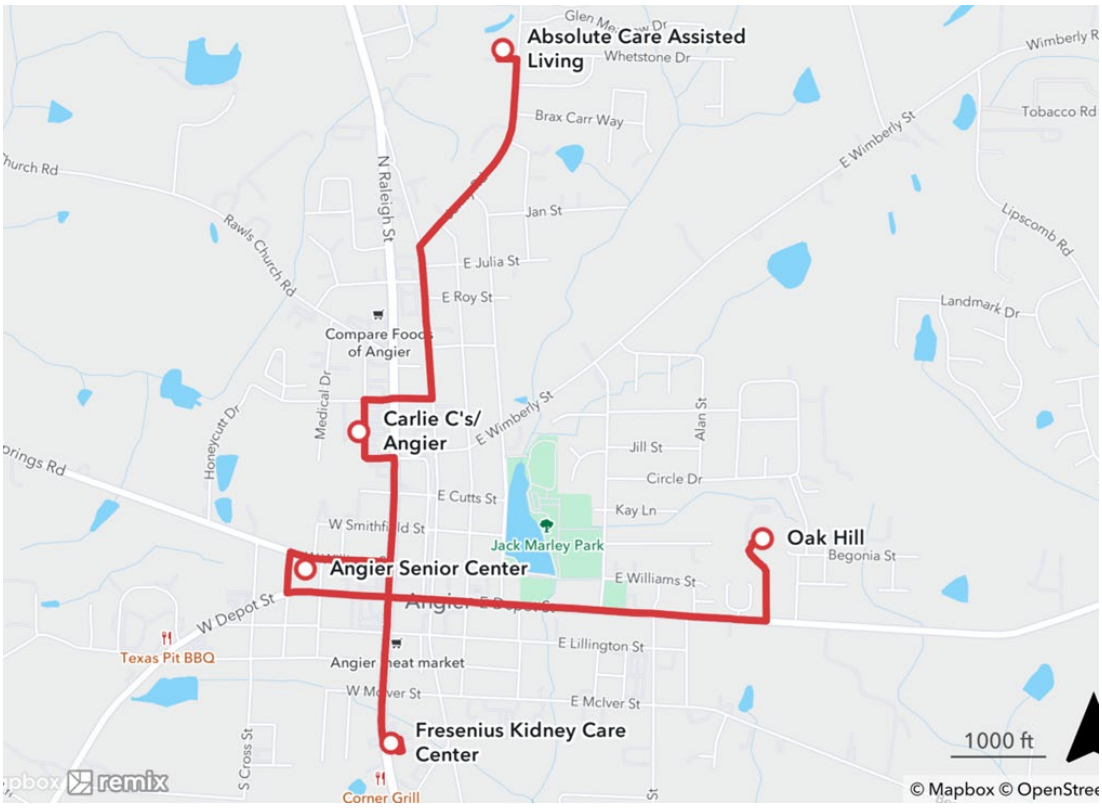


Figure 7: Angier Senior Shuttle

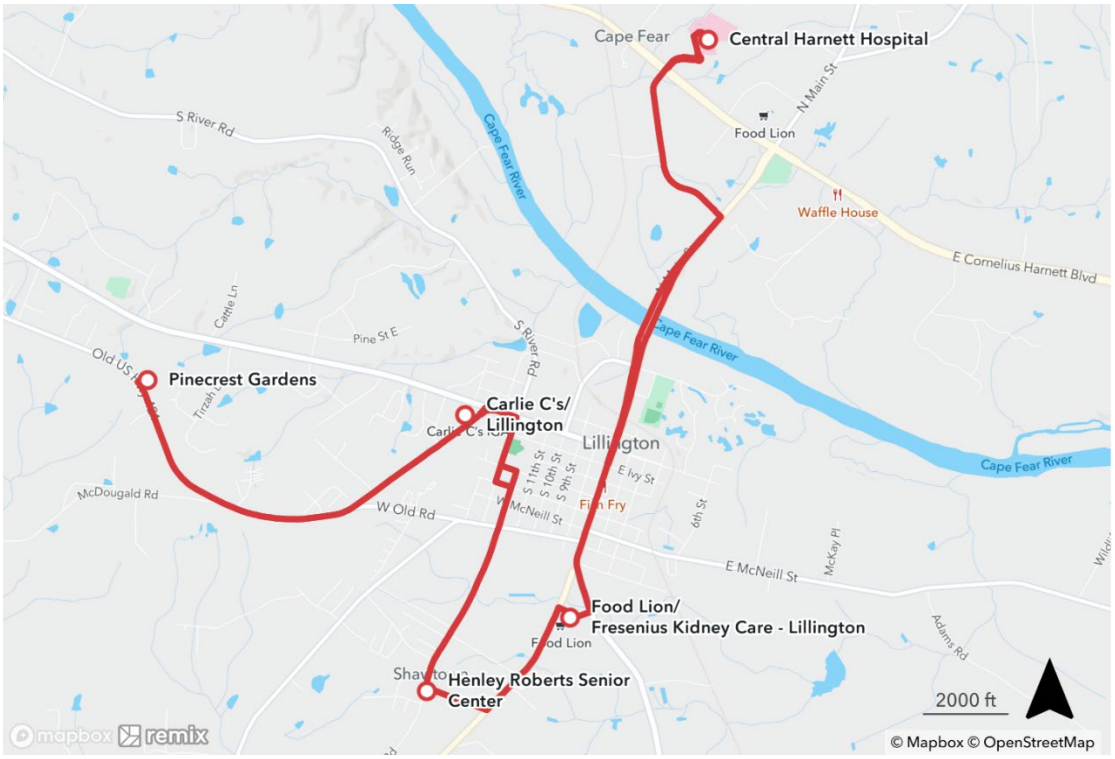


Figure 8: Lillington Senior Shuttle

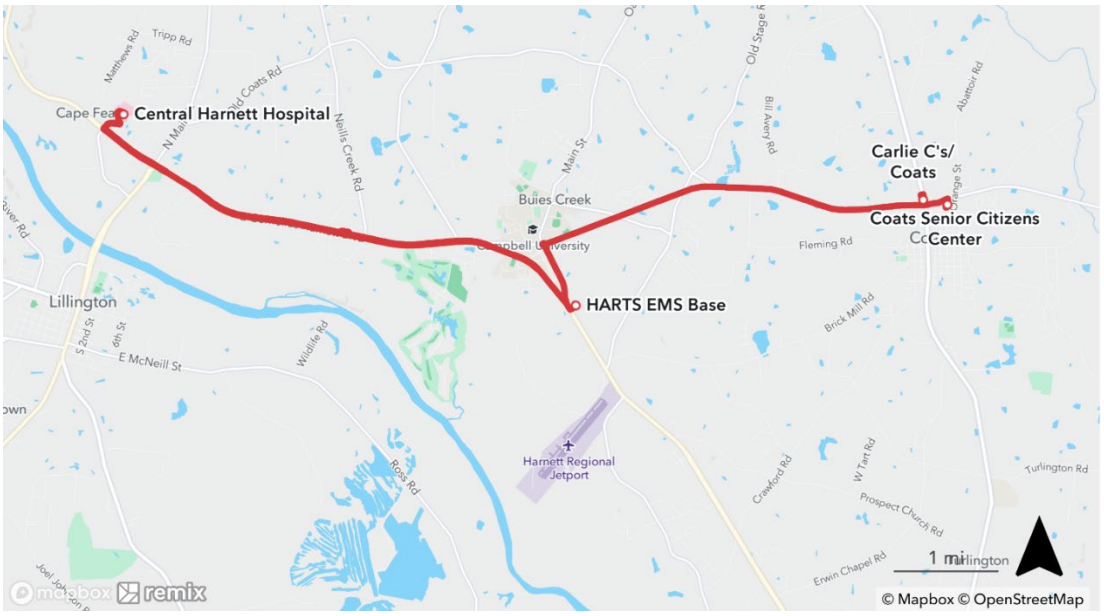


Figure 9: Coats-Lillington Senior Shuttle

Considerations for Implementation

Based on NTD data and stakeholder engagement with HARTS, they currently have a fleet of vehicles larger than what is needed to operate their maximum service, which could allow HARTS to utilize their existing fleet to operate a senior shuttle service without the need of purchasing additional vehicles or other equipment. However, it may require hiring additional drivers if HARTS does not have enough drivers to operate an additional route. Compared to a fixed route, senior shuttles may allow HARTS to provide additional transit options within fewer revenue hours, but the more limited routes may also limit the ridership seen on these routes. Table 6 below also describes additional benefits and challenges of HARTS adding a senior shuttle service.

Table 6: Benefits and Challenges of Senior Shuttle Service

Service Type	Benefits	Challenges
Senior Shuttle	• Consistent timetable and routing; ease of understanding for passengers • Direct access to essential goods and services for seniors • No reservations needed • No external operator required	• Limited flexibility in destination choice for passengers • Limited connectivity to other parts of Harnett County • Relatively low density and limited locations may result in lower ridership • Limited ridership pool

Operating Parameters

There are operating parameters to be considered when contemplating a senior shuttle service that include:

- **Service Area:** When determining the boundaries of a service area, transit agencies should consider factors such as the major trip destinations and length of the route. Longer routes may be able to serve a bigger population and increase potential trip destinations, but this may impact on frequency, increase cost, and/or require more vehicles to meet frequency goals. Shorter routes may be able to facilitate increased frequencies but will serve less people and limit trip destinations.
- **Service Span:** When determining the days and hours that the service will operate, agencies should consider whether the population has a need for service throughout the entire day or could be accommodated with a shorter service span. In addition, agencies should consider whether the population has a need for service every day of the week or could the need be accommodated across fewer days.
- **Pick Up and Drop Off Locations:** Passengers are picked up at their location and dropped off at their destination.
- **Trip Booking:** Passengers are not required to book a trip in advance and often operate on a first-come, first-serve basis. However, GoDurham encourages the senior community offices to offer a sign-up sheet to make sure there's room for everyone who wants to ride the shuttle.

Regional Connections

Background

Currently, there are no connections to other transit agencies within the Study Area and no connections provided by HARTS to neighboring transit systems that could provide opportunities to regional transit connections. Identified in the CAMPO 2050 Metropolitan Transportation Plan, there is a proposed route from Apex to Angier, to be operated by GoCary, that would provide a regional connection to the Study Area, but a timeframe for project implementation has not been determined.

Similar to a fixed route transit, a route focused on providing regional connections would operate on a predetermined route and schedule. Passengers would not have to reserve a ride and are able to wait at the predetermined stop for service. While not comparable to a commuter route that serves key employment destinations directly from outlying areas, a route focused on regional connections, would allow HARTS to provide service to regional transit connections, allowing passengers to then connect to other transit systems and the larger Triangle Region.

Example

A potential concept for a regional connection service in the Study Area was created to help understand some of the potential benefits and impacts to implementing a similar service. Figure 10 provides an example of a concept that connects North Harnett with the following transit routes in Wake County:

- **GoTriangle's Route 305**: operates hourly, from 6:30am to 10:00pm, Monday - Friday between Apex and Raleigh via Cary on with peak hour service extending to Holly Springs.
- **GoApex's Route 1**: a circulator service operating hourly from 6:00am to 10:00pm Monday through Saturday.
- **GoCary's Route ACX:** operates hourly, during peak hours, Monday – Friday between Apex and Cary.
- **GoRaleigh's FRX:** operates hourly, during peak hours, Monday - Friday between Fuquay-Varina and Raleigh.

The potential concept would connect Angier to Fuquay-Varina and Apex running every two hours. During peak hours, the route would deviate to stop at the Fuquay-Varina South Park-and-Ride to connect to GoRaleigh's FRX route during its service windows. Running this service every two hours would require one vehicle. To create connections with route FRX, the service would need to run beyond HARTS' typical hours of operation.

Table 7 below provides a high-level snapshot of the operational requirements for this example service, assuming a 6:00am to 8:00pm service window, and existing operating costs to calculate the snapshot.

Table 7: Operational Requirements of Regional Connection Service

Hours of Per Day	Vehicles Needed	Daily Revenue Hours	Cost Per Hour[13]*	Cost Per Day	Annual Cost**
14	1	13	$50.00	$700	$175,000

**Rounded*

***Calculated using 249 weekdays; 249 weekdays is the number of non-holiday weekdays*

[13] 2022 Annual Agency Profile - Harnett County (NTD ID 41119)

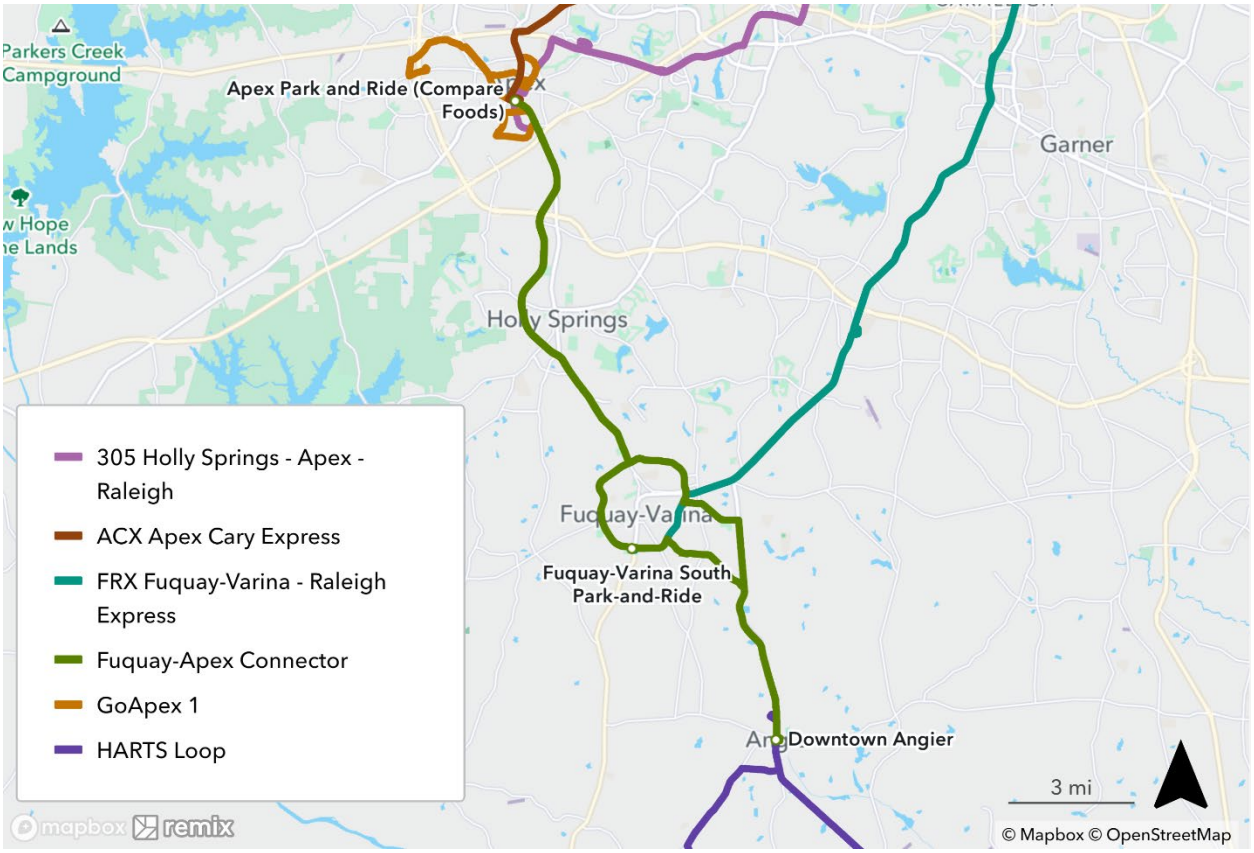


Figure 10: Fuquay-Apex Connector

Considerations for Implementation

Similarly to a fixed-route or senior shuttle, HARTS could likely utilize their existing fleet to operate a regional connection service without the need of purchasing additional vehicles or other equipment but may require hiring additional drivers. In order to provide connections to other routes that operate during peak hours, such as GoRaleigh's FRX route, a regional connection service would need to run beyond HARTS' typical hours of operation. This would likely also result in the need for longer hours for additional HARTS staff outside of the drivers operating the route.

Table 8 below also describes additional benefits and challenges of HARTS adding a senior shuttle service.

Table 8: Benefits and Challenges of Regional Connection Service

Service Type	Benefits	Challenges
Regional Connection	• Consistent timetable and routing; ease of understanding for passengers • Access to other transit systems; regional connections • No reservations needed • No external operator required	• Relatively low density and limited locations may result in lower ridership • Limited ridership pool • Longer service hours required • Not a direct connection to regional destinations / employment centers

Service Type	Benefits	Challenges
		• Limited number of trips per day

Operating Parameters

There are operating parameters to be considered when contemplating a regional connection service that includes:

- **Service Area:** When determining the boundaries of a service area, transit agencies should consider factors such as the major trip destinations and length of the route. Longer routes may be able to serve a bigger population and increase potential trip destinations with more regional connections, but this may impact on frequency, increase cost, and/or require more vehicles to meet frequency goals. Shorter routes may be able to facilitate increased frequencies but could serve less people and limit trip destinations to fewer regional connections.
- **Service Span:** When determining the days and hours that the service will operate, agencies should consider whether the population has a need for service during throughout the entire day or could be accommodated with a shorter service span, such as only operating to meet peak hour schedules of other regional connections.
- **Pick Up and Drop Off Locations:** Passengers are required to walk to a bus stop. If the service is focused on passengers commuting to work, consideration should be given to the ability of a park-and-ride location at the stops within Harnett County.
- **Trip Booking:** Passengers are not required to book a trip in advance and often operate on a first-come, first-serve basis. However, GoDurham encourages the senior community offices to offer a sign-up sheet to make sure there's room for everyone who wants to ride the shuttle.

Comparison of Service Types

Each of the four service options have their own benefits and challenges when it comes to implementation. They also can be implemented for varying purposes and/or to address different transportation challenges. It will be important to consider what the goals are for transit service in the Study Area when considering which service types to explore further and the feasibility of each service type. Table 9 provides a comparison of implementation considerations between the service types, considering how they compare to each other in terms of cost, ridership potential, and ease of implementation. Table 10 recaps the benefits and challenges of each service type, as discussed earlier.

There are likely additional considerations for implementation that are not directly related to operations but could impact the quality of service provided. For example, a fixed route likely requires passengers to walk/bike from the bus stop to their destination, so it will be important to consider what pedestrian infrastructure currently exists to allow riders to safely access a bus stop.

For service types with a fixed stop location, considering the infrastructure available for waiting riders, such as benches or shelters, could also be consideration.

Table 9: Implementation Considerations for Each Service Type

Service Type	Operating Cost Estimates	Capital Costs	Potential Ridership	Implementation Effort	Service Area	Service Span	Frequency	Convenience / Flexibility
Microtransit	**$$$ - $$$$**	**$**		**üü - üüüü**	**üüüü**	**üü - üüü**	**üüü**	**üüüü**
Fixed Route	**$$**	**$**		**ü**	**üüü**	**üü**	**üü**	**üü**
Senior Shuttle	**$**	**$**		**ü**	**ü**	**ü**	**üü**	**üü**
Regional Connection	**$$**	**$**		**üü**	**üü**	**üüü**	**ü**	**ü**

Table 10: Benefits and Challenges of Each Service Type

Service Type	Benefits	Challenges
Microtransit *(General)*	• Flexibility in destination choices • Limits distance people need to travel to access transit • On-demand rides • Can be more efficient than fixed route transit in low density areas • Smartphone application facilitates easy booking and ability to track ride	• Some passengers may not have access to or be comfortable using smartphone application • High operating costs • Longer wait times during peak hours
Microtransit *(SaaS/Technology Acquisition)*	• Transit agency has more control over managing and operating service • Lower vendor costs • Can make use of existing resources if transit agencies already has necessary staff, vehicles, and equipment	• Higher start-up capital costs if agency does not already own vehicles and equipment (i.e., tablets) • Transit agency may need to hire more staff to manage and operate the service • Slower implementation if transit agency needs to procure vehicles and/or hire staff • Overall costs may be higher when accounting for compensation and benefits of drivers and staff
Microtransit *(TaaS/Turnkey)*	• Faster implementation than SaaS • Vendor has expertise that in house staff may lack	• Less direct control over service delivery (driver training, drug screening, vehicle maintenance, safety, etc.); contract to outline

Service Type	Benefits	Challenges
	• Convenience of not having to procure/own/maintain vehicles, recruit and train drivers, and coordinate daily operations • Single point of contact • Vendor takes on risk of accidents and claims	requirements for service delivery • More oversight required than SaaS to ensure quality and performance targets are met and service is in compliance with federal regulations • Service rates may change based on market demand
Microtransit *(Separate Contracts)*	• Convenience of not having to procure/own/maintain vehicles, recruit and train drivers, and/or coordinate daily operations • Can select specialized vendors rather than relying on one vendor who may have expertise in one area (i.e., microtransit technology) but not another (i.e., vehicle maintenance)	• Requires coordination and communication among service providers • More oversight required than SaaS to ensure quality and performance targets are met and service is in compliance with federal regulations
Fixed Route	• Consistent timetable and routing; ease of understanding for passengers • No reservations needed • Provides connections to key destinations • No external operator required	• Predetermined destinations • Relatively low density may result in lower ridership • Some destinations may require passengers to walk/bike from the stop to their destination
Senior Shuttle	• Consistent timetable and routing; ease of understanding for passengers • Direct access to essential goods and services for seniors • No reservations needed • No external operator required	• Limited flexibility in destination choice for passengers • Limited connectivity to other parts of Harnett County • Relatively low density and limited locations may result in lower ridership • Limited ridership pool
Regional Connection	• Consistent timetable and routing; ease of understanding for passengers • Access to other transit systems; regional connections • No reservations needed • No external operator required	• Relatively low density and limited locations may result in lower ridership • Limited ridership pool • Longer service hours required • Not a direct connection to regional destinations / employment centers • Limited number of trips per day

Conclusion

In November 2024, the study's Core Technical Team and Public Officials met to discuss the proposed service types and to determine which service type(s) to move forward with to investigate further in an implementation plan. At the beginning of the discussion, meeting participants were asked which of the service types should move forward to the implementation plan. Microtransit was the top recommendation with regional transit ranked second, fixed route ranked third, and senior shuttle ranked fourth.

In discussing the reasoning behind participants' choices, there was discussion around not wanting to exclude parts of one service type in choosing one type versus the other. For example, there was discussion and desire to include destinations outside of the study area to allow for regional connections, while focusing on a more local service like fixed route or microtransit. It was noted that microtransit service can offer flexibility in the design to provide connections outside of the service area.

Questions were raised about the logistical and financial feasibility of microtransit, versus a fixed route, but the discussion highlighted local transit examples where microtransit has replaced low performing fixed routes noting that microtransit can often be more cost effective than fixed route because of higher ridership. After the discussion among the meeting participants, they were asked once again which of the service types should move forward to the implementation plan. The rankings of the service types remained the same with microtransit being the top recommendation, regional transit being second, fixed route being third, and the senior shuttle ranking fourth.

Based on the desire to provide regional connections and the top ranking of the microtransit service option, it is recommended that **a microtransit service type, that includes connections to regional destinations, be the option further investigated in the implementation plan**.