Town of Garner

Transit Study

July 2020

Kimley»Horn

Acknowledgements

Thank you to the Stakeholder Committee members, Garner Town Council, and the Town of Garner for collaborating on this planning effort and support of the project. We extend our sincere appreciation to the residents, business owners, elected officials, and stakeholders who participated in the planning process provided critical input. Everyone's time, feedback, and energy are greatly appreciated.

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Ms. Leah Harrison, PE –Town of Garner
Ms. Cynthia Alston – Garner Resident
Ms. April Wood – Garner Chamber Board
Ms. Samone Oates-Bullock – Go Triangle
Mr. John Hodges – Town of Garner
Mr. David Langley – Garner Resident
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Ms. Mari Howe – Downtown Garner Association
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Introduction

The Garner Transit Study is intended to identify a community-based transit project that compliments regional service and focuses on local needs. The study was completed by Kimley-Horn in partnership with Town of Garner staff, and with funding support from the Wake Transit Community Funding Area Program.

This report includes a report of public and stakeholder input received throughout the study, detailed analysis of transit needs, recommendations for: capital needs, bus operations, fare structure, and outline available funding opportunities. The intent of this study is to inform a potential application for capital and operating funds available through the Wake Transit Community Funding Area Program. GoRaleigh was included in the stakeholder group and considered a partner in this study as it is anticipated GoRaleigh would operate Garner's preferred route.

Contents

Chapter 1 – Public Engagement 3
Chapter 2 – Transit Needs and Demands 14
Chapter 3 – Transit Fare Evaluation 29
Chapter 4 – Transit Service Model and Implementation Plan 37
Chapter 5 – Funding 45
Appendix 1 - Transit Propensity Analysis-2020 ..... A1
Appendix 2 - Transit Fare Evaluation - 2020 ..... A26

Chapter 1 – Public Engagement

Introduction

The Town of Garner conducted stakeholder and public engagement throughout the transit study timeframe consistent with town policy and the study's Engagement Plan. The study team hosted a combination of active and passive engagement opportunities to solicit feedback from a broad spectrum of participants. These engagement techniques included:

- Stakeholder Group – Garner Transit Study Stakeholders were selected by Town staff to ensure key groups within Garner were well represented and transportation/transit decision makers would be included at key decision points throughout the planning process. Members included representatives from Town of Garner, GoRaleigh, CAMPO, Garner Senior Center, Downtown Garner Association, Town of Garner Chamber of Commerce, the YMCA, current transit riders, and potential future transit riders.
- Pop-up Booth – Town staff provided information and conducted surveys before/during Town Council meetings/work sessions, at park and ride lots, and various Town of Garner events.
- Online Survey – An informational survey related to each phase of the Town of Garner Transit Study was developed and distributed via social media and posted to the Town of Garner and GoForward websites. The study process included two surveys.
- Town Council Presentations – Garner Town Council was updated throughout the study process and the final plan was brought before the Council for adoption.

Impacts from COVID-19 Pandemic on Engagement

The COVID-19 pandemic posed unique challenges to transit study engagement efforts. Governments imposed social distancing restrictions for March through May 2020 and encouraged social distancing after May 2020 to slow the spread of the virus and manage healthcare capacity. In response to social distancing, most community events and public meetings were cancelled, and many businesses and institutions closed and furloughed staff, or required staff to work from home. Traditional engagement methods for the transit study engagement phase II was impossible, and creativity was required to deliver an effective and meaningful approach to disseminating information and gathering input. Online surveying and online virtual meetings were utilized to share information and gather feedback from the public, stakeholders, and the Town Council regarding study results and the adopted service plan.

Three Phases of Engagement

Engagement for the Garner Transit Study was organized into the three phases summarized below.

Phase I –Existing Conditions within the Town of Garner

a. Key Stakeholder kickoff meeting – introducing the study and soliciting input on potential areas of focus within Garner
b. Pop-up booth –surveying Garner residents and gauge existing transit use and overall interest in transit
c. Online survey—gathering feedback on current ridership and desired characteristics and posted on various social media outlets: twitter, Facebook, Town of Garner website, and the GoForward website
d. Key Stakeholder meeting #2 – update on engagement and transit needs analysis
e. Presentation/update to Town Council –reporting results of public survey (and an existing conditions/transit needs analysis being performed by Kimley-Horn)

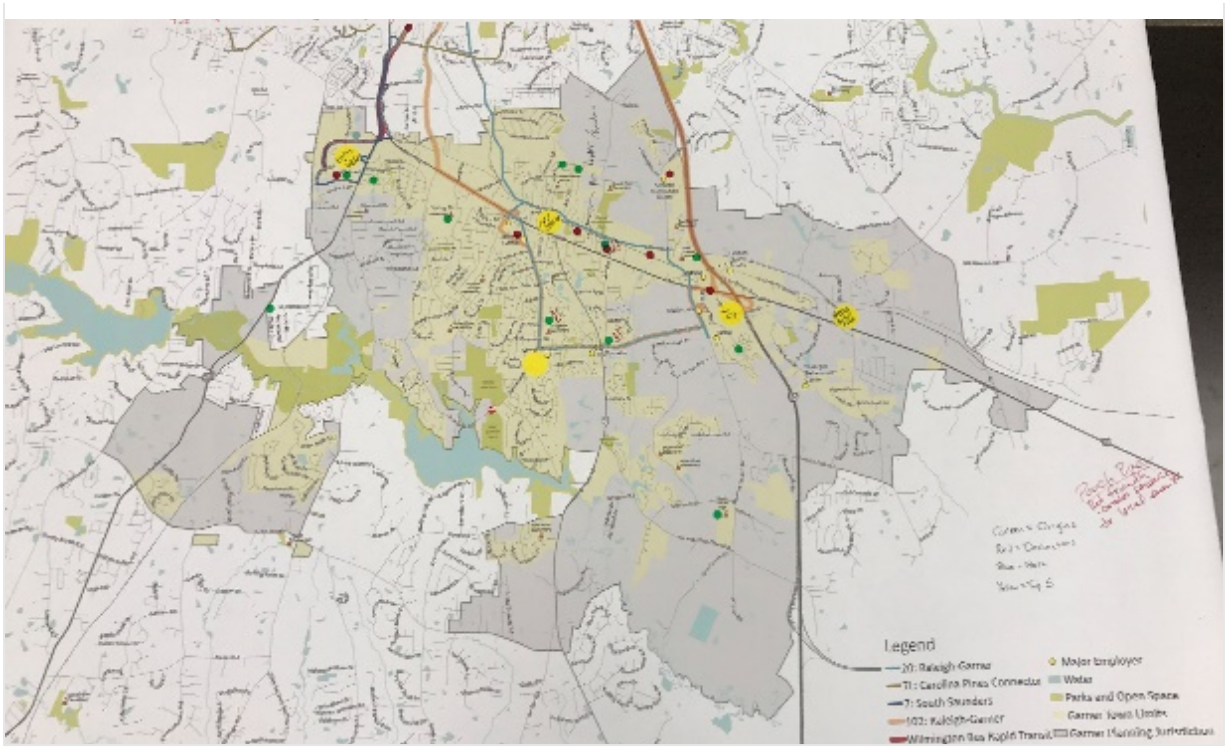
Process

Transit propensity and travel demand analyses were conducted in conjunction with stakeholder and public engagement; the engagement provided real-life validation for the demographic travel model findings and analytic support for strong opinions expressed by Garner residents—all helping to inform potential routing recommendations for a local Garner service.

Stakeholder Meetings

There were 17 attendees at the first stakeholder meeting, held on September 25, 2019. Those present were asked to identify major destinations and areas where transit would be needed within Garner and to identify the priorities and goals of the transit service.

Figure 1 Stakeholder Identified Areas of High Transit Need



Feedback gathered at the kickoff meeting was used to inform the study's transit needs analysis (examining demographic, land use, and travel demand data) and potential routing options discussed at the second stakeholder meeting, held on January 15, 2020. The 17 attendees were asked to provide comment on different local Garner route options, and confirm the routings were meeting identified transit needs within Garner and would help achieve the goals of the service.

Figure 2 Stakeholders Providing Input on Potential Transit Route Options

Pop-Up Meetings

The project team facilitated three pop-up style information sessions in order to provide information related to the project, survey the public, and receive feedback. The three pop-up sessions were held:

- During a blood drive held at Garner Senior Center
- Riding GoRaleigh Route 20
- Prior-to/during December 17, 2019 Garner Council meeting at Town Hall

Online Survey

Between November 26, 2019 and January 3, 2020, Garner residents were invited to complete an online survey. A link to the survey was:

- Posted on Town of Garner Website
- Posted on Wake County's GoForward "Get Involved" page
- Included in Town of Garner e-newsletter
- Sent via Garner Info app
- Posted on Town of Garner Facebook and Twitter accounts
- Posted on GoTriangle's Facebook and Twitter accounts

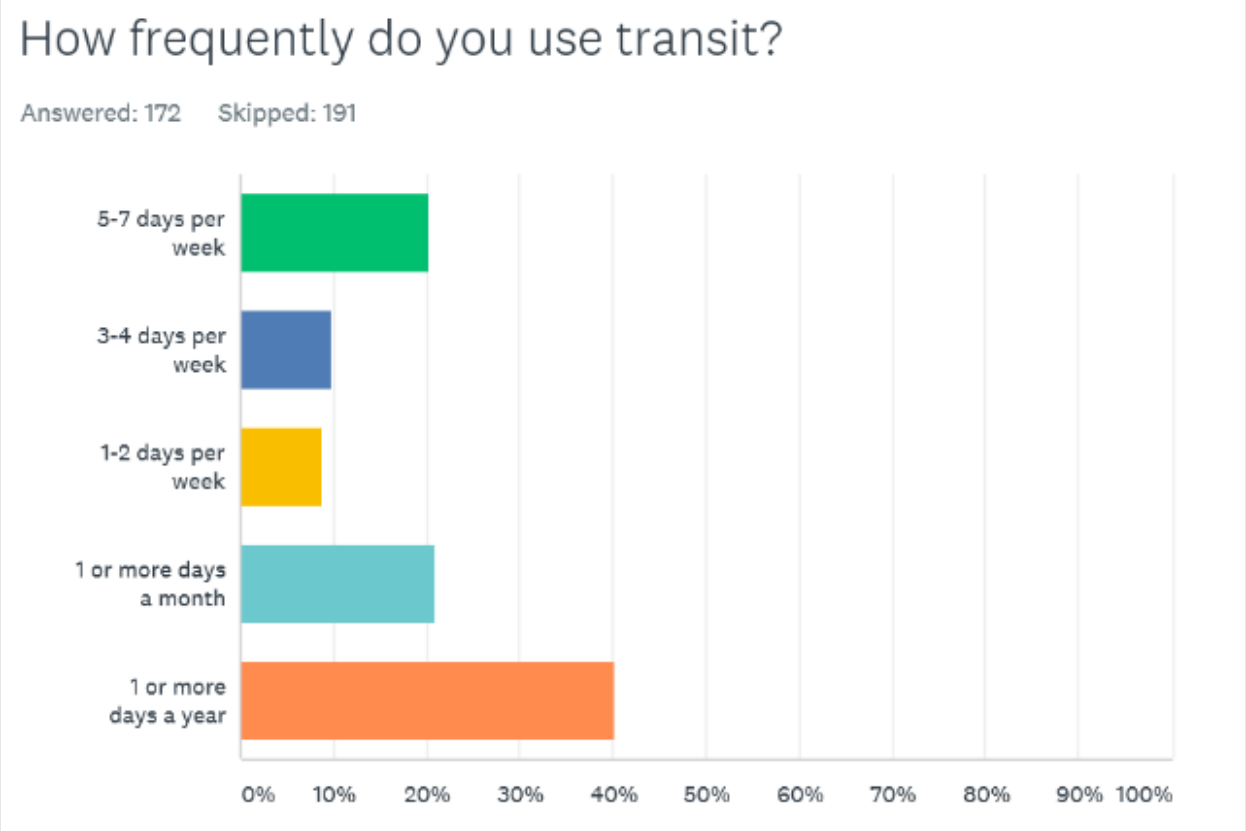
The survey included 15 questions focused on gauging the appetite for local transit service, identify desirable destinations to be served by transit, and document key demographic indicators of potential transit users within Garner. Three hundred sixty two (362) people completed the survey.

Town Council Presentation Key Messages

During Phase 1 of the transit study engagement, the study team identified several key themes:

1. ***While there are several locations in Garner that could have potential demand for transit service, stakeholders and survey respondents identified priority destinations.***
    a. White Oak Crossings Shopping Center
    b. Timber Landing (Lowe's Foods)
    c. North South Station
    d. Timber Crossings/Post Office
    e. Town Hall
    f. Amazon fulfillment center
2. ***For people using transit, they either use it several days a week for commuting/recreation, or a few times a year.***
    Survey respondents either seem to commit to using transit and make it part of their routine, or they use it very infrequently. For people who said they used transit, 31 percent said they used it three (3) or more days per week, while 40 percent said they used it one (1) or more days per year.

Figure 3 Charted Responses to the Question "How Frequently do you Use Transit?"



3. ***Riders of the former GoTriangle Route 102 experience longer wait times because of the new GoRaleigh Route 20 service design implemented in October 2019.***
   The hourly, peak-only Route 102 operated by GoTriangle, was replaced by the GoRaleigh Route 20 in October 2019. The new Route 20 reaches more Garner destinations (and still serves downtown Garner and White Oak Shopping Center), and operates hourly, all-day service. However, the majority of the Garner portion of Route 20 is a one-way loop, creating longer wait times for former 102 passengers making the same trip on Route 20 as they did on Route 102.
   GoRaleigh has since confirmed their intent to introduce bi-directional service on the Route 20 Garner loop, and increase the frequency of the weekday service to every 30 minutes in the spring/summer of 2020. Staff is waiting on Council approval.
4. ***Most respondents have a car available for their use, a driver's license, and have a household income of more than $50,000.***
   This suggests that structuring local service within the Town of Garner to serve populations with high transit propensity, as well as major destinations with park and ride potential, will have a higher likelihood of capturing local ridership.

Phase II –Develop Service Alternatives

a. Online survey – highlighting fixed route alternatives and potential for capital investments posted on various social media outlets: twitter, Facebook, Town of Garner website, and the GoForward website
b. Key stakeholder meeting #3 – relaying results of existing conditions survey/transit needs analysis from Phase I of outreach, evaluating fixed route alternatives
c. Presentation/update to Town Council—reporting results of fixed route alternative evaluation/survey and preferred service alternative endorsement from the stakeholder group

Process

The study team developed two potential Garner route alternatives based on stakeholder and public input gathered in September 2019 through January 2020 and shared the route options in March 2020 for stakeholder and public review and comment. Engagement input informed refinement of the alternatives and the recommendation for the preferred local Garner bus service alternative.

Online Survey

As the online survey was the only available method of public outreach, staff extended the survey period a week and distributed the survey link widely. Between March 6, 2019 – April 3, 2020, Garner residents were invited to complete an online survey. A link to the survey was:

- Posted on Town of Garner Website
- Posted on Wake County's GoForward "Get Involved" page
- Included in Town of Garner e-newsletter
- Sent via Garner Info app
- Posted on Town of Garner Facebook and Twitter accounts
- Posted on GoTriangle's Facebook and Twitter accounts
- Posted on GoRaleigh Route 20 bus routes (via a flyer with printed link and scannable QR code)
- Posted on GoRaleigh's Facebook and Twitter accounts

The survey included 9 questions focused on identifying the preferred route alternative between options 1 and 2, the current level of transit ridership within Garner, preferred service operating hours and days of the week,

tolerance for route transfers, the current level transit ridership within Garner, and which transit amenities were considered a priority. 156 people completed the survey.

Stakeholder Meetings

The COVID-19 pandemic posed unique challenges during Phase II of stakeholder and public engagement as recommended social distancing made it difficult to engage with the stakeholder group in traditional, in-person meetings. The study team worked together creatively and leveraged technology to disseminate information and provide an accessible platform for all stakeholders to provide feedback.

Garner Transit Study Stakeholders were sent a link on March 30, 2020 (via email) to the Phase II online survey as well as a presentation detailing the study process, route options 1 and 2, and a summary of online survey results (that had been collected at that time). Stakeholders were asked to provide their preference between route options 1 and 2 and any additional feedback or comments regarding the Garner local bus service.

A virtual stakeholder meeting was held on April 20, 2020 via Microsoft Teams for stakeholders to offer verbal input. The 16 call-in attendees were asked to comment on the two refined local Garner route options and provide feedback regarding which of the two routing options best met the needs of Garner while achieving the service goals. The discussion provided valuable feedback on the two route alternatives, including stakeholder concerns about forcing potential additional transfers. Specifically, Route Option 1 would modify existing Route 20 service, forcing an additional transfer for riders wanting to access GoRaleigh Station from some locations in Garner. Route Option 2 would not modify existing Route 20 and would not force additional transfers, and this was noted as a key advantage of Route Option 2 over Route Option 1.

Staff confirmed with stakeholders that Route Option 2 was the preferred service alternative and presented route option details to Council as information on May 26, 2020.

Town Council Presentation

Staff presented a review of the Garner Transit Plan Process to-date, including a description of the two local routing options. A summary of the survey results and reactions to the routing options was also given. At the time of the presentation, 156 survey responses had been collected. Prior to the Council update, a stakeholder meeting had also been held, staff also provided an update on route option preferences as expressed by stakeholders, with the general thought being Route Option 2 provided new service connections while still maintaining current service levels and preserving the existing GoRaleigh Route 20.

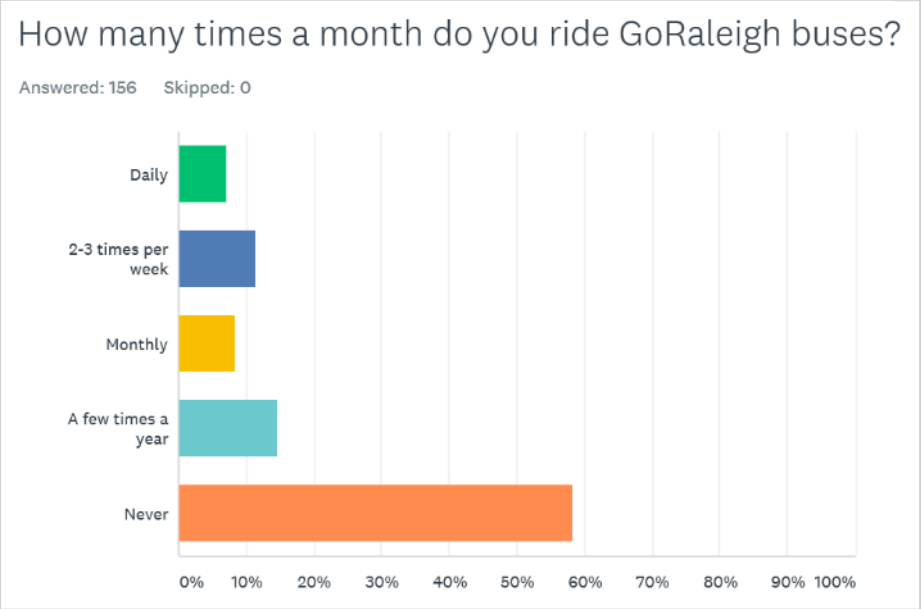
A high-level overview of potential capital and operating costs was given, describing different cost contributing factors that affect service quality and cost (length of a single round-trip, span of service, frequency, operating days, type of amenities provided at bus stops, and any required infrastructure improvements). The potential for Garner to charge a transit fare was also discussed, as it relates to potential service funding strategies the Town of Garner could pursue.

Phase 2 Engagement Key Messages

The study team identified several key these based on Phase II engagement outcomes:

1. ***While only 20% of respondents said they ride transit, those who do use transit, use it weekly/daily.***

Figure 4: Charted Responses to the Question "How Many Times a Month do You Use Transit?"



2. ***Shelters, benches, and trash receptacles are the most important transit amenities to stakeholders and survey respondents.***
   Respondents were asked to rank potential amenities in order of their importance. 58% ranked shelters as the most important, 44% ranked benches as the second-most important, and 67% ranked trash receptacles as the third most important amenity.

3. ***People would primarily use the service on weekdays and during the midday (10am-4pm).***

Figure 5: Charted Responses to the Question "Which Days of the Week would You Use the Proposed Bus Service?"

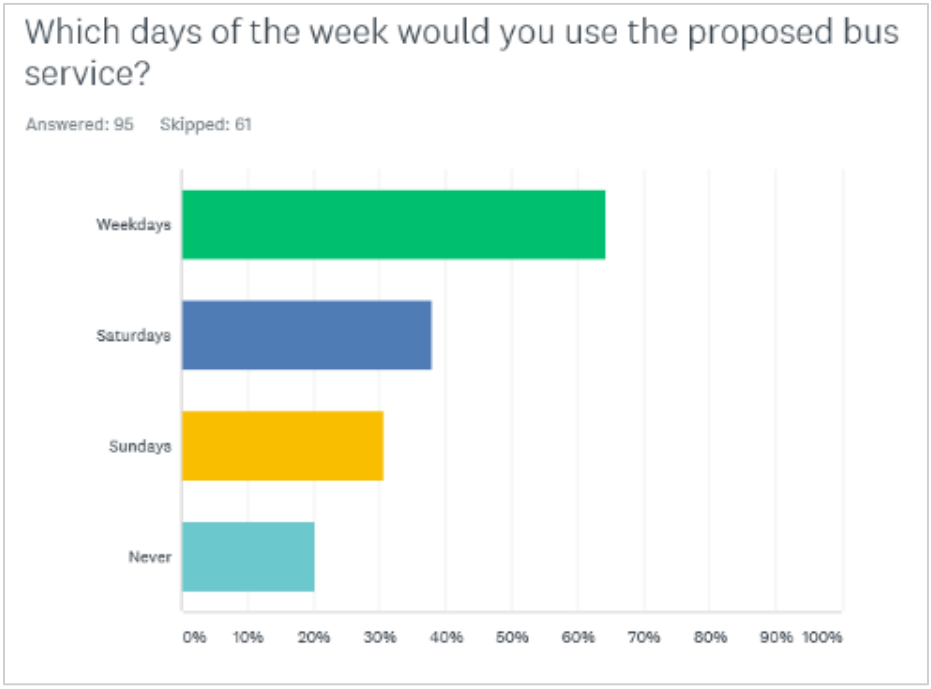
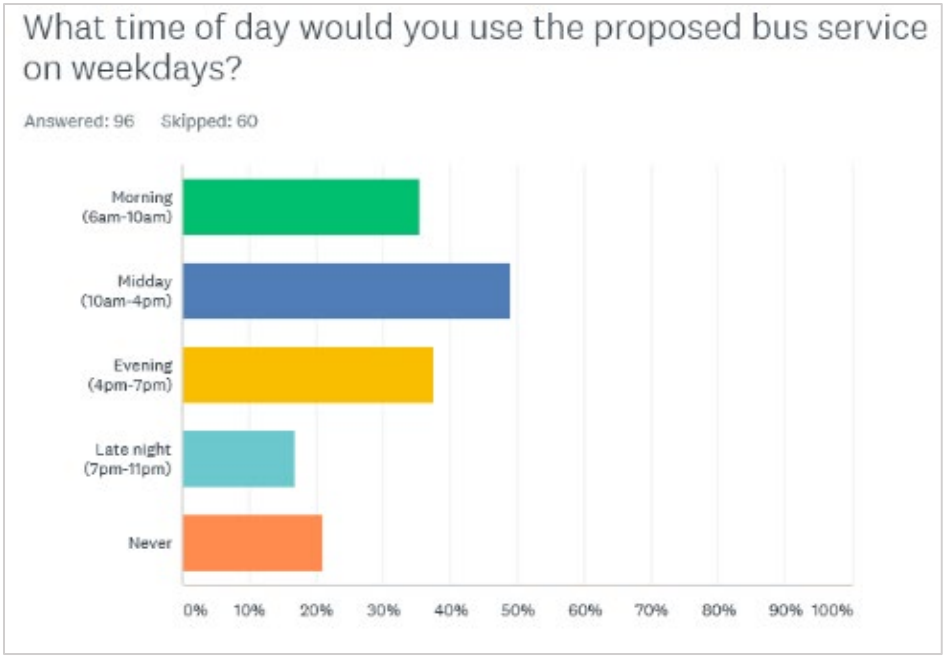


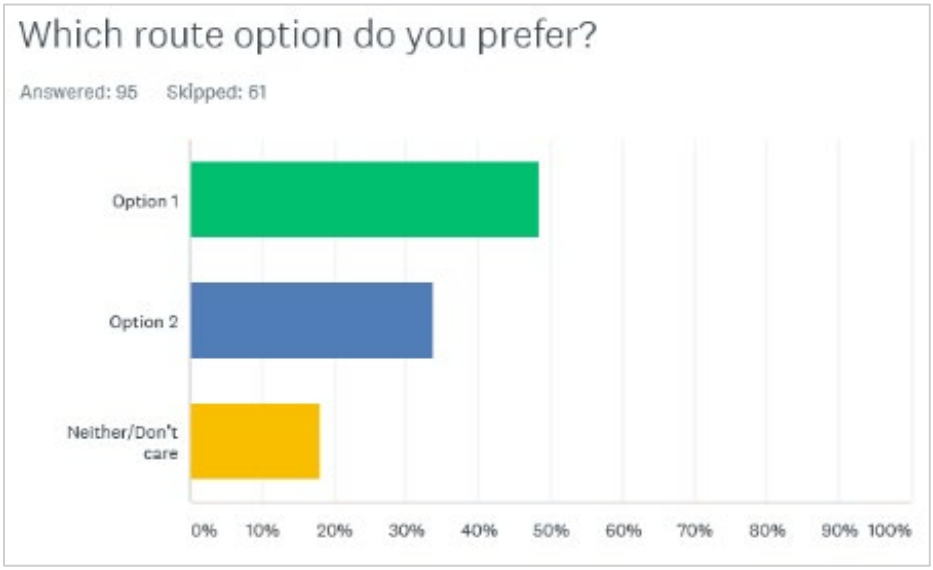
Figure 6: Charted Responses to the Question "What Time of Day Would You Use the Proposed Bus Service?"



4. ***Based on public and stakeholder engagement, Route Option 2 service is more appealing than Route Option 1 when combined with GoRaleigh's existing Route 20 service pattern.***
   While survey respondents overall indicated Option 1 as their preferred route alternative, stakeholders expressed concern that if GoRaleigh Route 20 was replaced with the local Garner service along Aversboro Rd and Timber Dr, the current one-seat ride option from Garner to GoRaleigh station would no longer exist.

   Stakeholders indicated that as GoRaleigh is planning to increase the frequency of Route 20 from hourly to every 30-minutes in fall of 2020 – by keeping Route 20 operating as it does today, and implementing the Garner route option 2, current transit users in Garner could keep their one-seat ride, while new areas/destinations like the WakeMed Garner Healthplex located on US 70, and the new rec center on Main St, would benefit from the new transit service connections.

Figure 7: Charted Responses to the Question "Which Route Option Do Your Prefer?"



Phase III – Finalize Service Recommendation and Financial Plan

f. Town Council Approval —presented final route alignment, service plan, and financial plan for Council review and approval

Route Information Online – present final route alignment, service plan, and financial plan online for public and stakeholder information

Engagement Summary and Key Findings

Table 1 summarizes the Garner Transit study public engagement activities and timeline.

Table 1: Garner Transit Plan Public Engagement Activities by Phase

	Event	Date
Phase I	Stakeholder kickoff meeting	September 25, 2019
	Online survey #1	November 26, 2019 – Jan 3, 2020
	Route 20 ride-along survey	December 17, 2019
	Pop-up – Garner Senior Center Blood Drive	December 13, 2019
	Pop-up – Outside of Town Council Meeting	December 17, 2019
	Stakeholder Meeting #2	January 15, 2020
	Town Council Update	January 28, 2020
Phase II	Online Survey #2	March 6th – April 3rd
	Stakeholder Meeting #3	April 20, 2020
	Town Council Update	May 26, 2020
Phase III	Town Council Approval	June 16, 2020
	Route information posted online	TBD

Key Garner Transit Study Engagement Findings

Input received during phases I, II, and III of engagement helped establish service level and coverage/location priorities for Garner residents and stakeholders—which laid the groundwork for transit service model development. Below are the major findings from engagement:

1. Major activity centers in Garner with high transit propensity:
    a. White Oak Shopping Center
    b. Timber Landing
    c. Target/Home Depot
    d. Timber Crossings/Post Office
    e. Town Hall

2. Routing Option #2 was the preferred local service alternative, with connections to North South Station and GoRaleigh Route 7, US 70, Main Street, and preservation of GoRaleigh's current Route 20 along Aversboro Rd and Timber Dr, resulting in overall increased service to White Oak Shopping Center (the highest ridership stop in Garner), and overall an increase in transit service coverage for Garner.

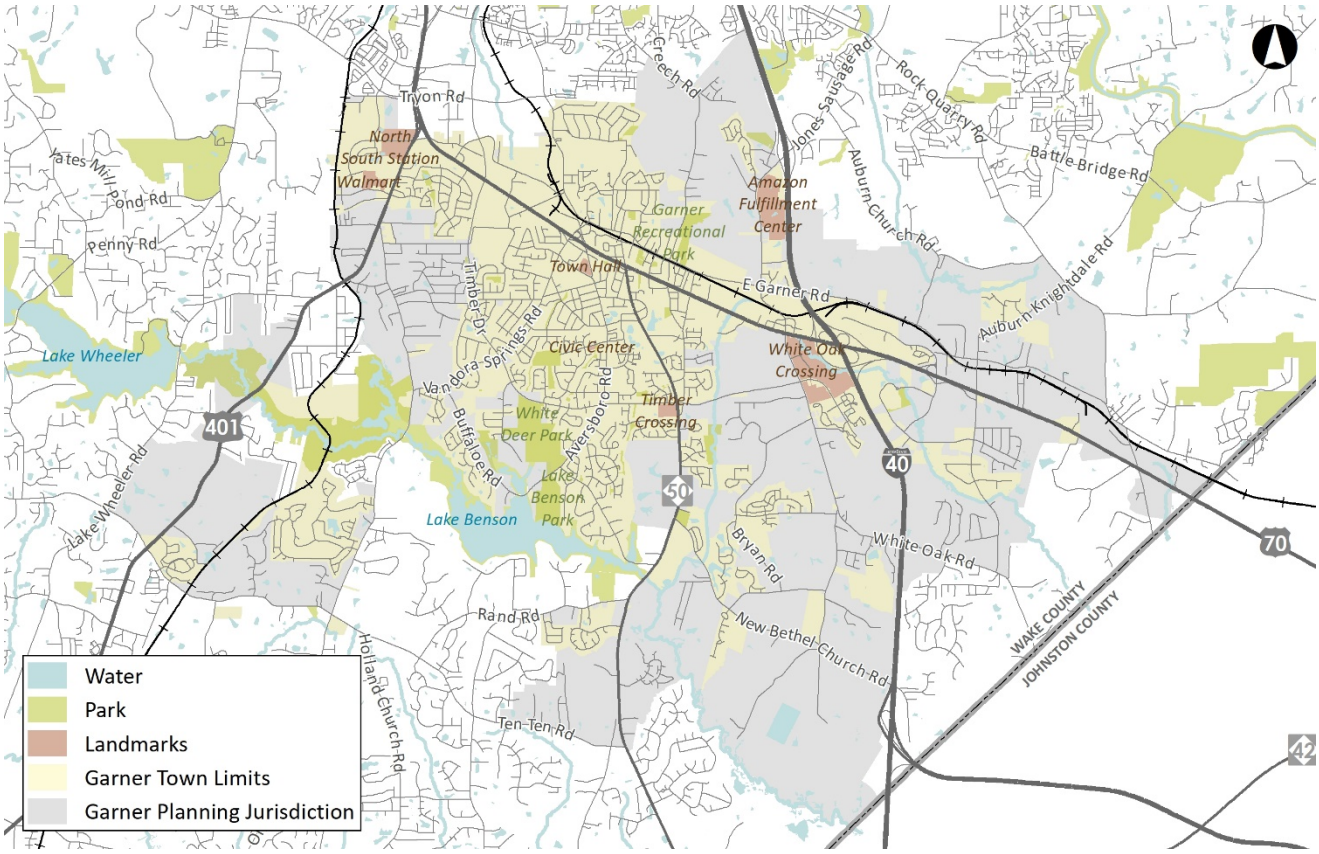
3. Residents are more likely to use a local transit service during the week, during traditional peak hours and midday.

Chapter 2 – Transit Needs and Demands

Introduction

The Town of Garner (the Town) is located in Wake County, North Carolina (Figure 1). The Town is just south of the City of Raleigh and maintains a residential identity within the Raleigh metropolitan area. Garner is connected to the greater Raleigh metropolitan area by Interstate 40 (I-40), US Highway 70 (US 70), NC State Highway 50 (NC 50), and US 401. US 70 is one of the Town's major east-west corridors connecting two major destinations within the Town, the North South Station and White Oak Crossing.

Figure 4: Study Area



The Town of Garner has experienced tremendous population growth since 2010, growing 18 percent to approximately 30,000 according to the latest Census estimates. In contrast, employment in Garner has stayed constant in the past few years at about 14,000 jobs. This balance of jobs and population in Garner is highlighted even further when analyzing commute flows. Based on the Census, approximately 95 percent of people employed in Garner live outside of the Town; approximately 93 percent of Garner residents leave the Town for employment. This type of commuter-based movement can create significant pressures for all travelers along major highway corridors in and around the Town.

Chapter 2 – Transit Needs and Demands identifies and explores attributes that demonstrate need and demand for transit services. This section summarizes these attributes to establish a baseline understanding of regular route bus service potential within Garner. This chapter presents these attributes in three ways:

- Transit Propensity – analysis of geographic characteristics that indicate suitability for regular route bus service
- Transit Potential – analysis of population and employment density in terms of suitability for regular route bus service
- Travel Demand Patterns and Flows – analysis of common origins and destinations for existing or potential regular route bus trips

Based on the analysis results, the chapter concludes with two options for local bus routes within the Town; these options are evaluated in Chapter 3.

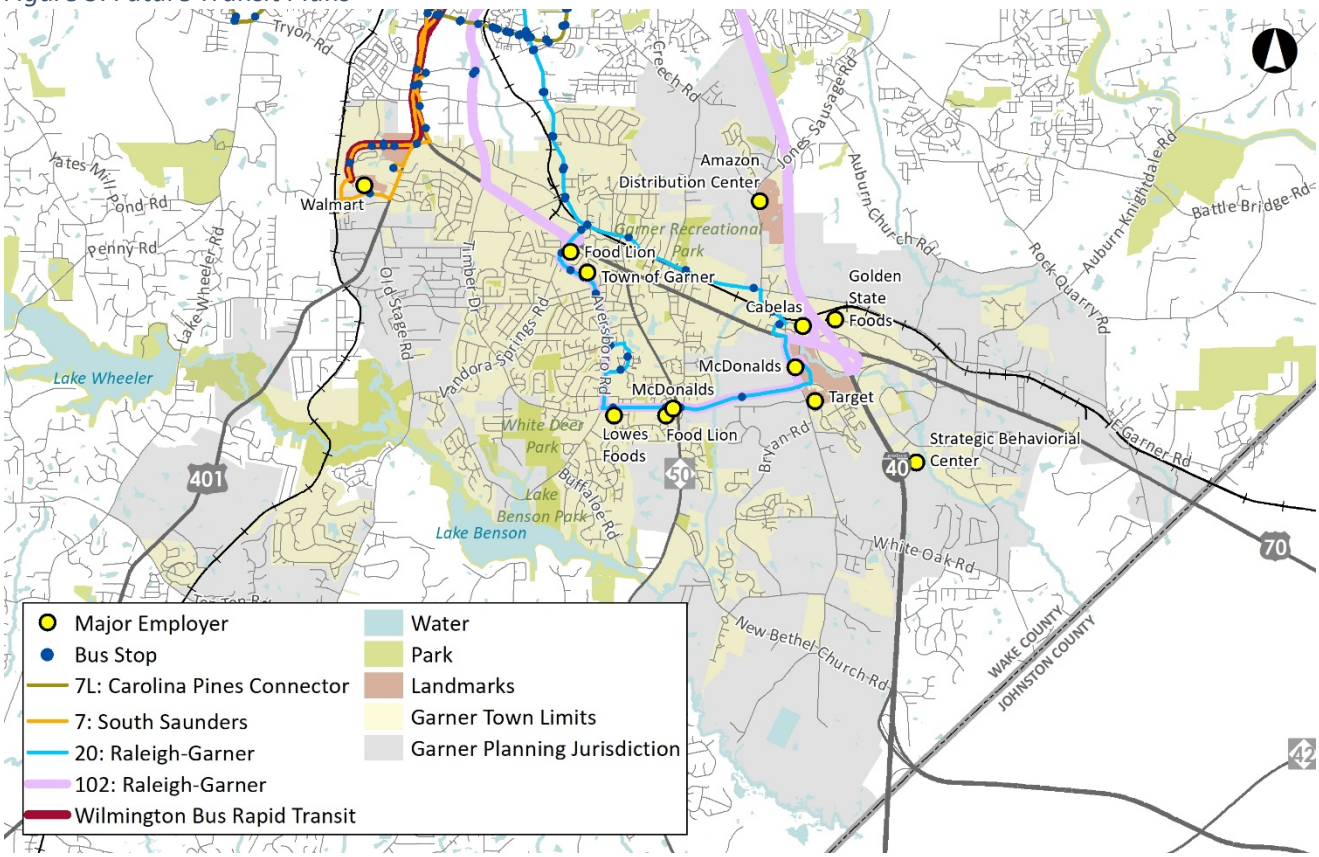
Previous Planning Efforts

Several planning efforts were reviewed as part of this study to not only understand the Town, County, and Capital Area Metropolitan Planning Organization's (CAMPO) priorities, but to understand the larger multijurisdictional picture established in the regional transit vision.

- Wake Transit Plan – establishes local, regional, and high-capacity transit improvements across Wake County by focusing on four "Big Moves" – 1. Connect the Region, 2. Connect all Wake County Communities, 3. Create Frequent, Reliable Urban Mobility, and 4. Enhance Access to Transit. In an effort to achieve these "Big Moves," the Wake Transit Plan includes elements that have direct, significant benefits for Garner:
    - 50% matching funds for Wake County Towns (like Garner) to study, plan, and/or operate local transit service through the Community Funding Area Program (CFAP).
    - A bus rapid transit corridor that connects Garner to downtown Raleigh
    - All-day local service to downtown Raleigh
    - Commuter rail connections to and from Durham and Raleigh
- Wake 10-year Bus Plan—recommends operating and capital improvements in the Wake County bus network between 2019 and 2027. One of the recommendations includes GoRaleigh's hourly, all-day Route 20 with service to downtown Raleigh from White Oak Shopping Center. Route 20 replaces GoTriangle's express, hourly, peak-only Route 102 service to downtown Raleigh. The plan designates funding to increase the frequency and add weekend service in future years.
- Community Funding Area Market Analysis—as part of the CFAP, a market analysis of Wake County communities was completed to identify the most effective areas to implement different types of transit solutions. The study examined population and employment, socioeconomic characteristics, as well as planned transit capital and service investments. The analysis identified several potential market-supportive solutions for Garner including a local transit route, improving bicycle and pedestrian infrastructure, and extending existing GoRaleigh routes into Garner.
- Garner Forward Comprehensive Plan – identifies and addresses a range of issues affecting Garner. Transportation issues raised included the lack of road connectivity for major destinations within Garner and the recommendation of a "trunk" bus route along US 70 through Garner.
- Garner Transportation Plan – multimodal solutions included pedestrian, bicycle, complete streets improvements, and transit. Transit solutions include a circulator/local Garner service that provides connections to the area surrounding Walmart and North South Station.
- Southeast Area Study—due to high growth rates and the goal of maintaining the character of the southeast area, a comprehensive transportation strategy was developed in an effort to accommodate existing and future transportation needs. The study included portions of Wake and Johnston counties and 11 municipalities, Garner being one. Recommendations include road and intersection improvements, rail service in Garner and beyond into Johnston County, hourly bus service between Garner and Clayton, and a bus rapid transit route between Garner and downtown Raleigh.

Future transit plans for Garner include the Wake Bus Rapid Transit (BRT): Southern Corridor line as shown in Figure 2 below (the exact alignment of the route might vary from what is shown on the map).

Figure 5: Future Transit Plans[1]



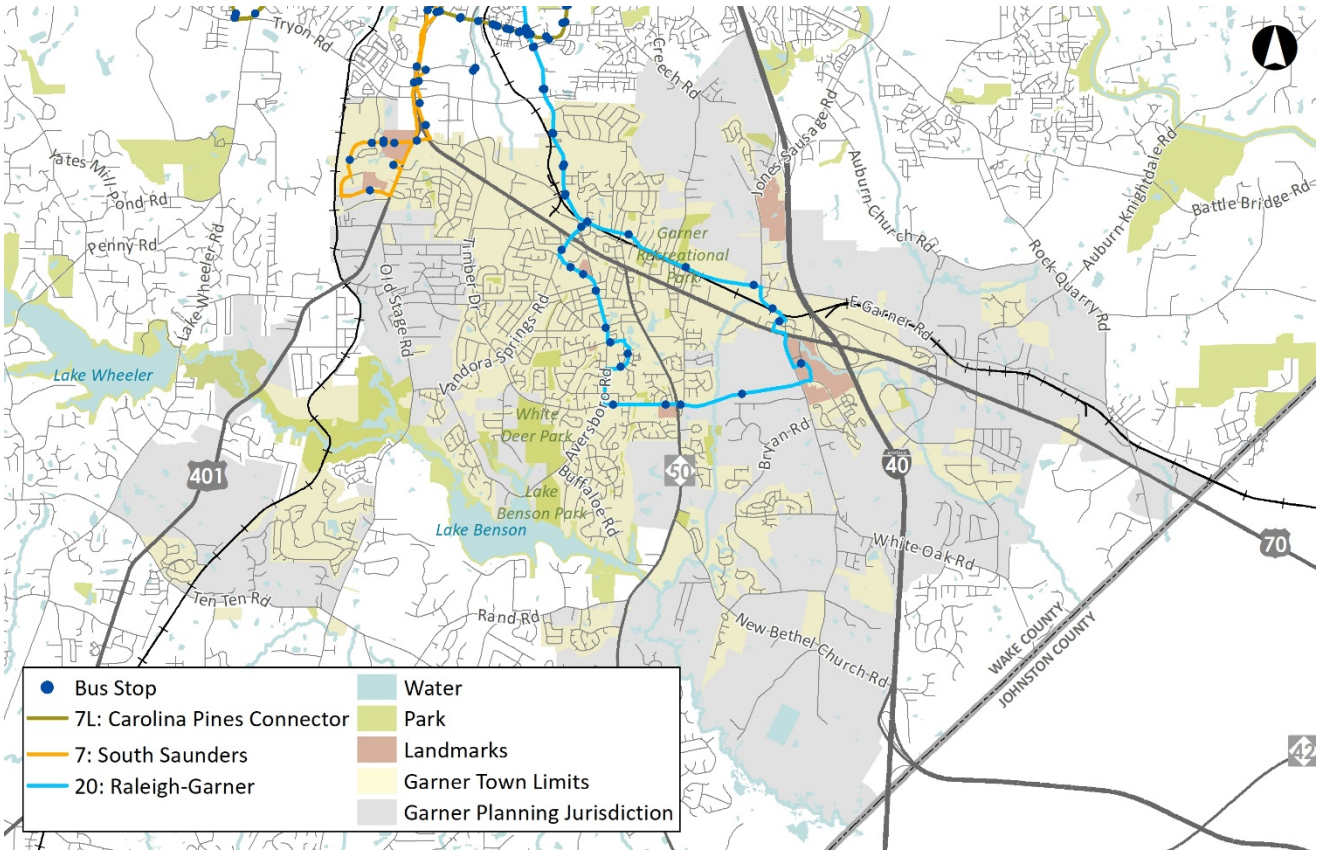
Existing Transit Services

Garner is served by GoRaleigh by three specific routes:

- 7L: Carolina Pines Connector (Trailwood Hills Drive/Tryon Road to Southgate Plaza)
- 7: South Sanders (GoRaleigh Station to Wal-Mart/Purser Drive)
- 20: Garner (GoRaleigh Station to White Oak Shopping Center Park & Ride)

[1] Route 102: Raleigh-Garner is shown on the map but no longer in service after Winter 2019; it was replaced by all-day Route 20 service. For context on the Town's recent transit service, all recent, existing, or planned transit routes are shown in Figure 2 and Figure 3.

Figure 6: Existing Transit Services[1]



Ridership

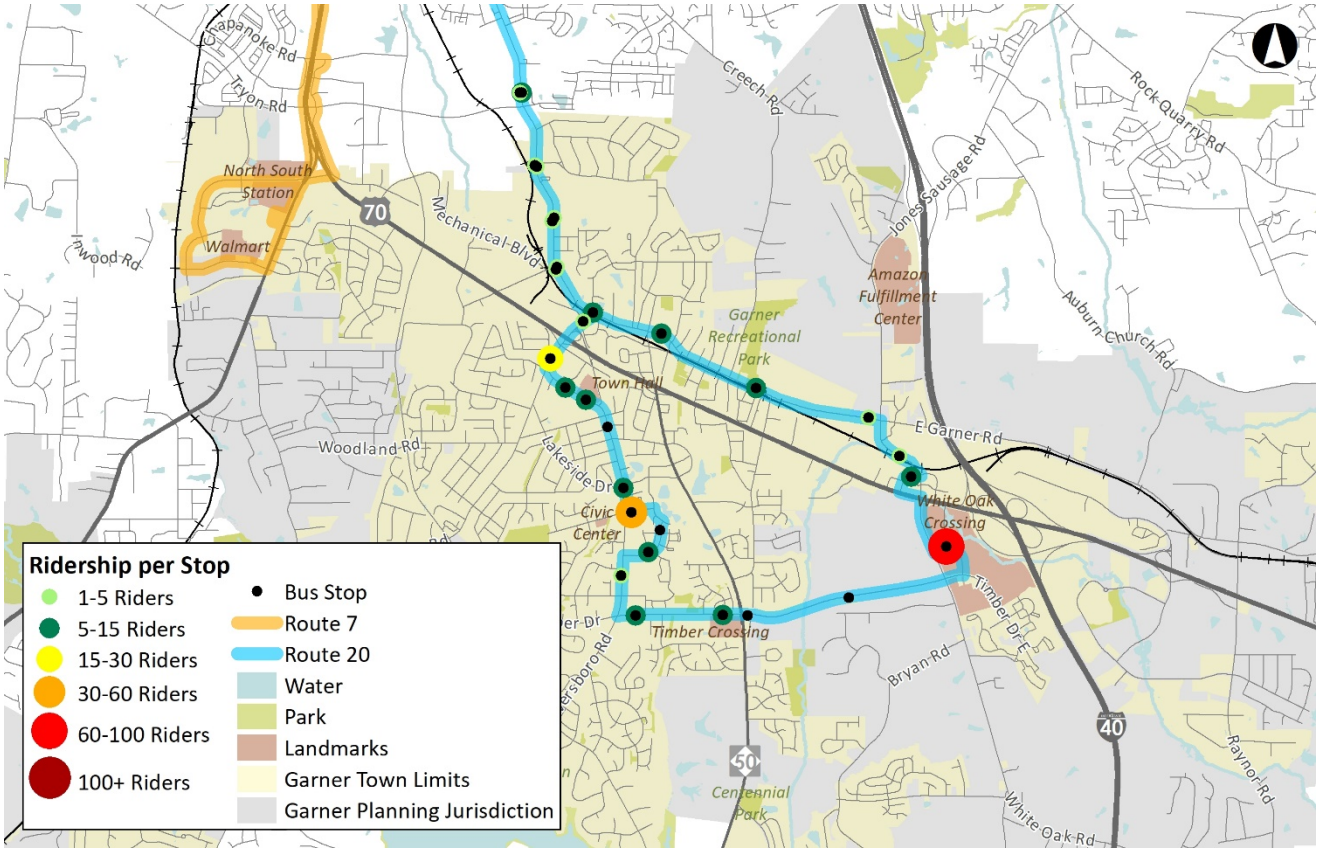
Route 20 – Garner

According to GoRaleigh ridership statistics from October and November 2019, the majority of stops along Route 20 within the Garner planning jurisdiction have 5 to 15 riders daily. Three stops had more than 15 riders per day in 2019:

- Forest Hills Shopping Center along Vandora Springs Road
- Aversboro Square along Aversboro Road
- White Oak Shopping Center along Timber Drive

Ridership by transit stop is shown in Figure 4.

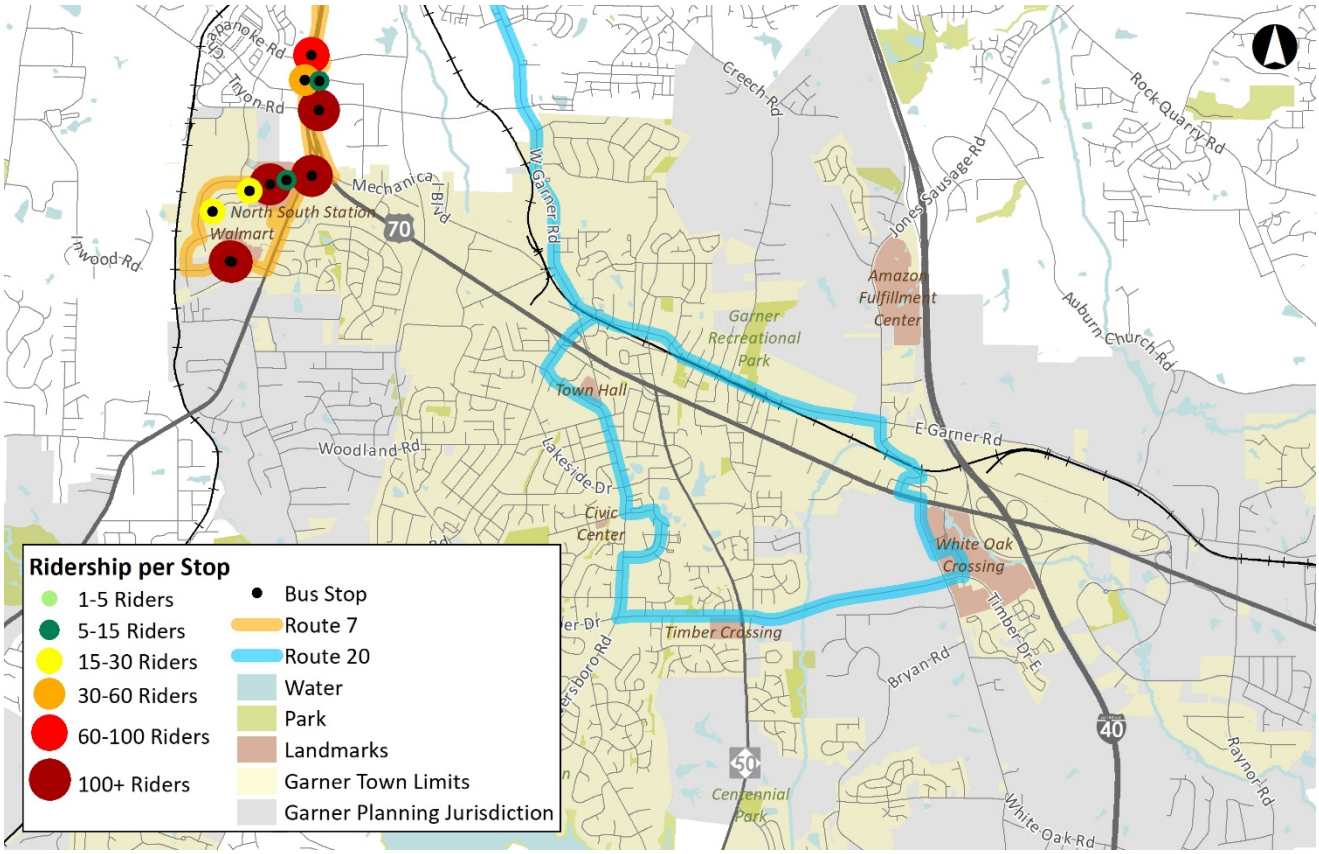
Figure 7: Route 20 Ridership by Stop



Route 7

The ridership by transit stop is shown in Figure 5.

Figure 8: Route 7 Ridership by Stop



Existing and Planned Future Transit Market Analysis

Garner's transit market analysis evaluated three attributes: transit propensity, transit potential, and travel demand patterns and flows. The three attributes, when looked at together, can indicate not only where transit service would be appropriate, but the type of transit mode as well as the preferred route.

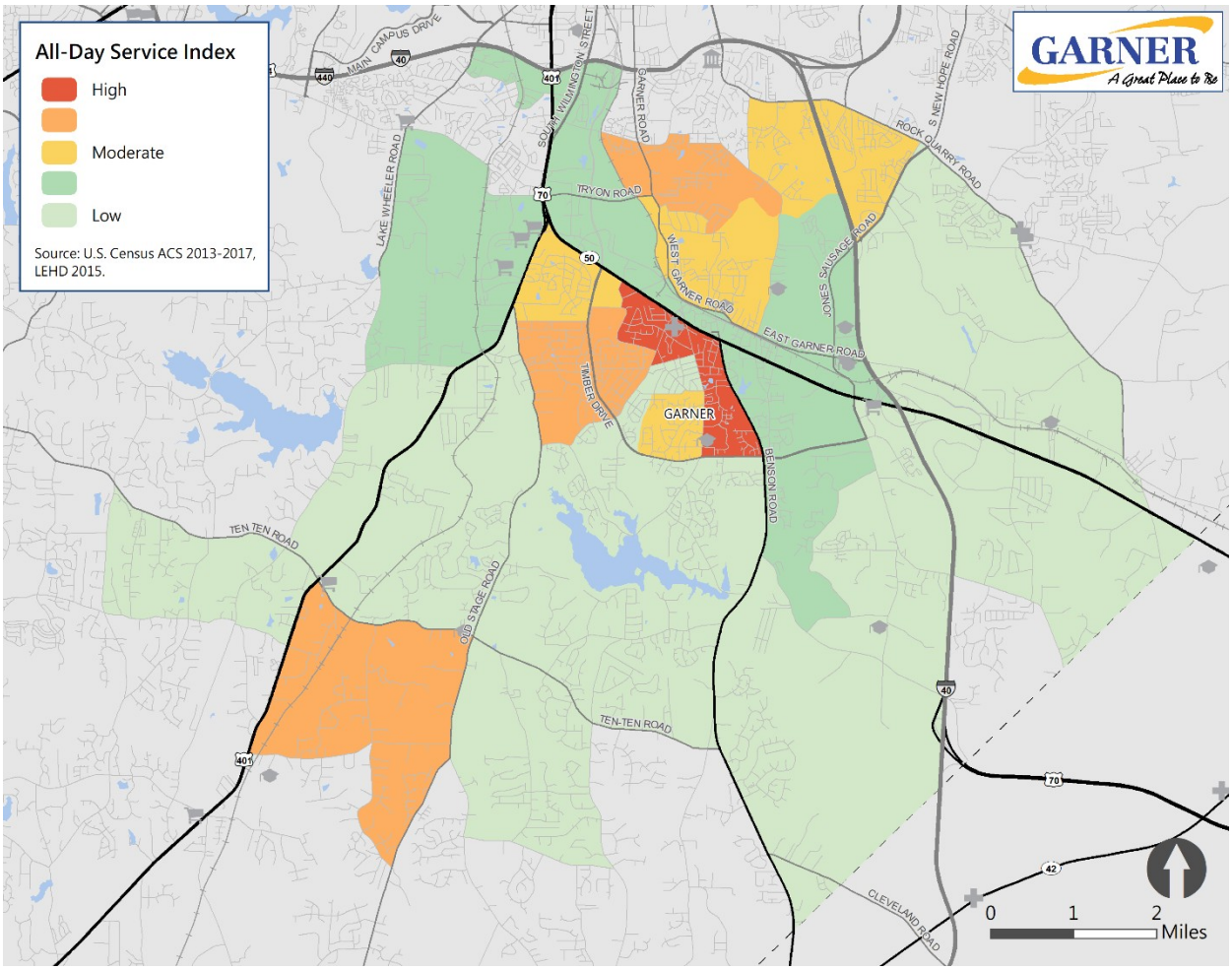
Transit Propensity

Transit propensity is a measure of the demographic and employment characteristics of an area. Transit planners evaluate transit propensity to identify existing population and employment densities best suited for transit services. Places with people who rely on transit or other forms of ride-sharing, high population density, large activity centers, or high job density typically produce greater demand for transit. Transit propensity considers a variety of datasets together to identify where transit needs and demands are greatest. The study used two indices to identify where transit propensity exists for Garner: 1) all-day transit service index; and 2) peak period transit service index.

All-Day Transit Service Propensity

The all-day transit service propensity index (Figure 6) looks at transit-oriented populations as well as activity centers within the study area. Transit- oriented populations are likely to use transit to access everyday destinations. The all-day transit service index identifies areas that can serve as origins or destinations throughout all times of the day. The greatest all-day transit service propensity in Garner is along the south side of US 70 between Coldwater Drive and Aversboro Road, and to the west of Benson Road near the town's municipal campus, as shown in Figure 6. Other areas of higher all-day transit service propensity include dense residential communities on the north side of US 70 and commercial corridors along Timber Drive and Fayetteville Road.

Figure 9: All-Day Service Propensity

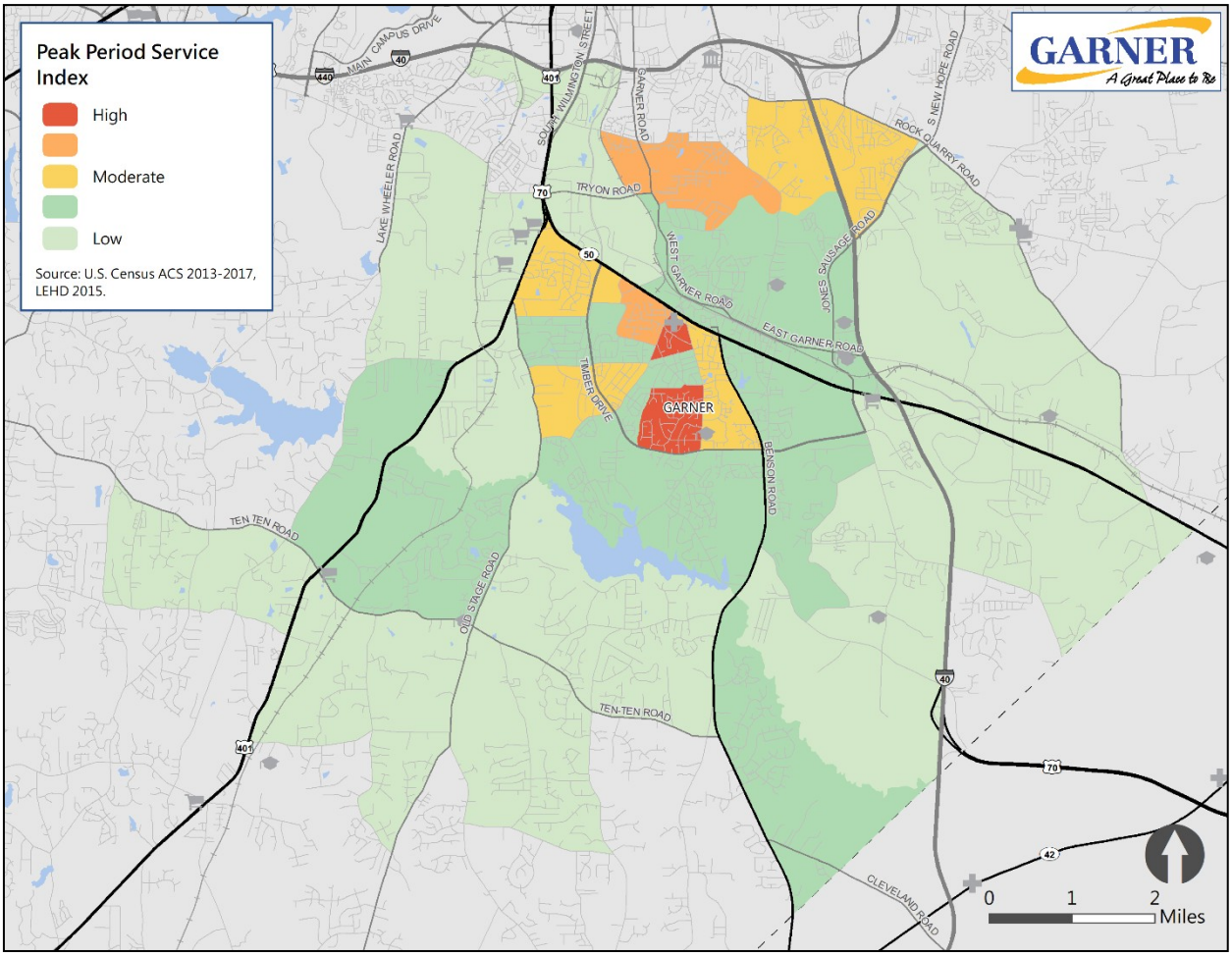


Peak Period Transit Service Propensity

The peak period transit service propensity identifies where transit commute trips originate as well as where employment is located. By combining the two together, this index identifies areas that serve as the origin or destination for home-to-work trips, which are concentrated during the peak morning (6 to 9 am) and evening (3 to 6 pm) commute hours.

Figure 7 shows the distribution of peak period transit service propensity in Garner. The highest peak period propensity is found in the more densely populated areas in the center of town and to the north, as well as along major roads such as US 70 and Timber Drive. The peak period service index is low to moderate-low throughout most of the town, including residential communities in the southern and eastern parts of Garner.

Figure 10: Peak Period Service Propensity



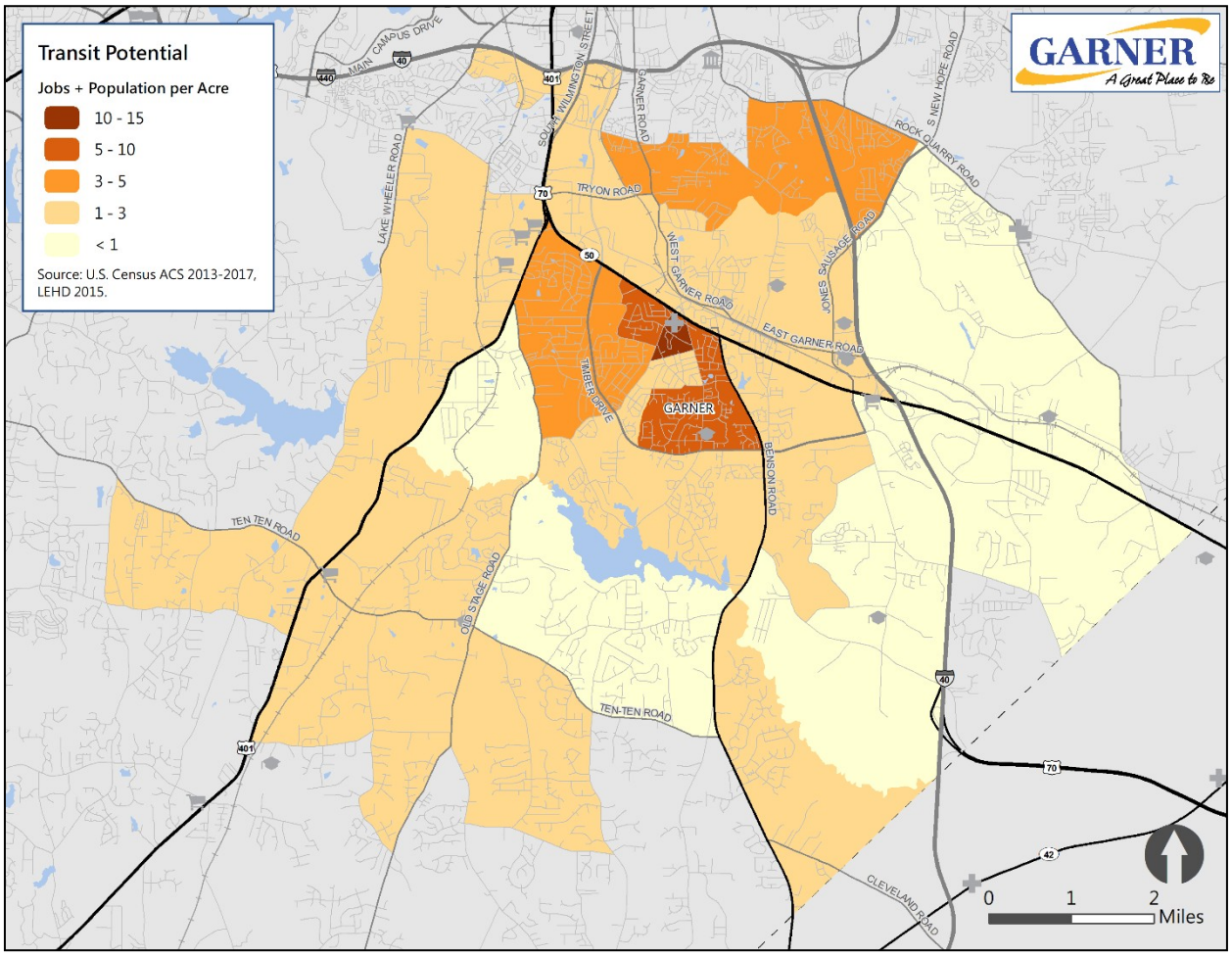
Transit Potential

In addition to transit propensity, a key measure of the potential demand for transit is population and employment density. Transit potential measures the combined population and employment density. This attribute helps to inform where transit service should be and the right mode to serve the need. Regular route bus service (a specific form of fixed-route transit) is typically best supported by areas with five jobs and residents per acre or more.[2] Areas with lower density are often better served by demand-response transit services.

[2] Based on Transit Cooperative Research Program (TCRP) Report 100: "Transit Capacity and Quality of Service Manual, 2nd Edition", 2003. The report finds that the minimum density to support hourly fixed-route transit service is approximately 3 households per acre or 4 jobs per acre.

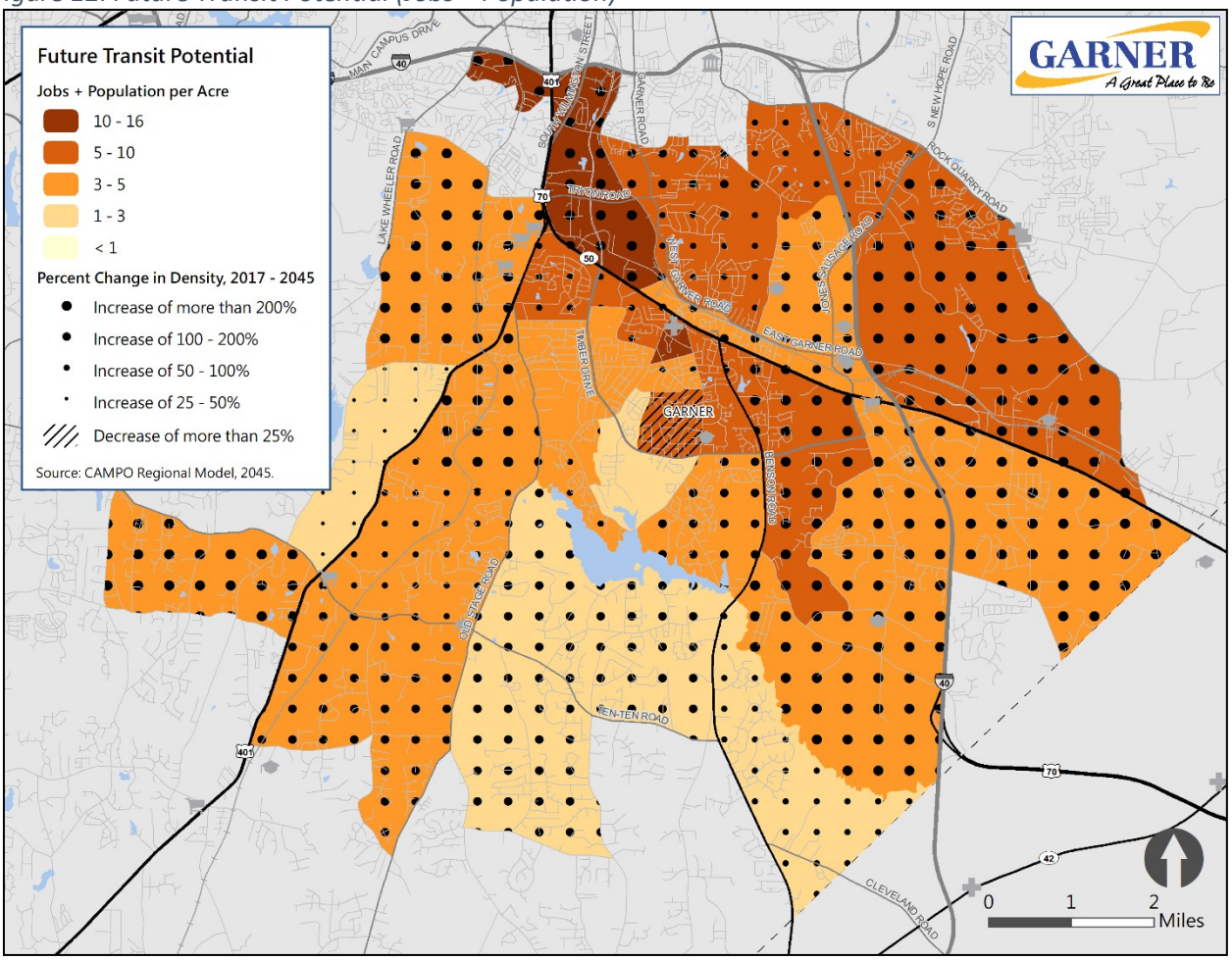
As shown in Figure 8 , existing regular route bus service potential in Garner is concentrated in the Town's center between Timber Drive, US 70, and Benson Road. Overall, the density in Garner does not surpass 15 jobs and residents per acre, while only a small section of the town has a combined density greater than five jobs and residents per acre.

Figure 11: Existing Transit Potential (Jobs + Population)



Planned future (year 2045) regular route bus service potential in Garner is shown in Figure 9**.** Dot patterns show planned density increases of 25 percent or more relative to today, and diagonal hatches show planned decreased density (e.g., when children leave home and parents remain in the home). By 2045, population and employment in Garner are forecast to increase significantly. Most of northern Garner will surpass five jobs and residents per acre, which means that these areas of Town will likely be able to support regular route bus service in the future.

Figure 12: Future Transit Potential (Jobs + Population)



Transit Travel Demand Patterns and Flows

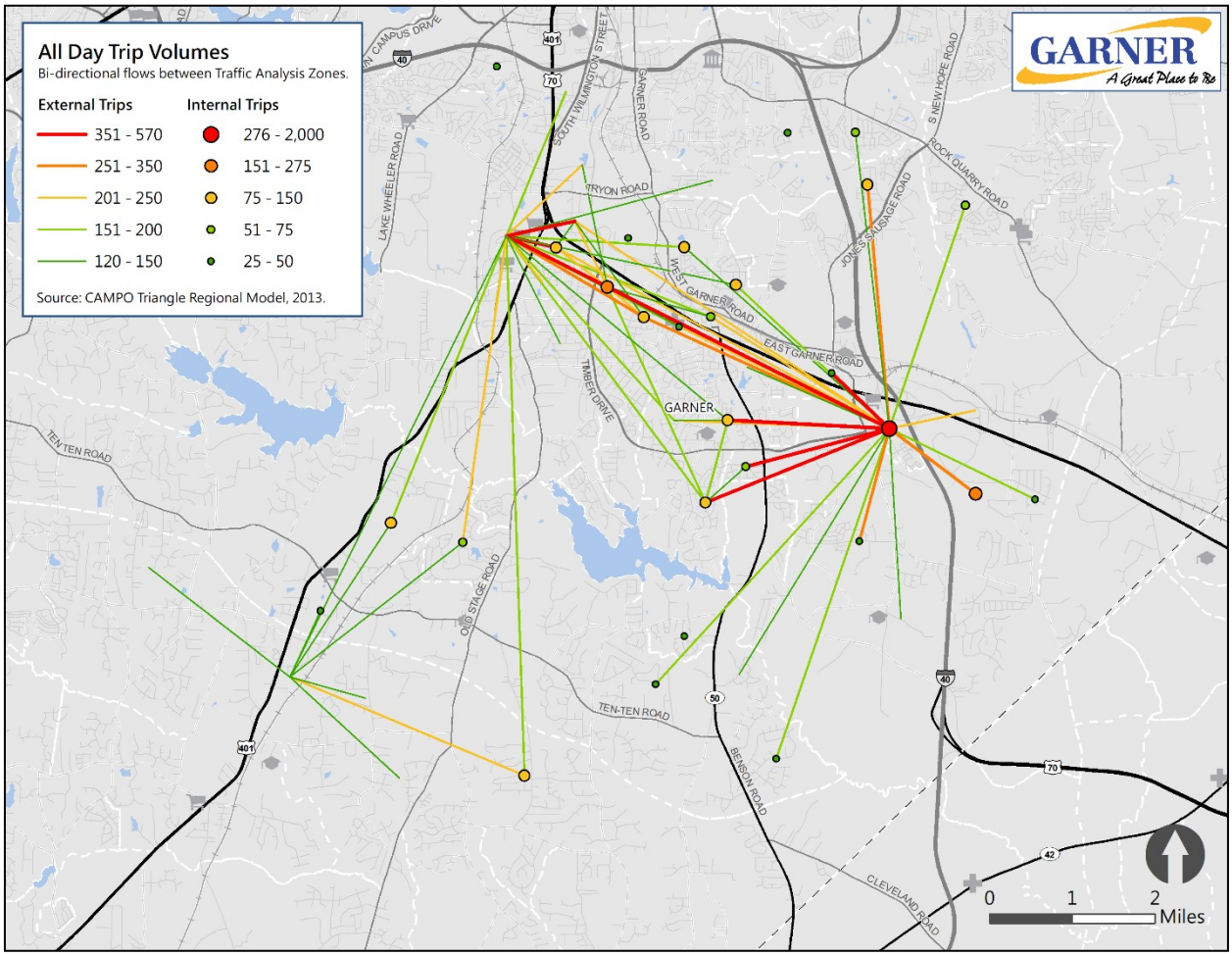
Transit travel demand exists where many residents or workers in the study area make trips between the same origins and destinations. The most significant connections form patterns of movement throughout the study area that can be grouped by the time of day, purpose, and mode of each trip. For transit services, common origins and destinations form the basis of a route or network that meets the needs of existing and potential transit riders. To maximize the benefit of transit services, planning must therefore be informed by existing and forecast travel demand patterns.

Overall, travel in Garner is dominated by connections to the White Oaks shopping area, which has significant travel between many areas during all times of the day. The US 70 corridor in general exhibits high travel demand, producing and attracting trips from all parts of Garner. In the future, however, new developments on Timber Drive west of White Oak Road will eclipse the existing White Oak shopping area as the major travel node. Neither current conditions nor future forecasts reflect potential trips created by the opening of the Amazon Fulfillment Center in 2020, which may create significant demand in and around Garner in the near-term.

Existing Travel Demand

Existing daily travel flows are shown in Figure 10. The White Oak shopping area at the junction of US 70 and I-40 is a major node for all-day demand in Garner, with thousands of trips beginning and ending there every day. Major daily connections in Garner reach from the White Oak shopping area along US 70 to the commercial area at Fayetteville Road and along Timber Drive to areas north and south of Timber Drive near Benson Road. Outside of the US 70 corridor, smaller connections reach to residential neighborhoods in northern and southern Garner.

Figure 13: Existing Daily Trips Between Traffic Analysis Zones



Future Travel Demand

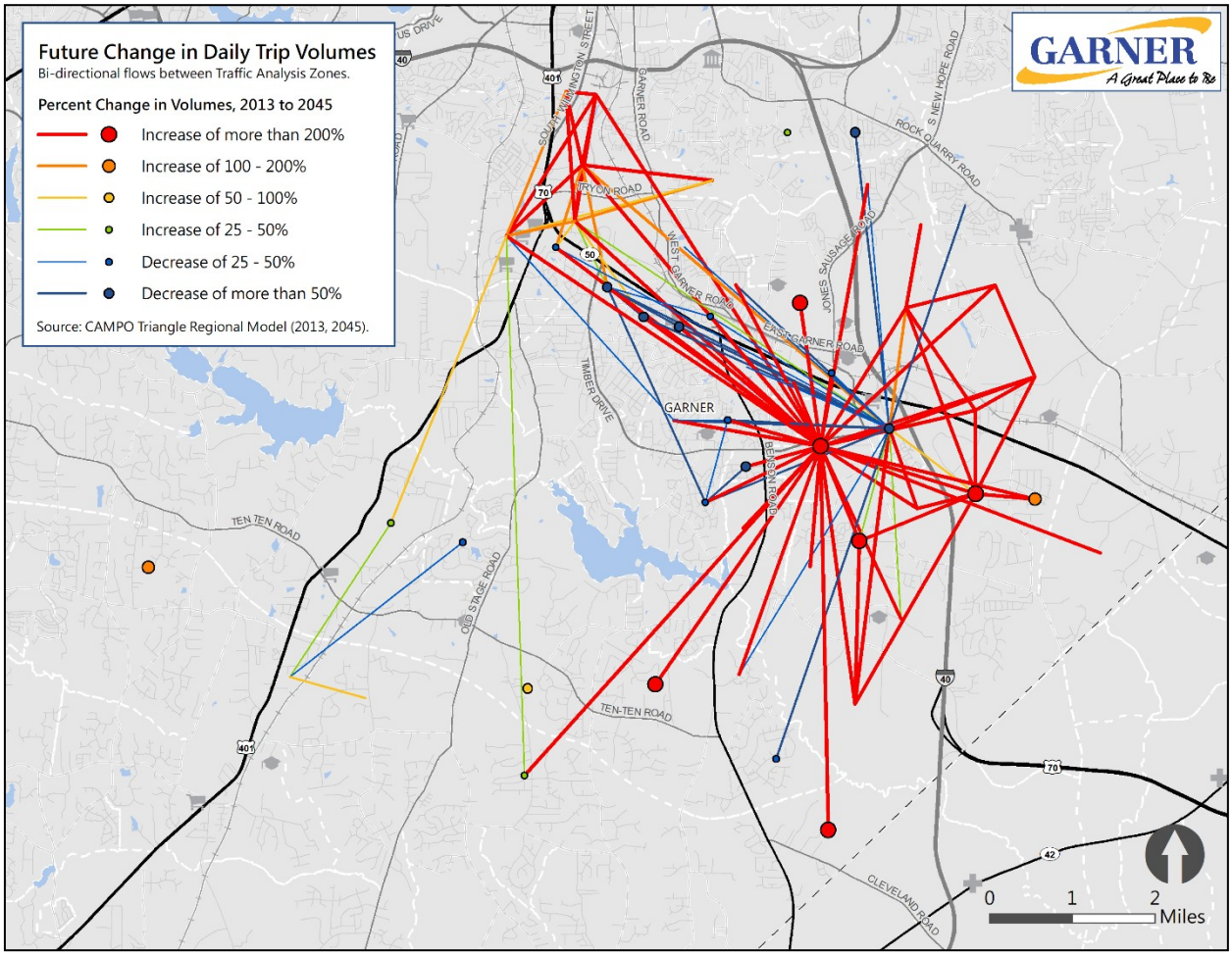
As Garner and the Triangle region continue to grow in the future, new developments and shifting travel behavior will change the demand patterns in the study area. Planned transit services must account for future demand by providing opportunities for adjustment to meet shifting rider needs.

The percent change in 2045 daily trip volumes relative to today are shown Figure 11. Red, orange, yellow, and green symbols represent increases in demand, while blue symbols indicate decreased demand. Most notably, planned developments on Timber Drive to the west of White Oak Road are anticipated to dominate future travel demand in Garner, as volumes to the existing White Oak shopping area are forecast to decline. Other

connections with increased demand are around US 70 and Tryon Road in northwestern Garner, as well as in eastern Garner. Overall, many flows are forecast to increase by more than 200 percent, with total demand in Garner more than doubling by 2045.

The 2045 travel flows do not include the Amazon Fulfillment Center set to open on Jones Sausage Road west of I-40 in 2020. This employment destination will generate approximately 5,000 jobs in Garner in 2020 and will likely serve as a significant travel node in the future.

Figure 14: Percent Change in Daily Trips Between Traffic Analysis Zones (2013-2045)



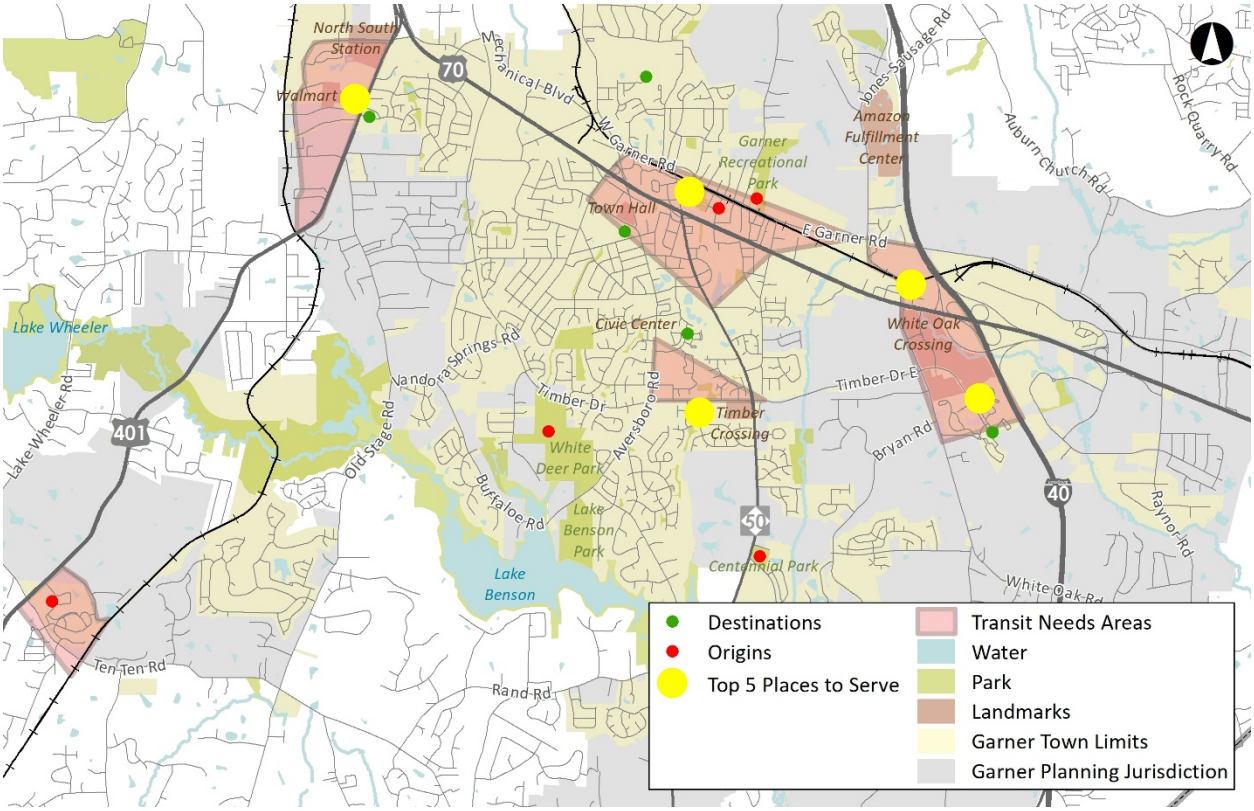
Existing Transit Needs and Future Route Options

Areas of High Transit Demand

Overall, existing transit demand in Garner is concentrated around the center of the town, between US 70, Timber Drive, and Benson Road, and around the town's municipal campus. When combining travel flow information with propensity measures, the highest combination of trip volumes and transit propensity occur along the length of the US 70 corridor, as well as between the White Oak shopping area and the neighborhood northwest of Timber Drive and Benson Road. Residents and workers in this area are more likely to use transit services throughout the day, and many daily trips occur between the key origins and destinations along these corridors. This level of transit demand indicates that central Garner and the US 70 corridor has the greatest potential for transit ridership within the study area.

In addition to this technical analysis, Chapter 1 describes the stakeholder and public engagement completed for this study. Figure X summarizes the technical and engagement results and illustrates the areas of high transit demand.

Figure 15: Garner Areas of High Transit Demand



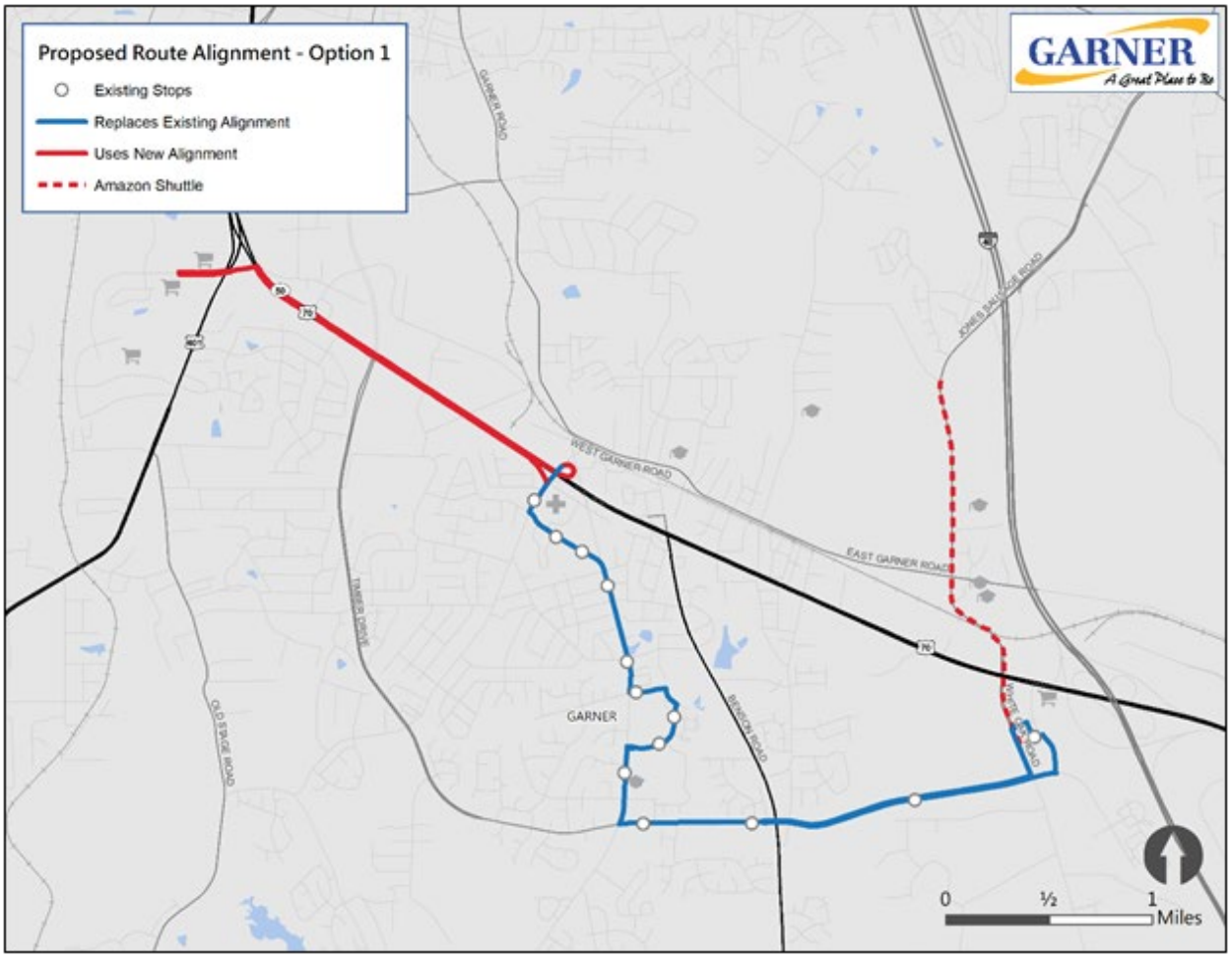
Transit Options Based on High Transit Demand Findings

Based on the results of stakeholder and public engagement, combined with demographic and employment data analyses, and travel demand findings, two route alignment alternatives were identified to better serve existing transit needs and demands. Both options provide connections to areas within Garner identified as key origins and destinations but vary in service north of US 70 and south of US 70.

Option 1

Figure 13 shows alignment Option 1 connects the North South Station shopping center with White Oak Crossing along US 70, Vandora Springs Road, 7th Avenue, Aversboro Road, and Timber Drive. In this route scenario, the local Garner route would replace GoRaleigh Route 20 service along Aversboro Road and Timber Drive. Route 20 would no longer serve the area but would continue to operate service from White Oak to GoRaleigh Station at a higher frequency. Six trips per day would also include a shuttle north on Jones Sausage Road to the new Amazon facility. This alignment follows the same alignment as Route 20 for thirteen of the existing stops, excluding the Amazon shuttle.

Figure 16: New and Existing Segments on Proposed Route Alignment Option 1

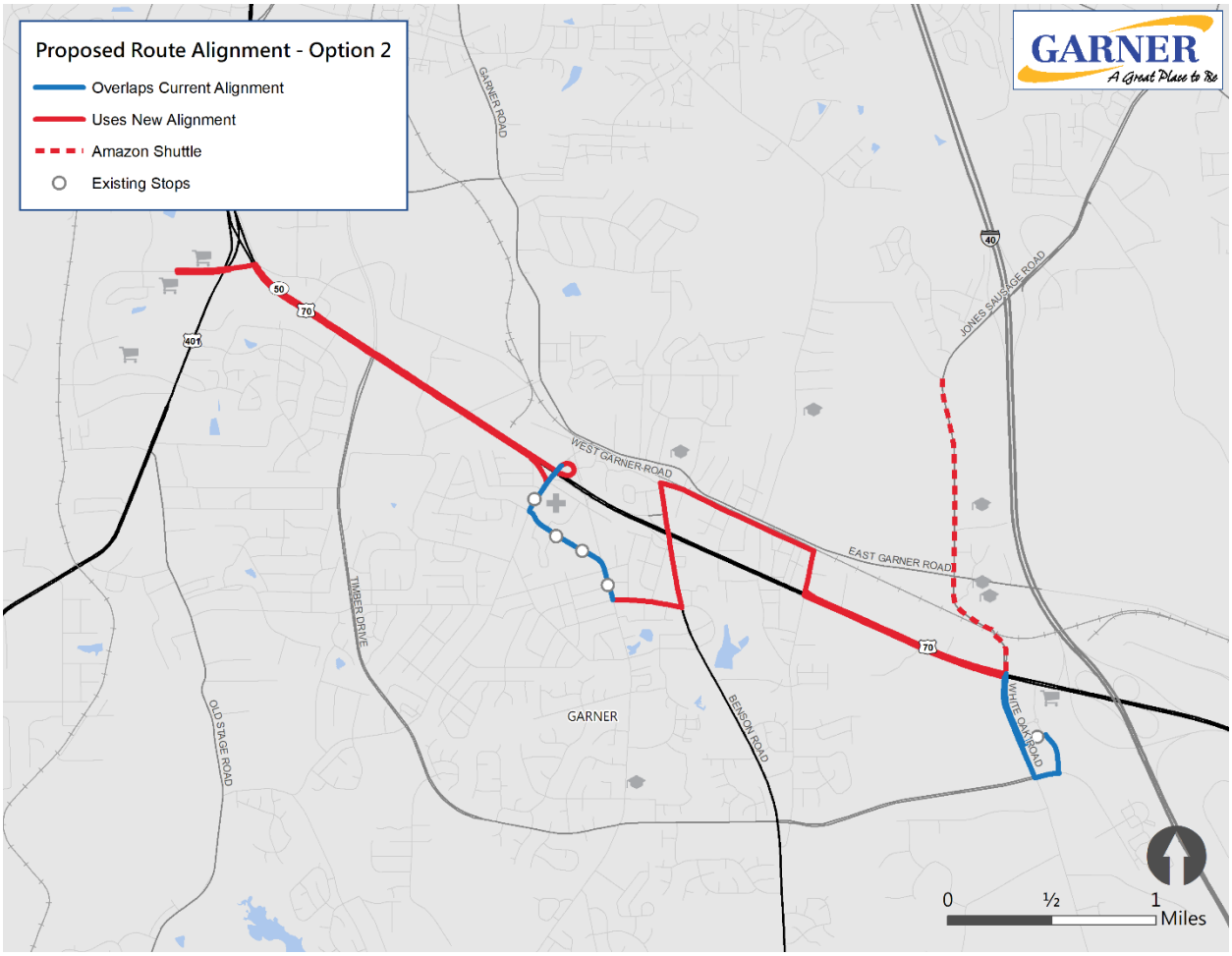


Option 2

Figure 14 shows alignment Option 2 connecting the North South Station shopping center with White Oak Crossing along US 70, Vandora Springs Road, 7th Avenue, Forest Drive, Benson Road, Main Street, and White Oak Road. GoRaleigh Route 20 would maintain the current route alignment and

frequency that is operated today. Like Option 1, six trips per day would also serve the new Amazon facility. Option 2 follows the same alignment as Route 20 for five of the existing stops.

Figure 17: New and Existing Segments on Proposed Route Alignment Option 2



Chapter 3 – Transit Fare Evaluation

Introduction

Transit fares, on the surface, are simply the price travelers pay to ride transit. Beneath the surface, fares have broad implications on things that affect travelers' everyday lives—access to resources such as housing, employment, food, and opportunities as well as larger societal issues, like socio-economic equity and discrimination. These broad implications result because the price travelers pay for transit fares, like all types of goods and services, affect the consumers' purchasing decisions. An incremental price increase in fares can motivate travelers to make different decisions – for example, using transit less, shifting to a different mode, or not taking a trip.

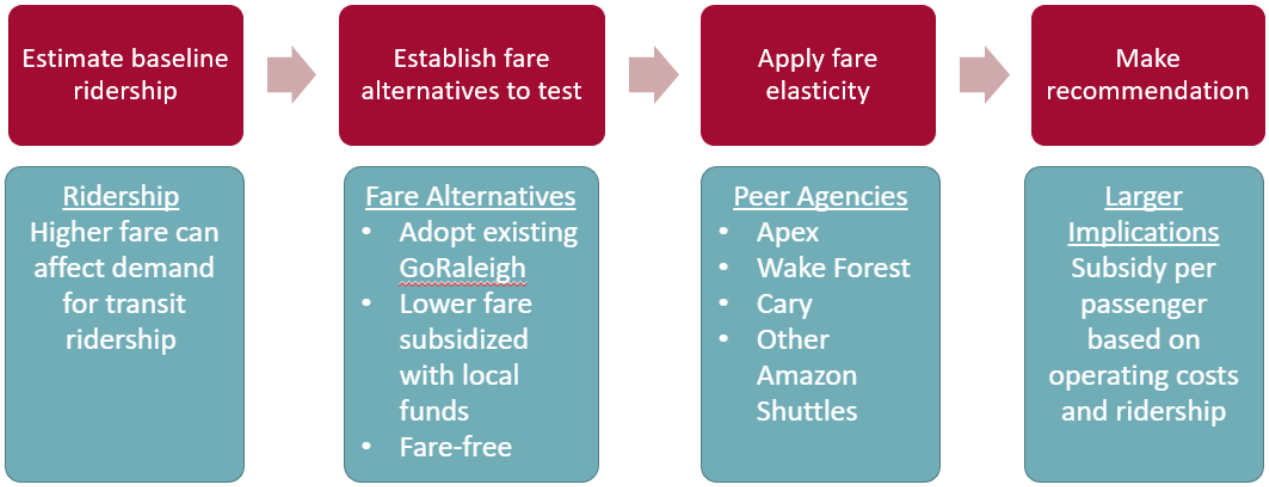
As Garner explores its transit options, a key question is asked – what fare (if any) should be charged for the new local, fixed-route bus? This chapter presents four key considerations in Garner's fare decision: ridership, communication, administration, and financial feasibility. Chapter 3 – Transit Fare Evaluation outlines three fare scenarios and identifies the key differentiators for each scenario. The three fare scenarios are:

- Adopt GoRaleigh existing fare structure
- Subsidize fares to lower than GoRaleigh levels
- Eliminate fares

Methodology

The methodology for transit fare evaluation is summarized in Figure 1.

Figure 18: Transit Fare Evaluation Methodology



Estimate Baseline Ridership

To evaluate the impact of each fare scenario on ridership, the planning team estimated baseline ridership using existing, local conditions for transit demand. Based on the current ridership of GoRaleigh

Route 20 in Garner, the estimated ridership for both proposed route options will be used as a baseline along with the existing GoRaleigh fare.

Baseline Ridership for Route Option 1

Route Option 1 (Figure 2) has three distinct parts– a portion that replaces the existing Route 20 alignment; a portion that uses a new alignment along US 70; and a separate shuttle service serving the Amazon Distribution facility six times a day. Option 1 was assumed to run at 30-minute headways weekdays from 6AM to 11PM. As of Spring 2020, Route 20 runs at hourly headways (i.e., one trip every 60 minutes). Based on the routing and ridership elasticities, Table 1 illustrates the weekday boardings estimated for Option 1.

Figure 19: New and Existing Segments on Proposed Route Alignment – Option 1

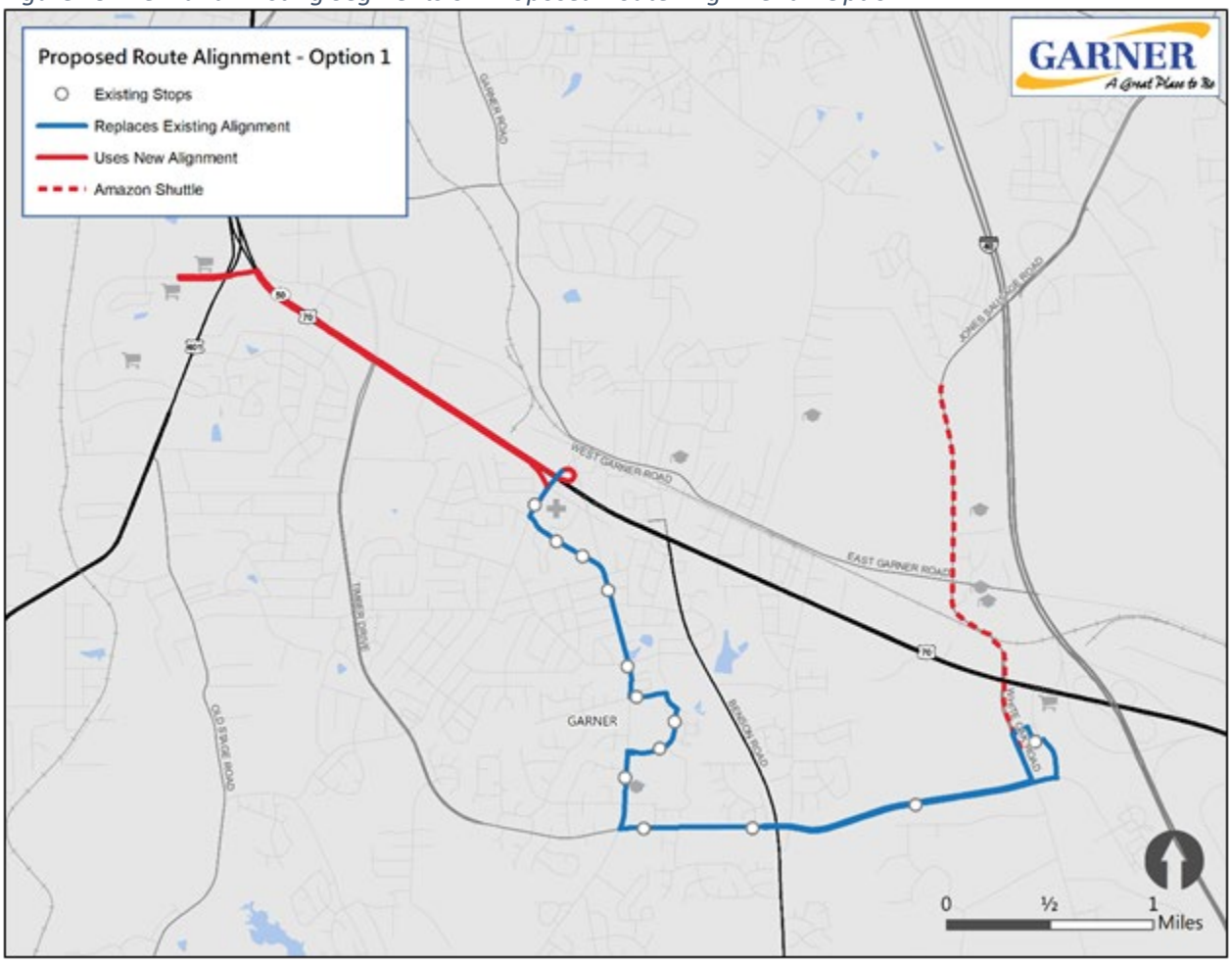


Table 1: Estimated Weekday Boardings – Option 1

Proposed Route Segment	Round-Trip Length (mi)	Daily Revenue Trips	Daily Revenue Miles	Average Daily Boardings
Existing Segments	9.5	34	323.2	125.4
New Alignment	4.5	34	152.6	117.7
Amazon Shuttle	4.0	6	23.7	21.0
Total	**18.0**	**34**	**499.5**	**264.1**

Baseline Ridership for Route Option 2

The proposed alignment for route Option 2 connects the North South Station shopping center with White Oak Crossing along US 70, Vandora Springs Road, 7th Avenue, Forest Drive, Benson Road, Main Street, and White Oak Road (Figure 3). The same proposed shuttle would serve the new Amazon facility six times daily. This alignment follows the Route 20 alignment for five of Route 20's existing stops. Based on the routing and ridership elasticities, Table 2 summarizes the weekday boardings estimate.

Figure 20: New and Existing Segments on Proposed Route Alignment – Option 2

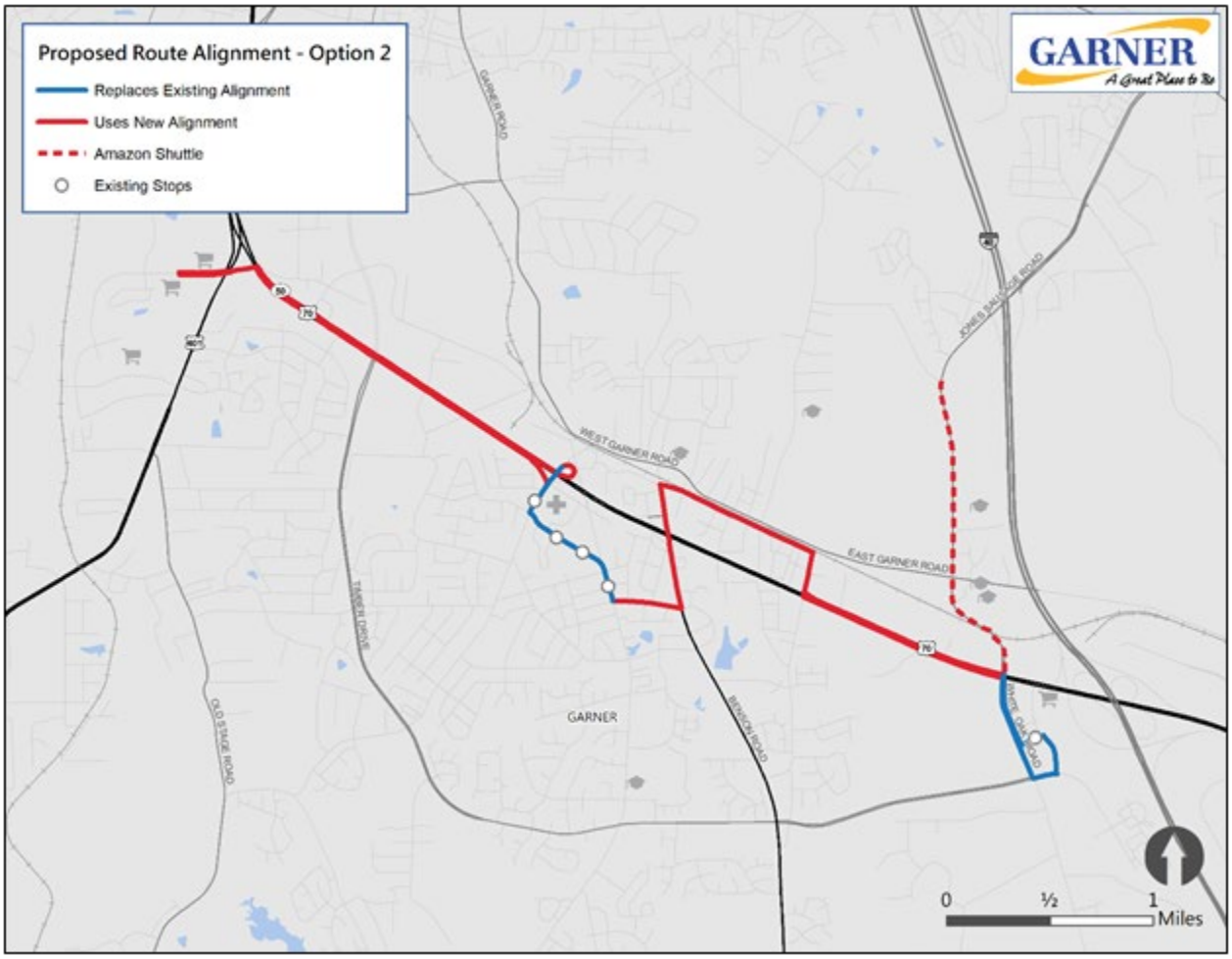


Table 2: Estimated Weekday Boardings – Option 2

Proposed Route Segment	Round-Trip Length (mi)	Daily Revenue Trips	Daily Revenue Miles	Average Daily Boardings
Existing Segments	3.0	34	101.3	78.2
New Alignment	10.5	34	356.9	275.3
Amazon Shuttle	4.0	6	23.8	21.0
Total	**17.5**	**34**	**481.9**	**374.5**

Establish Fare Alternatives to Test

Peer Jurisdictions

The planning team identified Garner transit fare alternatives by exploring fares implemented by peer jurisdictions within the Research Triangle region. In early 2020 throughout the region, one-way fares for fixed-route bus transit services ranged from fare-free in Chapel Hill and Wake Forest to $1.00 on GoDurham, the lowest priced base fare in the region, and $2.25 on GoTriangle regional routes. The peers selected have populations, regional roles, and transit needs similar to Garner. The fare policies for three jurisdictions were studied: the Town of Apex, the Town of Wake Forest, and the Town of Cary.

Town of Apex

The Town of Apex is located in Wake County southwest of Raleigh, with a population of nearly 54,000. Apex has grown rapidly over the past few decades, resulting in an increasing need for transit infrastructure. In early 2020, GoTriangle serves Apex through two regional bus routes with peak period service to the Regional Transit Center in southwest Durham and to Downtown Raleigh, where riders may make connections to bus routes serving all parts of the region.

In 2019, the Town of Apex, in partnership with the Town of Cary, conducted a transit study for a circulator route that would serve major destinations in Apex and connect to regional transit services. In early 2020, Apex undertook an implementation study to finalize plans for the schedule, stops, fare, and operator of the service. The new service will likely be operated by GoCary. In its circulator transit study, Apex considered two fare alternatives: adopt the regionwide local bus base fare of $1.25 or offer the service fare-free. The town estimated that while revenues would decrease without a fare, ridership would increase by more than 30 percent. Ultimately, the Town of Apex decided to offer the service as fare-free.

Town of Wake Forest

The Town of Wake Forest is located in northern Wake County, with a population of approximately 44,000. Although Wake Forest borders Raleigh, the town lies near the edge of the Triangle region, about 15 miles northeast of downtown Raleigh. Similar to Apex and Garner, Wake Forest has grown significantly over the past few decades.

Since 2008, GoRaleigh has operated a fare-free bus route in an hourly clockwise loop, serving the main points of interest in Wake Forest. In January 2020, the service was expanded to include a second bus operating in the reverse direction as well as Saturday service. In early 2020, the Wake Forest Loop operates hourly in each direction from 6:00 a.m. to 8:25 p.m. on weekdays and from 8:00 a.m. to 8:25 p.m. on Saturdays. GoTriangle also offers an express commuter bus route from Wake Forest to Downtown Raleigh during weekday peak periods. While the Wake Forest Loop is free, the base fare for the Wake Forest-Raleigh Express is $3.00, with discount fares and multi-day passes available.

Town of Cary

The Town of Cary is larger than Garner, with 168,000 residents. Cary lies primarily within Wake County, bordering Raleigh to the west, and like the rest of the region, has seen sustained growth over many decades, emerging into a prominent regional activity center.

In 2001, Cary began providing door-to-door on-demand transit service, and in 2005, the town established a network of five fixed, local bus routes. Today, GoCary offers six local bus routes and one peak-period express route. Cary is also served by four GoTriangle regional routes and one GoRaleigh route. The base fare for GoCary routes is $1.25, and GoTriangle fares start at $2.25 for a regular one-way trip. Both services also offer discounted fares for youth, people who are disabled, and senior riders, as well as multi-day passes. In 2016, GoCary's subsidy per passenger was $6.57.

Fare Scenarios for Testing

The planning team identified three fare scenarios to test for use on the potential Garner route options: adopt the existing GoRaleigh fare structure, offer a fare that is lower than GoRaleigh by subsidizing GoRaleigh fares with local funds, or offer the service fare-free. Each scenario is described below.

Scenario A – Existing GoRaleigh Fare

The current fare policy for GoRaleigh is shown in Table 3. The base fare is $1.25, with a discount fare of $0.60 for riders with disabilities. Free rides are offered to seniors 65 or older and youth ages 18 or younger who present the appropriate ID card. Day passes, week passes, and month passes are available at the rates of $2.50, $12.00, and $40.00, respectively, with half price discounts offered to riders with disabilities. Transfers within the GoRaleigh system are free with a transfer receipt. With this policy, the average fare per trip collected by GoRaleigh was $0.60 in 2016.

Table 3: GoRaleigh Fare Policy

Fare Type	Fare
Single Ride	$1.25
Single Ride – Discount	$0.60
Single Ride – Seniors, Age 65 or Older	Free
Single Ride – Youth, Age 13-18	Free
Single Ride – Youth, Age 12 or Younger	Free
Day Pass	$2.50
Day Pass – Discount	$1.25
7-Day Pass	$12.00

7-Day Pass – Discount	$6.00
31-Day Pass	$40.00
31-Day Pass – Discount	$20.00

Scenario B –Subsidized GoRaleigh Fare

The Town of Garner may choose to further subsidize passenger fares below existing GoRaleigh fares. By applying fare elasticities to the baseline fare and estimated ridership, the impact of lower fares on ridership, revenue, and the resulting subsidy per passenger were evaluated for base fares of $0.50, $0.75, and $1.00. Fare levels at multiples of $0.25 were selected for the ease of paying and giving change with cash and quarters.

Scenario C – Fare-Free

The Town of Garner may choose to fully subsidize passenger fares, eliminating a direct cost to the passenger. The benefits of eliminating fares include increased ridership and added convenience and may result in improved financial and operational productivity.

Apply Fare Elasticity

Route Option 1

Table 4 shows the estimated changes resulting from each fare level on annual ridership and annual revenue for route Option 1. The lowest subsidized fare of $0.50 (Fare B3) has the highest ridership of 87,523 annual boardings and the lowest annual revenue of $22,756. The average subsidy per passenger is also estimated to decrease for Fare B3 due to ridership growth, with Fare B3 resulting in a subsidy of $13.11 per passenger.

Table 4: Ridership and Revenue – Route Option 1

Fare Type	A	B1	B2	B3
Base Fare	$1.25	$1.00	$0.75	$0.50
Actual Revenue per Passenger	$0.60	$0.52	$0.39	$0.26
Annual Paying Passengers	61,276	65,940	72,295	81,463
Annual Non-Paying Passengers	6,060	6,060	6,060	6,060
Annual Ridership	**67,336**	**72,001**	**78,356**	**87,523**
Annual Revenue	**$40,402**	**$37,440**	**$30,559**	**$22,756**
Subsidy per Passenger	**$16.78**	**$15.74**	**$14.55**	**$13.11**

Option 2

Table 5 shows the estimated changes resulting from each fare level for route Option 2. The lowest subsidized fare has the highest estimated ridership of 124,116 annual boardings and the lowest annual revenue of $32,270. Similar to Option 1, the subsidy per passenger is estimated to decrease with lower fares, falling to $9.17 for a base fare of $0.50 (Fare B3).

Table 5: Ridership and Revenue – Route Option 2

	Option 1		% Change	Option 2		% Change
	$1.25 Fare	Fare-Free		$1.25 Fare	Fare-Free	
Annual Operating Cost	$1,170,450	$1,170,450	0%	$1,170,450	$1,170,450	0%
Annual Revenue	$40,402	--	--	$57,293	--	--
Annual Ridership	67,336	91,846	+36%	95,488	127,712	+34%
Subsidy per Passenger	**$16.78**	**$12.74**	**-31%**	**$11.66**	**$9.16**	**-27%**

Table 6: Fare Type and Subsidy Per Passenger – Route Option 2

Fare Type	A	B1	B2	B3
Base Fare	$1.25	$1.00	$0.75	$0.50
Actual Fare per Passenger	$0.60	$0.52	$0.39	$0.26
Annual Paying Passengers	86,894	93,509	102,521	115,522
Annual Non-Paying Passengers	8,594	8,594	8,594	8,594
Annual Ridership	**95,488**	**102,103**	**111,115**	**124,116**
Annual Revenue	**$57,293**	**$53,094**	**$43,335**	**$32,270**
Subsidy per Passenger	**$11.66**	**$10.94**	**$10.14**	**$9.17**

Estimated Fare-Free Ridership

As shown in Table 6, the average subsidy per passenger is estimated to decrease due to ridership growth if fare-free service would be implemented. The annual operating cost for both route options 1 and 2 was estimated at $1,170,450 (2020 dollars). Ridership is estimated to be the highest of any fare alternative and subsidy per passenger would be the lowest, falling to $12.74 for Option 1 and $9.16 for Option 2.

Findings and Considerations

Based on the two route options presented to serve the US 70 corridor, three fare scenarios were presented: existing GoRaleigh fare; subsidized fare; and fare-free. Each of the fare scenarios have implications on operating costs, revenues, and ridership based on fare elasticity research and best practices. In comparing the three scenarios and the fare impacts to service, a subsidy per passenger was calculated for each route option. Based on the fare evaluation, it was found that Route Option 2 has the lower subsidy per passenger, at $11.66 if charging a $1.25 fare and $9.16 if the system were fare-free. Option 1 has a higher subsidy per passenger in comparison, at $16.78 if charging a $1.25 fare and $12.74 if the system were fare-free.

It is possible for the Town to test fares before making a final commitment. Garner may consider implementing an initial fare-free introductory period to encourage existing and new riders to try the service. This period could also serve as a pilot in which the Town and the transit operator could evaluate the feasibility of a permanently free-free service.

Chapter 4 – Transit Service Model and Implementation Plan

Introduction

The Garner Transit Study team considered several factors and answered several questions when defining the transit service alternatives. The previous chapter discusses the Transit Needs Analysis identifying *where* transit should operate in Garner and explored the geographic coverage versus ridership choices. The study team paired the needs analysis results with public and stakeholder input, to answer service questions like: which riders should the transit route serve?, and between which locations should riders be able to travel without a transfer to another route?

The study team also defined *how* for the service, answering questions like: what time should the service run?, how frequently should the service be running?, and who should be paying for the service?. Answers to these questions define the service model and implementation plan. This chapter discusses the criteria and methodology used to develop operating details for the Town of Garner local transit service options.

Route and Service Evaluation Criteria and Application Methodology

Route Design Criteria

The study team leveraged best practices in transit route design to increase the likelihood of the Town of Garner local transit service being useful and efficient, and an overall positive passenger experience. The route design criteria that follow provide a foundation for designing a potential route alignment and service model in Garner.

The service should be easy to understand: A consistent schedule (frequency, operating hours, days of the week the service is offered, etc.) and route alignment help passengers understand the service and encourage use, especially for people who do not use transit every week.

The route should be direct: Transit routes should not deviate from the most direct alignment unless there is a compelling reason—such as providing service to a major ridership generator or maintaining service in a corridor where other transit service exists and transfers need to be coordinated, and ridership numbers justify continuing to provide the existing transit service. In these instances, the benefits of serving the locations off the direct alignment have to be weighed against the time added to the trip by making the deviation.

When deviations are introduced to a route, they should be par of the route all-day with one exception: when the activity generator has no activity – for example, a major employment generator may have specific shift times when workers will need to travel to the site, meaning transit service would only be needed immediately before and after shift changes.

Bi-directional service is preferable: When routes operate along the same alignment in both directions, passenger trips are more simple and efficient when a rider travels the same route to and from their origin and destination. There are situations when mirrored, bi-directional routing this is not possible – such as presence of one-way streets or turns at intersections not conducive to transit—but in general, it is more convenient for passengers if both directions of a route mirror each other.

Service design should maximize in-service time for route: A route's travel time determines how efficiently it operates. The length of the route and the time it takes to make each round trip determines how many buses are needed to provide the service at the desired level of frequency.

For example, if a route takes 60 minutes to complete a round trip, then at a frequency of every 30 minutes, two buses would be required to operate the service and there would be very little layover (i.e., leftover time in a trip when the bus is not providing service to riders). However, if a route takes 70 minutes to complete a round trip, then at a frequency of every-30 minutes, three buses would be required to operate the service and there would be a long duration of layover at the end of each trip. In this instance it would be more efficient to adjust the route design so the trip time would fit within 60 minutes or serve more places during the extra time.

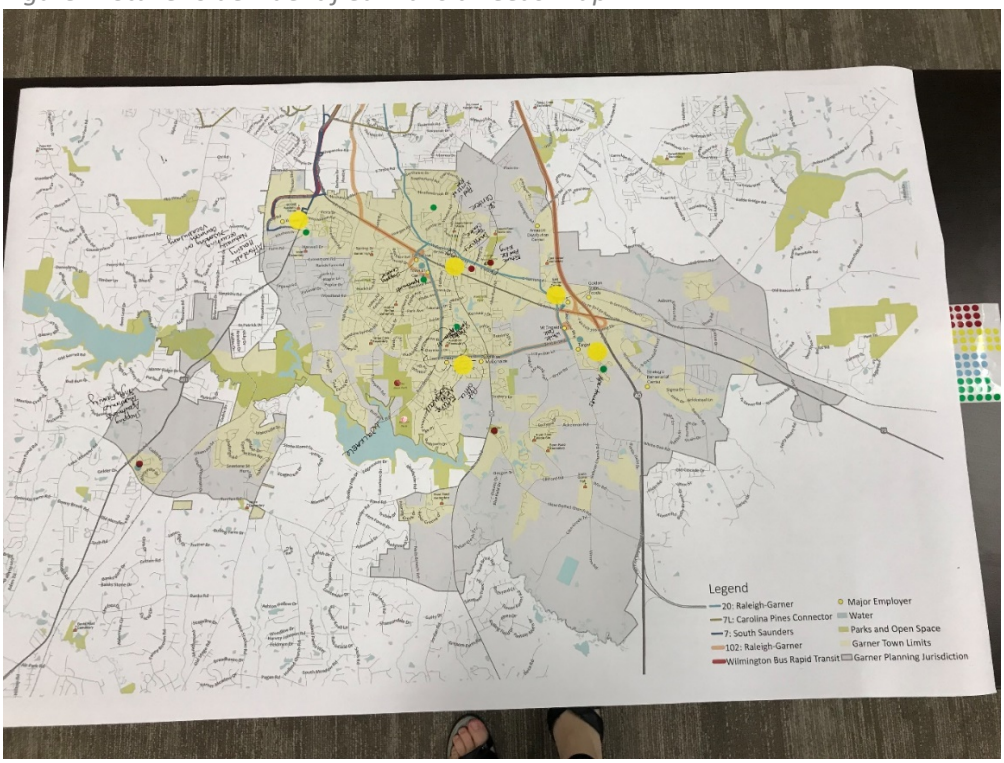
Route Design Methodology

The study team leveraged data analysis results, public/stakeholder input, and a review of previous studies to identify areas in Garner with a need for transit and/or a high likelihood of transit usage based on potential for trip generation. Chapter 1—Stakeholder and Community Engagement—details the methods of outreach used during the study and the results, and Chapter 2 – Transit Needs and Demands – discusses the data analysis and travel demand modeling, as well as provides a high-level summary of transit/transportation-related studies recently conducted in the Town of Garner. Transit service currently operating within the Town of Garner was also documented.

Establishing Service Priorities

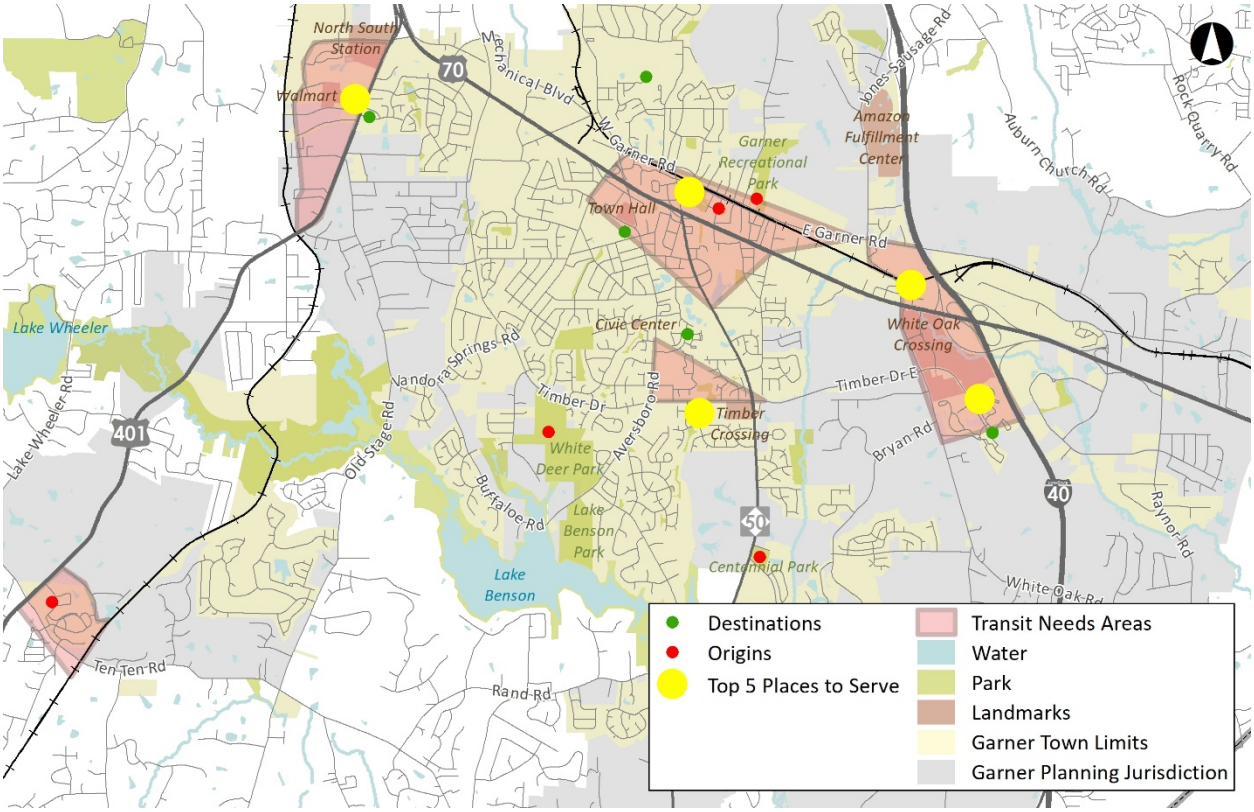
At the beginning of the planning effort, stakeholders were asked to identify areas within Garner they felt were major destinations and points of origin.

Figure 1: Stakeholder-Identified Transit Needs Map



Locations identified by stakeholders were combined with locations identified during Phase I engagement results and overlaid with areas of high transit propensity identified during the transit needs analysis. Figure 2 illustrates high-priority areas for a local transit service in Garner based on agreement between stakeholder and public engagement and the transit needs analysis results.

Figure 2 – Garner Areas of High Transit Demand



Route Option Development

The study team developed and shared several routing options with the stakeholder group, illustrating service tradeoffs between focusing service along high ridership corridors and providing maximum geographic coverage.

Figure 3: Route Scenario

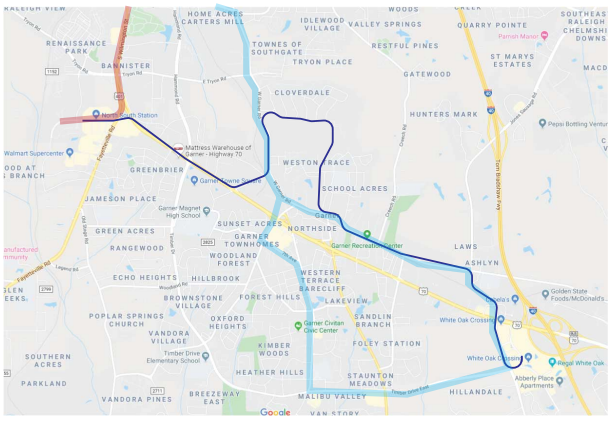


Figure 4: Route Scenario

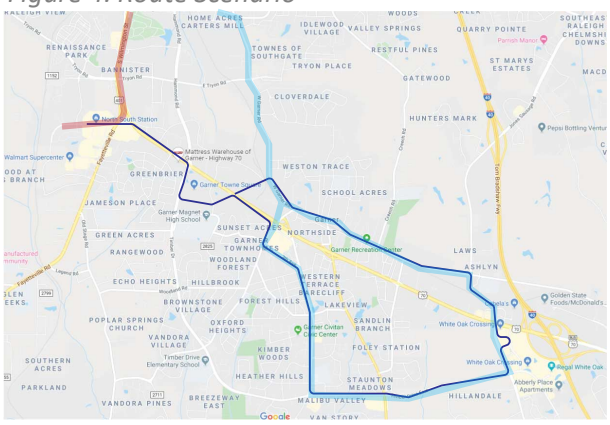


Figure 5: Route Scenario

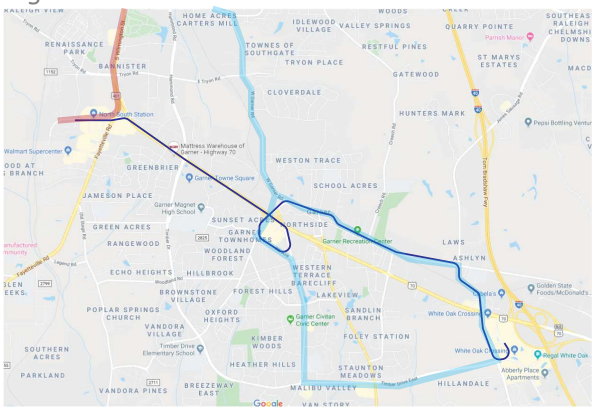
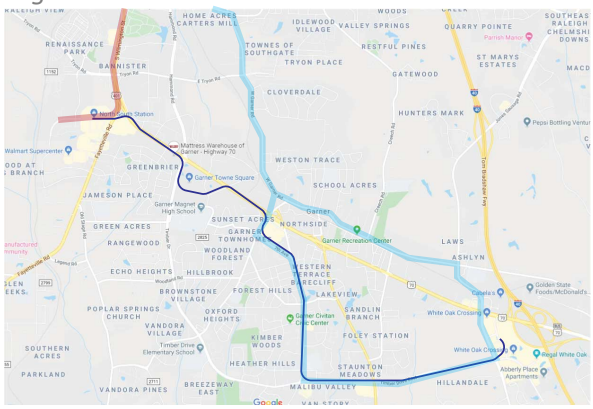


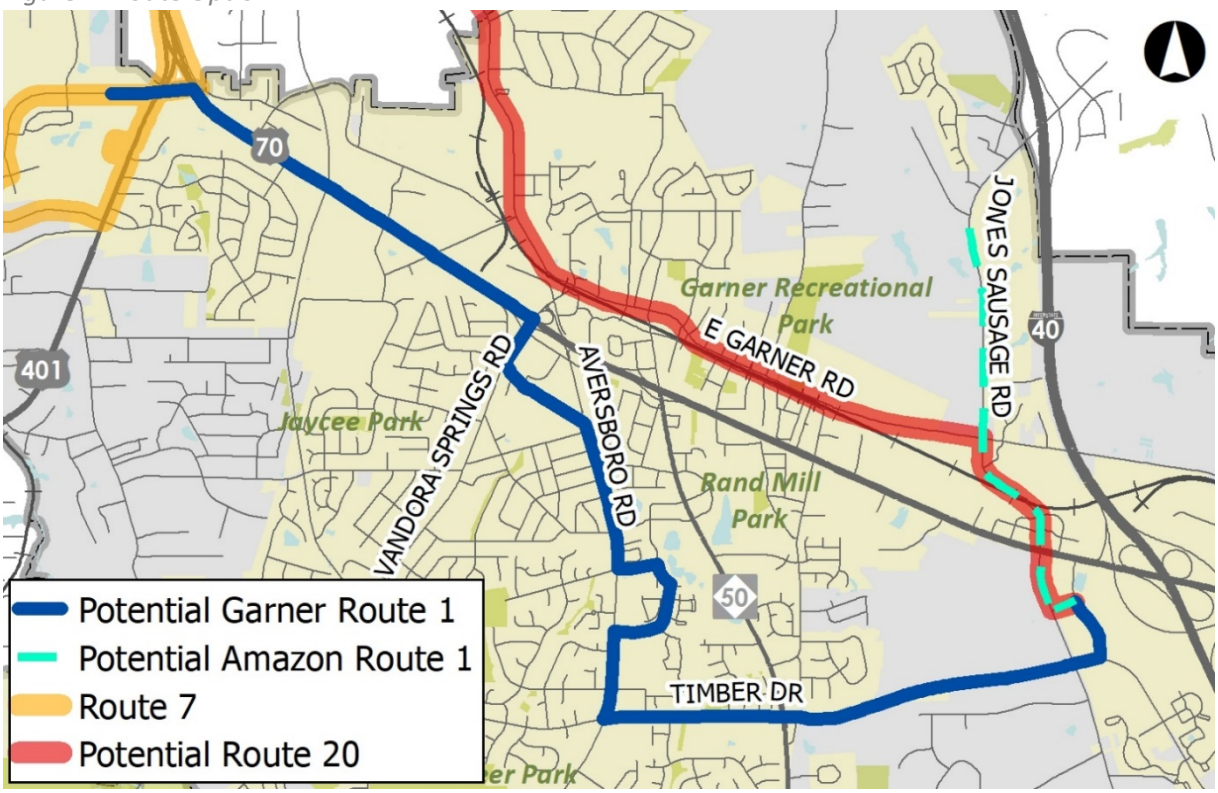
Figure 6: Route Scenario



The study team narrowed and refined two route options based on input from Town of Garner staff and the stakeholder group and presented the two refined route options to the public for review and comment.

Route Options 1 and 2 provide a connection from North South Station and White Oak Shopping Center in Garner, serve areas identified as “low-income” or “transit-dependent,” as well as some of the locations in Garner characterized as “major destinations” by stakeholders, the surveyed public, and through the transit needs analysis.

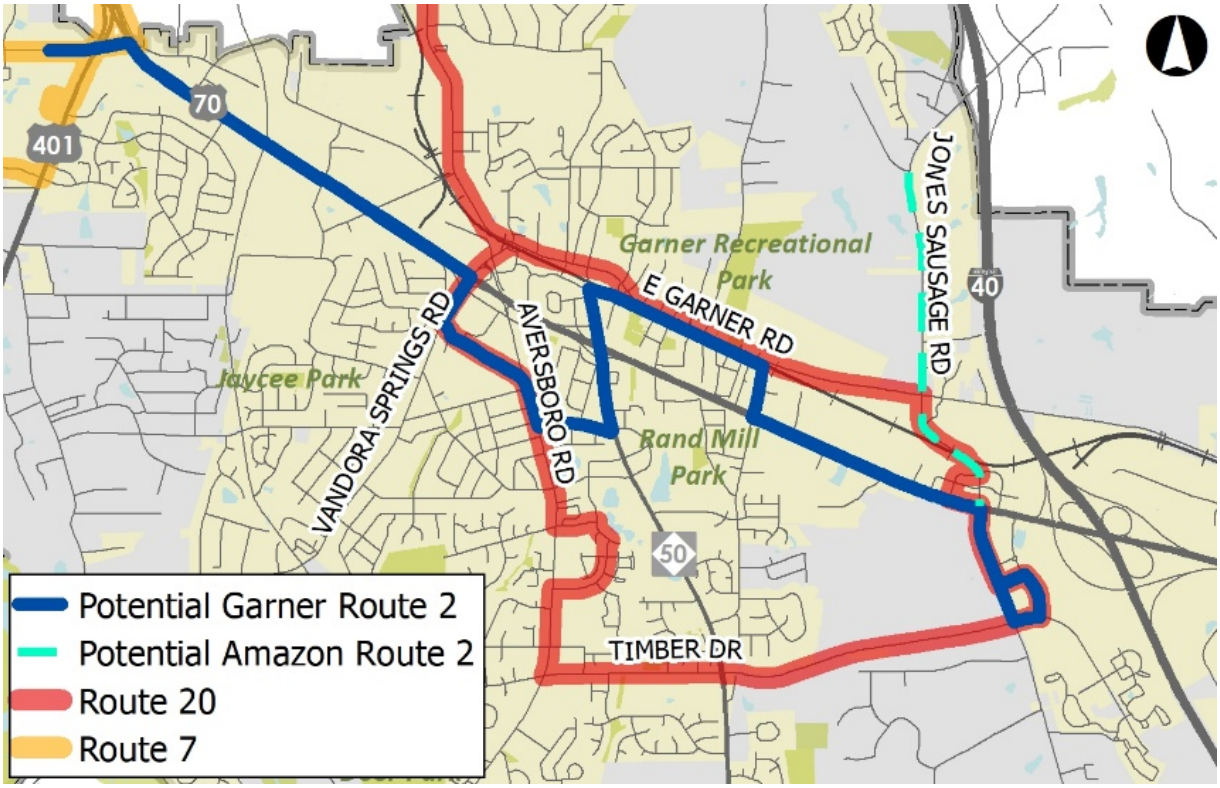
Figure 7: Route Option 1



Route Option 1 would operate from North South Station to White Oak Shopping Center via Aversboro Rd and Timber Dr. In this scenario, GoRaleigh’s Route 20 is proposed to no longer operate along this

portion of road, but would continue to operate from White Oak Shopping Center to GoRaleigh station via Garner Rd.

Figure 8: Route Option 2



Route Option 2 would operate from North South Station to White Oak Shopping Center via Main St and US 70, providing new connections to the Garner Rec Center and the Wake Med Medical Center. In this service scenario, GoRaleigh Route 20 would continue to operate along it's current alignment.

Preferred Route Alternative

The study team presented Route Options 1 and 2 and a summary of Phase II engagement results to the stakeholder group. Stakeholders reviewed and discussed the materials and details of each route option with staff. Based on public and stakeholder input during the final round of outreach, Route Option 2 is the formally-endorsed preferred service alternative for the Town of Garner.

Draft Operating Cost Estimates

Transit operating costs are based on the amount of time a bus and driver require to complete a round trip of the route (i.e., cycle time), the calculated cost-per-hour to operate a bus, the number of buses required to operate the service, and the number of days and hours a service will operate within a given year. The study team understands that the City of Raleigh's transit agency, GoRaleigh, will be operating Garner's local transit service and all operating costs were calculated using GoRaleigh's 2019 cost per hour of $85 provided by GoRaleigh staff.

Route Option 2's cycle time is estimated to be just under one hour. Once the route's frequency, operating hours per day (span), and days of the week are finalized, the equation shown below in Figure 9 will be used to calculate the annual operating cost (the calculation is based on weekday-only service).

Figure 9: Operating Cost Equation

# of Buses needed x (operating hours x $85 x 255) = Annual Operating Cost

GoRaleigh and Town staff will use the operating cost equation to calculate service costs once a final service plan is adopted by Town Council. Below are examples of how adjusting frequency, span, and operating days affect service cost.

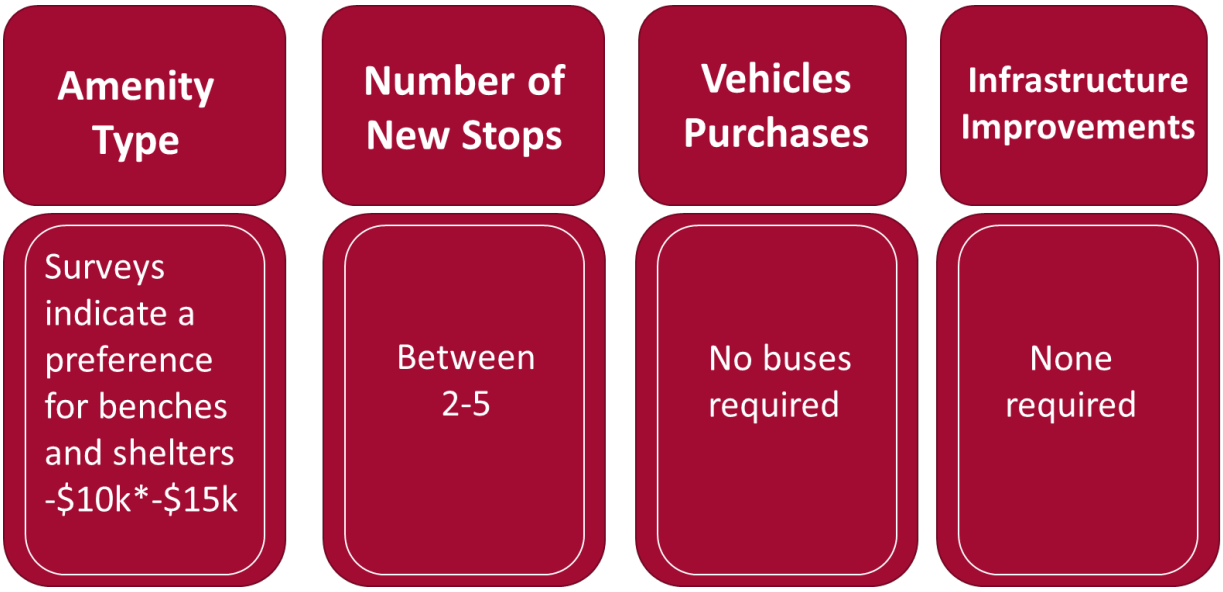
Figure 10: Service Plan Cost Scenarios – Represents Weekdays Only

Level of Service	Cycle Time	Frequency	Span of Service	Cost per hour	Total Cost (weekdays only)	Total Coast (7 days)
Tier 1	60	30 minutes all day	5:30am-11:30pm	$85	$780,300	$1.1 million
Tier 2	60	30 minutes during peak and 60 minutes during the midday	5:30am-11:30pm	$85	$542,000	$775,625
			OR			
			6am-8:00pm		$433,500	$651,525
Tier 3	60	60 minutes All day	5:30am-11:30pm	$85	$390,150	$558,450
			OR			
			6am-8:00pm		$303,450	$434,350

Capital Investments

Capital costs are any costs associated with infrastructure and/or equipment required to operate and administer a service. Amenity type, number of amenities, vehicle purchases/leases, and infrastructure improvements are examples of factors that affect the total capital cost for a planned transit service.

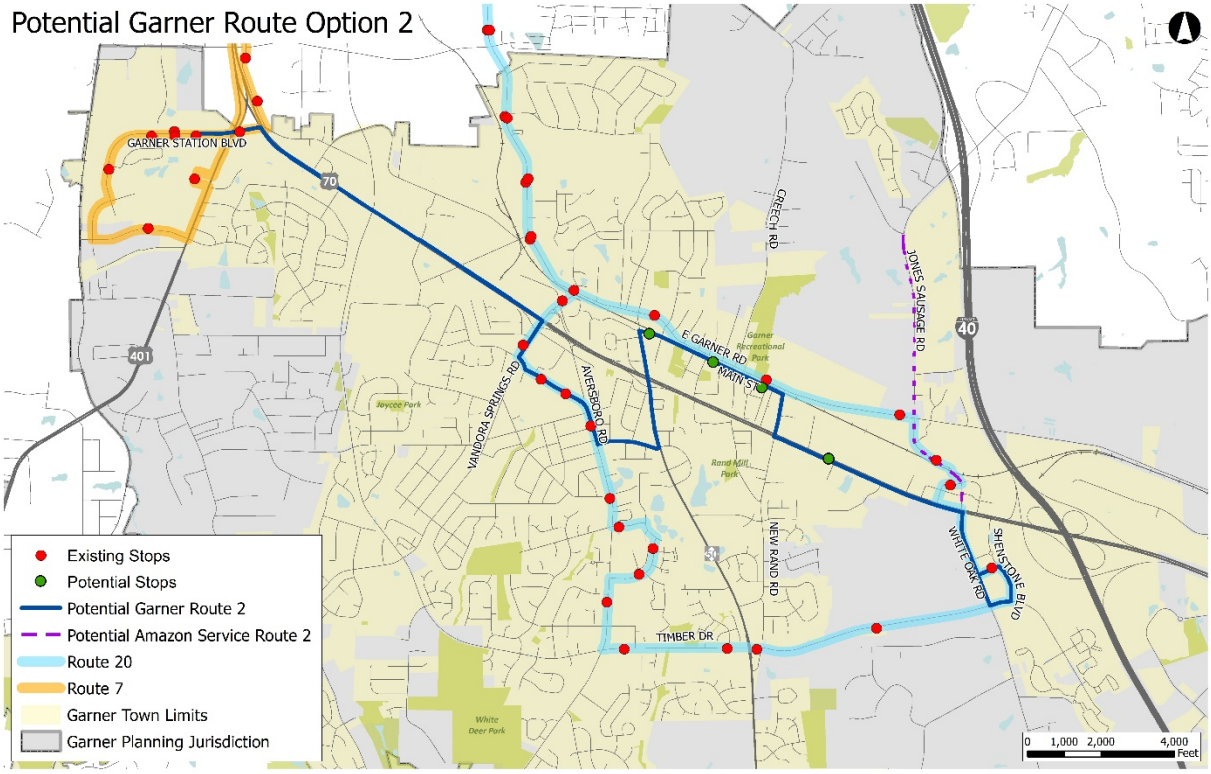
Figure 11: Potential Capital Cost Contributors – Route Option #2



Bus Stops

Route Option 2 would utilize existing GoRaleigh Route 20 bus stops and require construction and installation of new stops.

Figure 12: Existing Route 20 Bus Stops and Proposed Bus Stops for Route Option 2



Capital costs associated with transit stops vary based on the level of amenities provided at each bus stop. During Phase II Engagement, online survey respondents were asked to rank the importance of different types of amenities at bus stops in Garner. Survey results indicate a preference for benches and shelters with 58 percent of respondents saying that shelters were the most important amenity to be provided and 44 percent saying benches are the second most important. Trash receptables were also high on the priority list, with 66 percent of respondents indicating they were the third most important amenity.

Vehicle assumptions

The Garner Transit Study understands that if GoRaleigh operates the Garner transit service, it will also provide the buses with the cost of the buses built into the $85 per hour operating cost.

Chapter 5 – Funding

Introduction

This chapter introduces two funding opportunities available to support a portion of the operating and capital expenditures associated with a local Garner fixed route service. The Wake County Transit Community Funding Area Program (CFAP) and the Locally Administered Projects Program are both administered by the Capital Area Metropolitan Planning Organization (CAMPO) and provide municipalities the opportunity to apply for operating and capital funds to match local dollars.

CFAP

The CFAP is a relatively new funding opportunity available to communities in the County, providing resources for communities interested in developing local public transportation programs. The program leverages Wake County tax revenue and local funding to develop community-based public transportation solutions and make transit supportive investments in the County municipalities in order to facilitate the development of local transit options[3]. Eligible municipalities act as the project sponsor for their projects under this program.

CFAP dictates that there is a minimum local funding match of 50% of the total project costs to encourage joint projects between neighboring communities where possible and maximize the available funding. There are no restrictions on the funding source used to match CFAP resources; the requirement is the same for operating, capital, and planning projects. As a part of the grant application, project sponsors must identify their source of matching funds and demonstrate sufficient funding to execute the proposed project.

There is an annual grant maximum for both operating and capital awards set by CAMPO, and reviewed by TPAC, that each municipality can receive. In addition, no single CFAP applicant can be awarded more than 30% of the total dollars available in a single funding period. A financial spreadsheet estimating operating and capital costs and potential revenues through 2027 is located in Appendix B.

LAPP

The LAPP program is used by CAMPO to prioritize and program local transportation projects in the region that utilize federal funding and are the responsibility of the MPO. The funding available through LAPP varies, but the recommended FY2022 modal investment mix identifies $2,000,000 available for transit-related projects. LAPP will fund up to 80% of locally-administered projects, with a preference for projects that have larger local matches.

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3 https://nmcdn.io/e186d21f8c7946a19faed23c3da2f0da/8bfec28a290449a7b10eb1fee3a0e264/files/about-us/committees/wake-county-transit-planning-advisory-committee-tpac/TPAC_Meeting_9-19-18/Att_E_-_CFAP_CTT-Recommended_Final_Draft_for_TPAC_-_9-18-2018.pdf

Costs

Transit operating and capital cost estimates were based on the assumption that a Garner local transit service would be operated by GoRaleigh, and calculated using GoRaleigh's cost per hour and typical capital costs (including engineering/design services and installation).

Operating Costs

Operating costs were calculated based on the following operating model:

- Span of 6am-11pm (matching GoRaleigh's current operating hours in Garner)
- Peak frequency span (operating every 30 minutes) from 6am-9am and 3pm-7pm
- Off-peak frequency span (operating hourly) from 9am-3pm and 7pm-11pm
- Weekday-only service

These service-level projections would equate to roughly 6,120 annual operating hours, and at $85/hr, a local Garner fixed route service would cost a total of $520,000.

A final route operating cost will be calculated using the final, approved service model at the time of service implementation.

Capital Costs

Capital cost estimates were calculated using the following assumptions related to the implementation of Route Option 2:

- A total of four new bus stops would be installed with the implementation of Route Option 2
    - Two with a bench
    - Two with a bench and shelter
    - All four would have a trash can
- No buses would be purchased
- No roadway improvements would be required

Based on the listed capital improvements it is estimated that the total cost would total $44,800.

A final capital cost will be calculated using the final, approved capital investment plan at the time of service implementation.

Guidance from Connect 2045 through the Capital Area Metropolitan Planning Organization (CAMPO) was used to calculate year of expenditure for both operating and capital costs[4]. The costs included in the financial calculations include a 3.5% year-over-year inflation number.

4 https://nmcdn.io/e186d21f8c7946a19faed23c3da2f0da/8bfec28a290449a7b10eb1fee3a0e264/files/2045-Joint-MTP-v2-Full-Report-01-16-2019-update.pdf

Summary of Findings

As a result of stakeholder feedback, resident input, and a transit propensity analysis, two options for a local Garner transit service model were developed. Both connected Garner residents with Garner North South Station and White Oak shopping center, but Route Option 2 was formally endorsed by the Garner Transit Study Stakeholder Group due to its new connections to the Garner Wake Med Medical Center located on US 70 and the new Garner Rec Center located on Main St, as well as the additional service to White Oak Shopping Center when operated in conjunction with the current GoRaleigh Route 20.

Operating cost estimates were developed based on GoRaleigh's current cost per hour—calculated at roughly $85 per hour. Depending on the chosen service model for the local Garner Route—operating span, frequency, and weekday-only vs. 7-day service—operating cost estimates vary between roughly $434k and $1.1 million.

Capital cost estimates were also developed based on GoRaleigh's current capital costs, and depending on the number and level of passenger amenities provided – shelter, bench, trash can, and/or ADA accessible pad—capital cost estimates range from $10k--$15k (estimate includes current standard assumed engineering/design cost for GoRaleigh bus stops).

Appendix 1 - Transit Propensity Analysis-2020

FOURSQUARE ITP
INTEGRATED TRANSPORTATION PLANNING

Transit Propensity Analysis - 2020

CONTENTS

1.Transit Propensity 5
1.1. All-Day Propensity 7
Transit-Oriented Population Origin Index 7
Activity Destination Index 8
All-Day Service Index 9
1.2. Peak Period Propensity 10
Commuter Origin Index 10
Employment Destination Index 11
Peak Period Service Index 12
2.Transit Potential 13
3. Travel Demand Patterns 15
3.1. Existing Travel Demand 17
All-Day Trips 17
Peak Period Trips 18
Off-Peak Trips 18
3.2. Future Travel Demand 20
Future All-Day Trips 20
Future Peak Period Trips 21
Future Off-Peak Trips 22
4. Transit Demand and Ridership Potential 23
All-Day Transit Demand 23
Peak Period Transit Demand 24

FIGURES

Figure 1: Transit-Oriented Population Origin Propensity 7
Figure 2: Activity Destination Propensity 8
Figure 3: All-Day Service Propensity 9
Figure 4: Commuter Origin Propensity 10
Figure 5: Employment Destination Propensity 11
Figure 6: Peak Period Service Propensity 12
Figure 7: Existing Transit Potential 13
Figure 8: Future Transit Potential 14
Figure 9: Existing Daily Trip Volumes between TAZs 17
Figure 10: Existing Peak Period Trip Volumes between TAZs 18
Figure 11: Existing Off-Peak Trip Volumes between TAZs 19
Figure 12: Percent Change in Daily Trip Volumes between TAZs, 2013-2045 20
Figure 13: Percent Change in Peak Period Trip Volumes between TAZs, 2013-2045 21
Figure 14: Percent Change in Off-Peak Trip Volumes between TAZs, 2013-2045 22
Figure 15: All-Day Transit Propensity and Travel Demand 23
Figure 16: Peak Period Transit Propensity and Travel Demand 24

TABLES

Table 1: Transit-Oriented Population Origin Index Weights 5
Table 2: Commuter Origin Index Weights 5
Table 3: Activity Destination Index Weights 6

Transit Propensity

Transit propensity is a measure of the demographic and employment characteristics of an area to determine where the existing population and employment densities are best suited for transit services. Places with transit-dependent residents, high population density, large activity centers, or high job density often produce greater demand for transit.

The Propensity Model combines data from the U.S. Census American Community Survey (ACS) and Longitudinal Employer-Household Dynamics (LEHD) data to measure relative transit propensity within a specified study area. Various demographic, socioeconomic and employment factors were weighted within each index. Local zoning data was used to confine each part of the analysis to areas with corresponding land use (e.g., population density was calculated using only residential land areas). The study area for Garner, North Carolina included all block groups containing the town limits. The model measures propensity across four primary indices, which are then combined into two analyses of where all-day and peak hour transit services are best suited. The primary indices are:

- Transit-Oriented Population Origin Index
- Activity Destination Index
- Commuter Origin Index
- Employment Destination Index.

Three of the primary indices use weighting to determine how each demographic and employment factor contributes to transit propensity. These weights were set according to existing transit user characteristics on GoTriangle routes in order to represent the types of residents and activity centers that are most likely to produce transit demand in Garner. [5] **Table 1** through **Table 3** show the weights used for each variable contributing to the Transit-Oriented Population Origin, Commuter Origin, and Activity Destination indices, respectively. The Employment Destination Index evaluates all jobs equally and does not depend on weighting.

Table 1: Transit-Oriented Population Origin Index Weights

Variable	Weight (adds to 100)
Population	30
Youth	5
Seniors	5
Income	15
Zero-Vehicle Households	15
One-Vehicle Households	20
Persons with Disabilities	10

Table 2: Commuter Origin Index Weights

[5] Source: GoTriangle On Board Customer Survey, 2018.

Variable	Weight (adds to 100)
Non-SOV Commuters	30
Labor Force	70

Table 3: Activity Destination Index Weights

Variable	Weight (adds to 100)
Retail/Restaurants	25
Education	35
Health	15
Entertainment/Recreation	10
Government Services	15

Subsequently, the two propensity analyses are a combination of the primary indices. These analyses are defined as follows:

- All-Day Service Index combines the Transit-Oriented Population Origin and Activity Destination indices.
- Peak Period Service Index combines the Commuter Origin and Employment Destination indices.

For the six indices, each block group was given a score and rated from low to high relative to the propensity score of other block groups in the study area.

Overall, transit propensity in Garner is most concentrated within the center of the town, along US 70, Garner Road, and Timber Drive around the town civic center. The commercial development and multi-family housing located in this area would likely produce demand for transit services. Some areas of higher residential and employment density also fall just outside these areas, indicating that they may also be sources of transit demand.

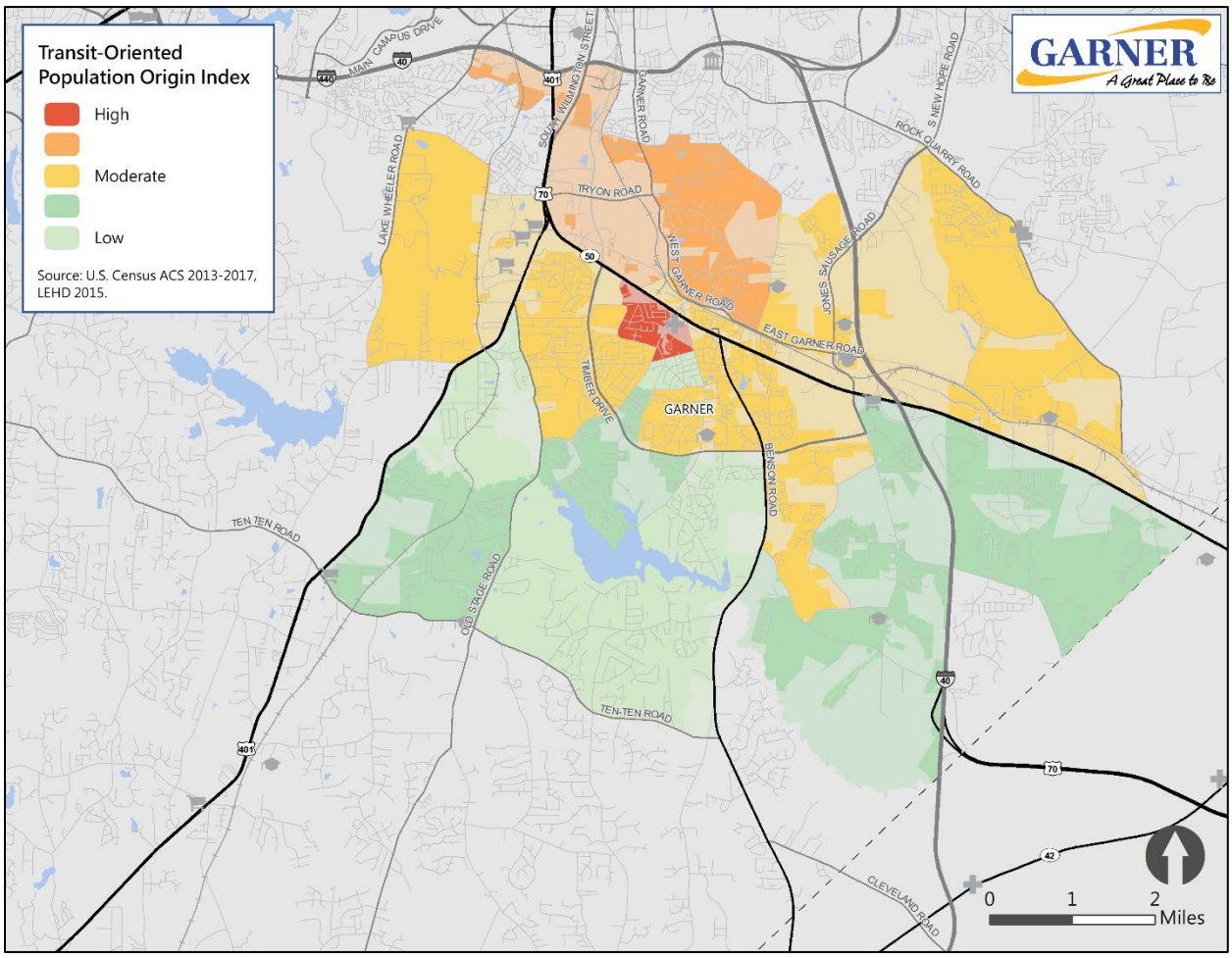
All-Day Propensity

Transit-Oriented Population Origin Index

The transit-oriented population (TOP) origin index represents where transit-dependent and likely choice transit riders live. This measure includes areas with many young and elderly residents, persons with disabilities, low incomes, and low car ownership.

Figure 1 shows TOP propensity for each block group in the Garner study area, with darker shades of colors highlighting the residential areas within the index. In Garner, transit-oriented populations are most concentrated on either side of US 70 in areas with dense housing. The greatest TOP propensity is found near the town civic center. On the southern side of Garner, the residential neighborhoods exhibit relatively low TOP propensity. However, new multi-family construction near White Oak Crossing may produce relatively high transit demand in the near future.

Figure 1: Transit-Oriented Population Origin Propensity

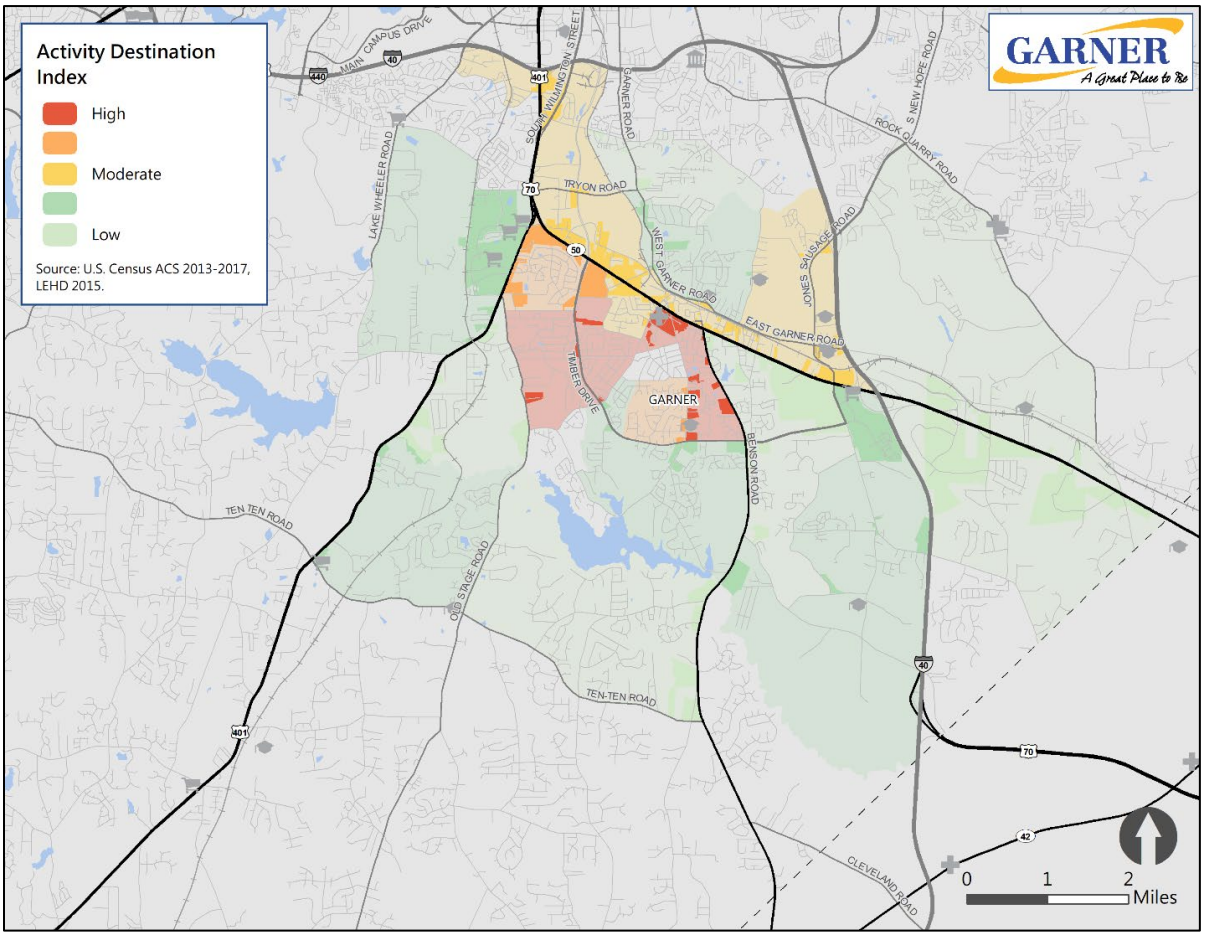


Activity Destination Index

The activity destination index represents areas that could be popular destinations for transit users throughout the day. These attractions in Garner include restaurants, grocery stores, schools and universities, civic buildings, healthcare facilities, retail locations, and shopping centers.

As shown in **Figure 2**, most activity destinations in Garner are concentrated along major roads, including US 70, Garner Road, Fayetteville Road, with the areas analyzed for this index shown in darker colors. The highest activity destination propensity occurs at the town civic center, with a high density of public buildings and commercial businesses. Additional key activity areas that are not captured by the index include the shopping centers at White Oak Crossing and the intersection of Fayetteville Road and US 70.[6]

Figure 2: Activity Destination Propensity



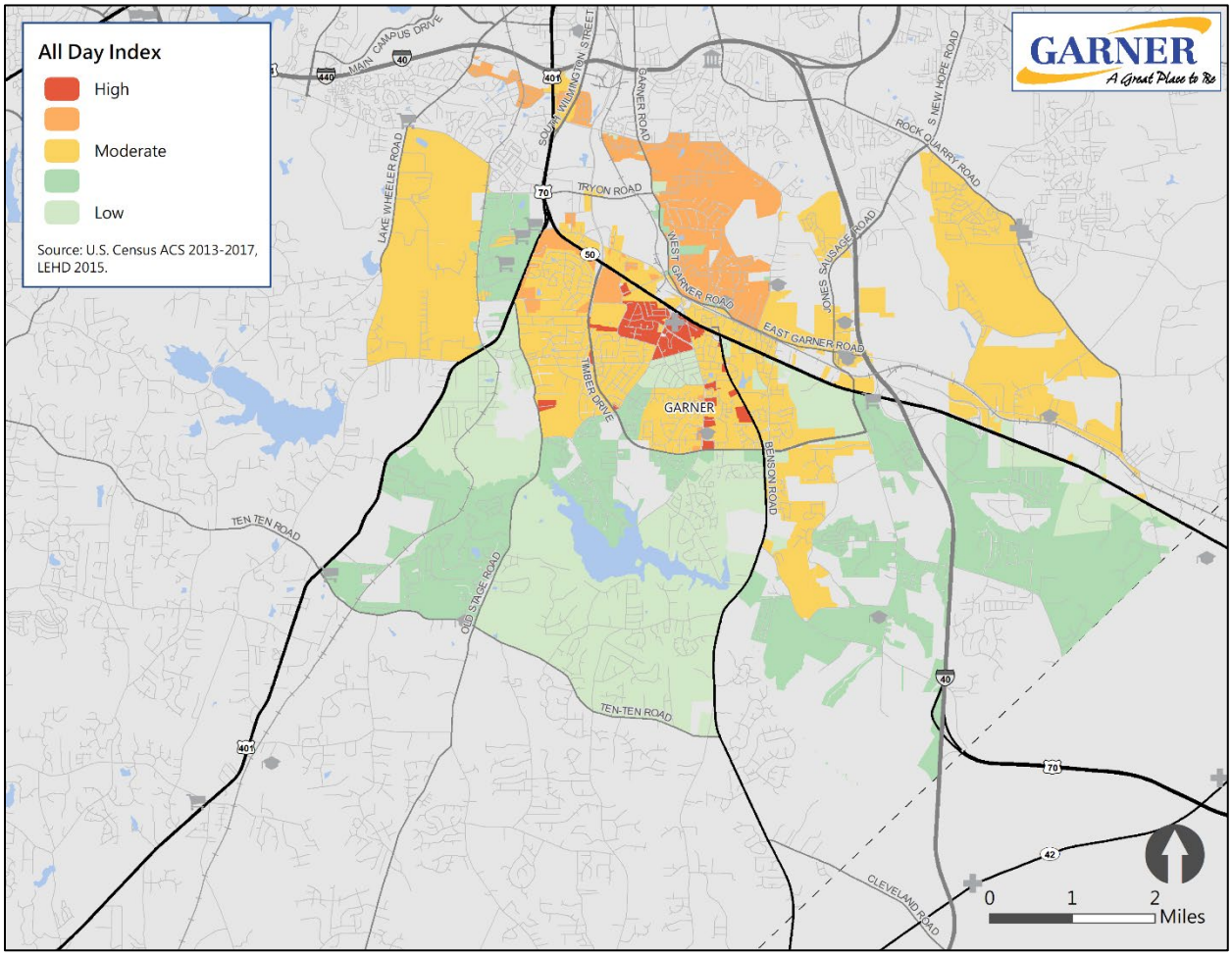
[6] These areas are not captured likely because the large developments have lower job density than other employment areas.

All-Day Service Index

The all-day service index is a combination of the TOP origin and activity destination indices. Transit-oriented populations are likely to use transit to get to the everyday destinations represented in the activity destination index. By combining these measures, the all-day service index represents areas that can serve as origins or destinations throughout all times of day.

The greatest all-day service propensity in Garner is found in the block groups along the south side of US 70 and north of Timber Drive near the town civic center, as shown in **Figure 3**. Other areas of significant all-day service propensity include dense residential communities on the north side of US 70 and commercial corridors along US 70 and Fayetteville Road.

Figure 3: All-Day Service Propensity



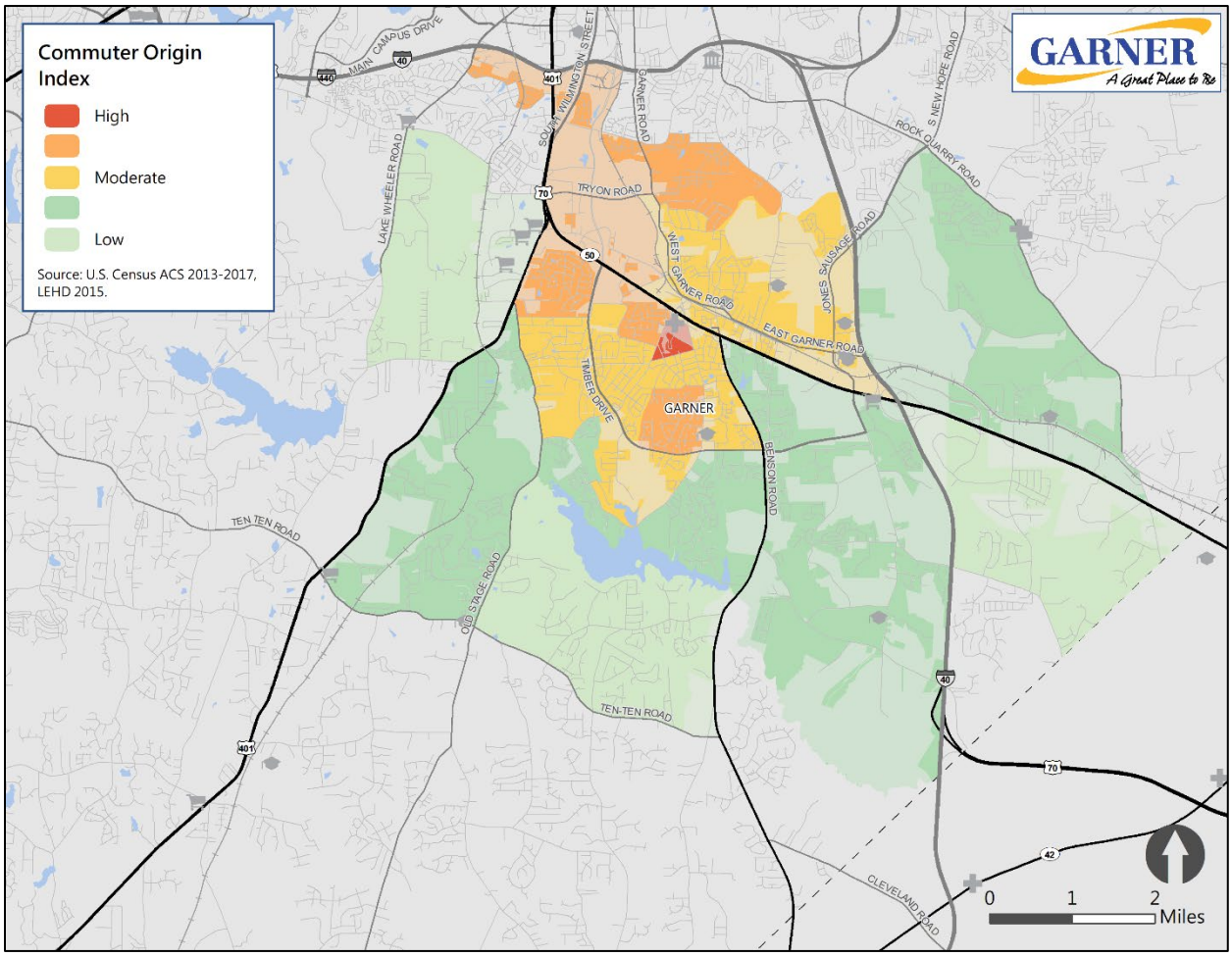
Peak Period Propensity

Commuter Origin Index

The commuter origin index represents areas that are likely to serve as the origin for transit commuters. This measure includes residents who are employed or in the labor force, with an additional focus on transit and carpool commuters.

Figure 4 shows the commuter origin propensity for each block group in Garner, with the residential areas used to calculate this index shown in darker shades of color. Commuter propensity is the greatest near the town civic center, as well as in the denser residential communities northeast of Garner Road. The commuter origins in the rest of residential Garner have low or moderate-low propensity, although new multifamily development near White Oak Crossing may produce relatively high transit demand in the near future.

Figure 4: Commuter Origin Propensity

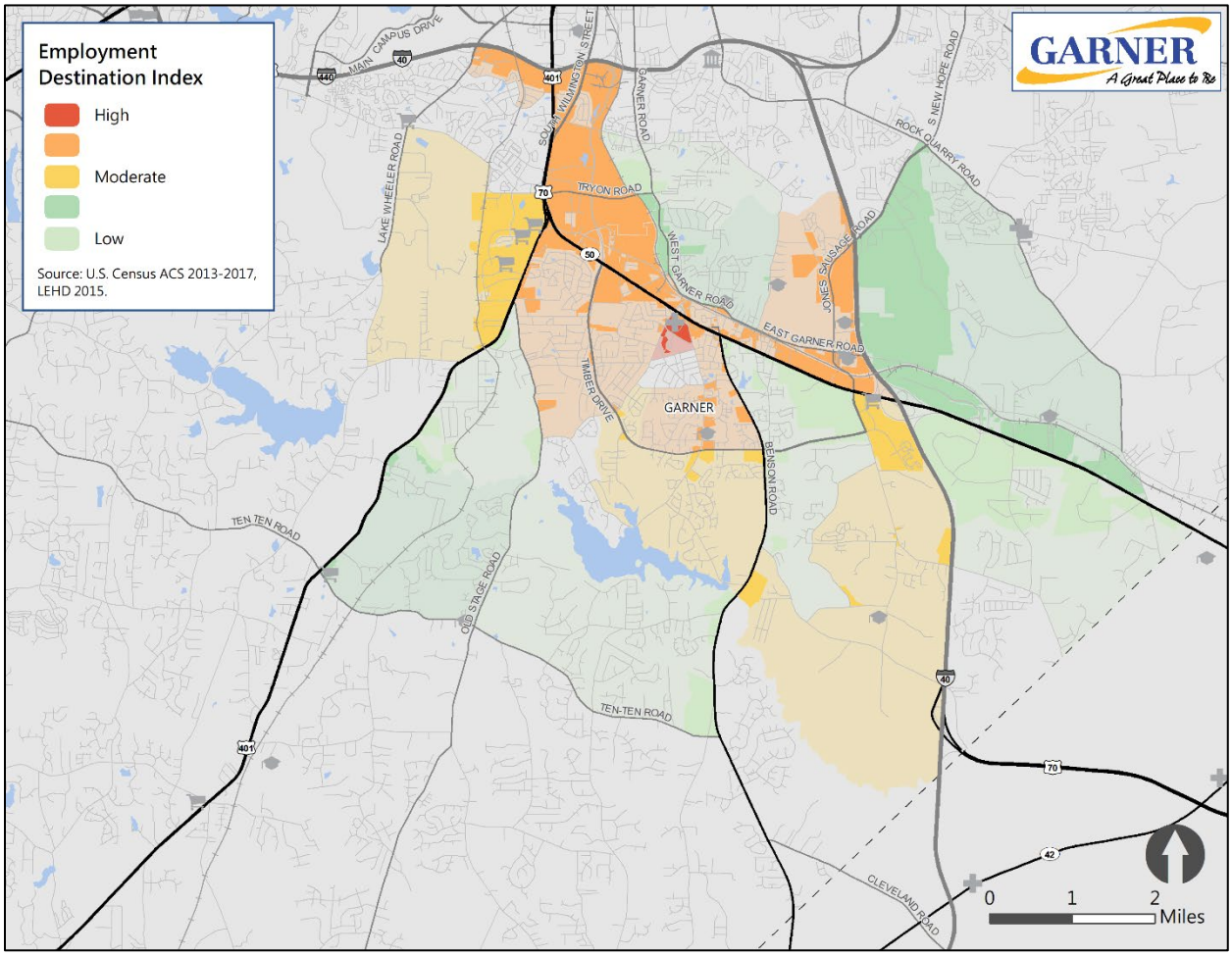


Employment Destination Index

The employment destination propensity index represents areas that serve as the destination for work trips. This measure includes the total number of jobs and job density in each area.

As shown in **Figure 5**, common employment destinations in Garner are concentrated at the town civic center and along commercial corridors, including US 70, Fayetteville Road, and Garner Road, with the areas analyzed for this index shown in darker colors. The light industrial areas north and south of Tryon road exhibit the largest area of significant employment destination propensity. In addition, the Amazon Fulfillment Center on Jones Sausage Road will open as a major employer in 2020 with an anticipated 1,500 jobs.

Figure 5: Employment Destination Propensity

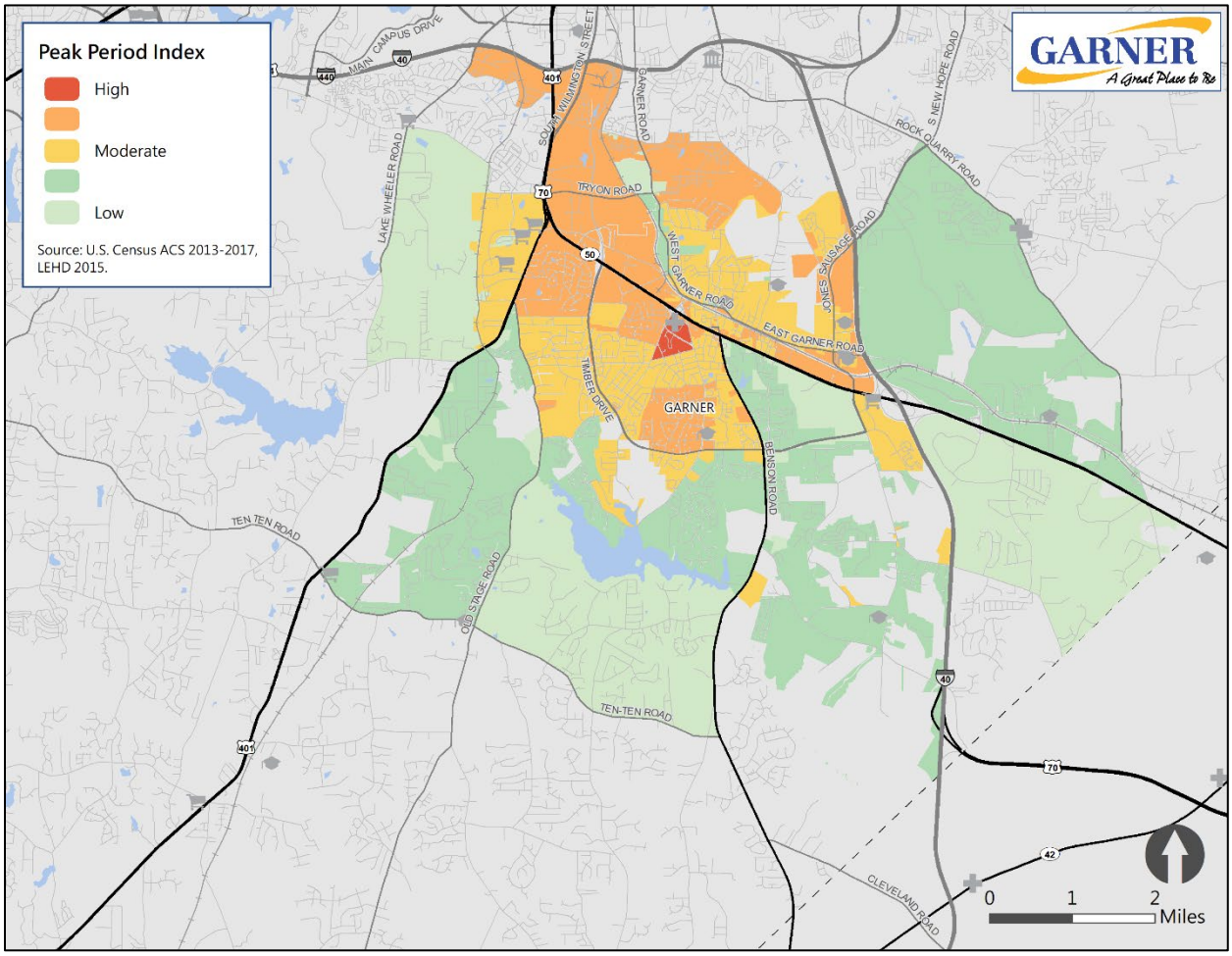


Peak Period Service Index

The peak period service index represents a combination of the commuter origin and employment destination indices. This index identifies areas that serve as the origin or destination for home-to-work trips, which are concentrated during the peak morning and evening commute hours.

Figure 6 shows the distribution of peak period service propensity in Garner. The highest peak period propensity is found in the more population- and job-dense areas in the center of town and heading north toward Raleigh, as well as along major roads such as US 70 and Timber Drive. The peak period service index is low to moderate-low throughout the rest of the town, including residential communities in the southern and eastern parts of Garner.

Figure 6: Peak Period Service Propensity



Transit Potential

In addition to transit propensity, a key measure of the potential demand for transit is density. Transit potential measures the combined population and employment density. Fixed-route transit is typically best supported in areas of five jobs plus residents per acre or more.[7] Below this density, various types of demand-response services are often better suited to the lower level of demand.

As shown in **Figure 7**, existing transit potential in Garner is concentrated in the town's center between Timber Drive and US 70. Other denser areas include the residential neighborhoods between Timber Drive and Old Stage Road and on the northern edge of the study area. Overall, the density in Garner does not surpass 15 jobs plus residents per acre, while only a small section of the town has a combined density greater than five jobs plus residents per acre. This means that fixed-route transit may be best supported in central Garner.

The future transit potential in Garner is shown in **Figure 8**. Dotted hatch patterns indicate density increases of 25 percent or more relative to today, and diagonal hatches indicate decreased density. In 2045, population and employment in Garner are forecast to increase significantly, with a large portion of the town more than doubling. Most of northern Garner will surpass five jobs plus residents per acre, which means that more of the town will be able to support fixed-route transit service in the future.

Figure 7: Existing Transit Potential

[7] Based on Transit Cooperative Research Program (TCRP) Report 100: "Transit Capacity and Quality of Service Manual, 2nd Edition", 2003. The report finds that the minimum density to support hourly fixed-route transit service is approximately 3 households per acre or 4 jobs per acre.

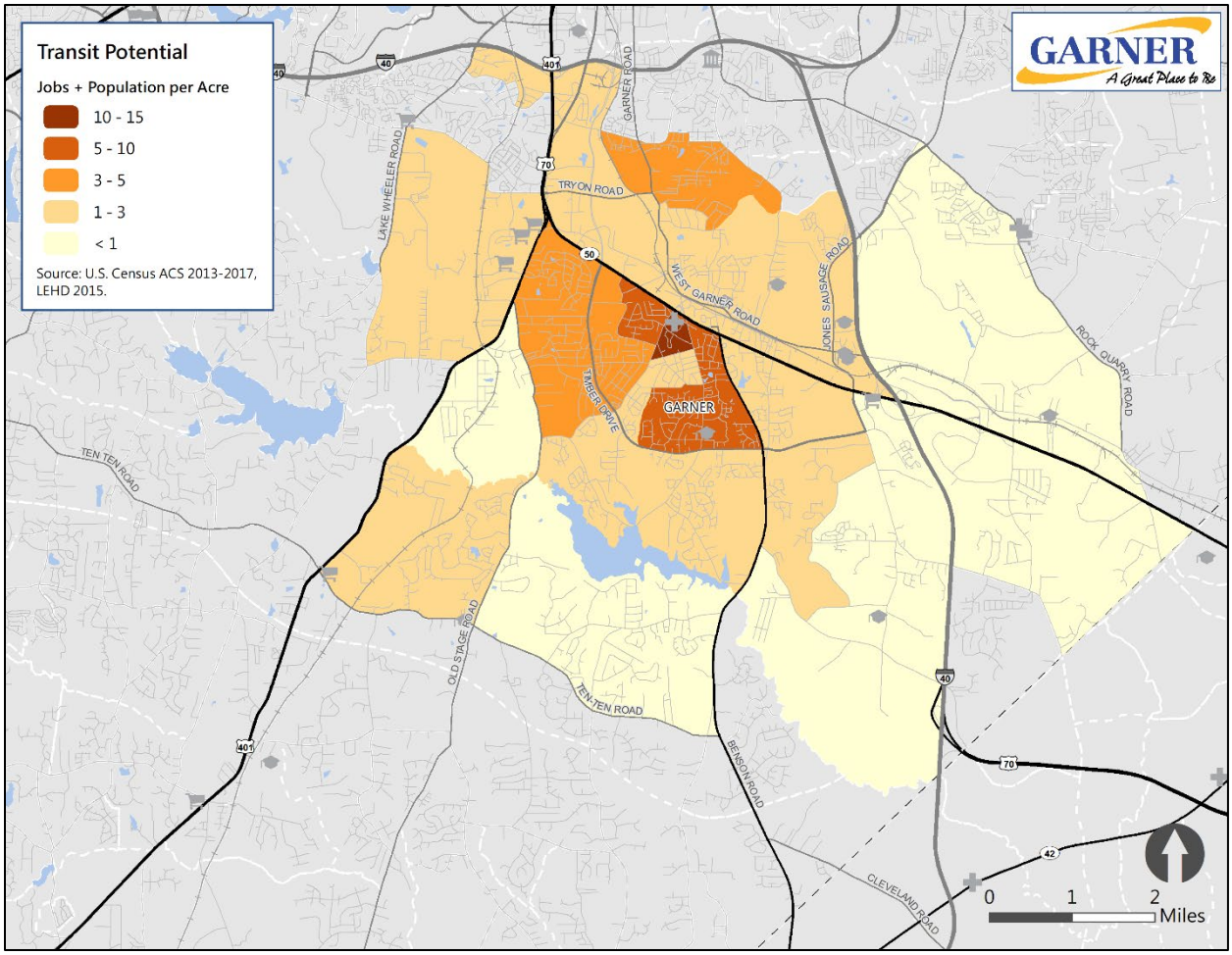
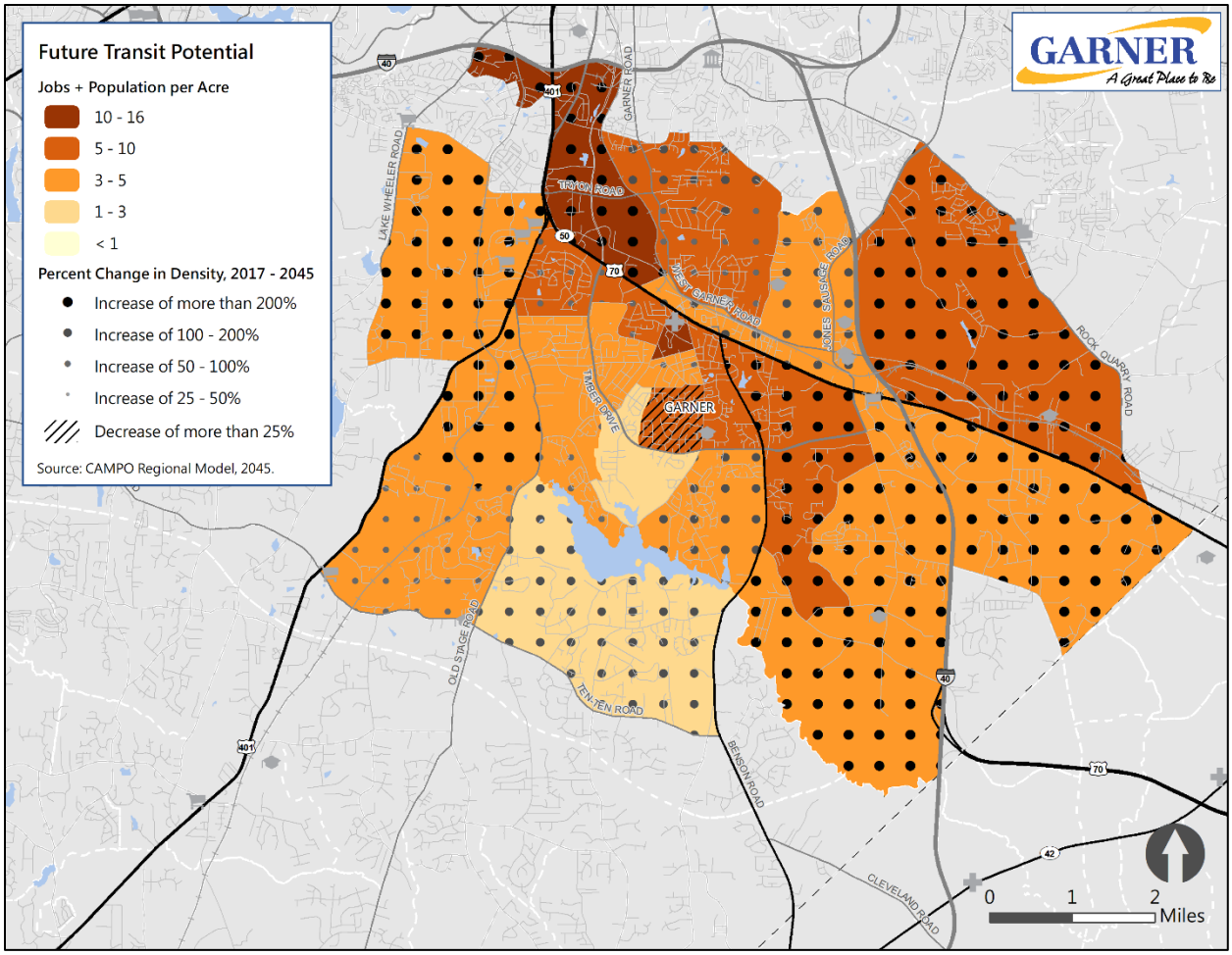


Figure 2: Future Transit Potential



Travel Demand Patterns

Travel demand exists where many residents or workers in the study area make trips between the same origins and destinations. The most significant connections form patterns of movement throughout the study area and these connections can be grouped by the time of day, purpose, and mode of each trip. For transit services, common origins and destinations form the basis of a route or network that meets the needs of existing and potential transit riders. In order to maximize the benefit of transit services, planning must therefore be informed by existing and forecasted travel demand patterns.

Travel demand patterns for the Raleigh-Durham-Cary region are modeled by the Capital Area Metropolitan Planning Organization (CAMPO) using a four-step multimodal travel model. The model forecasts trip volumes between Traffic Analysis Zones (TAZs), which define similarly-sized areas that are useful for transportation planning. TAZs are divided by major features, including arterial roads, highways, railroads, and natural barriers such as streams, rivers, or lakes. Travel demand is estimated using the existing transit network, forecasted demographic information, land use data, and data on planned developments to predict travel behavior throughout the region, including transportation mode and trip purpose.

In Garner, there is only one existing transit route, which provides a bus connection to the greater Triangle Transit bus network at the GoRaleigh Station in Downtown Raleigh. Therefore, most trips within the study area are not currently served by transit. In order to evaluate all possible flows that could be served by a transit route, all personal car trips for all purposes were analyzed as a basis for transit recommendations in Garner.

Overall, travel in Garner is dominated by connections to the White Oaks shopping area, which has significant travel between many areas during all times of the day. The US 70 corridor in general exhibits high travel demand, producing and attracting trips from all parts of Garner. In the future, however, new developments on Timber Drive west of White Oak Road will replace the existing White Oak shopping area as the major travel node. Neither current conditions or future forecasts reflect potential trips created by the opening of the Amazon Fulfillment Center in 2020, which may create significant demand in and around Garner in the near-term.

Existing Travel Demand

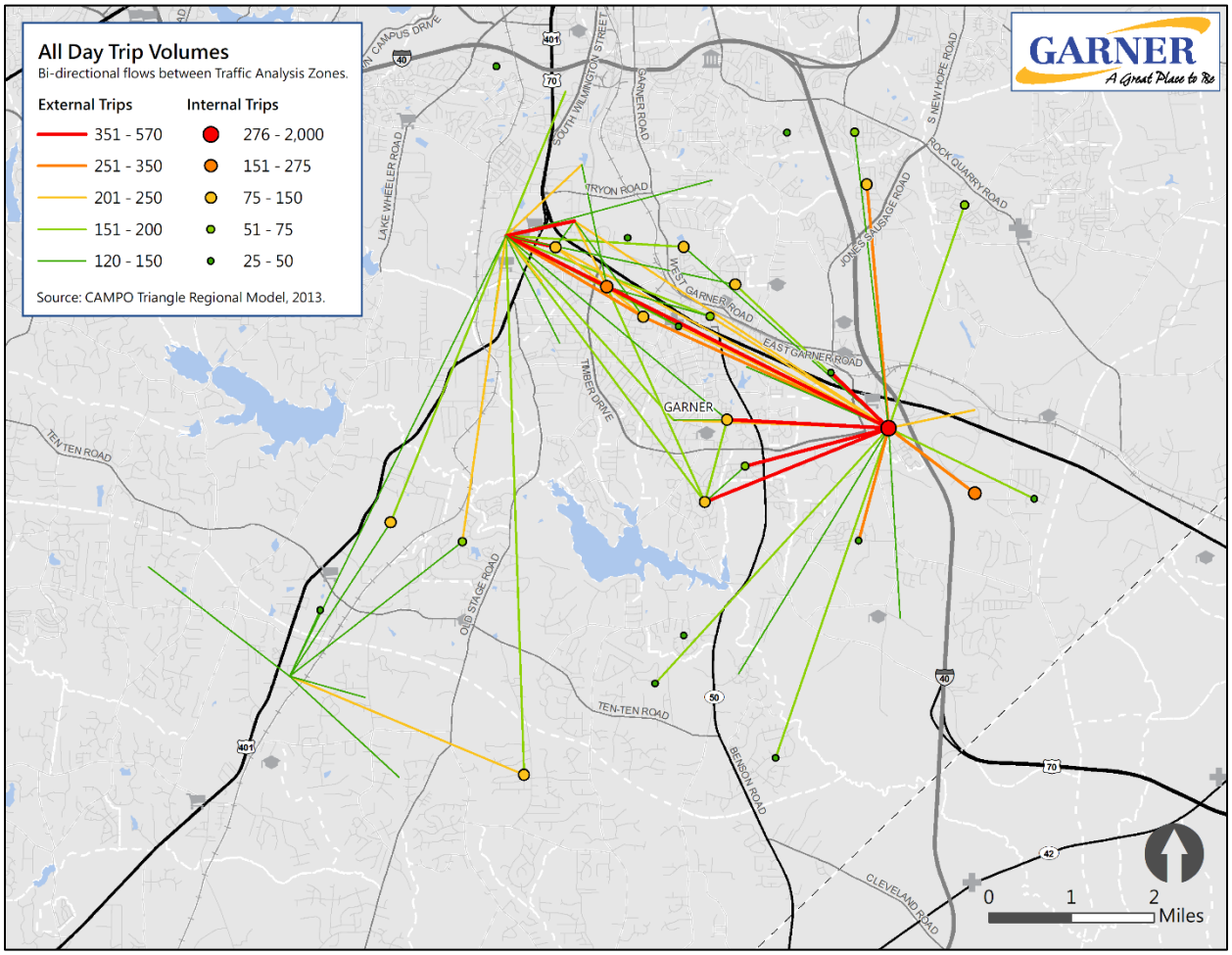
The existing travel demand in Garner represents where the most car trips occur within the study area today. Along with daily volumes, which include trips made at all times of day for a single typical day, travel flows were analyzed for the peak and off-peak periods, allowing for a separate evaluation of travel patterns during commute and non-commute times of day.

All-Day Trips

All-day travel patterns show where the residents and workers in Garner travel most throughout a typical day. The most significant flows reveal important origins, destinations, and connections within the study area. All-day demand can be served by transit services that follow the same route every day.

Existing daily travel flows are shown in **Figure 9**. The White Oak shopping area at the junction of US 70 and I-40 is a major node for all-day demand in Garner, with thousands of trips beginning and ending there every day. Major daily connections in Garner reach from the White Oak shopping area along US 70 to the commercial area at Fayetteville Road and along Timber Drive to areas north and south of Timber Drive near Benson Road. Outside of the US 70 corridor, smaller connections reach to residential neighborhoods in northern and southern Garner.

Figure 9: Existing Daily Trip Volumes between TAZs

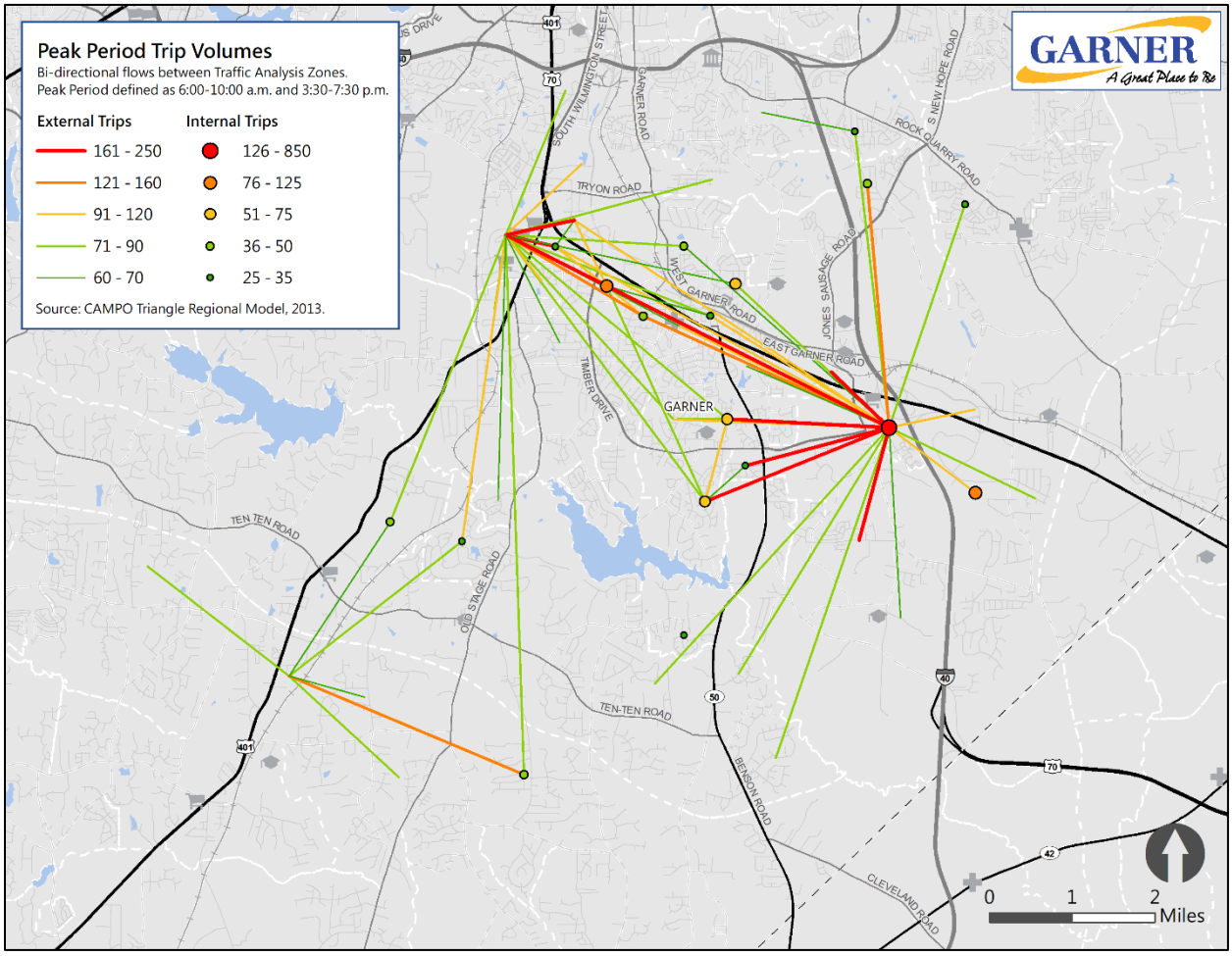


Peak Period Trips

Peak period trips represent a subset of daily travel patterns characterized by regular trips made during the busiest times of day. In the CAMPO travel demand model, the combined peak period is defined between 6:00 a.m. – 10:00 a.m. and 3:30 p.m. – 7:30 p.m. Peak period travel patterns are often dominated by commute and school trips, since most workers and students arrive or leave work or school during those hours.

Figure 10 shows the existing travel flows during the combined peak period. Similar to all-day flows, major nodes and connections during the peak period occur at the White Oak shopping area and along the US 70 corridor. Other flows reach to the residential neighborhoods in northern and southern Garner.

Figure 10: Existing Peak Period Trip Volumes between TAZs

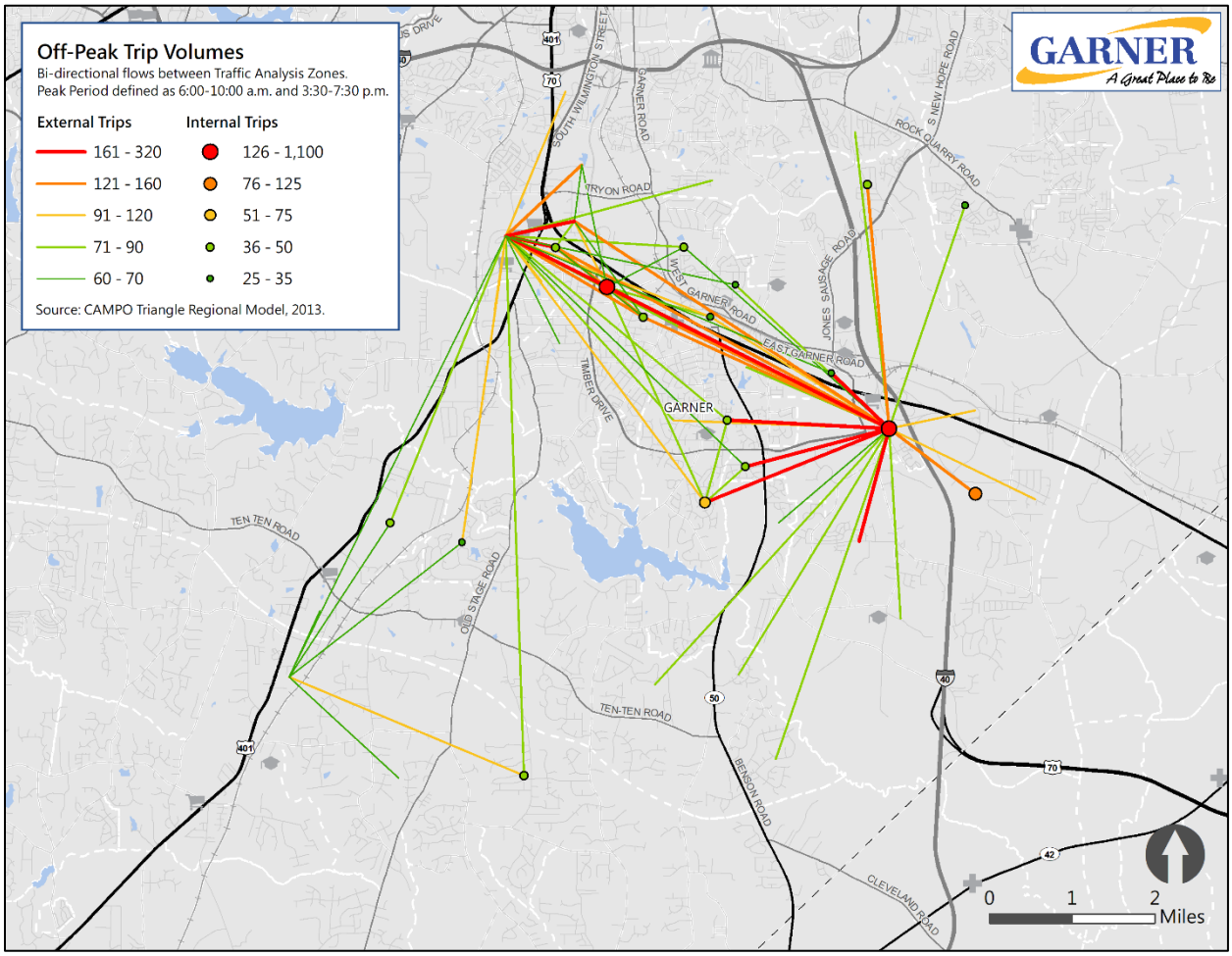


Off-Peak Trips

In contrast to the peak period, off-peak flows often reveal travel patterns that are not work or school related. Off-peak volumes include all trips during the early morning, midday, and night that occur outside the peak period.

The off-peak travel flows in Garner are shown in **Figure 11**. The patterns are similar to all-day and peak period demand, with the most significant trips occurring at the White Oak shopping area and throughout the US 70 corridor. Off-peak volumes are slightly higher than peak period volumes.

Figure 11: Existing Off-Peak Trip Volumes between TAZs



Future Travel Demand

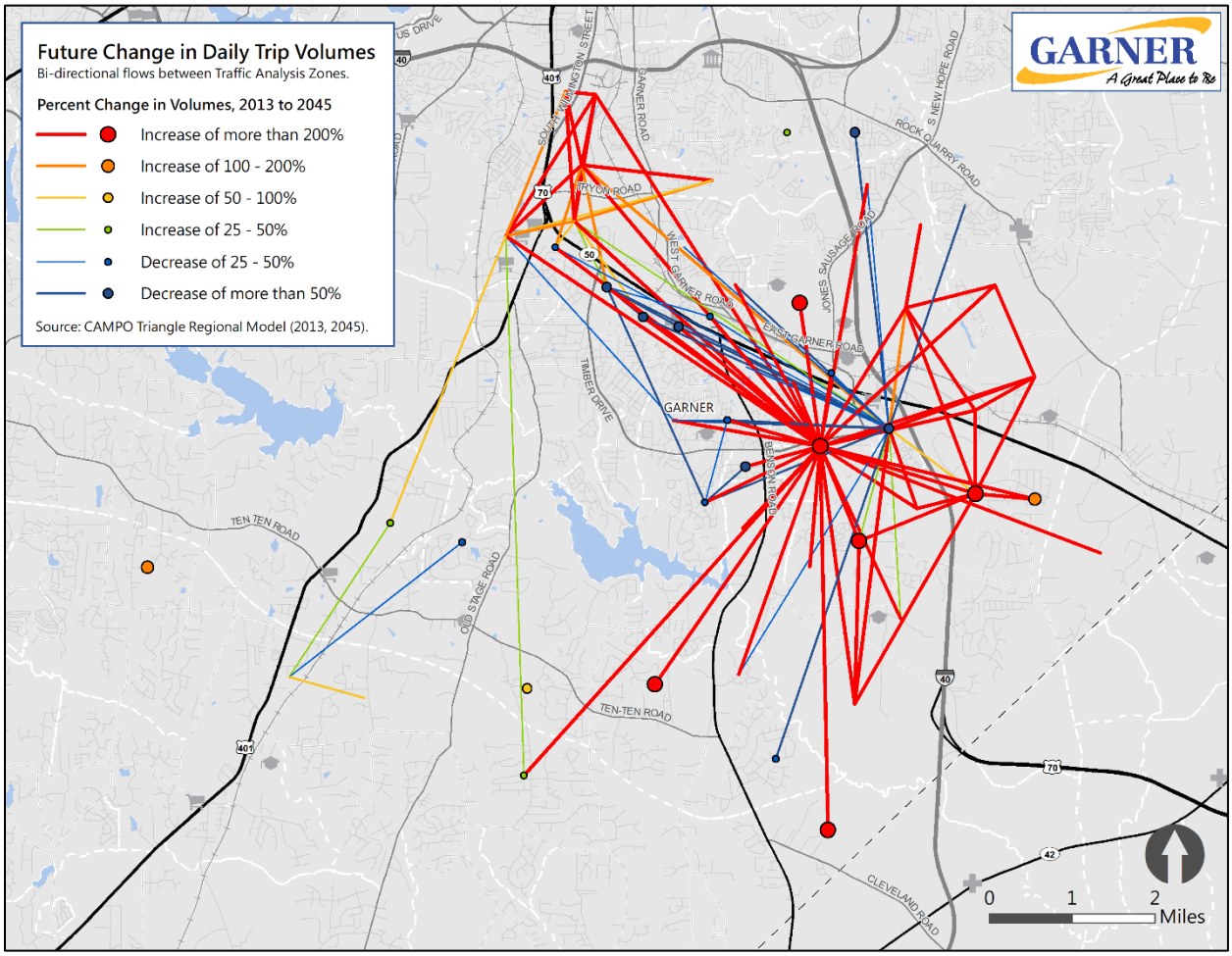
As Garner and the Triangle region continue to grow into the future, new developments and shifting travel behavior will change the demand patterns in the study area. Planned transit services must account for future demand by providing opportunities for adjustment to shifting rider needs.

Future All-Day Trips

The percent change in 2045 daily trip volumes relative to today are shown in **Figure 12**. Red, orange, yellow, and green symbols represent increases in demand, while blue symbols indicate decreased demand. Most notably, planned developments on Timber Drive to the west of White Oak Road will dominate future travel demand in Garner, as volumes to the existing White Oak shopping area are forecast to decline. Other connections with increased demand are around US 70 and Tryon Road in northwestern Garner, as well as in eastern Garner. Overall, many flows are forecast to increase by more than 200 percent, with total demand in Garner more than doubling by 2045.

Despite these trends, the travel flows in 2045 do not indicate demand to or from the Amazon Fulfillment Center set to open on Jones Sausage Road west of I-40 in 2020. This employment destination will create approximately 5,000 jobs in Garner and will likely serve as a significant travel node in the near future.

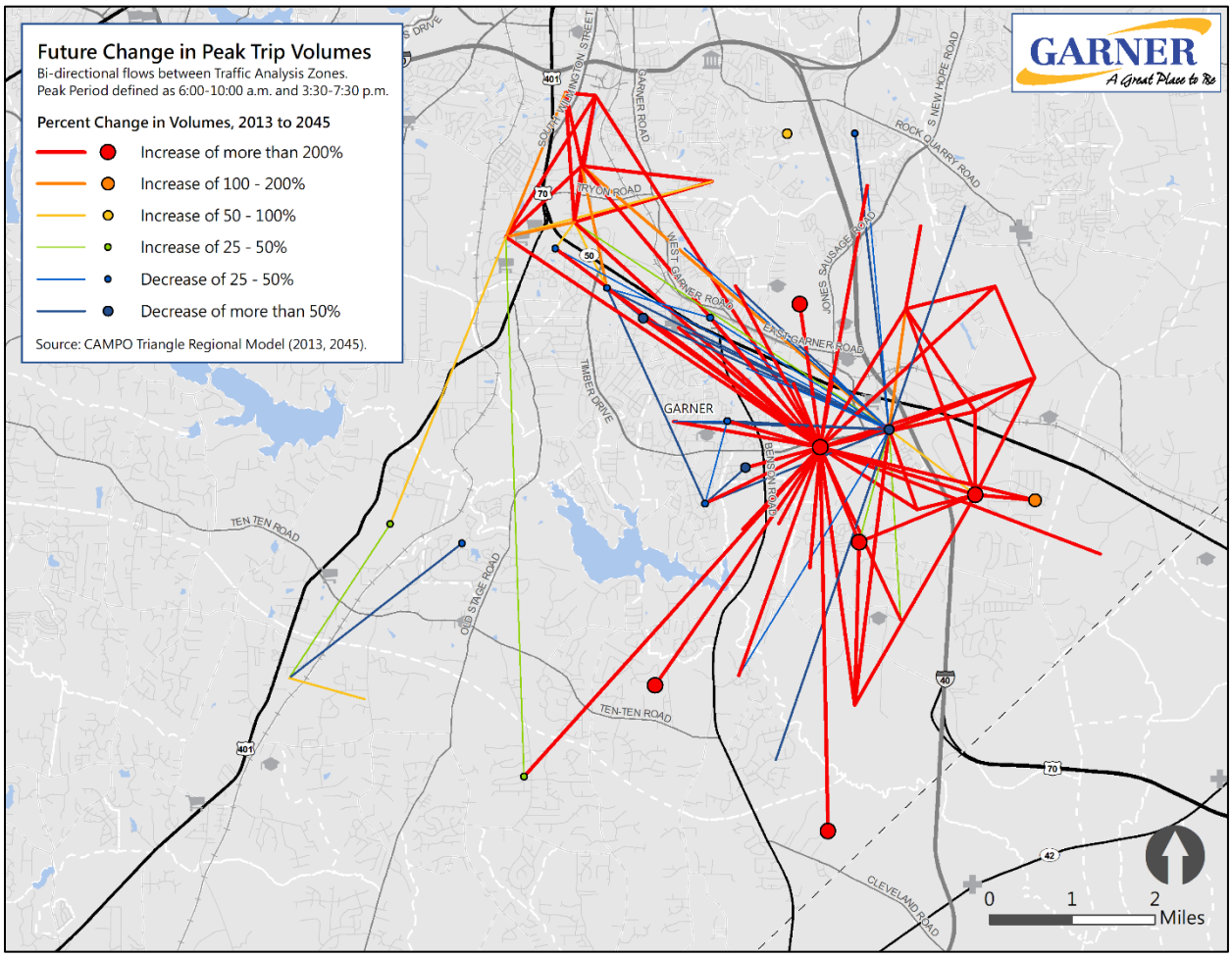
Figure 12: Percent Change in Daily Trip Volumes between TAZs, 2013-2045



Future Peak Period Trips

Future changes in travel demand during the peak period are shown in **Figure 13**. Similar to the all-day flows, significant growth is forecast in trip volumes in 2045. The greatest increases will occur at new developments on Timber Drive west of White Oak Road, around Tryon Road, and in eastern Garner, while demand at the existing White Oak shopping area will decline. As with the all-day demand patterns, the opening of the Amazon Fulfillment Center in 2020 is not reflected.

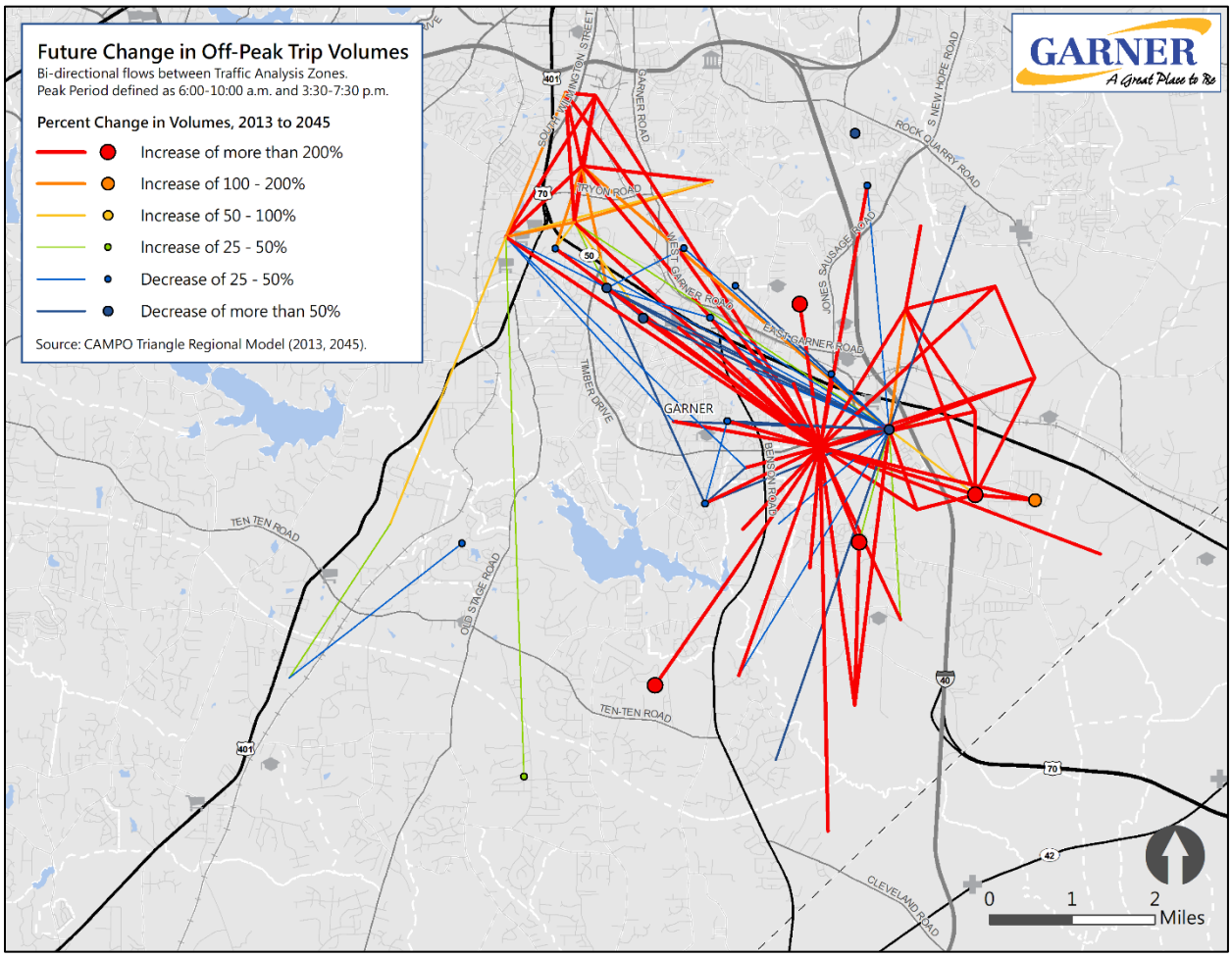
Figure 13: Percent Change in Peak Period Trip Volumes between TAZs, 2013-2045



Future Off-Peak Trips

Figure 14 shows future changes in travel demand during the off-peak period in Garner. Overall, future off-peak trip patterns will reflect changes in the peak and all-day flows, with large increases in volumes throughout the US 70 corridor and eastern Garner. The Amazon Fulfillment Center, which will likely produce off-peak demand due to early and late shift start and end times, is not represented in the off-peak demand patterns shown for 2045.

Figure 14: Percent Change in Off-Peak Trip Volumes between TAZs, 2013-2045



Transit Demand and Ridership Potential

Transit services aim to meet the demand of potential riders by serving those who will use it the most and connecting them to the origins and destinations they need. Therefore, the ridership potential for a transit route is the greatest where transit propensity and travel demand coincide. In order to synthesize these two factors, an analysis was conducted to evaluate transit propensity in tandem with existing travel demand patterns.

The analysis summarizes the transit propensity at the ends of each travel flow line, resulting in a combined representation of transit and travel demand between those locations for a given propensity measure. In order to evaluate all-day and peak-period demand, all-day travel flows were synthesized with the all-day service index and peak period travel flows were synthesized with the peak period service index. Each TAZ was scored between one (low) and five (high), based on the level of the propensity index in the block groups within that area. Then, the propensity scores at each end of a flow line were averaged in order to assign a single propensity score to every travel demand connection.

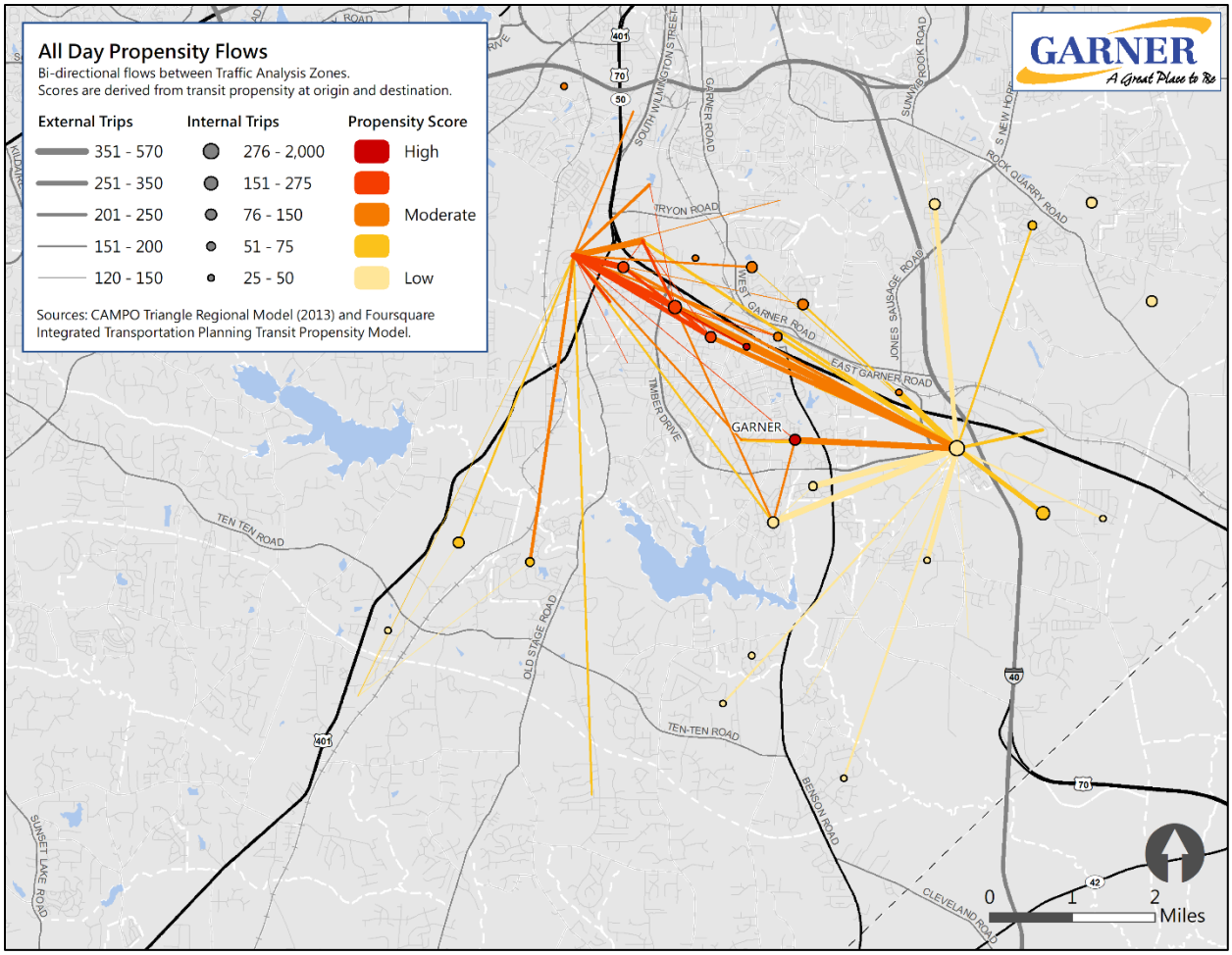
Together, the transit propensity and travel demand in Garner reveal that central Garner and the US 70 corridor have the greatest transit demand and ridership potential in the study area. This area has the greatest concentration of transit-oriented residents and jobs as the origin and destination of high trip volumes during the peak period and throughout the day.

All-Day Transit Demand

A visual representation of the all-day transit demand in Garner is shown in **Figure 15**. External trips occur between two different TAZs, while internal trips occur within a TAZ. The propensity score for each flow is visualized by color, and all-day trip volumes are visualized by line (external trip) or circle (internal trip) width. While the greatest trip volumes occur at the White Oak shopping area, some of the connections to that area exhibit low all-day service propensity. The highest propensity is found at the western end of the US 70 corridor, with flows connecting the Fayetteville Road commercial corridor and the Garner civic center at the center of the town. In addition, a set of lower-volume connections in northwestern Garner exhibit moderately high all-day service propensity.

The flows with the highest combination of volumes and propensity occur along the length of the US 70 corridor. Residents and workers in this area are more likely to use transit services throughout the day, and many daily trips occur between the key origins and destinations along these corridors. This level of transit demand indicates that central Garner and the US 70 corridor has the greatest potential for transit ridership within the study area.

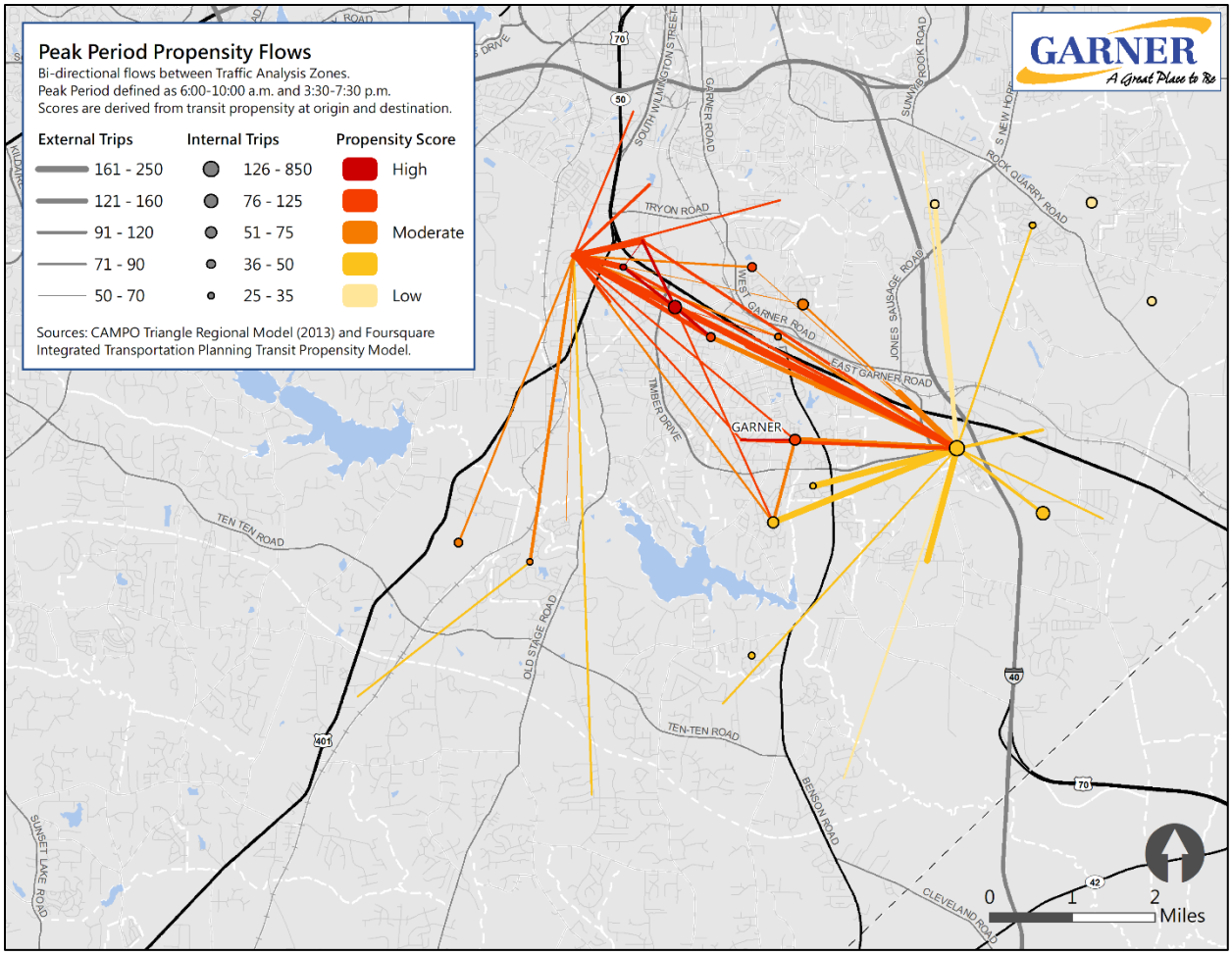
Figure 15: All-Day Transit Propensity and Travel Demand



Peak Period Transit Demand

The peak-period transit demand in Garner is shown in **Figure 16**. While the travel volumes during the peak period reveal similar travel patterns to all-day demand, peak period service propensity scores are higher than all-day service propensity for nearly all connections. The greatest combination of volumes and propensity still occurs in central Garner and along the US 70 corridor during the peak period. Compared to all-day demand, the peak period transit demand is more evenly distributed between the eastern and western ends of the US 70 corridor, and the relative transit demand to locations off the US 70 corridor is slightly greater. This level of transit demand provides further evidence that this area has the greatest potential for transit ridership in Garner.

Figure 16: Peak Period Transit Propensity and Travel Demand


Peak Period Propensity Flows
Bi-directional flows between Traffic Analysis Zones.
Peak Period defined as 6:00-10:00 a.m. and 3:30-7:30 p.m.
Scores are derived from transit propensity at origin and destination.
External Trips
161 - 250
121 - 160
91 - 120
71 - 90
50 - 70
Internal Trips
126 - 850
76 - 125
51 - 75
36 - 50
25 - 35
Propensity Score
High
Moderate
Low
Sources: CAMPO Triangle Regional Model (2013) and Foursquare Integrated Transportation Planning Transit Propensity Model.
GARNER
A Great Place to Be
TRYON ROAD
WEST GARNER ROAD
EAST GARNER ROAD
GARNER
TIMBER DRIVE
JONES SAUSAGE ROAD
ROCK QUARRY ROAD
SUNNYBROOK ROAD
SOUTH WILMINGTON STREET
GARNER ROAD
TEN TEN ROAD
OLD STAGE ROAD
TEN-TEN ROAD
BENSON ROAD
CLEVELAND ROAD
SUNSET LAKE ROAD
0
1
2
Miles

Appendix 2 - Transit Fare Evaluation - 2020

FOURSQUARE ITP

INTEGRATED TRANSPORTATION PLANNING

Transit Fare Evaluation - 2020

CONTENTS

1. Fare Evaluation……30

1.1. Methodology……30

1.2. Ridership Estimation……30

Ridership Estimation Results……31

1.3. Regional Peers……35

Town of Apex……35

Town of Wake Forest……36

Town of Cary……36

1.4. Fare Scenarios……36

Existing GoRaleigh Fare Scenario……37

Locally Subsidized Fare Scenario……38

Fare-Free Scenario……39

FIGURES

Figure 1: Existing Route 20 Alignment and Garner Loop....31
Figure 2: New and Existing Segments on Proposed Route Alignment – Option 1....32
Figure 3: New and Existing Segments on Proposed Route Alignment – Option 2....34

TABLES

Table 1: Existing Route 20 Daily Average Boardings by Stop – Option 1....33
Table 2: Estimated Average Daily Boardings – Option 1....33
Table 3: Estimated Average Daily Boardings – Option 2....35
Table 4: Regional Peer Comparisons....35
Table 5: GoRaleigh Fare Policy....37
Table 6: Actual Revenue Per Passenger....38
Table 7: Ridership and Revenue – Option 1....39
Table 8: Ridership and Revenue – Option 2....39
Table 9: Ridership Impacts and Subsidy per Passenger for Fare-Free Service....40

Fare Evaluation

The Town of Garner is working to establish the transit fare, if any, for its new, local fixed-route bus service. Two route options have been proposed that would connect to existing GoRaleigh Route 20, which provides hourly service between central Garner and Downtown Raleigh, and GoRaleigh Route7, which provides 15-minute to hourly service between west Garner and Downtown Raleigh. Garner Local Route Option 1 proposes to replace part of the existing GoRaleigh Route20, allowing for increased Route 20 frequency in Garner. Garner Local Route Option 2 would use a new alignment, providing additional coverage.

For each route option, various fare levels have differing effects on ridership, marketing, administrative effort, and financial feasibility. This document outlines the approach used to identify fare policy alternatives relative to other transit fares in the region, including adopting GoRaleigh's existing fare structure, subsidizing fares to lower them below Go Raleigh levels, or eliminating fares entirely. Analysis of the impacts of implementing the three alternatives reveals the potential advantages and challenges of each proposed fare policy.

Methodology

In order to identify and evaluate each fare alternative, the baseline ridership was estimated and an initial fare for the service was defined. The baseline ridership for each proposed route option was calculated based on the existing demand for fixed-route bus transit in Garner on GoRaleigh Route 20. This demand was estimated relative to the existing GoRaleigh fare structure, which subsequently served as the initial fare for analysis.

After establishing the baseline ridership and fare, alternative fare policies were chosen following research of the existing fare levels in the region. Peer jurisdictions within the Raleigh-Durham region were identified and analyzed, resulting in three fare alternatives: implement the baseline fare to match the existing GoRaleigh fare policy, subsidize the service using local funds to lower the fare below the existing GoRaleigh level, or fully subsidize the route (charge no fare). Based on existing plans and established literature, the fare elasticity for transit demand in Garner was applied to the baseline ridership and fare, resulting in the ridership and revenue impacts of implementing the subsidized fare alternative. For the fare-free alternative, the experiences of other fare-free systems nationwide were studied to understand the financial and ridership impacts of eliminating the fare, as well as any other benefits and drawbacks to a fare-free service.

This fare evaluation is a forecast for bus service that does not yet exist, and there is no current transit service that shares the characteristics of the proposed route. Therefore, demand for the new service may not reflect the same patterns observed on Route 20. In addition, the experience of other transit agencies in the region or nationwide will likely differ than the results observed in Garner from reducing or eliminating the fare.

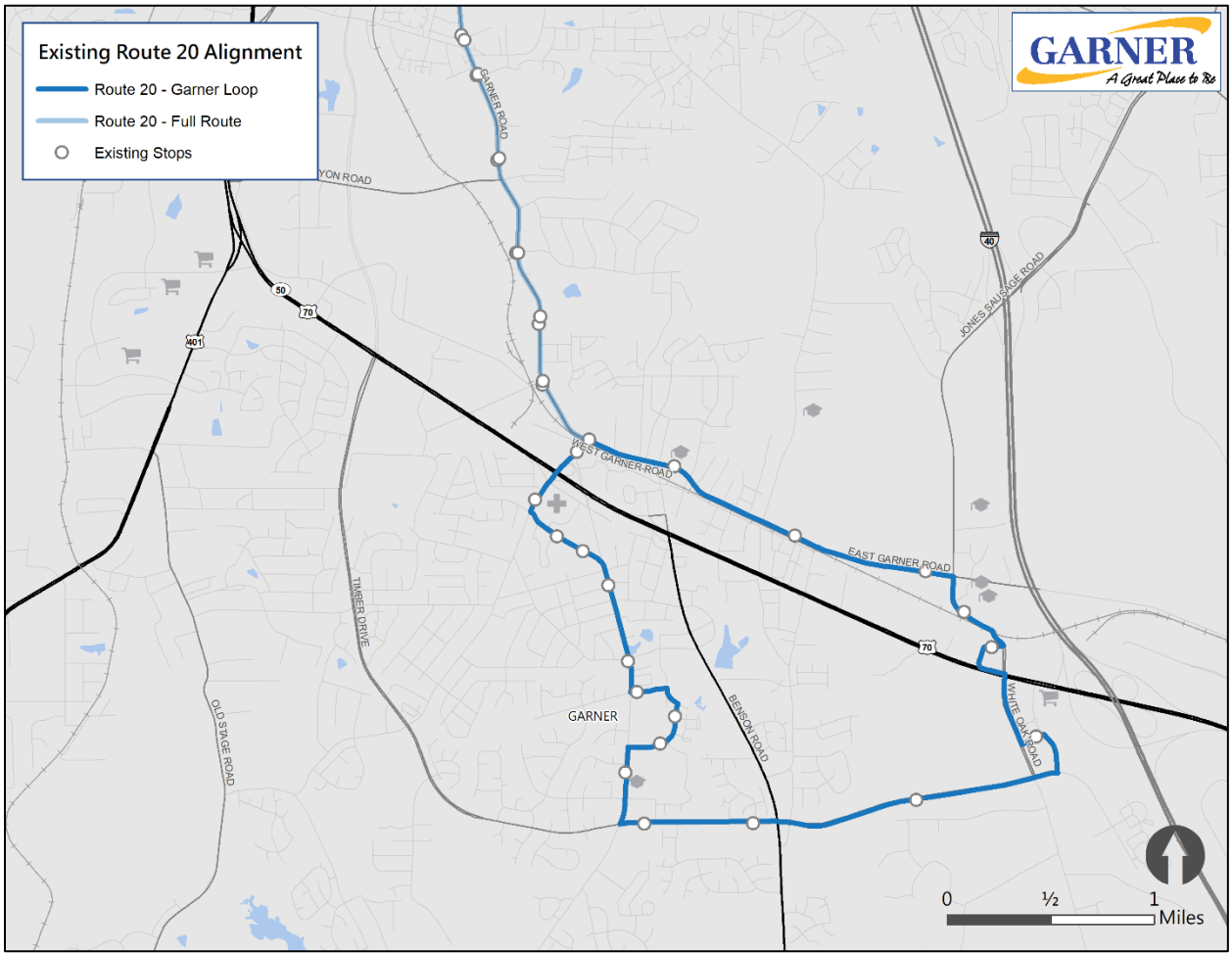
Ridership Estimation

As with any economic good, the fare (customer cost) for a transit service affects demand. In order to evaluate the impact of each fare scenario on ridership, a baseline ridership estimate must be calculated using existing conditions for transit demand. Based on the current ridership of GoRaleigh Route 20 in Garner, the estimated ridership for both proposed route options will be used as a baseline along with the existing GoRaleigh fare.

Ridership Estimation Results

Ridership estimation for the proposed route was based on the performance of the existing GoRaleigh Route 20, which provides hourly service between Garner and Downtown Raleigh. **Figure 1** shows the alignment and stops for Route 20 in Garner. The darker blue part of the alignment represents the segment that was used to evaluate transit demand in Garner, which forms a loop along Vandora Springs Road, 7th Avenue, Aversboro Road, Timber Drive, White Oak Road, Jones Sausage Road, and Garner Road. A deviation off Aversboro Road also serves three stops on Poole Drive, Lawndale Street, and Heather Park Drive. Using average daily stop-level ridership data at the stops on this loop for the one-month period between October 14 and November 19, 2019, the average transit demand in this area was calculated to be 0.8 boardings per revenue mile.

Figure 1: Existing Route 20 Alignment and Garner Loop

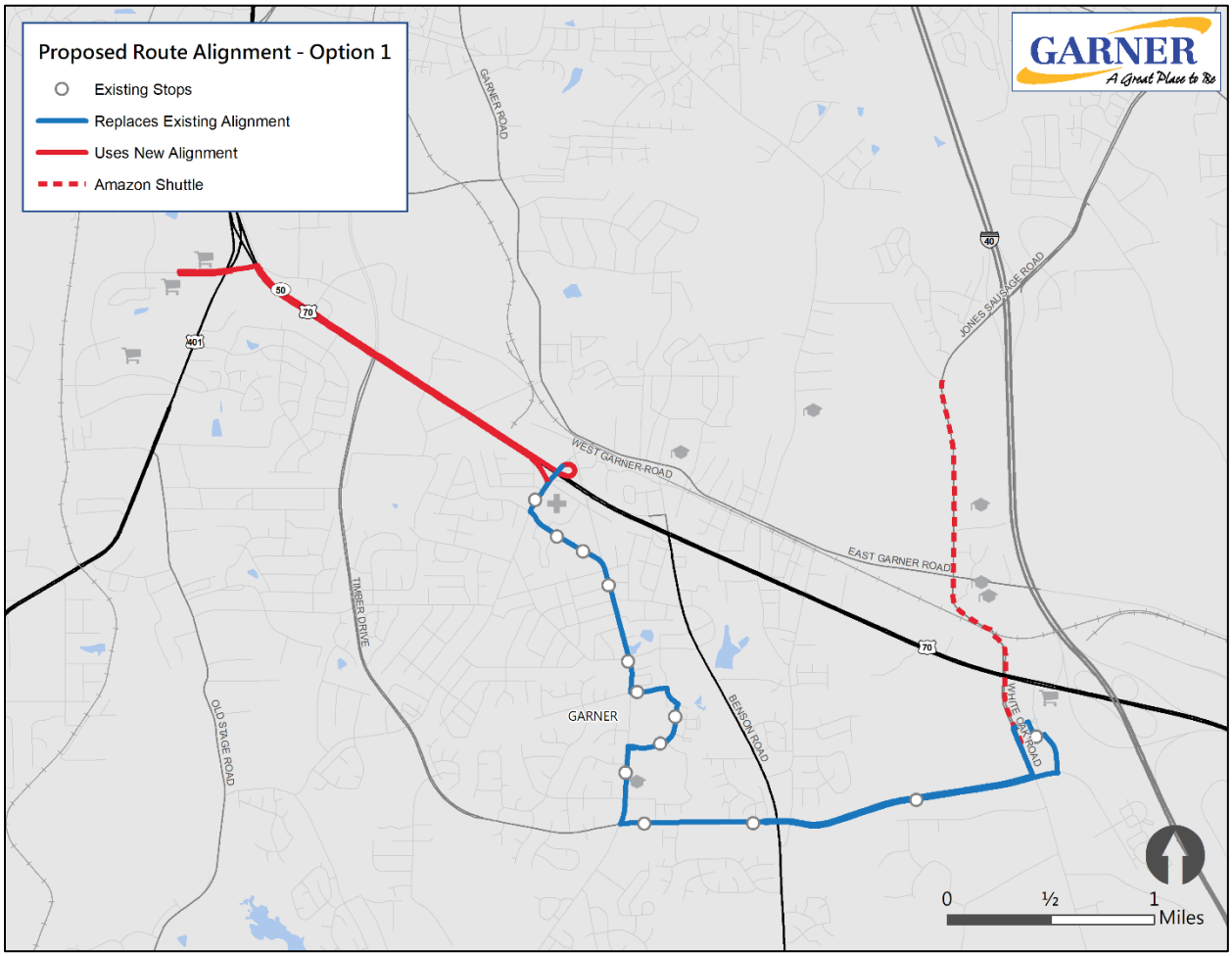


Option 1

The proposed alignment for Option 1 connects the North South Station shopping center with White Oak Crossing along US 70, Vandora Springs Road, 7th Street, Aversboro Road, and Timber Drive. A shuttle north on Jones Sausage Road serves the new Amazon facility six times daily. As shown in **Figure 2**, this alignment follows the same alignment as Route 20 for thirteen of the existing stops, and Route 20 would no longer operate on this section of the existing route. As shown in **Figure 2**, the proposed alignment

was split into three segments, one segment follows the existing Route 20 alignment, another segment follows the new Option 1 alignment, and the final new Option 1 segment connects to the Amazon facility.

Figure 2: New and Existing Segments on Proposed Route Alignment – Option 1



Ridership for the existing Route 20 segment was estimated using boardings data at the existing stops and assuming these riders would change from Route 20 to Option 1. The new route will operate at these stops twice as frequently as existing Route 20, with arrivals every 30 minutes instead of hourly. In general, transit ridership responds positively to decreased headways, due to improved reliability, shorter wait times, and greater flexibility. Therefore, a "headway elasticity" was applied to the existing boardings at these stops. The relationship between headways and ridership has been found to have an elasticity of 0.50.[8]

Table 1 shows the average daily boardings at each stop served by the new alignment and the adjusted ridership using this headway elasticity. Ridership at the stops served by Option 1 increase by 40 percent

[8] Transit Price Elasticities and Cross-Elasticities, Victoria Transport Policy Institute, March 2019.

due to increased frequency. The total estimated ridership on the existing segment of the proposed alignment is therefore 125.5 average daily boardings.

Table 1: Existing Route 20 Daily Average Boardings by Stop – Option 1[9]

Existing Stop	Existing Average Daily Boardings	Adjusted Average Daily Boardings
Vandora Springs Rd. at Beichler Rd.	8.1	11.4
7th Ave at Forest Hills Dr. SB	3.6	5.1
7th Ave. at Garner Town Hall SB	4.9	6.0
Aversboro Rd. at Brooks Ave.	0.0	0.0
Aversboro Rd. at Lakeside Dr.	4.1	5.7
Poole Dr. at Aversboro Rd.	22.2	31.1
Heather Park Dr. at Gulley Glen Dr.	0.0	0.0
Heather Park Dr. at Southerby Bluffs Ct.	2.5	3.4
Aversboro Rd. at Claymore Dr.	1.6	2.2
Timber Dr. at Aversboro Rd.	5.3	7.4
Timber Dr. at Benson Rd.	4.6	6.5
Timber Dr. at White Oak Rd.	0.0	0.0
White Oak Shopping Center Park & Ride	33.3	46.7
Total	**90.2**	**125.5**

Ridership on the Amazon shuttle was estimated using the average ridership per trip for an Amazon shuttle route operated by the Jacksonville Transportation Authority (JTA) in Jacksonville, Florida. The shuttle provides peak-hour service every 10 minutes on a 6.8-mile loop between the terminus of a nearby bus route at a park-and-ride facility and an Amazon Fulfillment warehouse, which opened in 2017 and employs more than 2,000 workers.[10] The average productivity provided by JTA for this service, which only stops at each end of the route, was 0.5 boardings per revenue mile and 1.8 boardings per trip. With six daily trips, the Amazon shuttle in Garner will operate 23.8 daily revenue miles and is forecast to serve 21 passengers each day.

For the parts of the alignment that provide service on new road segments, ridership was estimated using the observed demand of 0.8 average boardings per revenue mile on Route 20. **Table 2** shows the final estimated ridership for the proposed route. Estimates for the new alignment are calculated using the rate of boardings per revenue mile, while estimates for the existing alignment represent adjusted observed ridership data as outlined above. The expected ridership for the new route is 264.1 average daily boardings or 67,336 annual boardings.[11]

Table 2: Estimated Average Daily Boardings – Option 1

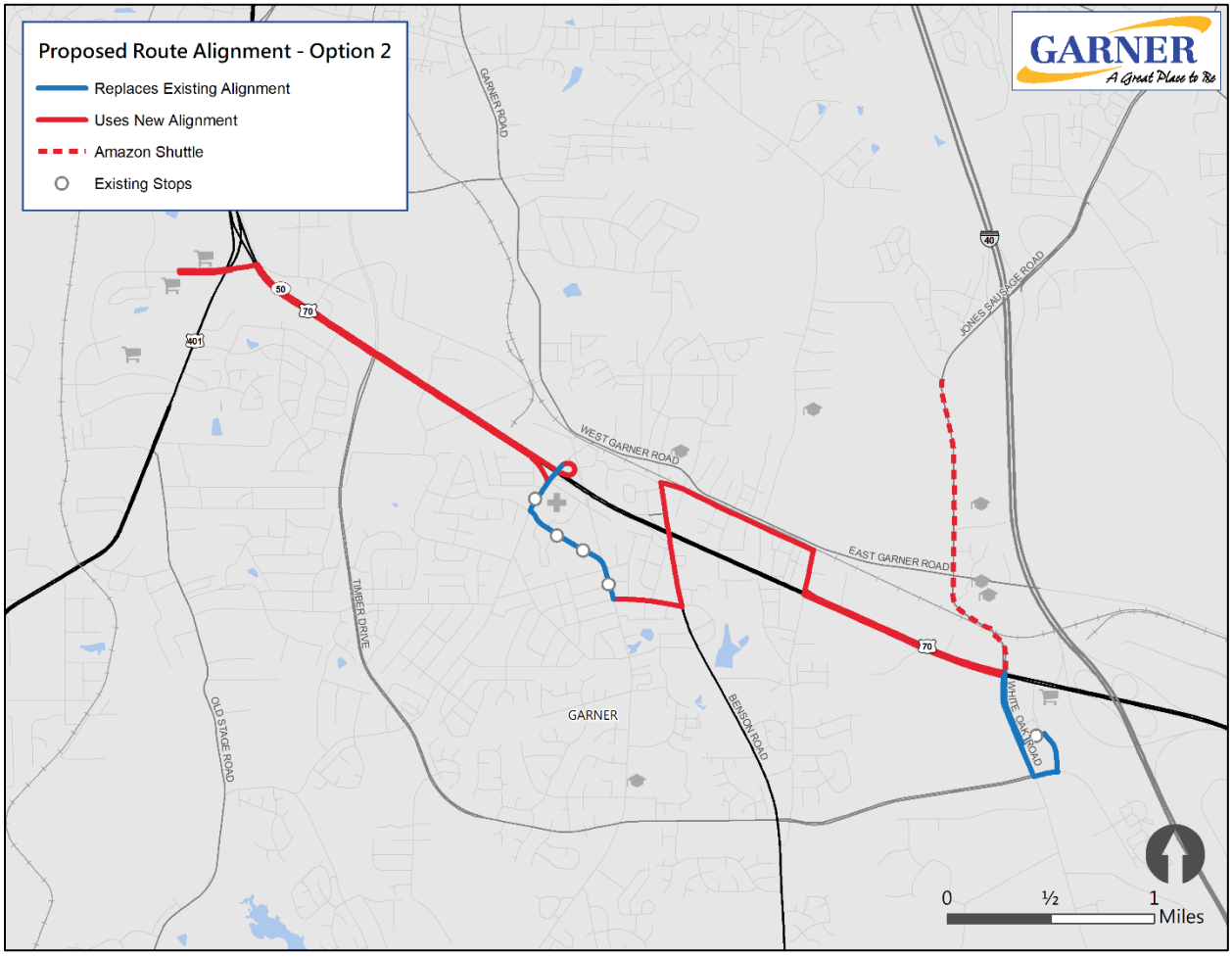
[9] Ridership for the existing Route 20 segment was estimated using boardings data at the existing stops and assuming these riders would change from Route 20 to Option 1.
[10] Jacksonville Transportation Authority (https://www.jtafla.com/media/2149/route82.pdf)
[11] The calculation for annual boardings assumes 255 days of operation, the number of annual weekdays minus holidays.

Proposed Route Segment	Round-Trip Length (mi)	Daily Revenue Trips	Daily Revenue Miles	Average Daily Boardings
New Alignment	4.5	34	152.6	117.7
Existing Stops	9.5	34	323.2	125.4
Amazon Shuttle	4.0	6	23.7	21.0
Total	**18.0**	**34**	**499.5**	**264.1**

Option 2

The proposed alignment for Option 2 connects the North South Station shopping center with White Oak Crossing along US 70, Vandora Springs Road, 7th Street, Forest Drive, Benson Road, Main Street, and White Oak Road. The same proposed shuttle will serve the new Amazon facility six times daily. This alignment follows the same alignment as Route 20 for five of the existing stops. As shown in **Figure 3**, the proposed alignment was split into the segments which follow the existing Route 20 alignment, the segments which use new alignments, and the Amazon facility extension.

Figure 3: New and Existing Segments on Proposed Route Alignment – Option 2



For Option 2, there would be no changes to the alignment of Route 20. Therefore, the assumption may not be made that boardings at the existing stops along the proposed route would be fully captured by

the new route. However, the observed demand on the existing segment for the new route can be assumed to match the existing demand. As a result, the average of 0.8 boardings per revenue mile will be used for the entire length of the proposed Option 2 alignment.

Table 3 shows the final estimated ridership for the proposed route. Estimates for the new alignment are calculated using the rate of boardings per revenue mile. The expected ridership for the new route is 374.5 average daily boardings or 95,488 annual boardings.[12]

Table 3: Estimated Average Daily Boardings – Option 2

Proposed Route Segment	Round-Trip Length (mi)	Daily Revenue Trips	Daily Revenue Miles	Average Daily Boardings
New Alignment	10.5	34	356.9	275.3
Existing Segments	3.0	34	101.3	78.2
Amazon Shuttle	4.0	6	23.8	21.0
Total	**17.5**	**34**	**481.9**	**374.5**

Regional Peers

Peer jurisdictions within the Raleigh-Durham region were identified to inform the alternative fare scenarios for the proposed bus route. Throughout the region, one-way fares for fixed-route bus transit services range from fare-free in Chapel Hill and Wake Forest to $1.00 on GoDurham, the lowest paid base fair in the region, and $2.25 on GoTriangle regional routes. The selected peers each have similar populations, regional roles, and transit needs as Garner (**Table 4**). The fare policies for three peers were studied: the Town of Apex, the Town of Wake Forest, and the Town of Cary.

Table 4: Regional Peer Comparisons

Regional Peers	Population[13]	Transit Services	Base Fare
Garner, NC	30,502	GoRaleigh Routes 7, 20, 40X	$1.25
Apex, NC	53,852	Apex Circulator (planned) GoTriangle Routes 305, 311	TBD $2.25
Wake Forest, NC	44,046	Wake Forest Loop GoTriangle Wake Forest-Raleigh Express (WRX)	Free $3.00
Cary, NC	168,160	GoCary Routes 1, 2, 3, 4, 5, 6, KFX GoTriangle Routes 300, 301, 305, 311 Go Raleigh Route 11L	$1.25 $2.25 $1.25

Town of Apex

The Town of Apex is located in Wake County southwest of Raleigh, with a population of nearly 54,000. Apex has grown rapidly over the past few decades, resulting in an increasing need for transit infrastructure. GoTriangle currently provides two regional bus routes in Apex with peak period service to the Regional Transit Center in southwest Durham and to Downtown Raleigh, where riders may make connections to all parts of the region.

[12] The calculation for annual boardings assumes 255 days of operation, the number of annual weekdays minus holidays.
[13] U.S. Census (census.gov/quickfacts/)

In 2019, the Town of Apex, in partnership with the Town of Cary, conducted a transit study for a circulator route that would serve major destinations within Apex and connect to regional transit services. The town is currently undertaking an implementation study to finalize plans for the schedule, stops, fare, and operator of the service. The new service will likely be operated by GoCary. In its circulator transit study, Apex considered two fare alternatives: adopt the regionwide local bus base fare of $1.25 or offer the service fare-free. The town estimated that while revenues would decrease without a fare, ridership would increase by more than 30 percent.[14]

Town of Wake Forest

The Town of Wake Forest is located in northern Wake County, with a population of approximately 44,000. Although Wake Forest borders Raleigh, the town lies near the edge of the Triangle region, about 15 miles northeast of downtown Raleigh. Similar to Apex and Garner, Wake Forest has grown significantly over the past few decades.

Since 2008, GoRaleigh has operated a fare-free bus route in an hourly clockwise loop, serving the main points of interest in Wake Forest. In January 2020, the service was expanded to include a second bus operating in the reverse direction as well as Saturday service. The Wake Forest Loop now operates hourly in each direction from 6:00 a.m. to 8:25 p.m. on weekdays and from 8:00 a.m. to 8:25 p.m. on Saturdays. GoTriangle also offers an express commuter bus route from Wake Forest to Downtown Raleigh during weekday peak periods. While the Wake Forest Loop is free, the base fare for the Wake Forest-Raleigh Express is $3.00, with discount fares and multi-day passes available.

Town of Cary

The Town of Cary is larger than Garner, with 168,000 residents and a prominent regional role. Cary lies primarily within Wake County, bordering Raleigh to the west, and like the rest of the region, has seen sustained growth over many decades.

In 2001, Cary began providing door-to-door on-demand transit services, and in 2005, the town established a network of five fixed bus routes. Today, GoCary offers six local bus routes and one peak-period express route. Cary is also served by four GoTriangle regional routes and one GoRaleigh route. The base fare for GoCary routes is $1.25, and GoTriangle fares start at $2.25 for a regular one-way trip. Both services also offer discounted fares for youth, disabled, and senior riders, as well as multi-day passes. In 2016, GoCary's subsidy per passenger was $6.57.[15]

Fare Scenarios

Three fare scenarios were selected for consideration for the proposed Garner route: adopt the existing GoRaleigh fare structure, further subsidize GoRaleigh fares with local funds, or offer the service fare-free. Each scenario is described below.

Existing GoRaleigh Fare

The current fare policy for GoRaleigh is shown in **Table 5**. The base fare is $1.25, with a discount fare of $0.60 for riders with disabilities. Free rides are offered to seniors 65 or older and youth ages 18 or younger who present the appropriate ID card. Day passes, week passes, and month passes are available at the rates of $2.50, $12.00, and $40.00, respectively, with discounts offered at half the price to riders

[14] Town of Apex Transit Circulator Study Draft Recommendations, October 2019.
[15] Wake-Durham Fare Integration Study: GoCary, GoDurham, GoRaleigh, and GoTriangle, November 2018.

with disabilities. Transfers within the GoRaleigh system are free with a transfer receipt. With this policy, the average fare per trip collected by GoRaleigh was $0.60 in 2016.

Table 5: GoRaleigh Fare Policy

Fare Type	Fare
Single Ride	$1.25
Single Ride – Discount	$0.60
Single Ride – Seniors, Age 65 or Older	Free
Single Ride – Youth, Age 13-18	Free
Single Ride – Youth, Age 12 or Younger	Free
Day Pass	$2.50
Day Pass – Discount	$1.25
7-Day Pass	$12.00
7-Day Pass – Discount	$6.00
31-Day Pass	$40.00
31-Day Pass – Discount	$20.00

Currently, a special regional fare structure is in place for trips that utilize more than one of the transit services in the Triangle region. In 2018, the four regional transit partners – GoTriangle, GoRaleigh, GoDurham, and GoCary – conducted a fare integration study in an effort to adopt a unified fare policy. The proposed regionwide fares are consistent with existing GoRaleigh fares. While the fare recommendations have not yet been adopted, GoRaleigh will likely not require many changes to its fare policies, which are consistent with the recommendations.[16]

The existing GoRaleigh fare structure was used as the baseline fare for evaluating the other fare scenarios, since baseline ridership was estimated using demand for GoRaleigh Route 20, which operates using GoRaleigh fares. The remaining scenarios were selected with lower fares than the GoRaleigh fares, since a higher fare would pose marketing challenges and conflict with the proposed regionwide fare policy.

Locally Subsidized Fare

The Town of Garner has the opportunity to further subsidize passenger fares below existing GoRaleigh fares. By applying fare elasticities to the baseline fare and estimated ridership, the impact of lower fares on ridership, revenue, and the resulting subsidy per passenger were evaluated for base fares of $0.50, $0.75, and $1.00. Fare levels at multiples of $0.25 were selected for the ease of paying and giving change with cash and quarters.

Fare-Free

The Town of Garner may choose to fully subsidize passenger fares, eliminating any cost to the passenger. The impacts of eliminating fares include increased ridership and added convenience, and may result in improved financial and operational productivity.

Existing GoRaleigh Fare Scenario

A fare policy that aligns with existing GoRaleigh fares mirrors the first fare alternative for the Apex circulator by adopting the recommended regionwide $1.25 base fare. With the implementation of either

[16] Wake-Durham Fare Integration Study: GoCary, GoDurham, GoRaleigh, and GoTriangle, November 2018.

proposed Garner route option, GoRaleigh will continue to operate Route 20. GoRaleigh may also operate the new route, easing administrative costs, facilitating customer convenience, and creating consistent branding on the new route in a similar arrangement to the Wake Forest Loop. In either case, a consistent fare policy across all GoRaleigh services in Garner would allow riders to maintain familiarity with a fare structure they already know, and fare passes would be valid on all routes in Garner. Any upcoming changes to the regionwide fare policy, which closely matches the existing GoRaleigh fares, would require little to no change for the new route.

At the existing GoRaleigh fare levels, estimating demand for the proposed route options requires no adjustment from the ridership estimates based on observed demand on Route 20. Therefore, the estimated ridership at a base fare of $1.25 would be 67,336 annual boardings for Option 1 and 95,488 for Option 2. Ridership forecasts are the most reliable at this fare level, since any uncertainties introduced by applying a fare elasticity are avoided.

In 2016, GoRaleigh's average collected revenue was $0.60 per trip due to discount fares and fare evasion.[17] By adopting the GoRaleigh fare policy, riders ages 18 and younger or 65 and older would have free access to the new route. On-board passenger surveys conducted on GoRaleigh buses in 2018 indicated that by these definitions, youth and seniors made up three and six percent of all GoRaleigh ridership, respectively. Using the average revenue of $0.60 per passenger, which includes free riders, the annual revenue would be $40,402 for Option 1 and $57,293 for Option 2. As outlined in the financial plan, the estimated annual cost for both options is $1,170,450. By subtracting the revenue from the cost, the average subsidy per passenger trip is estimated to be $16.78 for Option 1 and $11.66 for Option 2.

Locally Subsidized Fare Scenario

The Town of Garner has the opportunity to contribute funds to subsidize the GoRaleigh fares and reduce the cost to the passenger. Three fare levels below the GoRaleigh base fare were analyzed to evaluate various options for a locally subsidized fare.

For the existing GoRaleigh fare, the average actual fare per passenger of $0.60 is 52 percent lower than the base fare. In the locally subsidized fare scenario, it is recommended that Garner adopt the same discount-eligible classes as GoRaleigh for consistency with the existing bus route in Garner. Since Garner is currently within the GoRaleigh service area, it can be assumed that the actual fare per passenger will be a similar fraction of the base fare. **Table 6** outlines the estimated revenue per passenger that would be collected at each of the three fare levels: $1.00 (Fare A), $0.75 (Fare B), and $0.50 (Fare C).

Table 6: Actual Revenue Per Passenger

Fare Type	GoRaleigh	Fare A	Fare B	Fare C
Base Fare	$1.25	$1.00	$0.75	$0.50
Discount Fare	$0.60	$0.50	$0.30	$0.25
Actual Fare Revenue per Passenger	**$0.60**	**$0.52**	**$0.39**	**$0.26**

[17] Wake-Durham Fare Integration Study: GoCary, GoDurham, GoRaleigh, and GoTriangle, November 2018.

Option 1

Table 7 shows the impact of reducing the fare to each fare level on annual ridership and annual revenue for Option 1. Since fare-free riders would not experience a change in fare, the estimated ridership only increases due to the effect of fare elasticity on paying passengers. The lowest subsidized fare of $0.50 (Fare C) has the highest ridership of 87,523 annual boardings but the lowest annual revenue of $22,756. However, the average subsidy per passenger also decreases due to ridership growth, with Fare C resulting in a subsidy of $13.11 per passenger.

Table 7: Ridership and Revenue – Option 1

Fare Type	GoRaleigh	Fare A	Fare B	Fare C
Base Fare	$1.25	$1.00	$0.75	$0.50
Actual Revenue per Passenger	$0.60	$0.52	$0.39	$0.26
Annual Paying Passengers	61,276	65,940	72,295	81,463
Annual Non-Paying Passengers	6,060	6,060	6,060	6,060
Annual Ridership	**67,336**	**72,001**	**78,356**	**87,523**
Annual Revenue	**$40,402**	**$37,440**	**$30,559**	**$22,756**
Subsidy per Passenger	**$16.78**	**$15.74**	**$14.55**	**$13.11**

Option 2

Table 8 shows the impact of reducing the fare to each fare level for Option 2. The lowest subsidized fare has the highest estimated ridership of 124,116 annual boardings but the lowest annual revenue of $32,270. As with Option 1, the subsidy per passenger decreases with lower fares, falling to $9.17 for a base fare of $0.50 (Fare C).

Table 8: Ridership and Revenue – Option 2

Fare Type	GoRaleigh	Fare A	Fare B	Fare C
Base Fare	$1.25	$1.00	$0.75	$0.50
Actual Fare per Passenger	$0.60	$0.52	$0.39	$0.26
Annual Paying Passengers	86,894	93,509	102,521	115,522
Annual Non-Paying Passengers	8,594	8,594	8,594	8,594
Annual Ridership	**95,488**	**102,103**	**111,115**	**124,116**
Annual Revenue	**$57,293**	**$53,094**	**$43,335**	**$32,270**
Subsidy per Passenger	**$11.66**	**$10.94**	**$10.14**	**$9.17**

Fare-Free Scenario

The Town of Garner may choose to fully subsidize the new route and eliminate fares. This section discusses the advantages and challenges of providing a fare-free service, as well as potential financial impacts.

According to research on fare-free transit systems, most small urban and rural agencies that choose to eliminate fares do so for economic reasons.[18] Collecting cash fares present additional administrative

[18] TCRP Synthesis 101: Implementation and Outcomes of Fare-Free Transit Systems, 2012.

costs for managing secure fareboxes and counting fares that may be greater than the revenue received from passenger fares. Fare-free service is also easier to market, more convenient for riders and bus operators, and equitable. For most agencies, increased ridership is an added benefit but does not justify eliminating fares on its own.

Even if an agency or jurisdiction can fund fare-free service, some challenges may arise due to ridership growth. Overcrowded buses create safety risks and may require increases in levels of service, additional vehicle maintenance, or fleet expansion. In addition, extra dwell time would be needed to account for the bus stopping more often to load and unload more passengers; this could also counteract any time savings estimated from eliminating fare payment upon boarding.

In nearly every case, eliminating fares induces greater transit demand. For agencies that eliminated fares, ridership typically increased between 20 to 60 percent within a few months, with some systems surpassing 80 percent. However, observations indicate that these new trips are often made by the same passengers traveling more frequently, rather than attracting riders who previously did not use transit.[19] For the proposed route in Garner, ridership increases on a fare-free service were assumed to reach a mid-range increase of 40 percent. Ridership of already non-paying passengers was assumed to remain the same, since their demand does not depend on the cost of the service. As shown in **Table 9**, the average subsidy per passenger would decrease due to ridership growth, despite the loss of revenue. The annual operating cost for both proposed route options was estimated at $1,170,450. Ridership would be the highest of any fare alternative and subsidy per passenger would be the lowest, falling to $12.74 for Option 1 and $9.16 for Option 2.

Table 9: Ridership Impacts and Subsidy per Passenger for Fare-Free Service

	Option 1		Option 2	
	$1.25 Fare	Fare-Free	$1.25 Fare	Fare-Free
Annual Operating Cost	$1,170,450	$1,170,450	$1,170,450	$1,170,450
Annual Revenue	$40,402	--	$57,293	--
Annual Ridership	67,336	91,846	95,488	127,712
Subsidy per Passenger	**$16.78**	**$12.74**	**$11.66**	**$9.16**

Instead of immediately committing to fare-free service, the Town of Garner may also consider an initial fare-free introductory period to benefit marketing efforts and encourage riders to familiarize themselves with the service. This period could also serve as a pilot in which the Town and the operator could evaluate the feasibility of a permanently free-free service.

[19] TCRP Synthesis 101: Implementation and Outcomes of Fare-Free Transit Systems, 2012.