DRAFT FINAL REPORT

Greensboro Microtransit Study

PREPARED FOR

Integrated Mobility Division
N.C. DEPARTMENT OF TRANSPORTATION

GTA
ride. connected.

PREPARED BY

vhb

Vanasse Hangen Brustlin
Venture 1
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0328

02/28/2025

Study Purpose

The goal of the Greensboro Microtransit Study was to assess and analyze areas of Greensboro that would be ripe for microtransit service. The study began by assessing the current landscape of transit in Greensboro – largely supported by the recently finished GoBORO Long Range Transit Plan. Public and Stakeholder Engagement was also conducted, detailed more in Appendix A. The project team then summarized the potential needs and gaps for transit – which microtransit could support. Finally, recommendations were made for microtransit implementation. These recommendations are detailed in this report.

Goals of Proposed Microtransit Service

The process used to develop microtransit service areas reflects the priorities identified by the Greensboro Transit System (GTA), the City of Greensboro, community stakeholders, and members of the public. These priorities are summarized below.

Bridge gaps in public transportation access.

For much of the city, low-density land uses and limited supporting infrastructure – sidewalks, bike facilities, trail connections etc. – have made it difficult to ensure transit access everywhere. Expanding the existing traditional transit network to meet these needs would require large upfront capital investment and dedicated future funding for operations and labor. Acknowledging this, Greensboro's Mobility 2040 plan proposes a microtransit service as a cheaper, more efficient solution that can act as both an extension of the bus system and a first- and last-mile connection to it.

Serve communities with limited mobility options.

Income, car ownership, disability status, age, race, ethnicity, and first language are demographic factors that are often correlated with transportation disadvantage. In comparison to Greensboro's overall poverty rate of 20 percent, neighborhoods such as Glendale Hills, Phillips Avenue, Arlington Park, and Glenwood experience severe poverty rates, with nearly 60 percent of residents living in poverty.[1] Microtransit can help ease the financial burden of travel by offering a cheaper mobility alternative to car ownership.

The region's autocentric growth has resulted in mobility limitations for those who do not drive. Microtransit can improve opportunity access for those with disabilities or those without a car. Similarly, high numbers of individuals aged 60 and older indicate a portion of the population that may choose not to drive now or in the future.

Over 43 percent of Greensboro residents identified as Black or African American, approximately 5 percent identified as Asian, and 9 percent identified as Hispanic or Latino. Due to historic underinvestment, there is a notable connection between areas with high minority population density and limited access to transportation and opportunities. To address these challenges, it is important to focus on improving transportation planning in these communities. Additionally, with almost 30 percent of residents having limited English proficiency, navigating the

[1] "American Community Survey 5-Year Data (2009-2023)," United States Census Bureau, December 12, 2024.

transportation network can be particularly difficult for them.[2] For minority populations microtransit can provide a reliable, simplified mobility alternative.

Increase connectivity to key origins and destinations.

Efficient public transportation should connect homes with employment opportunities, schools, healthcare, grocery stores, and other essential services. Additionally, transit services should reflect local and regional travel demand trends to reduce the access deficits between where a potential rider is and where that rider wants to go. These principles are true for both microtransit and fixed-route services.

[2] Ibid.

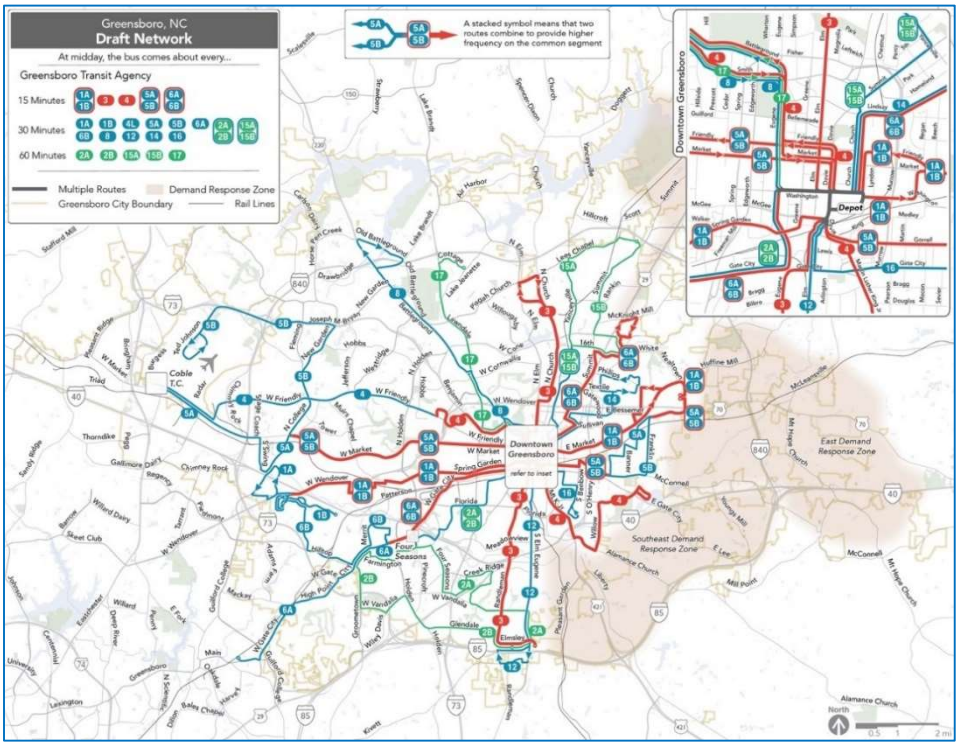
Gap Analysis

The project team prepared a Gap Analysis to identify areas of Greensboro lacking access to fixed route services. The goal of the analysis is to understand where micostransit would have the greatest impact in Greensboro. To align this analysis with the goals of GTA, the following categories were considered in the Gap Analysis: public transportation access, socioeconomic indicators, and travel demand. The study area for the analysis is the City of Greensboro's municipal boundary. The following sections will detail the metrics used in each category for the full Gap Analysis.

Public Transportation Access

Public transportation access is important because it increases access to jobs, food sources, and other staples of health that all should have access to. For the gap analysis, the team examined the future bus network shown in GTA's GoBORO Transit Plan (February 2025) and determined which parts of the study area are not served by transit. Connected pedestrian access was measured by being located at least a quarter mile from a bus stop. Anywhere further than a quarter mile was noted as having limited transit access. Areas highlighted in blue in Figure 2 are outside of the quarter-mile radius of a bus stop, indicating where walking to a stop is limited. Figure 1 depicts the future bus network per the GTA's GoBORO Transit plan, while Figure 2 depicts parts of the study area that will remain without access.[3] Areas in white are within a quarter-mile from a bus stop, identifying where walking to a transit stop is most likely easier, and therefore areas outside of the white lack access to transit.

Figure 1: Proposed Future Network, Greensboro Transit Agency



[3] "GoBORO – Greensboro's Long Range Transit Plan," City of Greensboro, accessed February 21, 2025, https://www.greensboro-nc.gov/departments/transit/goboro-greensboro-s-long-range-transit-plan.

The planned fixed-route network corresponds to more densely populated areas of Greensboro where transit demand is more concentrated. The "gaps" based on the public transportation access criterion show where microtransit can bridge transit access for those in low-density or limited-infrastructure neighborhoods. Table 1 details the GTA goal this assessment addresses and the methodology used to analyze this information.

Figure 2: Public Transportation Access

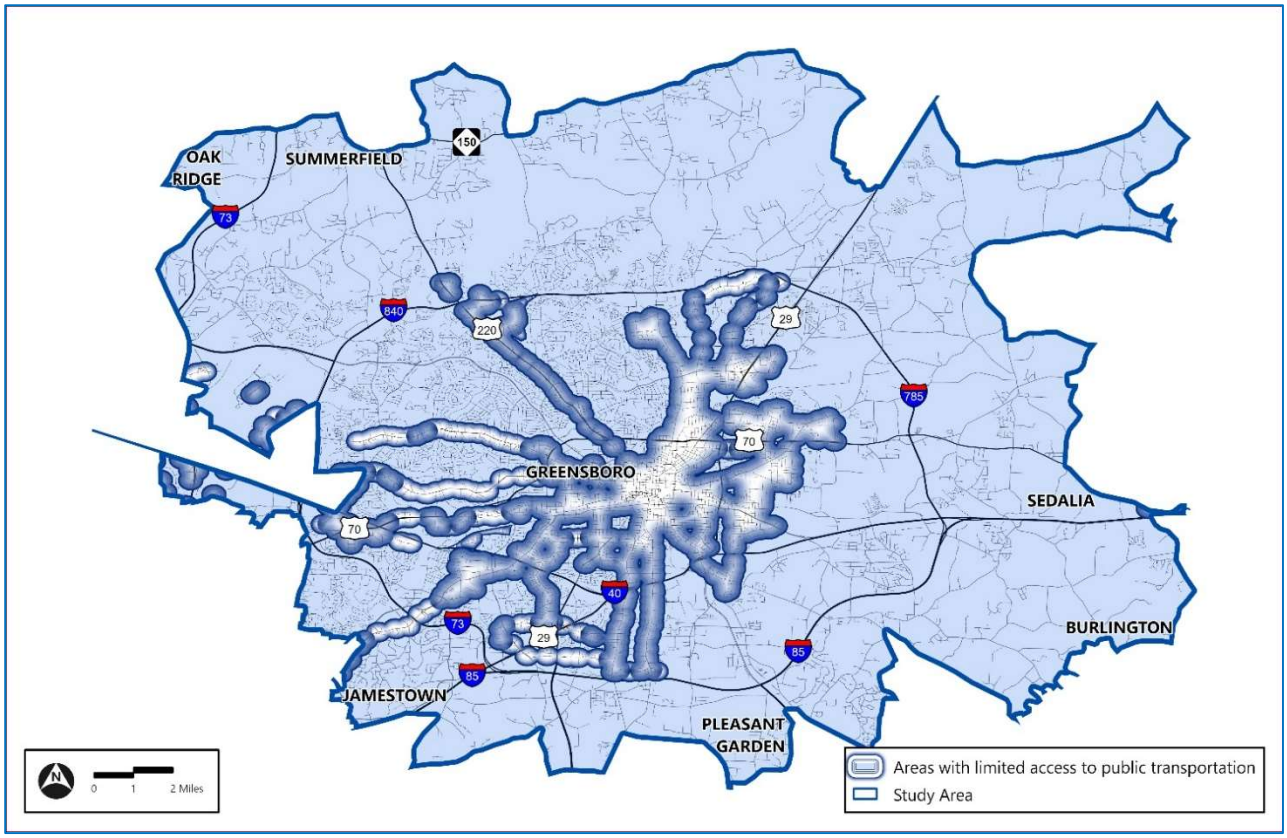


Table 1: Limited Public Transportation Access Selection Process

Goals	Measurement	Method
Bridge gaps in public transportation access	Euclidian Distance from bus stop	Isolated land farther than .25 miles from an existing or proposed bus stop, excluding those that only serve routes 12A and 17

Community Characteristics

To meet GTA's goal of alleviating transportation distress, microtransit services should strive to target those at a greater risk for mobility limitations. As such, priority zones were informed by the spatial distribution of the following socioeconomic indicators:

- Persons with one or more disability.
- Persons aged 60 plus.
- Black, indigenous, and persons of color.
- Available workers in the labor force.
- Persons with limited English proficiency.
- Households within 150 percent of the federal poverty line.
- Households without a vehicle available for personal use.[4]

Population density and available workers in the labor force were also considered – noting that where most people live and where many are eligible to be working would also benefit from enhanced transit service.

The project team calculated the proportion of population meeting the criteria for each indicator. Block groups were then scored for each indicator, with those in the highest two distribution levels assigned 1 and all others assigned 0. Block groups with an aggregate score of 2 or greater were identified as transportation distressed. Figures for each of the indicators can be found in Appendix B.

Figure 3 displays the results of this analysis. The range of socioeconomic indicators means a large area of Greensboro remains a candidate for service priority, while definitively distinguishing the parts of the city that are significantly more susceptible to transportation distress than the rest of the study area. Table 2 details the GTA goal this assessment addresses and the methodology used to analyze this information.

[4] "American Community Survey 5-Year Data (2009-2023)," U.S. Census Bureau.

Figure 3: Transportation Distress

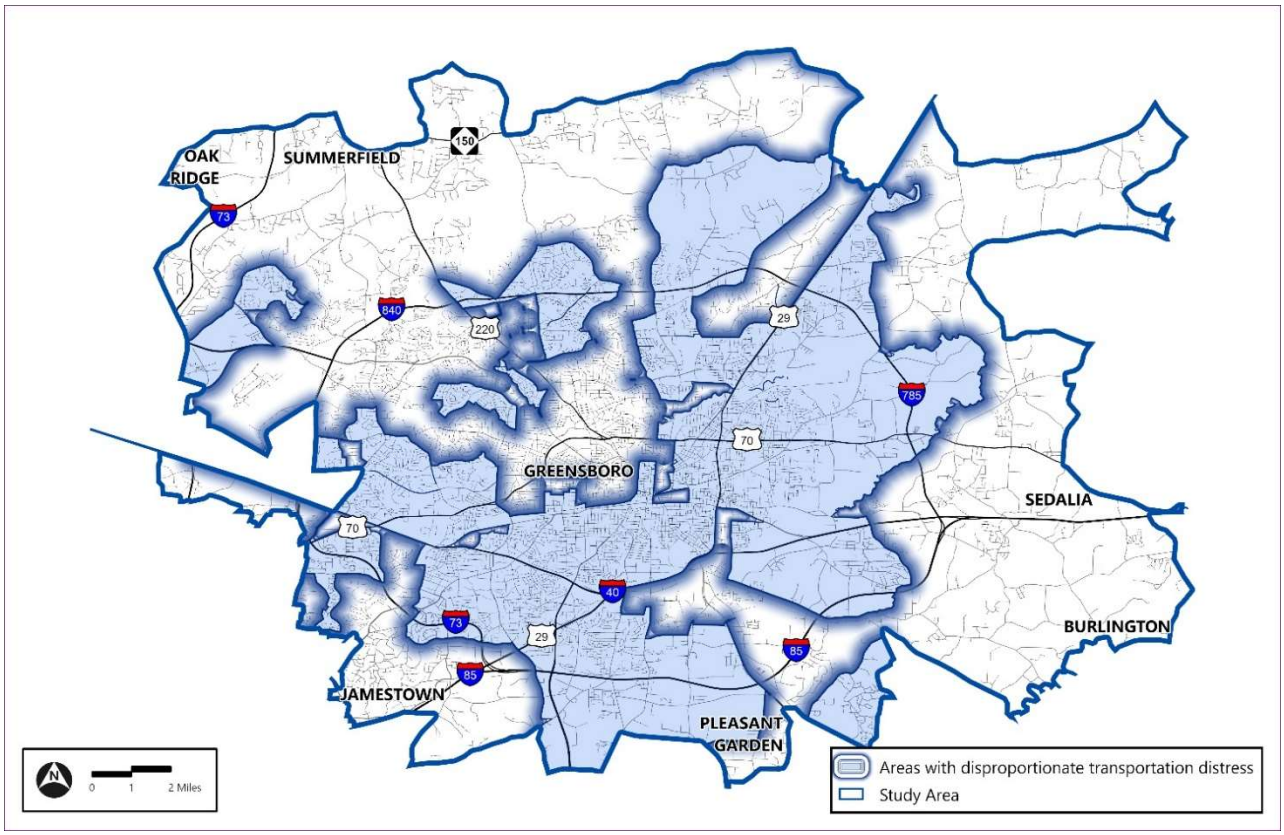


Table 2: Transportation Distress Selection Process

Need	Measurement	Method
Serve populations with disproportionate transportation distress	Overrepresentation of demographic groups associated with transportation disadvantage	Isolated block groups with two or more indicators in the top two of five Jenks

Travel Demand

To understand where people are interested in traveling, which can indicate where microtransit should serve, the project team analyzed where there is demand for travel. Street Light Data traffic counts revealed the neighborhoods in Figure 4 to be the transportation network's most central nodes, defined in this analysis as the block groups with total trips attracted and produced amounting to at least 0.5 standard deviation above the mean.[5] These areas identify where travel demand is highest and inform where microtransit service may be most beneficial for potential riders.

High demand areas are distributed throughout Greensboro, primarily coinciding with major employers; however, the residential area that extends north from I-840 toward Summerfield is a notable exception. Table 3 details the GTA goal this assessment addresses and the methodology used to analyze this information.

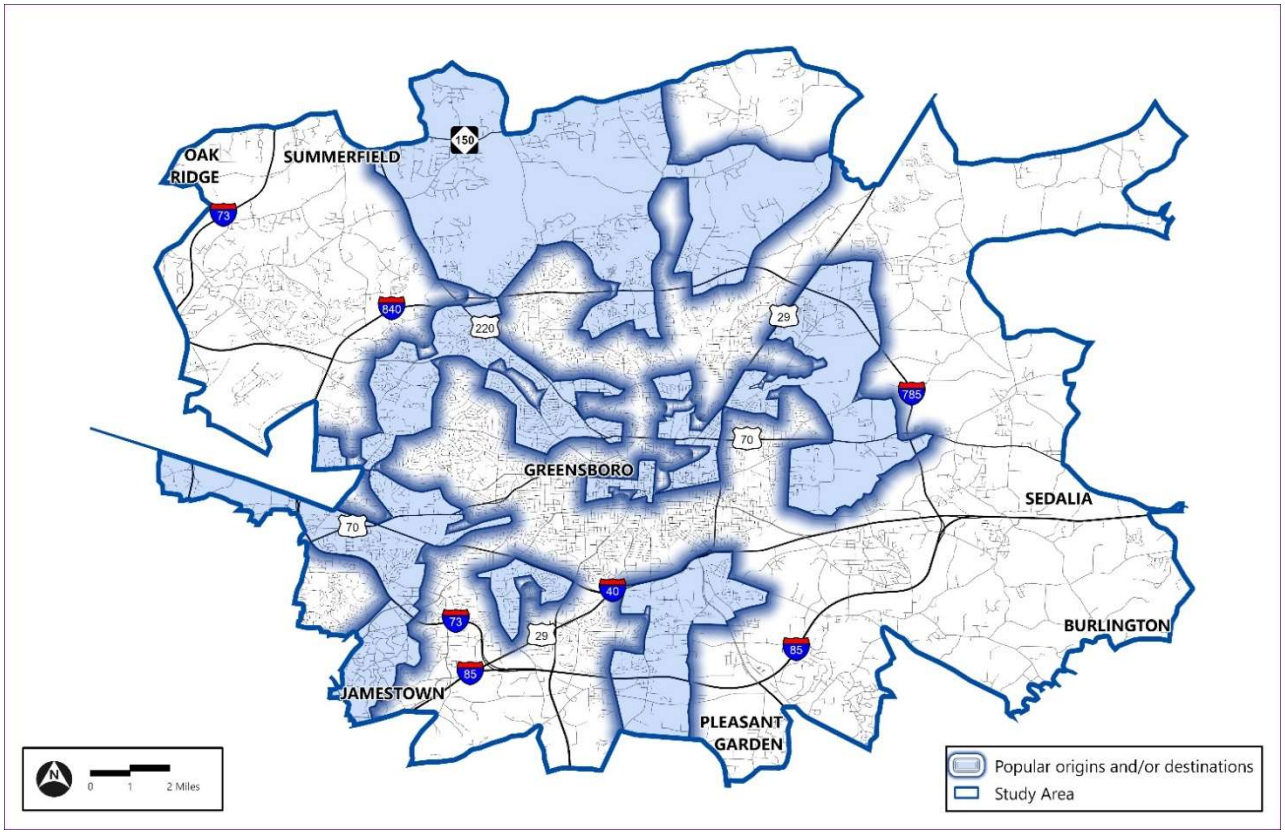


Figure 4: Popular Origins and/or Destination

Table 3: Popular Origin/Destination Selection Process

Need	Measurement	Method
Optimize response zones to reflect travel demand	Total average daily trips attracted and produced	Isolated block groups with total trips greater than 0.5 standard deviations from the mean

[5] "StreetLight InSight," StreetLight Data, accessed July 19, 2024.

Priority Zones

The combined results of the analyses described in this section produce a data-driven depiction of the areas that stand the most to gain from microtransit service. Figure 5 highlights land that met each of the access, socioeconomic, and travel demand criteria. Please note that results smaller than an acre were removed.

Figure 5: Priority Zones

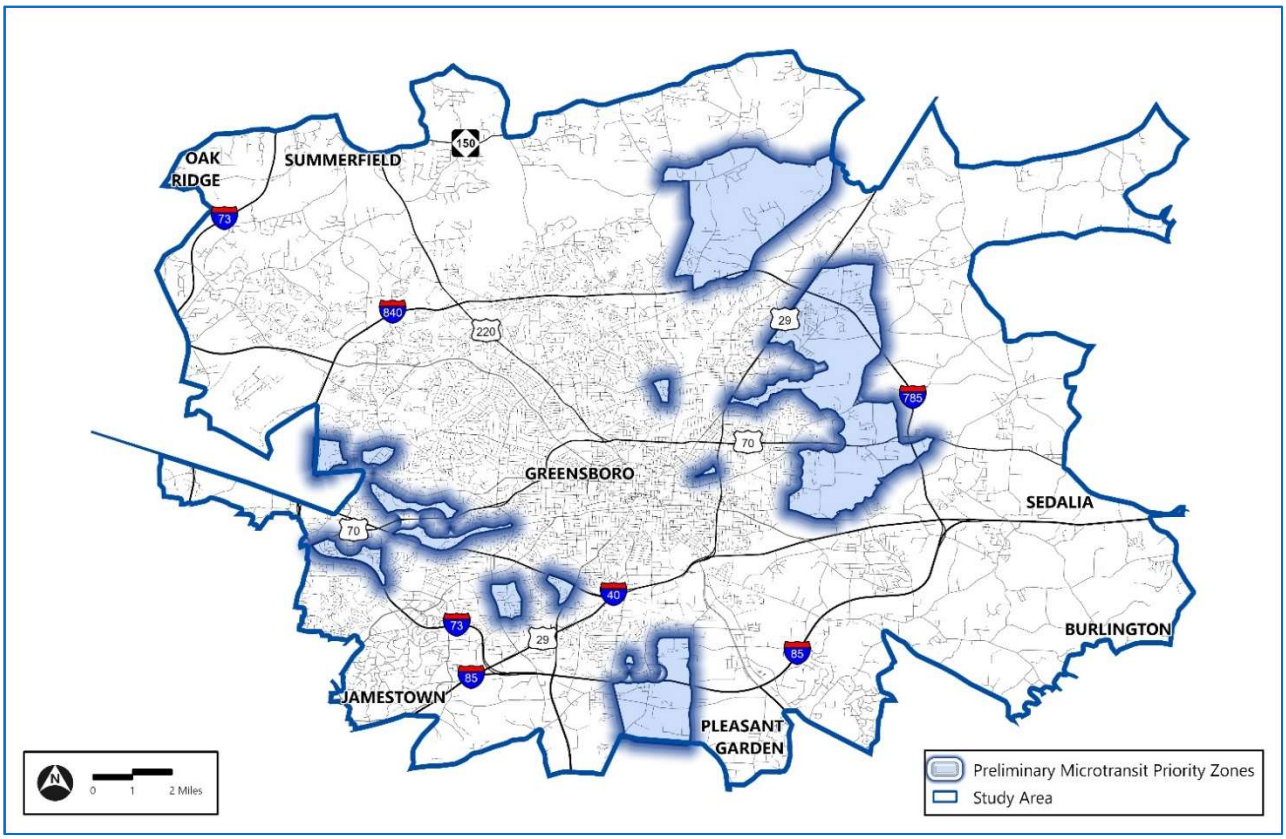


Table 4: Priority Zone Selection Process

Goal	Measurement	Method
Optimize response zones to meet goals	Spatial correspondence	Isolate land featuring all previously identified factors, removing unhelpfully small polygons

Service Area Refinement

The priority zones represent gaps in the transit network as defined by a series of quantitative analyses. To further refine these zones for best operational practices, the eligible zones were evaluated for the following characteristics:

- Does it include the GoBORO Demand Response Zone areas?
- Does it address feedback received during public engagement?
- Does it connect to high frequency transit services for both current and future routes? Does it replace any service being removed for future routes?
- Does it connect to key destinations (shopping areas, grocery stores, employment centers, varied housing, etc.).
- Does it include the zones identified as part of the data analysis for this feasibility study?

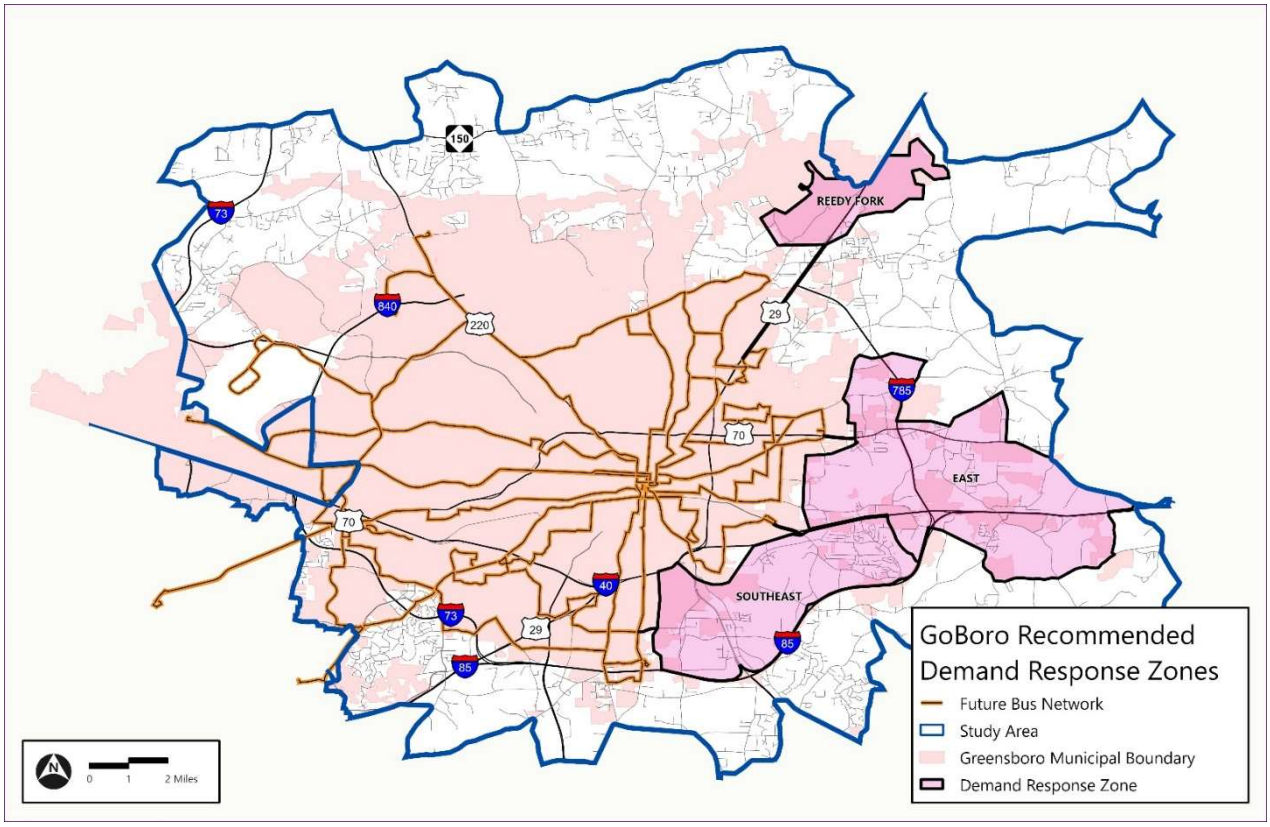
The following sections explain how each of the above considerations is addressed in the analysis.

Response Zones Identified in GoBORO

A central recommendation from GTA's GoBORO Transit Plan is the establishment of Demand Response Zones (DRZs) where microtransit would serve low density areas inf the City. Public feedback received during the GoBORO study expressed a desire for more f high-frequency routes serving the highest number of riders. As a result of this prioritization, the GoBORO Transit Plan leaves some areas of Greensboro that are not directly connected to these high-frequency routes. To address these areas, the GoBORO plan recommends a service similar to microtransit be considered. The recommended response zones, named Reedy Fork, East, and Southeast, are illustrated in Figure 6.[6] Most of the priority zones identified in the previous section are located within or adjacent to at least one of these Demand Response Zones (see Figure 6). Priority zones in the western part of the study area are not included within the response zones because of their lack of contiguity and superior transit access (i.e., outside of 0.25 miles of a bus stop). They are, therefore, not considered well-suited for efficient microtransit.

[6] Greensboro Transit Authority (GTA), "GoBORO Transit Plan" (draft plan document, Greensboro, NC, 2025), 33-44

Figure 6: GoBoro Recommended Demand Response Zones

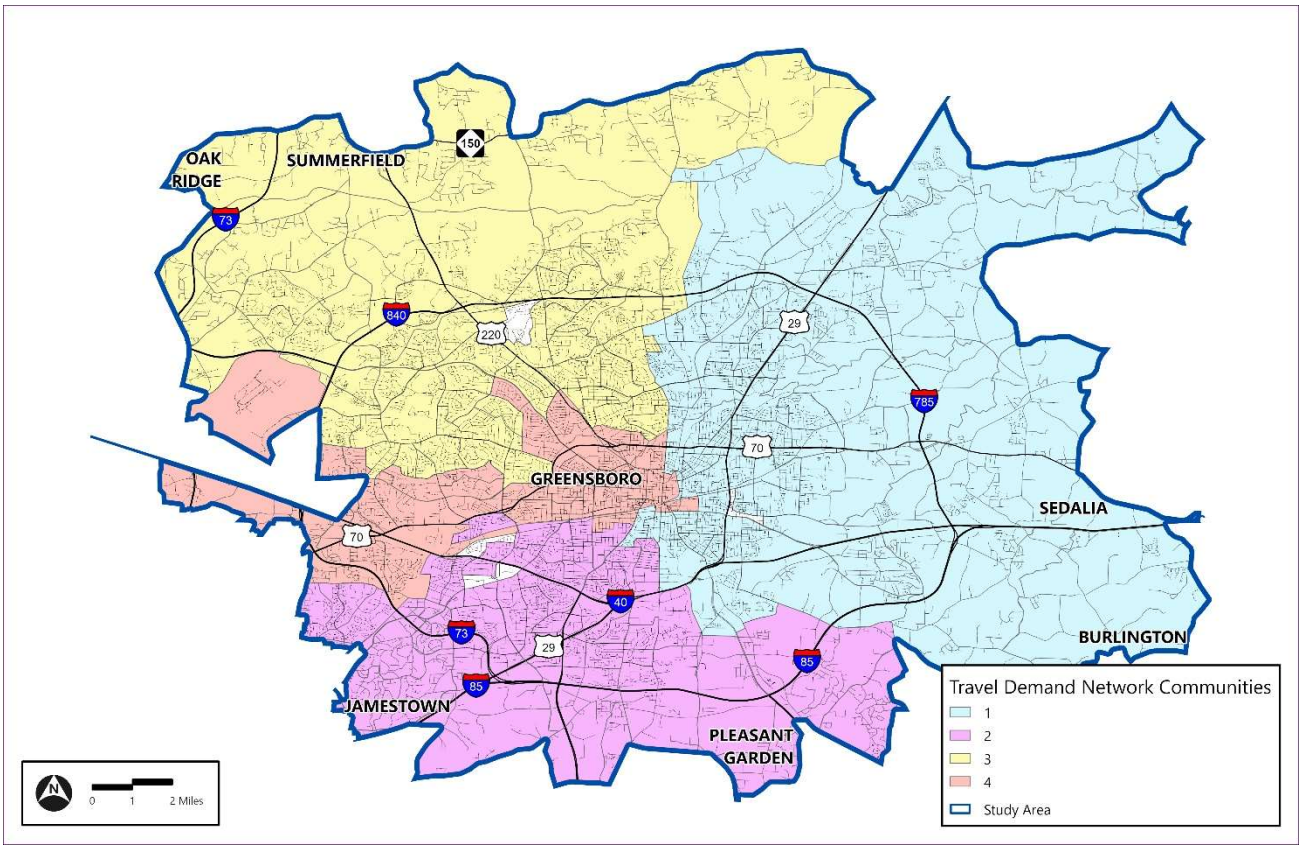


Travel Demand Network Communities

In the context of a travel demand network, "communities" are clusters of locations that have high internal trips and relatively few external trips. Identifying these groups is useful to understand which service area boundaries would most effectively capture local travel demand. Greensboro has four distinct network communities. The largest – labeled "1" in Figure 7 – contains both the Reedy Fork and East DRZs, suggesting many travel between the two areas. The Southeast DRZ is split between communities 1 and 2, prompting more analysis to determine its boundaries.[7]

[7] "StreetLight InSight," StreetLight Data.

Figure 7: Travel Demand Network Communities



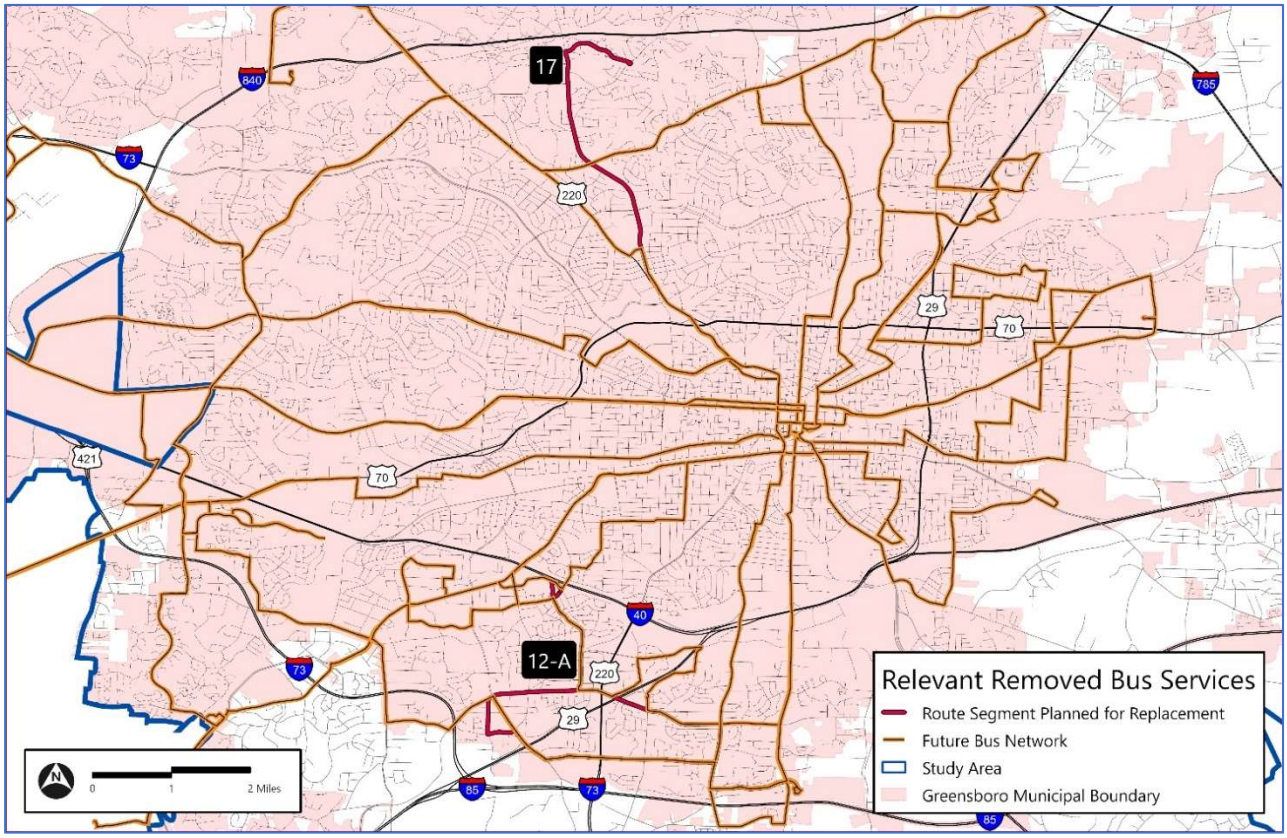
Replacement Service

The GoBORO plan recommends that existing bus routes 2, 8, 12A, and 17 eventually be replaced or absorbed by new, more-efficient services. While stops on Routes 2 and 8 will be entirely covered by the future fixed-route network, Routes 12A and 17 will only be partially covered by fixed-route service (Figure 8).[8] Microtransit can bridge these gaps.

Route 12A, or Southtown Connector, serves Benchmark Square, Hemphill Branch Library, Holden Crossing, Elmsley Square (Walmart), Four Seasons Town Centre, Wet N' Wild Emerald Pointe, and connections with GTA Routes 2, 12 and 13. Routes 2A and 2B will replace this route in some areas of the city, and microtransit can be used to fill remaining gaps.

Route 17 (Lawndale Drive) currently serves Center City Park, LeBauer Park, Greensboro Central Library, Greensboro Children's Museum, Greensboro Historical Museum, Lawndale Shopping Center, Guilford Mental Health Department, Greensboro Science Center, Country Park, Lewis Recreation Center, Grasshoppers baseball stadium, and Guilford Courthouse National Military Park. Bus stops south of US-220 will be absorbed by other routes but bus stops north will not be.[9]

Figure 8: Relevant Removed Bus Services



[8] Greensboro Transit Authority (GTA), "GoBORO Transit Plan," 33-44.

[9] "Routes," City of Greensboro, accessed February 21, 2025, https://www.greensboro-nc.gov/departments/transit/routes.

Public Input

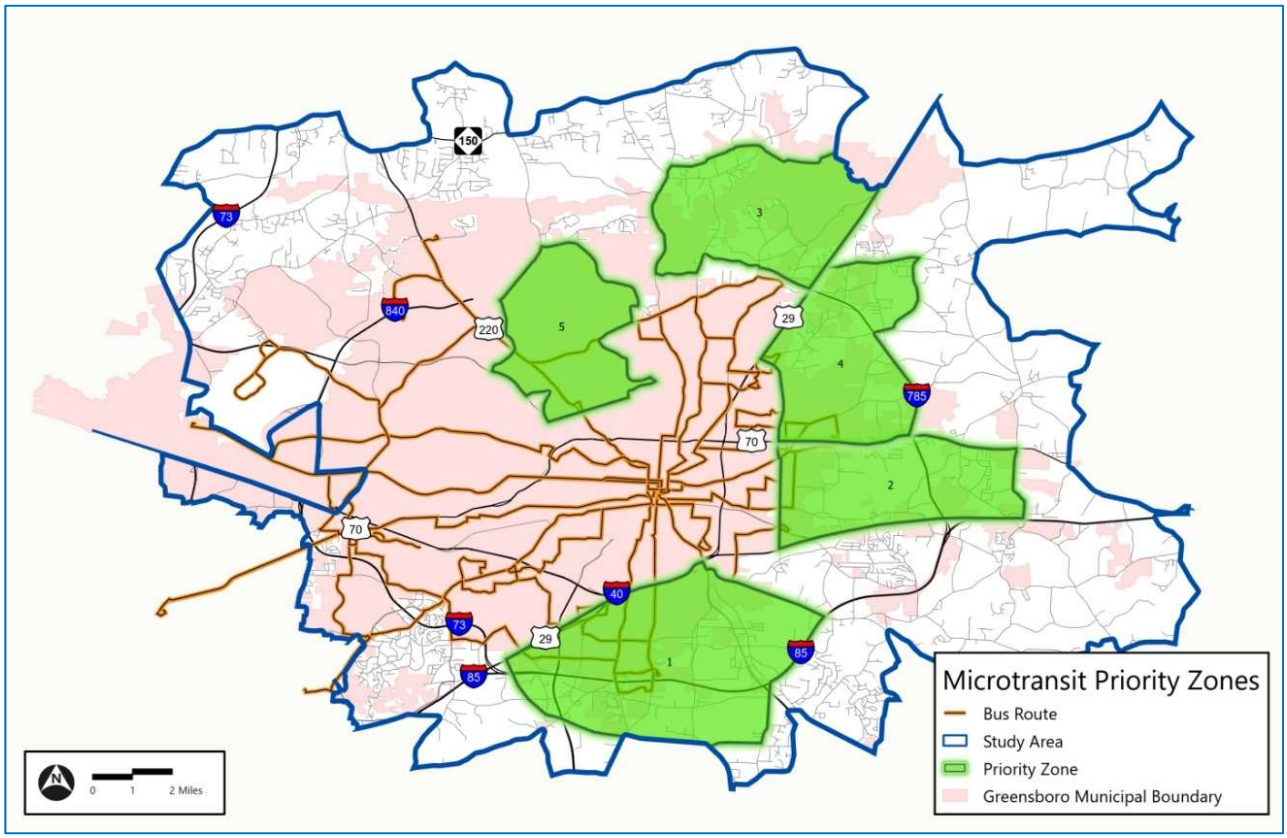
Public input was conducted during this study. The input received cannot be used to speak to every resident's opinion who lives in Greensboro, but for the purpose of a feasibility study, was an appropriate place to begin for future, more focused engagement to be done in each potential zone. It is recommended that Greensboro and GTA staff conduct more thorough engagement when beginning to prepare for implementation within a particular zone.

Briefly, engagement for this project included stakeholder interviews, coordination with a steering committee, and one public engagement event. More detailed information regarding public input can be found in Appendix A.

Boundary Selection

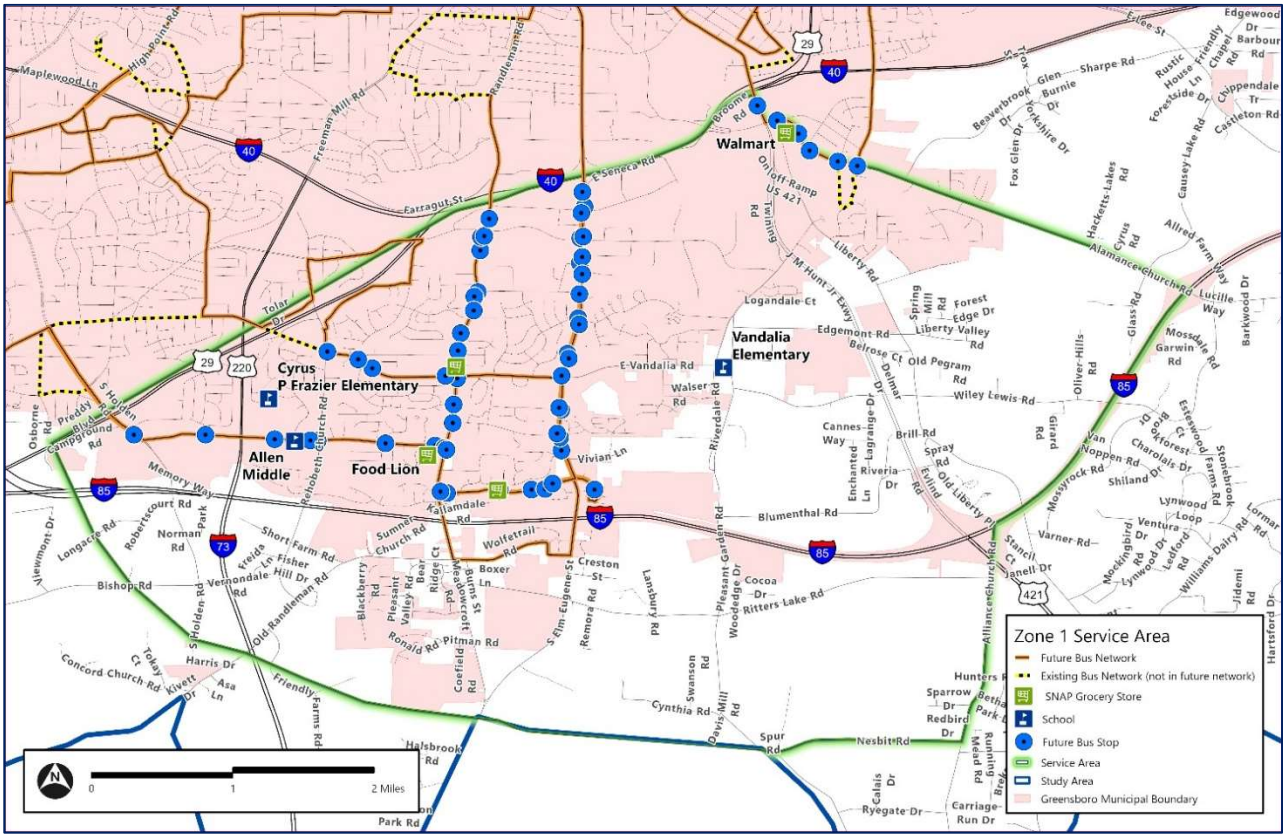
Using the information layers created during the refinement process, five service zones were identified as the most suitable for microtransit in Greensboro. These zones were based on creating boundaries naturally made by large thoroughfares, inclusive of access to key transit routes, and inclusive of key destinations – like mixed housing, employment, and food sources. Figure 9 outlines these priority zones.

Figure 9: Microtransit Priority Zones



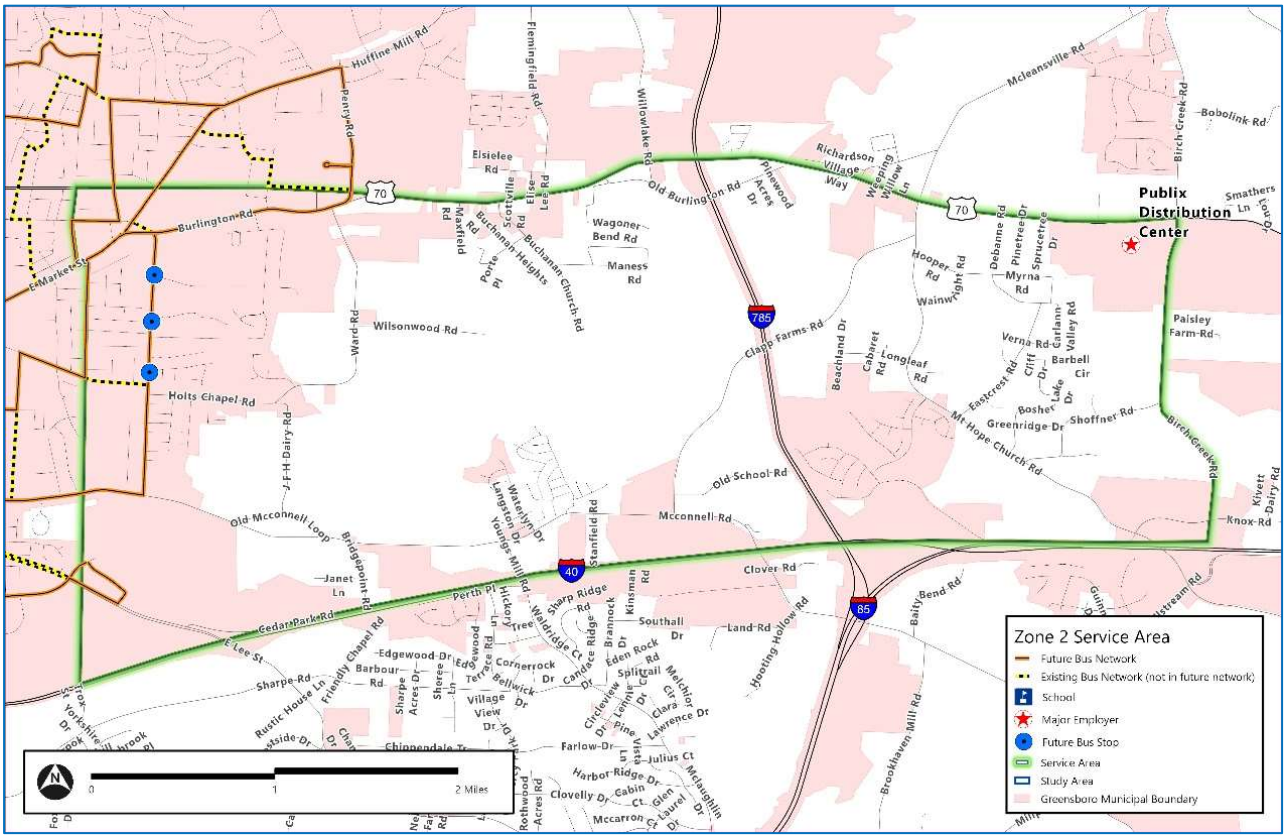
Zone 1 centers on Bethany Woods, a neighborhood within the Southeast DRZ that was identified as a priority zone as a result of the gap analysis. Boundaries were drawn to include contiguous priority zones, the part of the Southeast DRZ that shares Bethany Woods' travel demand community, and land east of I-40 that was previously served by Route 12A. The service area is designed to: (1) improve access to supermarkets Aldi, Food Lion, and Walmart (two) and to Allen Middle, Frazier Elementary, and Vandalioa Elementary Schools; (2) connect with Routes 2B, 3, and 18 of the future bus networks. Zone 1 also offers a starting point for reconnecting communities separated by I-85.

Figure 10: Zone 1 Service Area



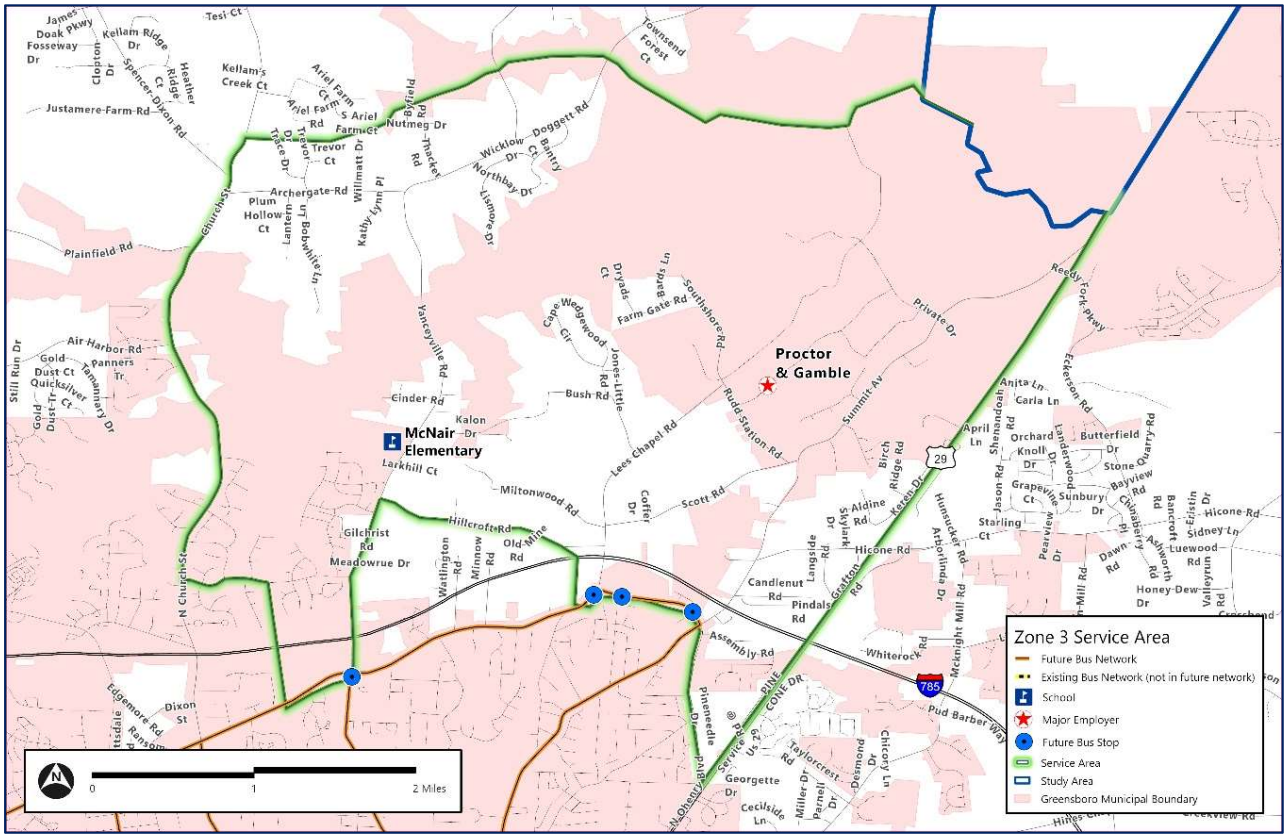
Zone 2 covers most of the East DRZ, focusing service on areas identified as priority zones. The service area connects Route 5A and 5B bus stops to the west with the Publix Distribution Center, a major regional employer, to the east. Additionally, the service area includes three schools and improves connectivity across I-785.

Figure 11: Zone 2 Service Area



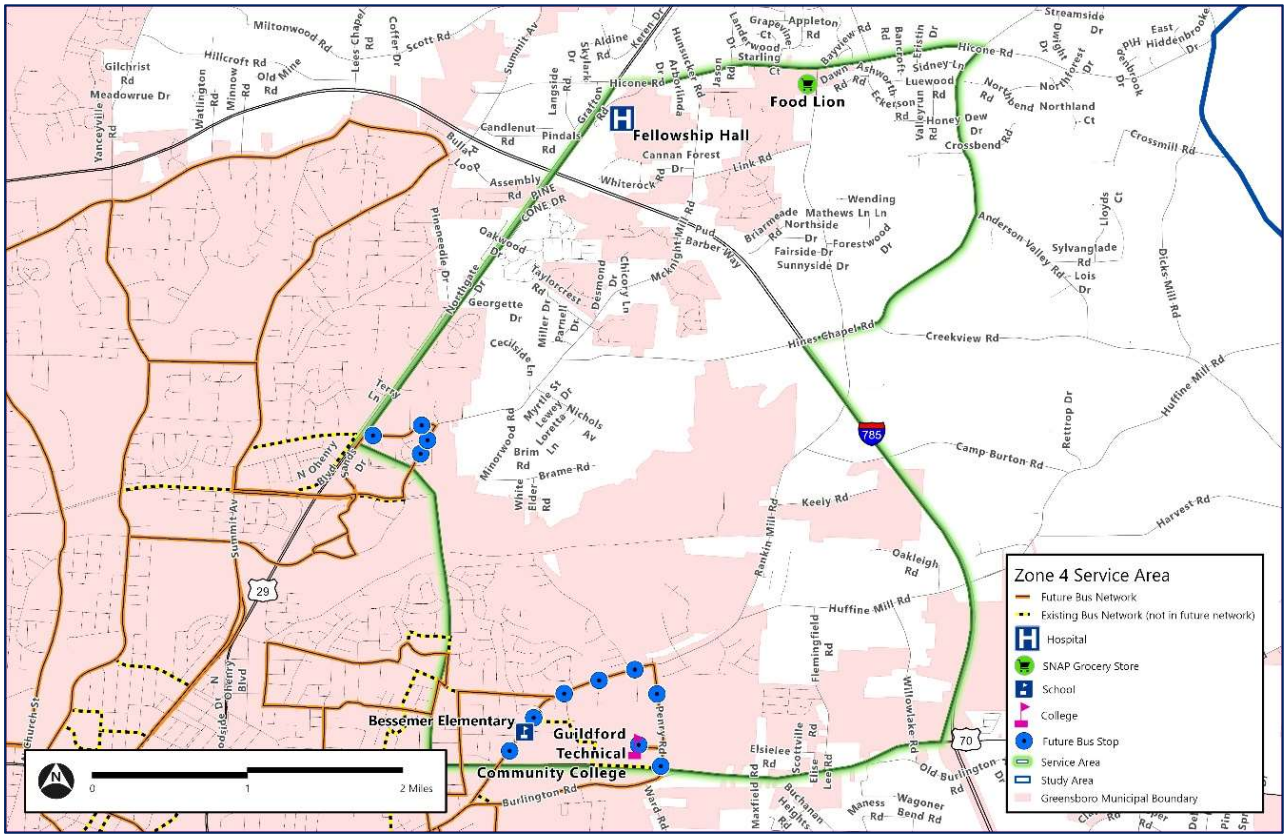
Zone 3 is the only zone that overlaps the Reedy Fork DRZ, connecting it with Routes 15A and 15B and the identified priority zones immediately adjacent. The area includes McNair Elementary School and Proctor & Gamble, a major regional employer.

Figure 10: Zone 3 Service Area



Zone 4, like Zone 2, is designed to capture the priority zones that intersect the East DRZ in the vicinity of Guilford Technical Community College (GTCC) (Figure 11). The boundary encompasses the contiguous priority zones from GTCC to Fellowship Hall psychiatric hospital and Food Lion to the north. The service area provides access to Routes 1A, 1B, 6A, and 6B, while providing improved connectivity across I-785.

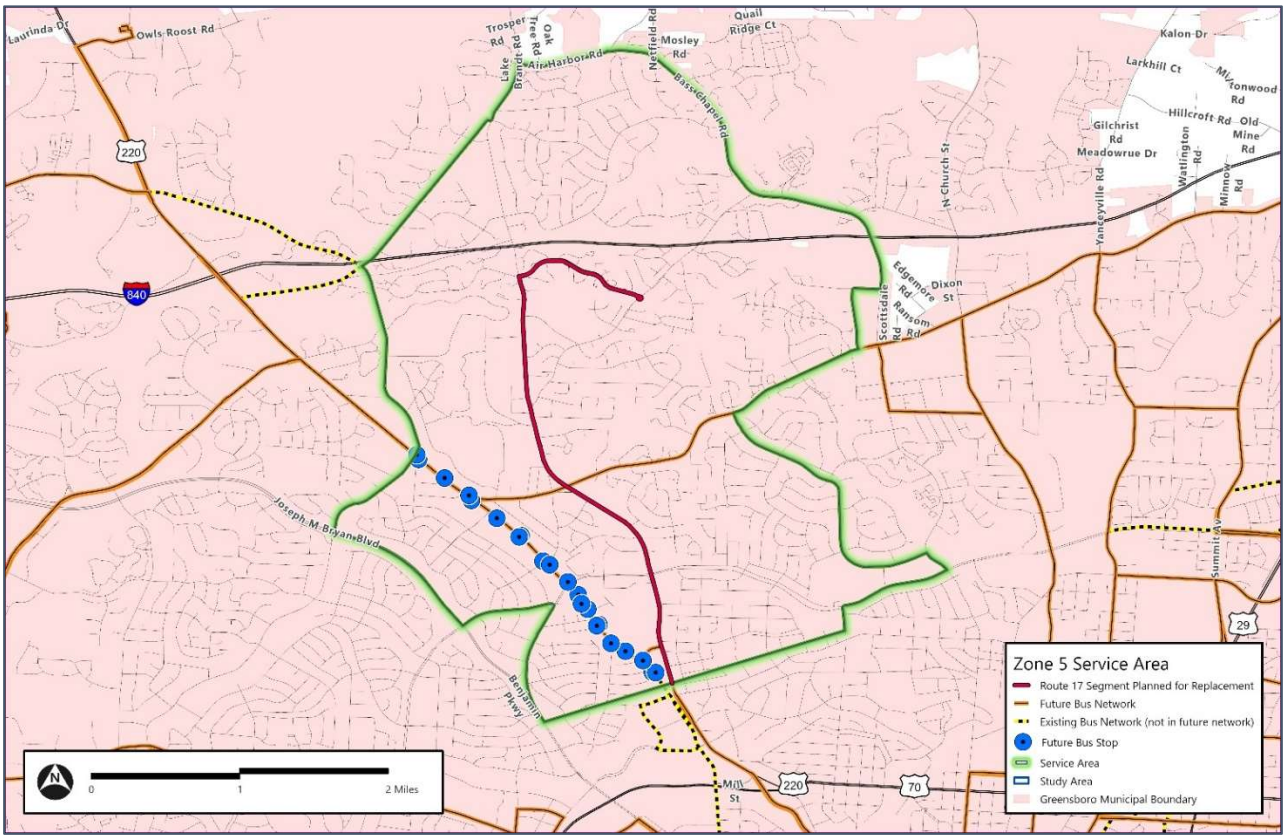
Figure 11: Zone 4 Service Area



As highlighted throughout this report, one of GTA's primary microtransit goals is to replace inefficient bus routes. At the conclusion of the service area refinement process, most of Route 17's service area remained unaddressed.

Zone 5 is designed to fill the gap left by the elimination of Route 17. Zone 5 includes all TAZs within 0.25 mile of an existing bus stop that is (1) currently only served by Route 17 and (2) not planned for service in the future network according to the GoBoro plan.[10] The resulting boundaries are captured in 14.

Figure 12: Zone 5 Service Area



The following table outlines the boundaries of each zone, the square miles, key destinations it connects to, and transit connections.

[10] GTA, "GoBORO Transit Plan," 33-44.

Table 5: Zone 5 Service Area

Zone	Boundary Roads	Area (sq. miles)	Key Destinations	Transit Connections (Planned Network)
1	Alamance Church Road, I-40, US-29, Bishop Road/Ritters Lake Road	18.9	Aldi, Allen Middle School, Cyrus P Frazier Elementary School, Food Lion, Vandalioa Elementary School, Walmart (x2)	Route 3, 2B, 18
2	Birch Creek Road, I-40, Franklin Road, US-70	10.2	Erwin Montessori School, Gateway Education Center, Publix Distribution Center, Waldo C Falkener Sr. Elementary School	Routes 5A/B
3	US-29, Air Harbor Road, Bass Chapel Road/N Elm Street, Lee's Chapel Road	11.4	McNair Elementary School, Proctor & Gamble Corporate Park	Routes 3, 15A/B
4	US-29, White Street, Nealtown Road, Huffline Mill Road, McLeansville Road, Hicone Road	10.8	Bessemer Elementary School, Fellowship Hall, Food Lion, Guildford Technical Community College	Routes 6A/B, 1A/B
5	Bass Chapel Road, Joseph M. Bryan Boulevard, W Cone Boulevard, Lake Brandt Road	8.7	NA	Routes 8, 8A/B

Service Prioritization and Implementation

To improve the financial and operational sustainability of the microtransit program, it is necessary to implement the service in phases. A benefit of microtransit over other transportation modes is the flexibility to adjust its network easily as ridership increases, technology evolves, and fiscal constraints change. Strategically planned program phasing allows service refinements to be more manageable than immediate full-scale implementation. To ensure resources are optimized towards bridging the most influential access gaps, each service area underwent additional prioritization analysis that captured where microtransit would be expeditiously beneficial.

It is recommended that Greensboro's microtransit operate in one of the following capacities:

- First-last-mile: picks up from a fixed route bus stop and delivers to any location's door step.
    - This supports access and use of GTA's fixed route services.
- Fixed-location drop off: the service can pick individuals up at any location, but can only drop them off at a few key destinations.
    - This can focus service to serve key employment centers.

After a pilot phase is conducted using either of these service capacities, the microtransit service can expand to include on-demand service: picking up residents anywhere, and dropping them off anywhere.

Scoring Matrix

Five criteria were used to compare levels of priority within the established service areas: connectivity to the existing fixed-route bus network, connectivity to the future fixed-route bus network, connectivity to other key destinations, connectivity to employment density, and connectivity to population density. Table 5 summarizes how land was scored. Each result was summed to produce the final prioritization score.

Table 5: Prioritization Scoring Matrix

Score	Connectivity to Existing Fixed-Route Network	Connectivity to Future Fixed-Route Network	Connectivity to Other Key Destinations	Employment Density	Population Density
3	Within 1-mile of existing bus stop	Within 1-mile of existing/future bus stop	Within 1-miles of key destination	> 5 jobs/acre	> 5 persons/acre
2	Within 2-miles of existing bus stop	Within 2-mile of existing/future bus stop	Within 2-miles of key destination	2-5 jobs/acre	2-5 persons/acre

1	Within 4-miles of existing bus stop	Within 4-mile of existing/future bus stop	Within 4-miles of key destination	< 2 jobs/acre	< 2 persons/acre

Connectivity to the existing fixed-route network

With the goal of using microtransit to complete the transportation network in mind, areas within .25 miles to an existing bus stops were scored more favorably than those farther away. Locations closer to existing bus stops can accommodate first-and-last-mile connection services more quickly than those farther away.

Connectivity to the future fixed-route network

Areas within .25 miles to stops included in the planned bus network will score higher than areas not. Stops served by both existing and future transit will therefore be double counted, while those served only by future transit are weighted less heavily as they do not offer the immediate opportunity.

Connectivity to other key destinations

The closer the zone is to priority destinations, the higher it scores. These destinations were uniquely selected for each zone.

Employment density

Connecting people to job opportunities is one of the major driving principles behind this microtransit study; as such, areas with more jobs will score better than those with fewer.

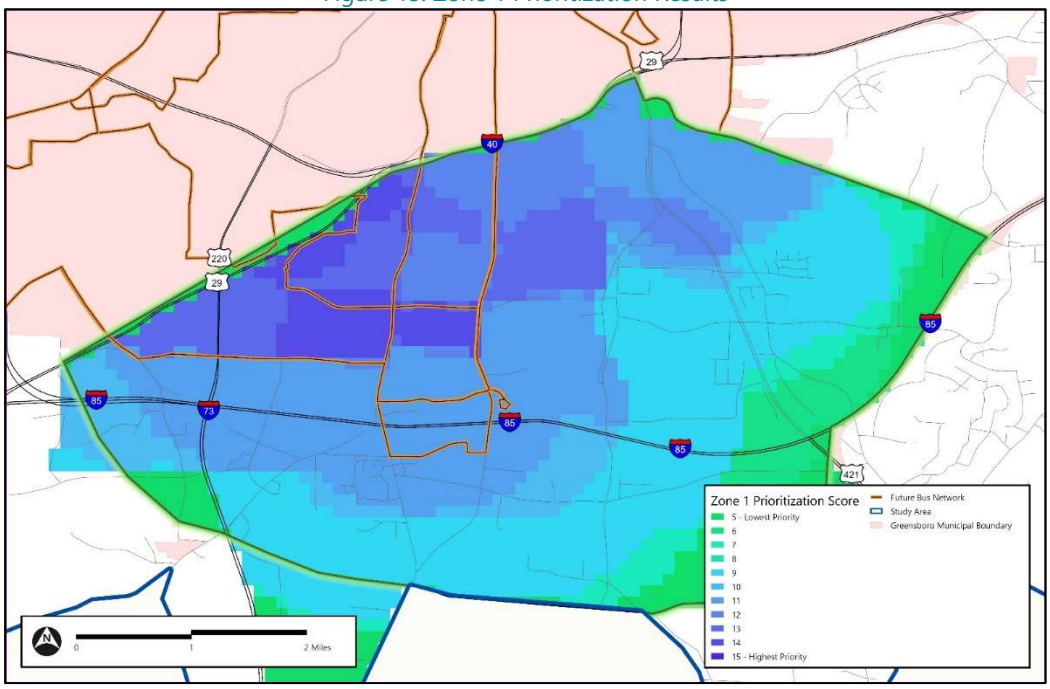
Population density

Given that subsequent analysis has excluded the highest-density parts of the city – where fixed-route bus service would be the most suitable mode of transit – the higher a remaining area's population density, the higher the likelihood of microtransit optimization, and, therefore, the higher the assigned score.

Prioritization Results

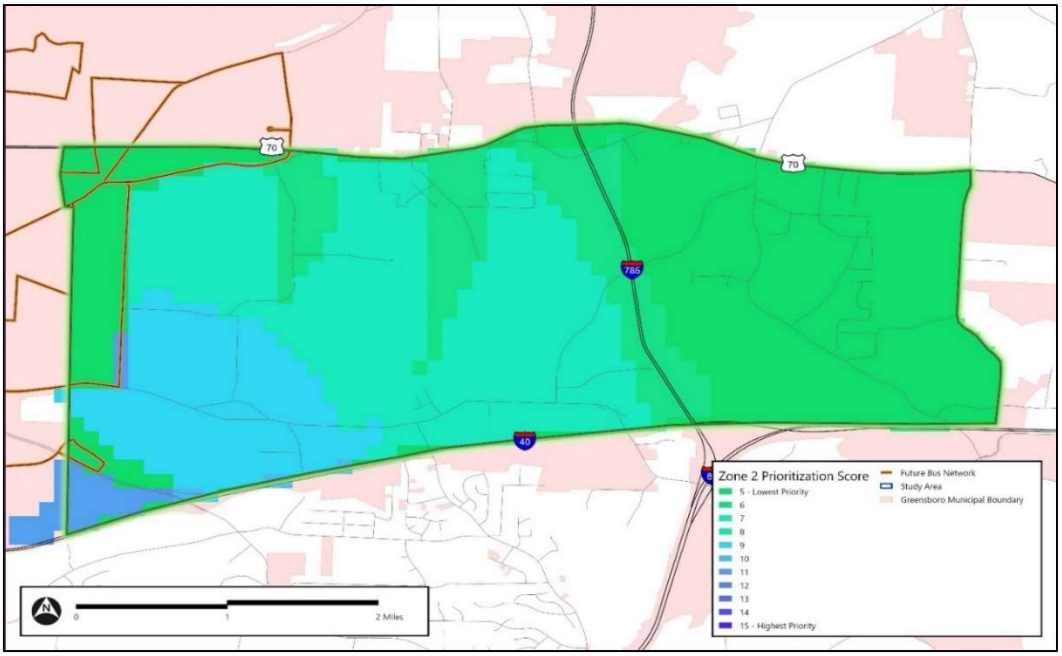
Zone 1's prioritization scores are high relative to the other service areas, predominantly due to the cluster of bus stops, grocery stores, and schools between I-40 and I-85 (Figure). The lowest scores are on the zone's edges where population and job densities are lower.

Figure 15: Zone 1 Prioritization Results



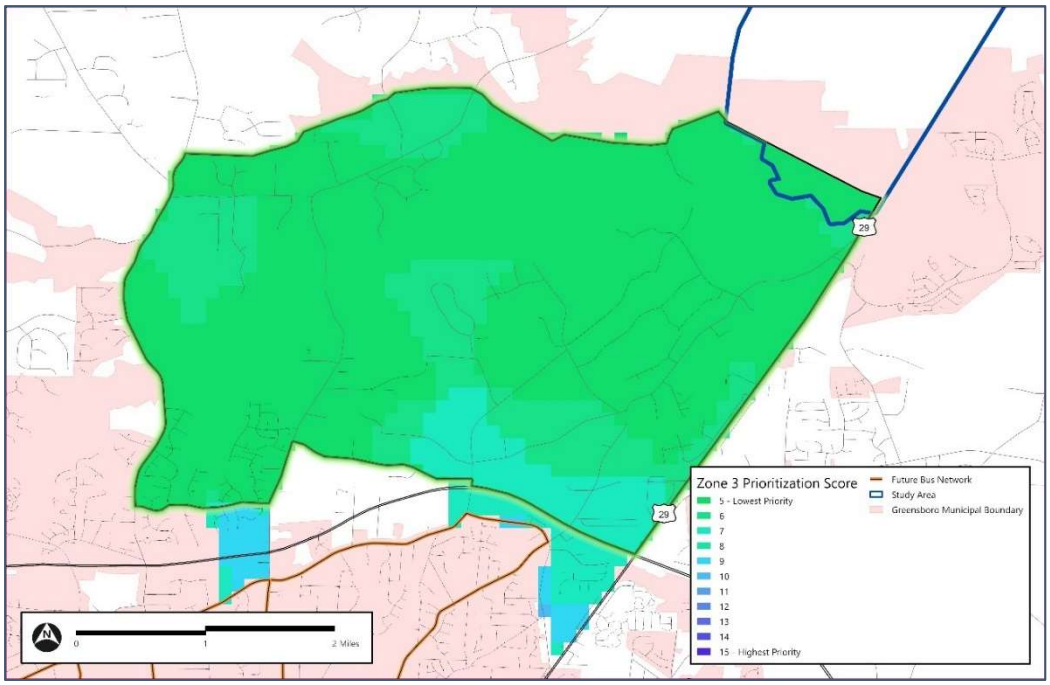
Priority scores in **Zone 2** trend downward from southwest to northeast (Figure). The comparatively few key destinations and bus stops produced results that prioritized density and potential demand over connectivity.

Figure 16: Zone 2 Prioritization Results



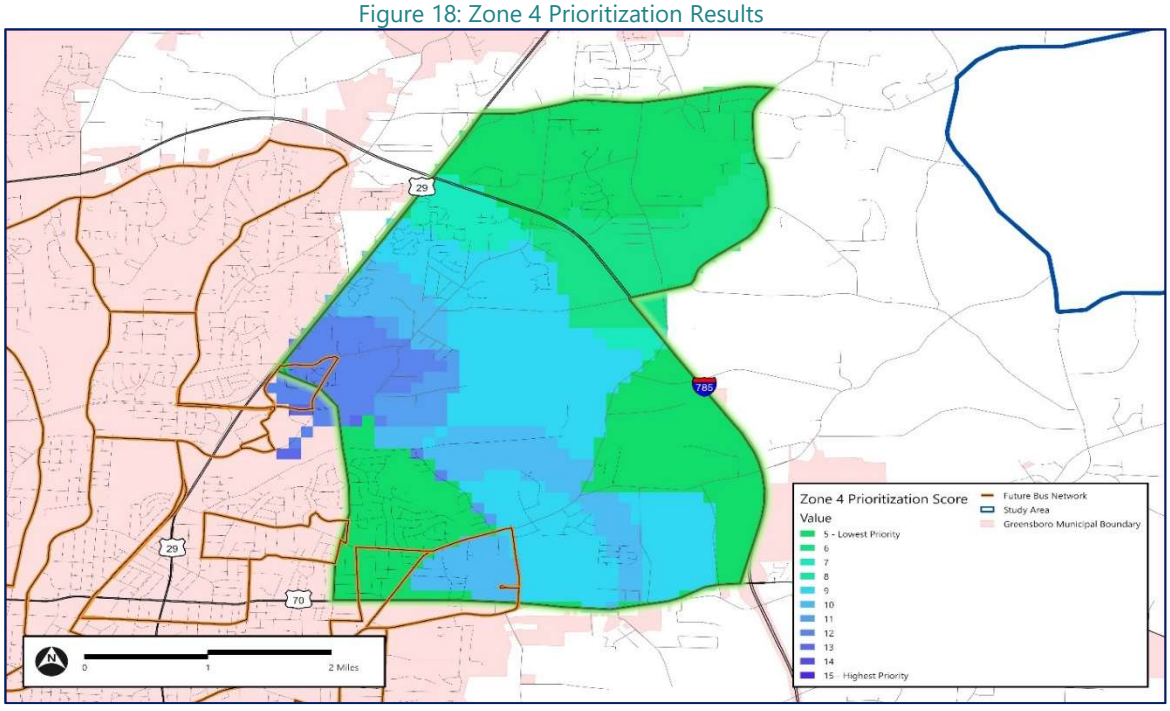
Zone 3's scores are lower on average than its peers (Figure). Like Zone 2, it contains few key destinations, and the bus stops are clustered in areas of relatively high population density.

Figure 17: Zone 3 Prioritization Results



Analysis indicates that **Zone 4** is generally more suited for microtransit in its western neighborhoods, where the Bessemer Elementary School, Guilford Technical Community College, and the region's bus stops are located (Figure). Although Fellowship Hall and the local Food Lion were identified as key destinations, their vicinities have comparatively low job and population densities which reduce their lower priority level.

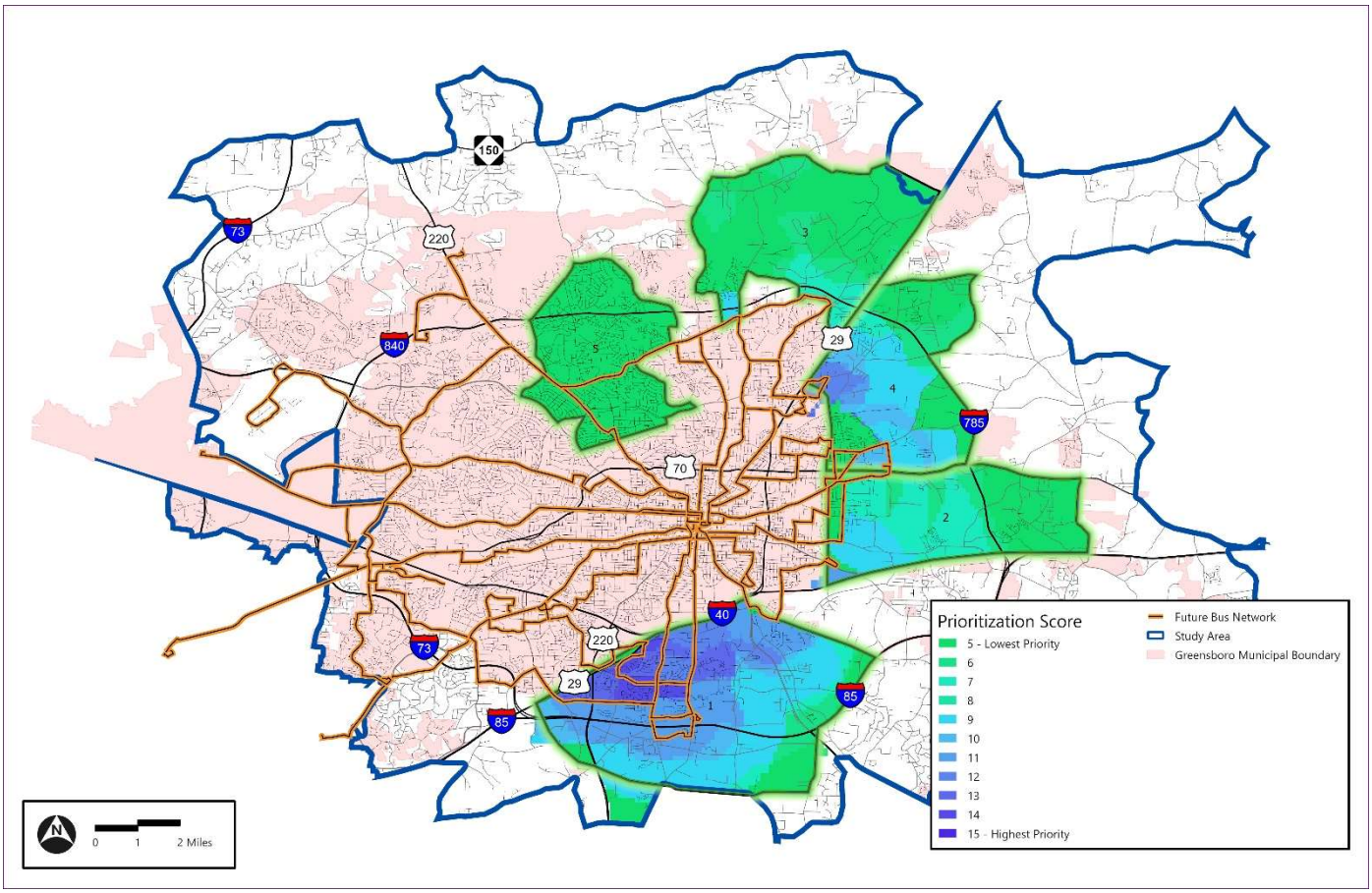
Figure 18: Zone 4 Prioritization Results



The GoBORO plan includes changes to Route 17 in its final (sixth) phase for network implementation. To ensure consistency between the plans, this study recommends **Zone 5** service be implemented in the third phase of microtransit rollout and determined that no prioritization process was required.

Figure 19 shows all the priority zones.

Figure 19: Prioritization Results



Service Recommendations

To prioritize implementation, the following phasing recommendation was created. Zones that are noted to begin in Phase 1 should be the first to be implemented. Zones noted in Phase 2 and 3 should then be incrementally implemented. Note, this plan recommends a first-and-last-mile model for Zone 5, whereby riders can schedule on-demand transit to or from any bus stop within the service area, As this response zone is planned to replace fixed-route service, and there are no other key destinations within its boundaries, a first-and-last-mile model would better maximize the service's efficiency than would a point-to-point service.

Table 6: Phasing Overview

Phase	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
1	Route 12 replacement service. **Fixed Location Drop Off**			Service areas include many key destinations. **Fixed Location Drop Off.**	
2		Connection to key fixed route services. **First-and-last-mile.**	Connection to key fixed route services. **First-and-last-mile.**		
3					Route 17 Replacement Service. **First-and-last-mile.**

Bibliography

"American Community Survey 5-Year Data (2009-2023)." United States Census Bureau. December 12, 2024

"GoBORO – Greensboro's Long Range Transit Plan." City of Greensboro. Accessed February 21, 2025. https://www.greensboro-nc.gov/departments/transit/goboro-greensboro-s-long-range-transit-plan.

Greensboro Transit Authority (GTA). GoBORO Transit Plan. Draft plan document, Greensboro, NC, 2025.

"Routes," City of Greensboro, accessed February 21, 2025, https://www.greensboro-nc.gov/departments/transit/routes.

"StreetLight InSight." StreetLight Data. Accessed July 19, 2024.

Appendix A: Community Engagement

Memorandum

To: NCDOT IMD & Greensboro

Date: April 2025

Project #: 39260.11

From: Paige Dickerhoof, AICP

Re: Greensboro Microtransit Feasibility Study Engagement Memo

Engagement Memo

Introduction

The purpose of public engagement for the microtransit feasibility study in Greensboro was to gather valuable input from the local community to ensure the proposed transit solutions meet their needs and expectations. Engaging the public provides insights into travel patterns, preferences, and pain points that can influence the design and implementation of microtransit services. This collaborative approach aimed to foster transparency, build public trust, and ensure that the microtransit system enhances overall accessibility, convenience, and connectivity within Greensboro, ultimately leading to a more efficient and user-centered transportation network.

Goals

The VHB team, together with NCDOT and the City of Greensboro, hoped to reach the following populations during through the public engagement process:

- Residents of Greensboro that currently use transit
- Residents of Greensboro that have an interest in using transit
- Residents of Greensboro that currently use other mobility services like dial-a-ride
- Residents of Greensboro that live near potential microtransit service areas
- Residents of Greensboro that live near existing transit routes

Public Engagement Strategies

Stakeholder Interviews

The project team researched potential stakeholders in Greensboro who could offer thoughts on how microtransit in the area could serve the needs of the community. As a result, stakeholders were grouped into five main categories:

- Community Center
- Place of Worship
- Medical Center
- Food Service
- Fire Station

Memorandum

After identifying these groups, the team sent out emails determining ideal times for them to meet and offered multiple meeting opportunities. As a result, five stakeholder interviews were scheduled via Microsoft teams, and three of those five groups were successfully communicated with.

Group	**Attendees**	**Key Themes**	**Date**
Stakeholder Interview 1	• Bruce Rich, Director of Housing and Community Studies, UNCG • Walker Sanders, President of the Community Foundation of Greater Greensboro	Connection to Educational Centers, Access to Job Centers, Downtown Connectivity, Rural to Urban Connectivity, Housing and Transportation	September 4th, 2024
Stakeholder Interview 2	• Eric Aft, CEO of Second Harvest Food Bank • Renai Wisley, Engagement Coordinator of Second Harvest	Service Flexibility, Integration with Fixed Routes, Zone Selection, Food Bank and Partner Network, Critical Areas for Transit	September 9th & October 2nd, 2024
Stakeholder Interview 3	• Mallory Goodman, Backpack Beginnings • Parker White, Backpack Beginnings	Access Points, Service Hours, Food Insecurity, First-Mile & Last-Mile Access, Technology	September 24th, 2024

Stakeholder Interview 1

On September 4, 2024, the project team met with Bruce Rich and Walker Sanders via Microsoft Teams. The main themes mentioned were:

- Improve connections to educational centers like community colleges and high schools
- Lack of direct bus routes from East Greensboro to key job centers such as the Koury Convention Center
- Need for better connectivity between the Greensboro Coliseum and downtown since the existing route isn't on a major thoroughfare
- Most options require multiple transfers, so we talked about creating a mini-network in underserved areas and integrating microtransit with current bus lines to improve efficiency
- The large distances between rural areas and city centers
- Establishing a Mobility Hub on Randleman Road to help address these transportation challenges

Stakeholder Interview 2

On September 9th, 2024, the team met with Eric Aft, the CEO of Second Harvest Food Bank.

- He talked about the flexibility of microtransit services, emphasizing that they could be adjusted to meet the specific needs of Greensboro's population regardless of the number of passengers.
- Eric identified areas currently lacking bus service as prime targets for the microtransit project. He stressed the importance of the extensive network of Second Harvest Food Bank partners, which includes around 90 programs like food pantries, after-school sites, and shelters.
- Important priorities for transit improvements were also highlighted, including better access to healthcare, government services, and childcare facilities. The committee discussed the strategy of staggering the operation times of food pantries to ensure the efficient placement of transit centers.

On October 2nd, 2024, the team met with Renai Wisley from Second Harvest.

- Various food pantries, including One Step Further, Backpack Beginnings, True Salvation Community Food Network, and the Islamic Center, collect supplies from Second Harvest to distribute to those in need.
- Renai highlighted the persistent issue of cyclical poverty in East Greensboro, where many jobs do not pay enough to help residents achieve financial stability.
- Proctor & Gamble is a major employer in the area, and many significant food pantries are conveniently located on bus lines, making them more accessible to those reliant on public transportation.
- Renai also suggested that engaging with community groups like the Concerned Citizens of East Greensboro and the Safer Cities initiative could help address food insecurity and economic challenges more effectively.

Stakeholder Interview 3

On September 24th, 2024, the project team met with Parker White and Mallory Goodman from Backpack Beginnings. They are particularly concerned about who is eligible to use the service, as well as any limitations regarding the destinations people can travel to and from.

- The need for Backpack Beginnings' services has increased significantly in the past two years, particularly due to the rise in food and gas prices. The organization operates in an area with 24 identified food deserts.
- They have identified several key needs among those they serve, including transportation and access to the items they provide, either through delivery or other means. Some community members have coordinated with others to shop on their behalf, but there is a concern for individuals without a social worker, advocate, or convenient access to support within the community.
- The lack of sidewalks in the area where Backpack Beginnings is located also poses a mobility challenge. While they have considered making their facilities more mobile, the cost associated with this is a significant barrier.
- The need to translate materials into various languages such as Spanish, Arabic (including Farsi), and French, given the presence of many refugee agencies.
- Mobility challenges are also prevalent, as many parents or caregivers are older and have their own health needs. In terms of microtransit services, it is important for Backpack Beginnings to ensure that if people can be dropped off at their location, they should also be able to be picked up after their hour-long appointments without having to wait long times, especially when they have perishable items.
- There were also concerns about the lack of technology among the population they serve; while everyone has a phone, not all may have internet access or feel comfortable using an app.
- Destinations commonly frequented by the individuals they serve include the 05, 06, and 07 zip codes, as well as locations like pediatricians' offices, DSS, housing authorities, and Title I schools.

Steering Committee

The Steering Committee, whose members were approved by GTA staff, was established to oversee and guide the feasibility study. The committee's main roles included receiving regular updates from the VHB team, providing feedback on key project deliverables such as the online survey, the Existing Conditions Summary, and the draft report, and advising on strategies to engage target audiences. Additionally, the committee was tasked with disseminating information about the study to increase interest and participation. Through these efforts, the committee aimed to leverage its expertise and networks to enhance the project's quality and reach.

Name	Organization	Department	Position
Caitlin Bowers	City of Greensboro	Housing and Neighborhood Development	Neighborhood Investment Manager
Gary Canapinno	City of Greensboro	Community Relations	Manager

Russ Clegg	City of Greensboro	Planning	Long Range and Strategic Planning Division Manager
Christopher Andrews	City of Greensboro	Planning	Land Development Division Manager
Mark Kirstner	Piedmont Authority for Regional Transportation	Planning	Director of Planning
Marshall Yandell	City of Greensboro	Planning- Economic Development	Economic Development Manager
Jamilla Pender	Cone Health		Director of Equity and Community Engagement

The steering committee met twice, on June 25th, 2024 and October 8th, 2024.

June 25th, 2024 Meeting

The Steering Committee used this meeting discussing public engagement strategies. They clarified the role of the steering committee, highlighting their responsibility for guiding the project's development and ensuring broad stakeholder involvement.

Committee members shared their priorities, which included but were not limited to:

- employment connectivity and the lack of transportation options
- transportation to and from services such as healthcare appointments, grocery stores, and parks
- the sustainability of services such as Uber Health and coordination with existing county services
- barriers to access, including affordability, lack of smartphone access, language differences, and disabilities
- transition from cash to cashless payment systems and the need for effective communication across different age groups.

The committee focused on multifamily and mixed-use developments, particularly in high-density areas like Red Hill. They emphasized the importance of framing microtransit as an on-demand service similar to Uber or Lyft, highlighting its flexibility and personal transportation benefits.

The meeting concluded with several action items:

- developing engagement strategies for upcoming public events
- finalizing the list of local stakeholders
- clearly communicating the benefits of microtransit
- collecting maps that illustrate employment connectivity to support planning efforts

Memorandum

October 8th, 2024 Meeting

In this meeting, the Steering Committee reviewed research the project team had conducted on similar transit agencies in Durham, NC, Tucson, AZ, Gwinnett County, GA, and San Antonio, TX. The focus was on the size, number of vehicles, and ridership of these systems. The meeting also highlighted the need for greater public engagement, as the current sample size is too small. The committee proposed creating a survey to prioritize zones and collect more feedback.

Concerns were raised about the clarity of GTA's service map, which has confusing colors and unclear boundaries. GTA's service area extends 10 miles beyond Greensboro city limits. To boost survey participation, the committee recommended using QR codes and URLs for easier access and distribution

Public Engagement

For Public Engagement, the project team decided to attend already planned Greensboro events. This helps engage members of the public that would not usually attend a formal public meeting, or do not have the time to. Noches Latinas Event: On November 8th, 2024, the VHB team participated in Noches Latinas at LeBauer Park in Downtown Greensboro from 6 to 9:30 pm, engaging actively with event attendees. The team brought several materials designed to facilitate engagement, including a detailed map of the project zones, a QR code linked to a comprehensive survey, and an infographic outlining key aspects of the initiative.

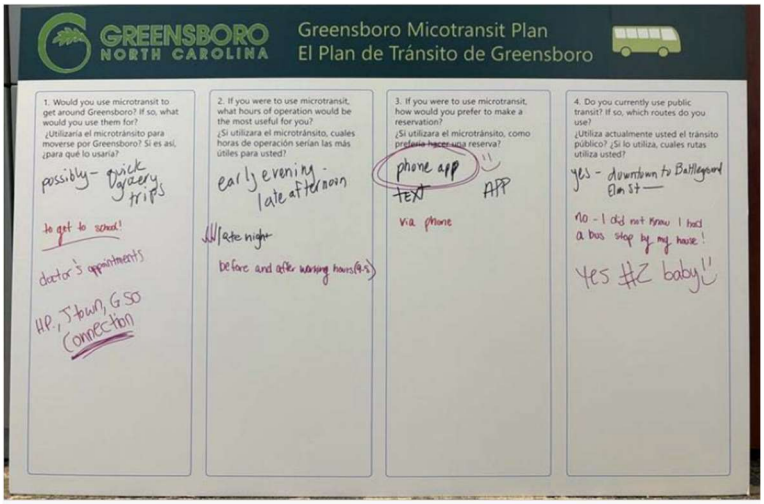


Figure 1. Input Board with Public Comments Designed for Public Engagements about the Project.

After determining the goal of attending these events, the project team developed four questions to input on the board:

- Would you use microtransit to get around Greensboro? If so, what would you use them for?
- If you were to use microtransit, what hours of operation would be the most useful for you?
- If you were to use microtransit, how would you prefer to make a reservation?
- Do you currently use public transit? If so, which routes do you use?

Throughout the evening, recurring themes emerged in conversations, notably the need for service access beyond the conventional 9-to-5 schedule, challenges related to travel to and from downtown, and general enthusiasm for the project. In total, the team engaged in direct dialogue with approximately 20 individuals and distributed around 50 survey fliers.

Memorandum

Survey

Figure 2. Social Media Graphic made to encourage people to take the survey.

The VHB team designed a short, accessible online survey on 123 Survey to gather community input on the draft alternatives. The survey content was ultimately approved by the City and NCDOT, but question types ranged from simple multiple-choice to interactive maps with drag and drop or comment options (See Appendix). Figure 2 is the interactive activity participants used to draw where they would prefer a microtransit zone to be placed. Darker red indicates areas that were drawn multiple times. The survey was open from August to November 2024 when the VHB team began finalizing the Study recommendations. The survey was online only and was accessible via QR code or link. It was advertised at Steering Committee and Stakeholder meetings, public workshops, on the City's website and social media pages, and on flyers.

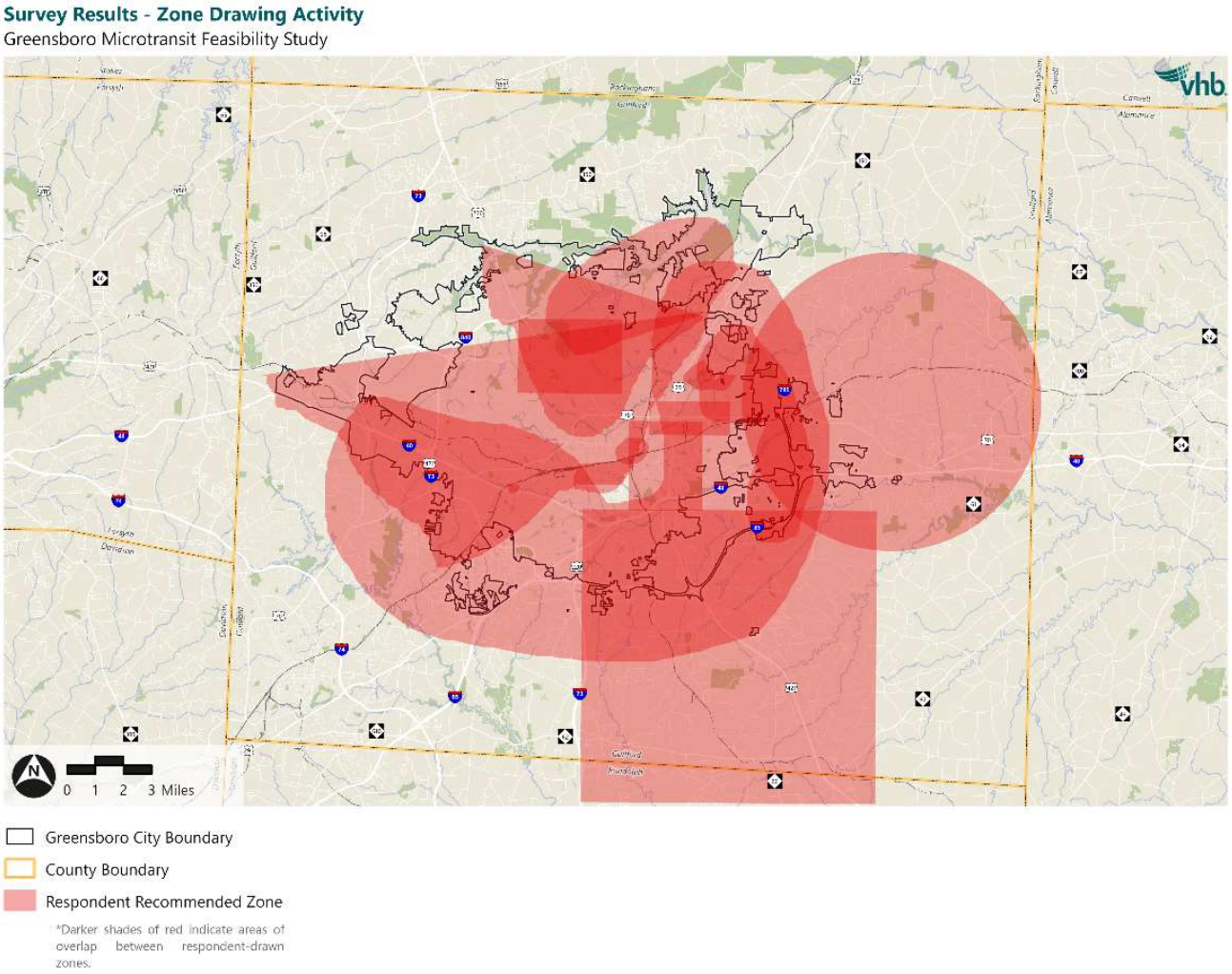


Figure 3. A map of proposed microtransit zones based on survey responses from the public. The dark red signifies overlap with other proposed zones.

Evaluation of Results

The engagement outcomes verified that the areas highlighted during the data analysis aligned with public needs. However, because the survey responses did not reach the response goal, it is not assumed that these findings are representative of the community. It is recommended that future engagement events occur later in the implementation phase, within each zone.

Appendix A: Aggregated Survey Results

Greensboro MTFS Survey

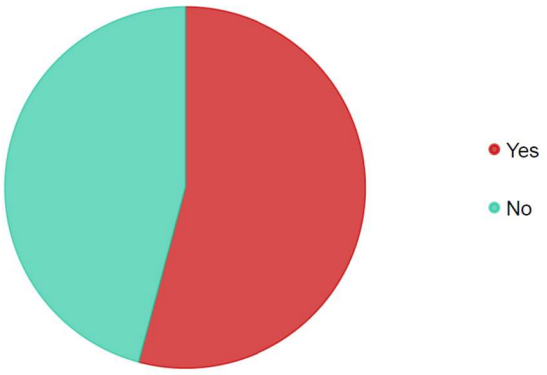
Please provide any additional comments on the proposed microtransit zones:

The word cloud requires at least 20 answers to show.

Response	Count
My name is Lowry Hill, HR assistant at Custom Converting Solutions. We are located at 1207 Boston Road, Greensboro 27407. I am taking the survey on behalf of my employees who currently use Greensboro transit to get to work.	1
Just moved to Greensboro from out of state so this being viewed by Someone quite unknowledgable to the area	1
I'm retired, but do volunteer work	1
1,2,3,4,5,6,7,8,9,12a,12,13,	1

Answered: 4 Skipped: 20

Do you currently use public transit?



Answers	Count	Percentage
Yes	13	54.17%
No	11	45.83%

Answered: 24 Skipped: 0

Which services do you use?

Answers	Count	Percentage
Bus	12	50%
On-demand service	1	4.17%
Other	1	4.17%

Answered: 12 Skipped: 12

Please specify:

The word cloud requires at least 20 answers to show.

Word	Count
6	1
biyclist	1
ride	1
bike	1
time	1
bus	1
route	1
work.	1

Answered: 1 Skipped: 23

Which bus routes do you use?

The word cloud requires at least 20 answers to show.

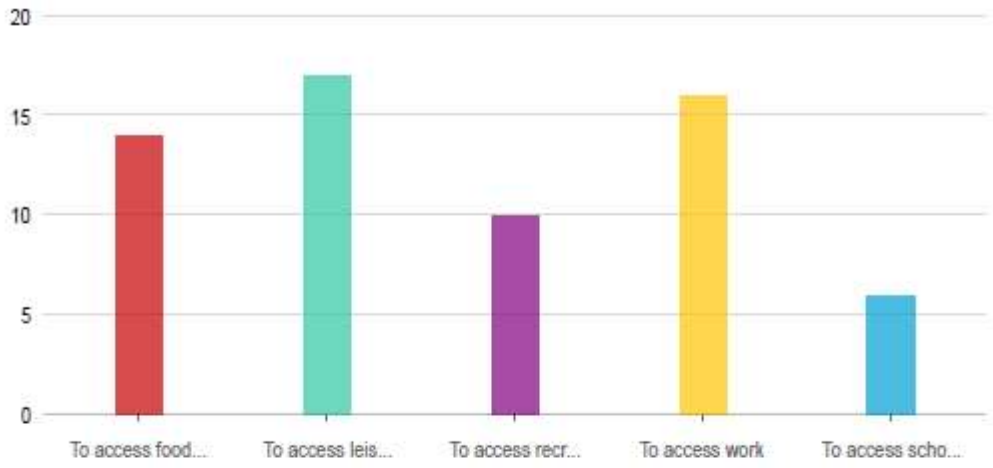
Word	Count
8	5
2	3
7	3
6	2
11	2
12	2
15	2
1	1
3	1

5	1
9	1
13	1
14	1
ride	1
Route	1
downtown.	1
weather	1
poor	1
bike.	1
crosstown	1
max.	1
Merrit	1
Drive	1
Crossmax	1
Purple	1
CMP	1
occasionally	1
17occasionally	1

Answered: 11 Skipped: 13

Would you use the potential microtransit services to get around Greensboro? If so, wha…

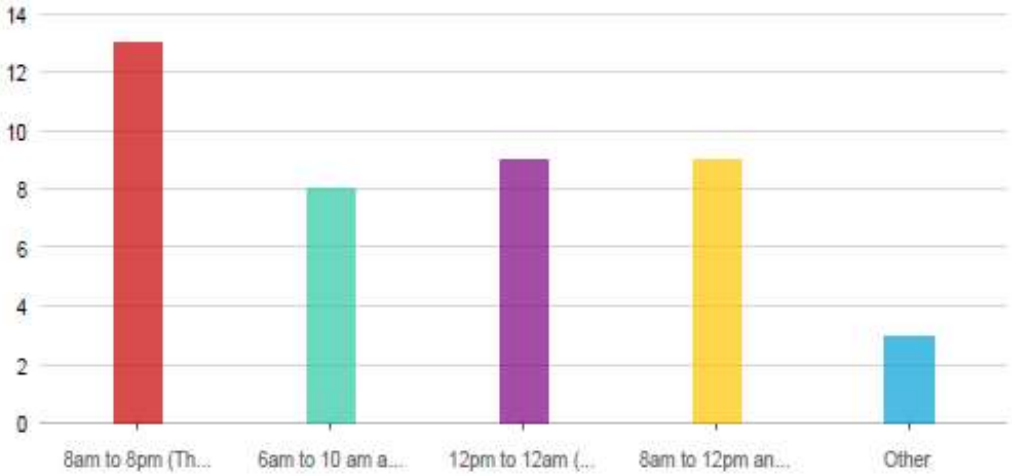
Memorandum



Answers	Count	Percentage
To access food (grocery stores, food pantries, convenience st ores)	14	58.33%
To access leisure activities (shopping, socializing)	17	70.83%
To access recreation (parks, the gym, the pool)	10	41.67%
To access work	16	66.67%
To access school	6	25%

Answered: 21 Skipped: 3

If you were to ride microtransit, what hours of operation would be the most useful for...



Answers	Count	Percentage
8am to 8pm (Throughout the day)	13	54.17%
6am to 10 am and 4pm to 8pm	8	33.33%
12pm to 12am (Midday to midnight)	9	37.5%
8am to 12pm and 6pm to 10pm	9	37.5%
Other	3	12.5%

Answered: 21 Skipped: 3

Please specify:

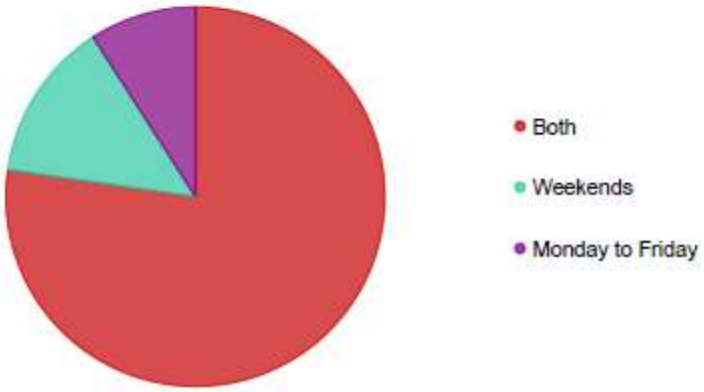
The word cloud requires at least 20 answers to show.

Word	Count
hours	2
7	1
24	1
fixed	1

routes	1
pm	1
midnight	1

Answered: 3 Skipped: 21

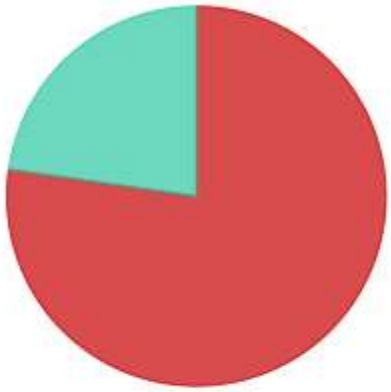
If you were to ride microtransit, what days of the week would be most useful ...



Answers	Count	Percentage
Both	17	70.83%
Weekends	3	12.5%
Monday to Friday	2	8.33%

Answered: 22 Skipped: 2

If you were to ride microtransit, how would you prefer to book a ride?



Answers	Count	Percentage
I would prefer to use an app similar to what Lyft or Uber has	17	70.83%
I would prefer to schedule on a website	5	20.83%
I would prefer to call a hotline	0	0%

Answered: 22 Skipped: 2

Please provide any other comments you have about microtransit in Greensboro:

The word cloud requires at least 20 answers to show.

Word	Count
transit	3
don't	2
good	2
defined	2
stops	2
cut	1

Memorandum

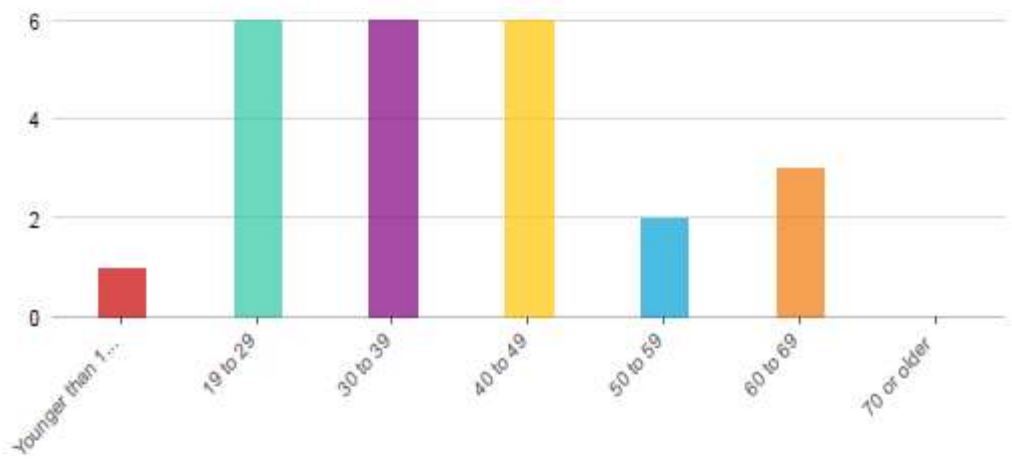
service	1
pay	1
this.	1
priority.	1
It's	1
hard	1
answer	1
questions	1
accurately	1
microtransit	1
explanation	1
is/limits/etc.	1
prior	1
background	1
info	1
sounds	1
city	1
sponsored	1
Uber/Lyft	1
question	1
accessible	1
everyone.	1
fantastic	1

addition	1
system.	1
thrilled	1
works.	1
person	1
survey	1
rarely	1
(once	1
month?	1
most.)	1
public	1
transportation	1
services	1
needed	1
ridden	1
cities	1
run	1
area	1
lot	1
efficient	1
curb	1
curb.	1
means	1

bus	1
future	1
fixed	1
route	1
service.	1

Answered: 6 Skipped: 18

Please select your age range:

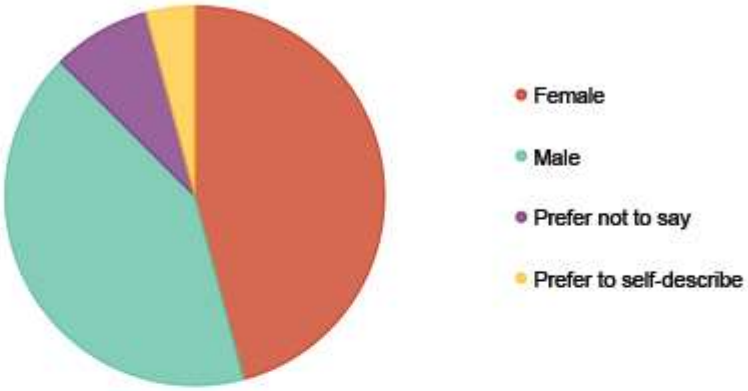


Answers	Count	Percentage
Younger than 18	1	4.17%
19 to 29	6	25%
30 to 39	6	25%
40 to 49	6	25%
50 to 59	2	8.33%
60 to 69	3	12.5%

70 or older	0	0%

Answered: 24 Skipped: 0

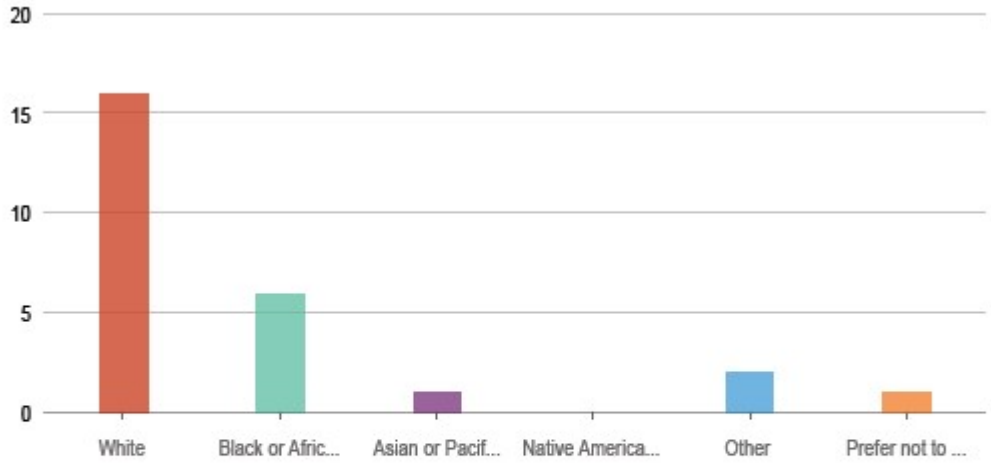
Please select your gender:



Answers	Count	Percentage
Female	11	45.83%
Male	10	41.67%
Prefer not to say	2	8.33%
Prefer to self-describe	1	4.17%

Answered: 24 Skipped: 0

Please select your race:



Answers	Count	Percentage
White	16	66.67%
Black or African American	6	25%
Asian or Pacific Islander	1	4.17%
Native American	0	0%
Other	2	8.33%
Prefer not to specify	1	4.17%

Answered: 24 Skipped: 0

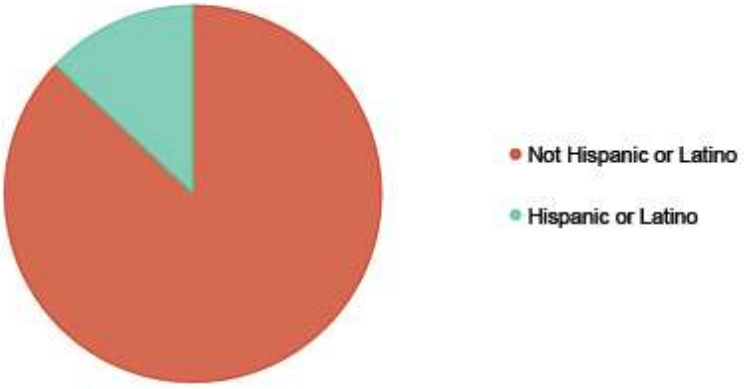
(please specify) (100 character limit)

The word cloud requires at least 20 answers to show.

Word	Count
hispanic	1
Afro-Latino	1
Panamanian	1

Answered: 2 Skipped: 22

Please select your ethnicity:



Answers	Count	Percentage
Not Hispanic or Latino	20	83.33%
Hispanic or Latino	3	12.5%

Answered: 23 Skipped: 1

q14repeat_count

Cannot display results for this question. Unable to find the field in related feature service.

Appendix B: Socioeconomic Analysis

Task 1: Existing Conditions

Introduction

This technical memorandum provides a detailed review of the current conditions and foundational planning documents that inform the potential deployment of microtransit zones within the City of Greensboro, hereafter referred to as the "City" Microtransit is a flexible, on-demand transportation service using smaller vehicles like vans or minibuses. Unlike traditional fixed route transit, microtransit uses technology to offer real-time ride requests, focusing on specific areas or zones. It complements existing transit systems by serving low-demand areas or filling service gaps and provides options when fixed route transit services are limited, aiming to enhance convenience and accessibility.

The VHB team has analyzed various existing transportation plans, reviewed geographic and demographic data, and identified key areas for potential microtransit services. This preliminary review sets the stage for subsequent analysis by highlighting trends and preliminary mappings that will guide the refinement and prioritization of microtransit zones for future implementation.

Background

3.1.1 Service Area History and Background: Greensboro Transit System (GTA)

Historical Background:

The Greensboro Transit System (GTA) has a rich and evolving history that traces back to the early 1920s[1]. The transit system initially started under the ownership of the Duke Power Company, operating as Southern Public Utilities. Key milestones include:

- **1925:** Southern Public Utilities, a subsidiary of Duke Power, begins public transportation services in Greensboro.
- **1962:** First African American driver, Ed Greenlee, takes the wheel.
- **1988:** A voter referendum authorizes a property tax to support public transit.
- **1990:** The City of Greensboro assumes operations from Duke Power, creating the Greensboro Transit Authority (GTA).
- **1991:** Formal establishment of the modern GTA.
- **1992-2024:** Numerous improvements and expansions, such as the introduction of lift-equipped buses, paratransit services, hybrid and electric buses, new routes, and advanced amenities.

Development of Transit System:

[1] About Public Transportation in Greensboro | Greensboro, NC (greensboro-nc.gov)

Urbanization, population growth, and the subsequent rise in demand for effective public transportation led to establishing and enhancing the GTA. The City of Greensboro's assumption of the transit services in 1990 marked a pivotal moment, fostering a structured and community-focused public transportation system.

Existing Transit Services:

The current services provided by GTA include:

- **Fixed-route buses:** A fleet operating 19 routes provides extensive coverage within Greensboro and meets various rider needs providing over 2 million unlinked passenger trips annually based on the 2022 National Transit Database (NTD). The 2024 GoBORO Long Range Transit Plan recommends growing operations to 28 routes. As part of this feasibility study, an analysis of fixed route efficiency was not done due to the recent extensive analysis done in the 2024 GoBORO Plan.
- **Paratransit services:** ACCESS GSO caters to individuals with disabilities who cannot use fixed-route services and offers curb-to-curb and door-to-door solutions providing over 171,000 unlinked passenger trips annually based on the 2022 NTD reporting.
- **Higher-frequency routes and weekend services:** To provide flexibility and accommodate diverse transit needs.
- **Regional connectivity:** Partnerships with the Piedmont Authority for Regional Transportation (PART) to enhance regional access.

3.1.2 Service Area Governance and Funding: Greensboro Transit System (GTA)

Governance:

GTA operates under the oversight of the City of Greensboro's Department of Transportation. The organizational structure includes the GTA Board of Trustees, now known as the Greensboro Transit Advisory Commission, composed of nine members appointed by the Greensboro City Council. This body provides strategic direction and policymaking to ensure diverse input reflective of the community's needs.

Boundaries of the Service Area:

GTA's service area primarily covers the metropolitan region of Greensboro, totaling 131 square miles and serving approximately 260,000 residents. An exception is the Jamestown campus of Guilford Technical Community College, which is outside city limits but included in the service coverage. The boundaries are set to maximize accessibility and operational efficiency.

Funding Structure:

The funding for GTA is derived from multiple sources to sustain operational and capital expenses. These include:

1. **Federal Funding:** Federal Transit Administration (FTA) grants aid in operational support and infrastructure investment.

2. **State Funding:** Contributions from the North Carolina Department of Transportation support statewide transit initiatives.

3. **Local Funding:** The City of Greensboro allocates funds from local taxes to bolster transit services.

4. **Fare Revenues:** Income from passenger fares constitutes a smaller fraction of the total revenue.

5. **Additional Revenues:** Revenue generation through advertising partnerships, sponsorships, and other innovative means.

The GTA's annual operating budget is approximately $23 million, with $1.7 million generated from pass sales and farebox revenue. Additional funding flows from the Federal Transit Administration, NC Department of Transportation, the City of Greensboro, and a lease-termination agreement with Duke Energy.

Decision-making Process:

Decision-making within the GTA involves multiple stakeholders, including the GTA Advisory Commission, city officials, and the community. Key decisions about routes, service modifications, budget allocations, and strategic initiatives involve public consultations, ridership data analysis, and alignment with broader city planning objectives. This collaborative approach ensures the transit services align with the community's needs and urban development goals.

Existing Conditions Overview

By analyzing the Metropolitan Transportation Improvement Program (2024), the 2045 Metropolitan Transportation Plan, the Comprehensive Transportation Plan (2020), the Congestion Management Process (2020), and the 2024 GoBORO Long Range Transit Plan we have pinpointed key areas where microtransit could enhance connectivity and fill existing transit gaps. These preliminary insights will guide further analysis and refine microtransit deployment strategies.

Demographics

The City of Greensboro is home to a broad and diverse population of 297,202 per American Community Census (ACS) 5-Year Estimates for 2018-2022. The City is similar in size to nearby municipalities such as Durham and Winston-Salem. The City, which has a median age of 34 and a median household income of $55,051, has become a hotspot for jobs and employment opportunities related to education, retail, and manufacturing.[2] The following section will detail the characteristics of Greensboro on a geographic scale at the census block group level.

[2] DP05: ACS Demographic and ... - Census Bureau Table

Black, Indigenous, and People of Color (BIPOC)

In Greensboro, most of the BIPOC population exists in the southeast portions of the city. Over 43% of all citizens in Greensboro identified as Black or African American, as well as 5.1% of residents identified as Asian as well. About 9% of the population identified as Hispanic or Latino. Figure 1 details BIPOC concentrations in and around the municipal boundary.

Limited English Proficiency (LEP)

The City has a smaller, more concentrated population of citizens who identified as unable to speak English 'very well', most notably between Patterson Street and High Point Road at I-40. In these block groups, nearly 30% of citizens may have some difficulty communicating explicitly in English, as shown Figure 2.

Populations Experiencing Low-Income and/or Poverty

Greensboro exhibits pockets of very high poverty, most notably in the Glendale Hills, Phillips Avenue, Arlington Park, and Glenwood communities. In these areas, over half of all residents are experiencing some form of financial stress, placing them below the poverty line. The area comprising Bennett College, a women's historically Black college (HBCU), is also categorized as low-income. Figure 3 details this trend.

Households Without a Vehicle Available for Personal Use

Most of the City's density of households without a vehicle available for personal use are concentrated in the downtown core, as seen in Figure 4. This is where most of Greensboro's colleges and universities exist, and thus may be impacted by the presence of students and temporary populations who are in and out throughout the academic year.

Disability

The City of Greensboro exhibits a notable population with one or more disabilities, specifically south of E Lee Street in the downtown core. Though several outdoor recreation opportunities and educational centers exist in this area, having the means to access these resources can sometimes prove challenging to residents relying on ADA accessible routes. Block groups adjacent to the intersection of I-85 and US-421 also exhibit high disability presence. Figure 5 shows this presence.

Population Density

Most of the population of Greensboro is concentrated in and near the downtown core, with additional subdivisions near I-85 also showing significant density. The city follows an urban-to-rural gradient, and densities of residents decrease as one moves farther from downtown. This trend is visualized in Figure 6.

Population Aged 60+

Senior populations (residents aged 60+) are also observed in pockets scattered throughout the city, most notably at the junction of I-85 and US-421. Here, block groups exhibit senior populations at rates of over 40%, meaning nearly half of all residents located in these block groups are above the age of 60. An additional retirement community exists east of Piedmont Triad International Airport, explaining the concentration of senior population in this area. Figure 7 shows this population.

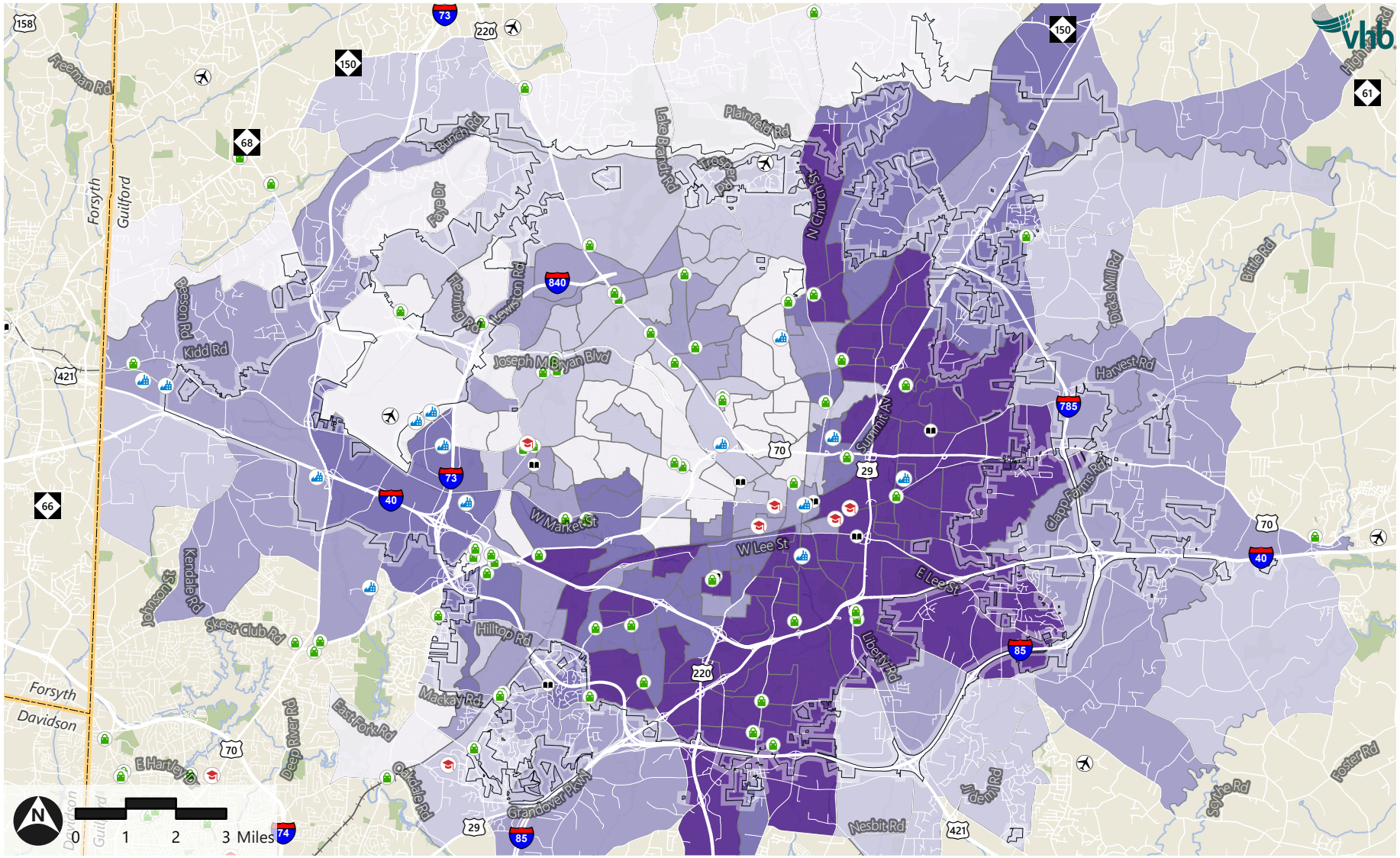
Employed Labor Force

Interestingly, the number of employed workers exhibits an opposite trend to the population density characteristics. A significant number of workers live along the City's northern boundary, as well as near the junction of I-85 and I-40 to the southeast. Large quantities of the work force also appear in the Holden Farms and Friendswood communities, as shown in Figure 8.

Figure 1:

Black, Indigenous, and Persons of Color (BIPOC) Population

Greensboro Microtransit Feasibility Study



Black, Indigenous, and Persons of Color (BIPOC) Population

- Less than 16.1%
- 16.1% - 34.4%
- 34.5% - 54.8%
- 54.9% - 77.2%
- More than 77.2%

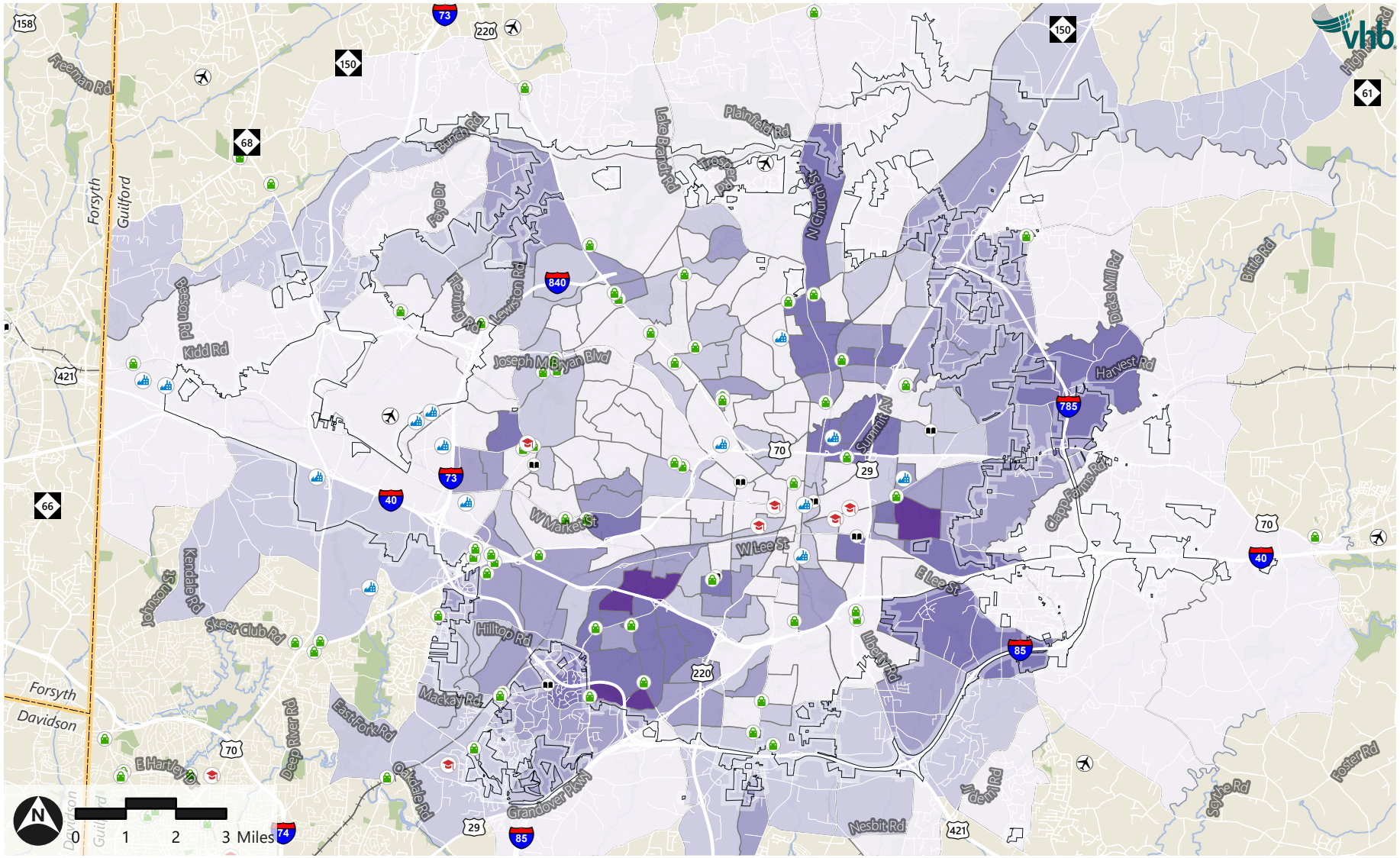
- Greensboro City Boundary
- County Boundary

- Airport
- Colleges and Universities
- Grocery Store
- Major Employers
- Public Library

Figure 2:

Percent of Population with Limited English Proficiency (LEP)

Greensboro Microtransit Feasibility Study



Percent of Population With Limited English Proficiency (LEP)

- Less than 2.7%
- 2.7% - 7.6%
- 7.7% - 15.5%
- 15.6% - 28.9%
- More than 28.9%

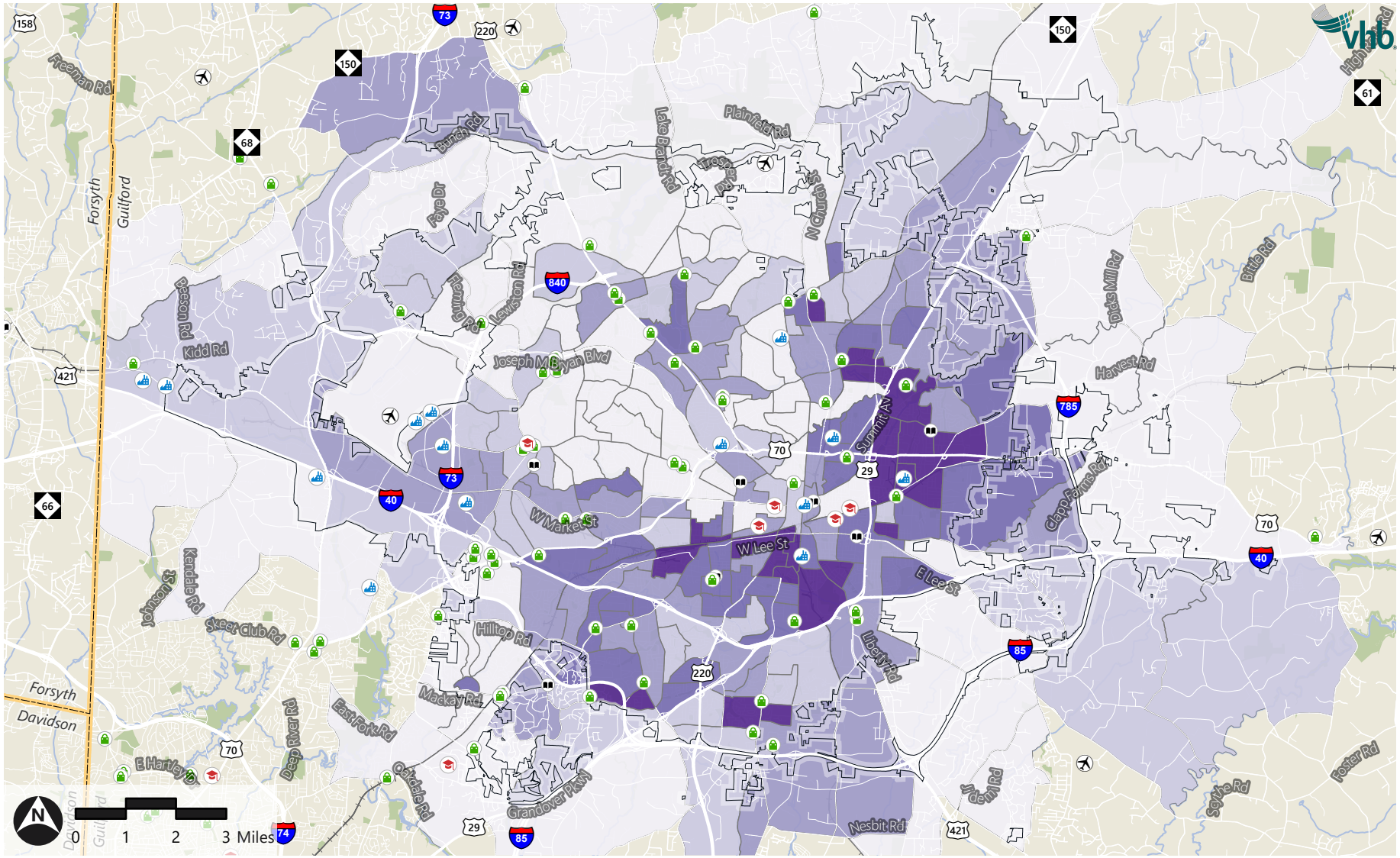
- Greensboro City Boundary
- County Boundary

- Airport
- Colleges and Universities
- Grocery Store
- Major Employers
- Public Library

Figure 3:

Percent of Population Categorized as Low-Income

Greensboro Microtransit Feasibility Study



Percent of Population Categorized as Low-Income

- Less than 12.3%
- 12.3% - 24.7%
- 24.8% - 38.4%
- 38.5% - 56.1%
- More than 56.1%

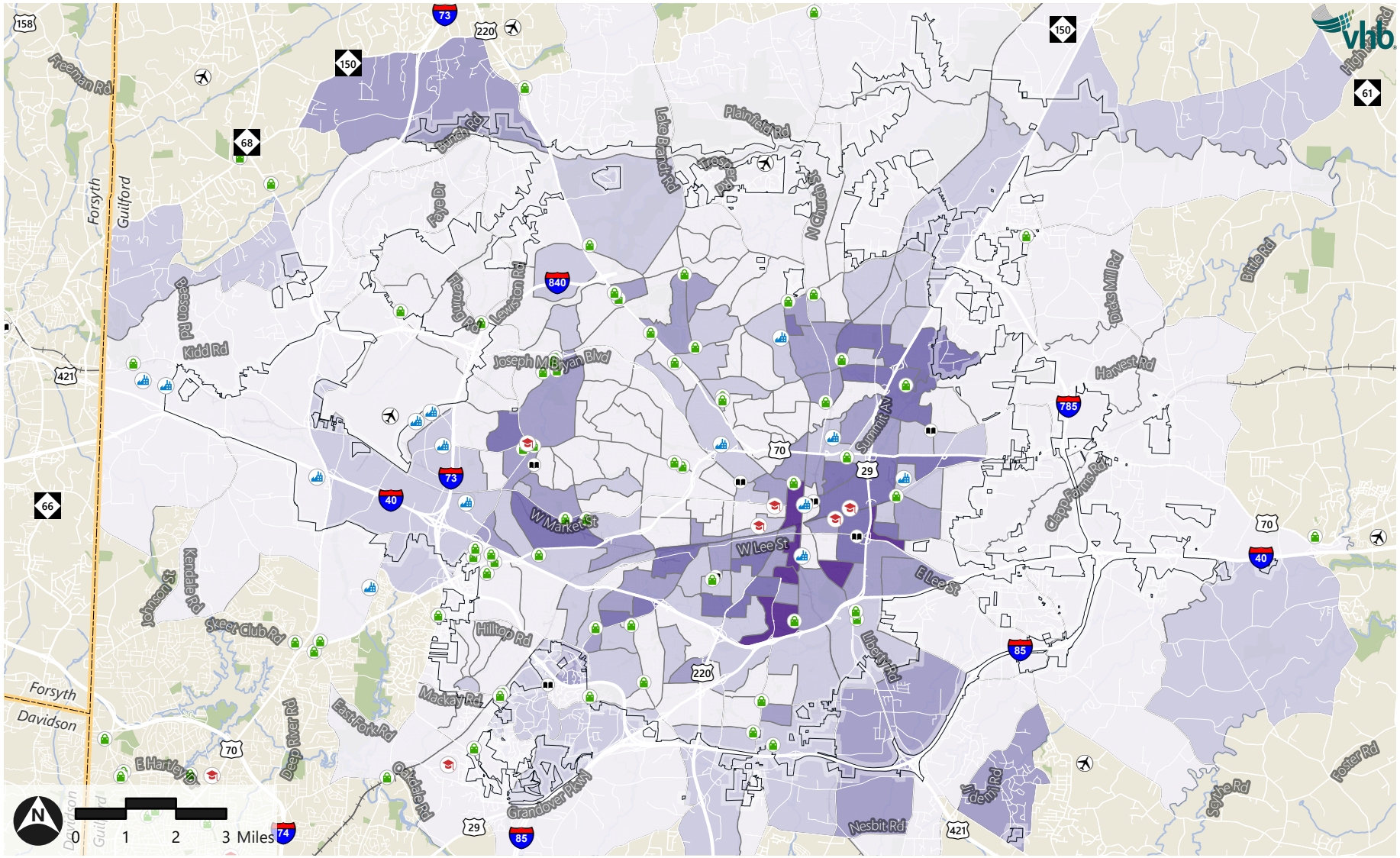
- Greensboro City Boundary
- County Boundary

- Airport
- Colleges and Universities
- Grocery Store
- Major Employers
- Public Library

Figure 4:

Zero Vehicle Households (ZVH)

Greensboro Microtransit Feasibility Study



Percent of Households Without a Vehicle Available for Personal Use

- Less than 3.8%
- 3.8% - 10.4%
- 10.5% - 20.3%
- 20.4% - 37.3%
- More than 37.3%

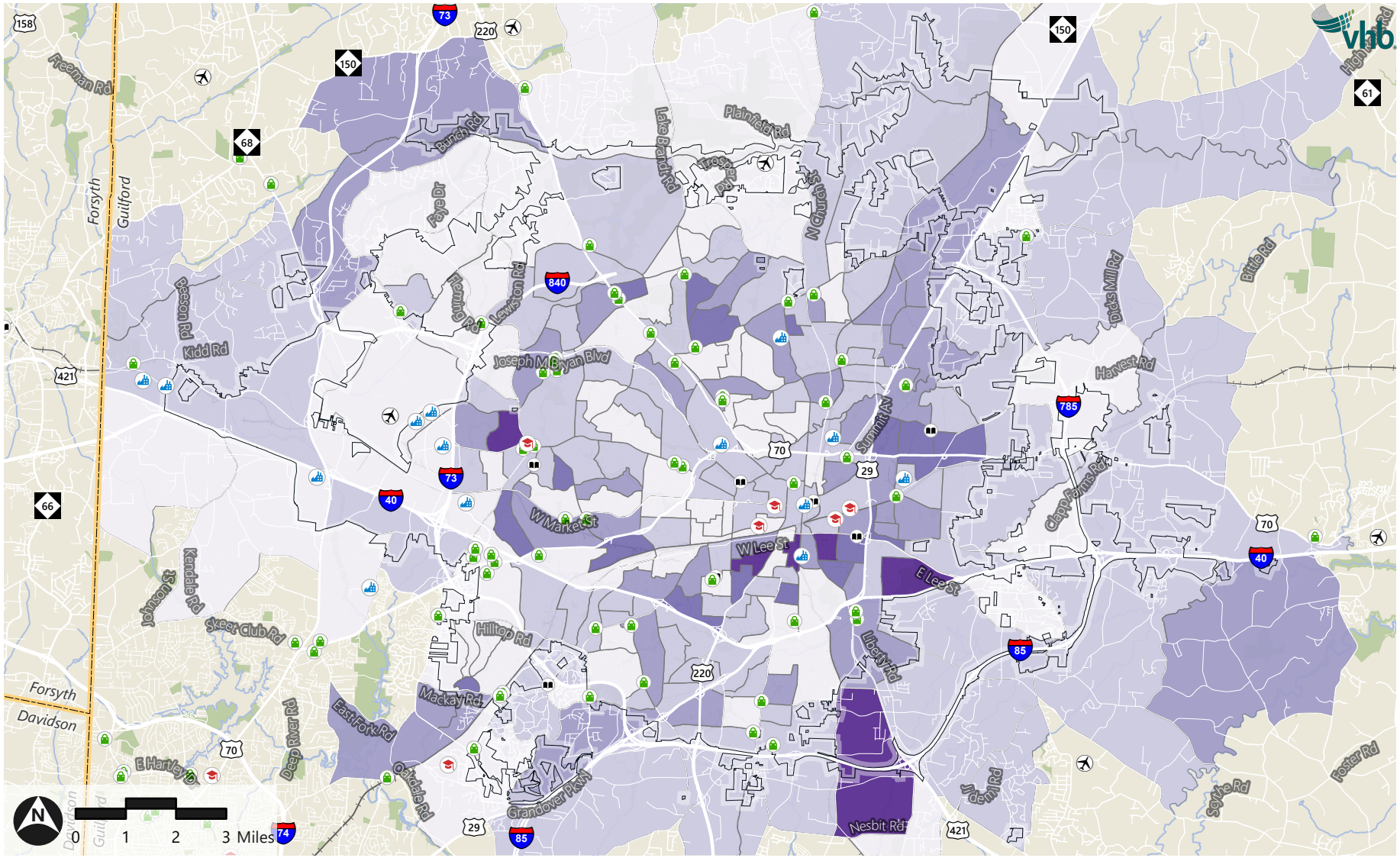
- Greensboro City Boundary
- County Boundary

- Airport
- Colleges and Universities
- Grocery Store
- Major Employers
- Public Library

Figure 5:

Disability Prevalence

Greensboro Microtransit Feasibility Study



Percent of Population with One or More Disabilities

- Less than 10%
- 10% - 17%
- 18% - 25%
- 26% - 36%
- More than 36%

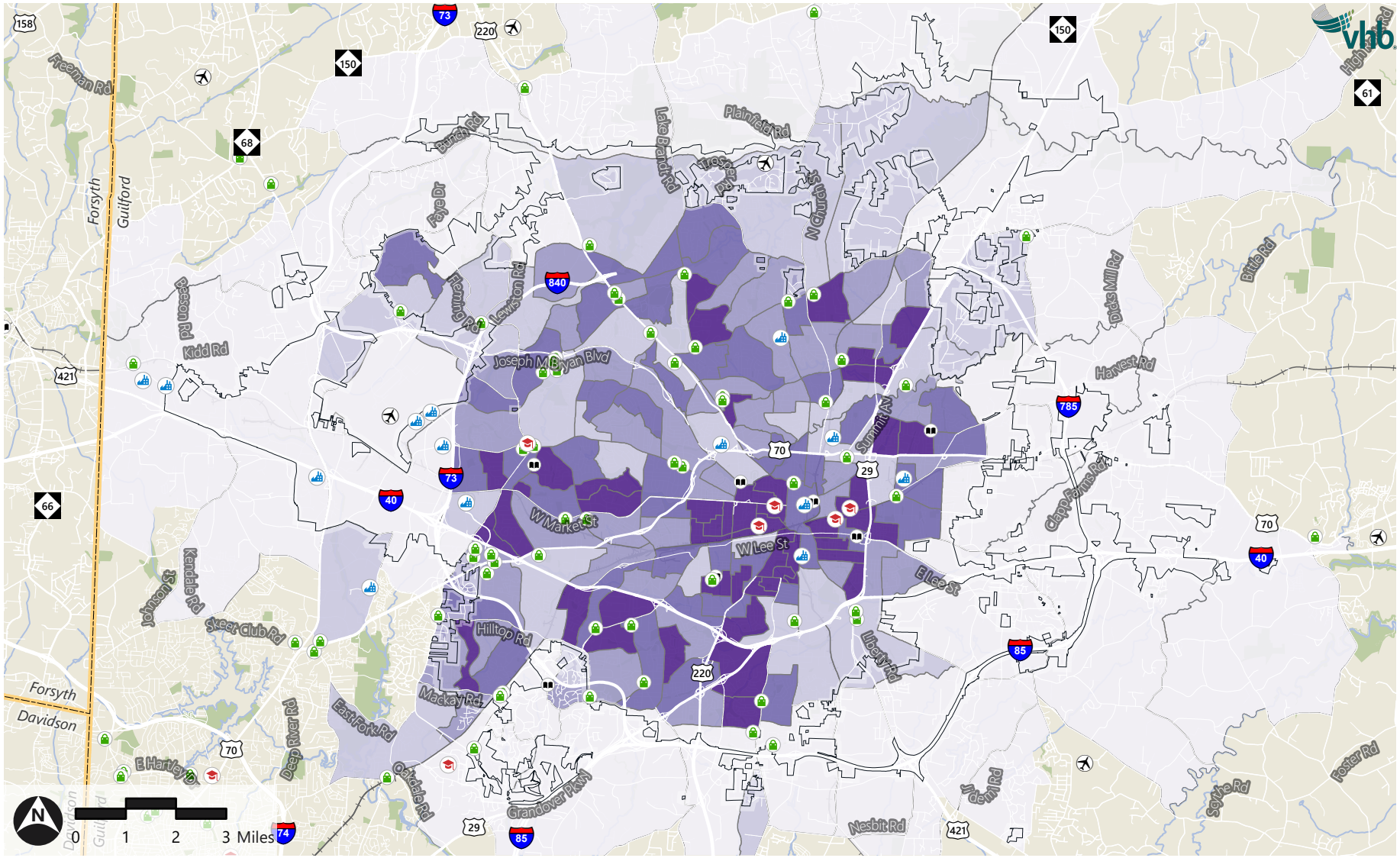
- Greensboro City Boundary
- County Boundary

- Airport
- Colleges and Universities
- Grocery Store
- Major Employers
- Public Library

Figure 6:

Population Density

Greensboro Microtransit Feasibility Study



# of Persons per Square Mile

- Less than 877
- 877 - 1942
- 1943 - 2693
- 2694 - 3704
- More than 3,704

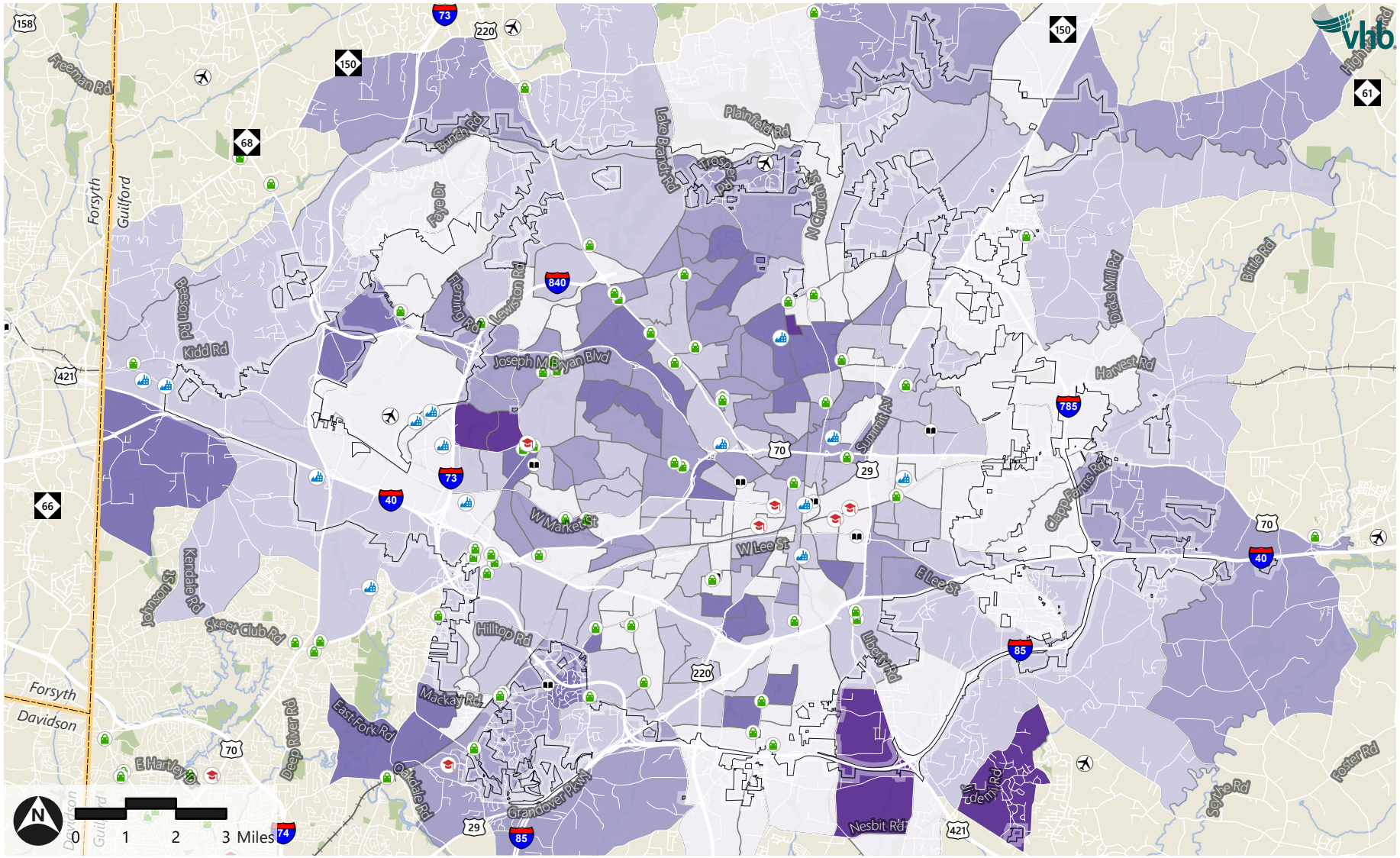
- Greensboro City Boundary
- County Boundary

- Airport
- Colleges and Universities
- Grocery Store
- Major Employers
- Public Library

Figure 7:

Percent of Population Aged 60+

Greensboro Microtransit Feasibility Study



Percent of Population Aged 60+

- Less than 10%
- 10% - 18%
- 18.1% - 27.4%
- 27.5% - 41.9%
- More than 41.9%

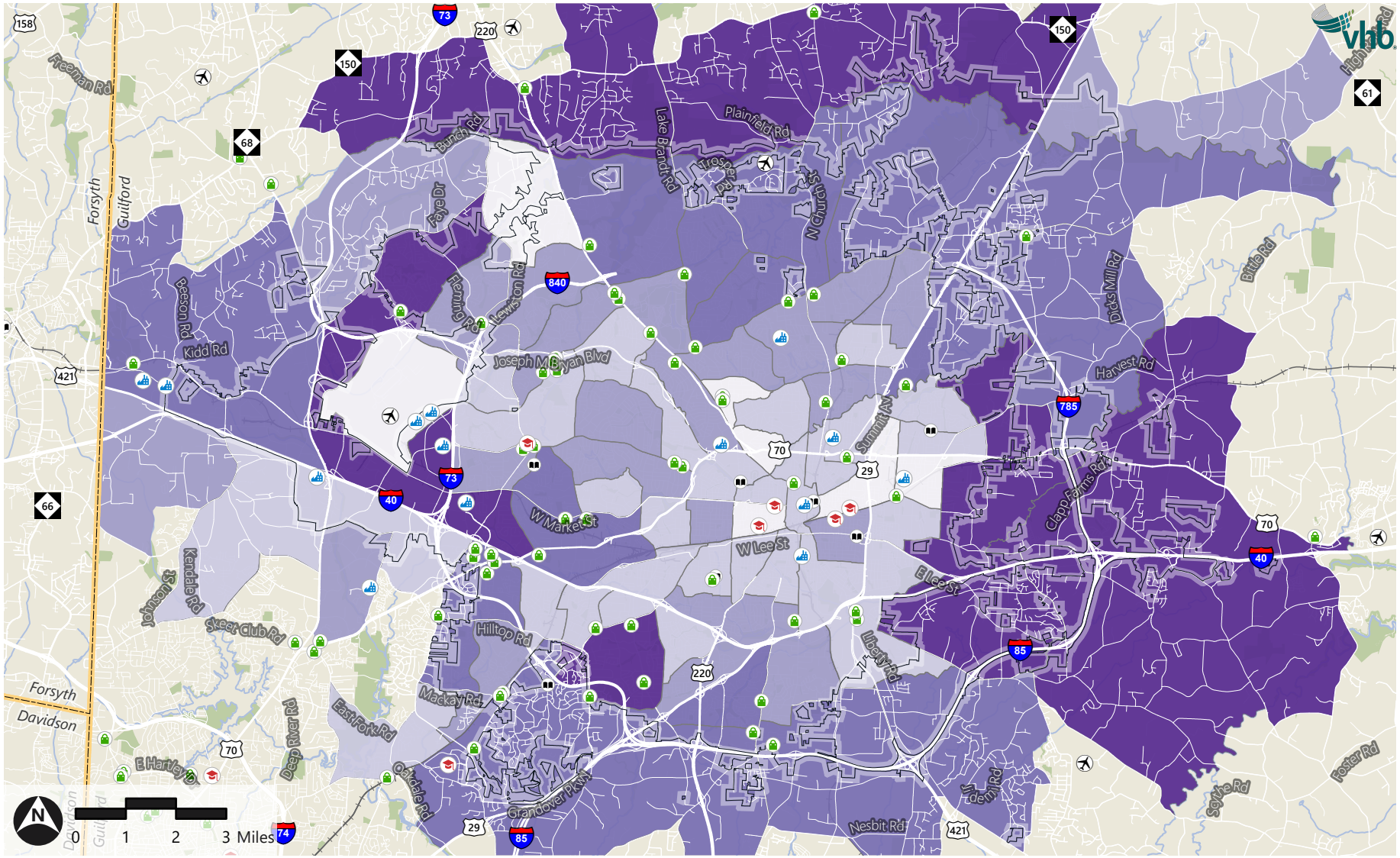
- Greensboro City Boundary
- County Boundary

- Airport
- Colleges and Universities
- Grocery Store
- Major Employers
- Public Library

Figure 8:

Employed Labor Force

Greensboro Microtransit Feasibility Study



# of Employed Workers in the Labor Force

- Less than 971
- 971 - 1,734
- 1,735 - 2,527
- 2,528 - 3,546
- More than 3,546

- Greensboro City Boundary
- County Boundary

- Airport
- Colleges and Universities
- Grocery Store
- Major Employers
- Public Library

Relevant Plans Reviewed

The following table outlines the previous plans that were reviewed, including the most recent GoBORO plan. The key takeaways identify recommendations and projects listed in each plan that are relevant to the implementation of microtransit in the City. Many include reference to significant roadway improvements, transit planning, and bicycle and pedestrian improvements.

Table 1: **Reviewed Plans**

Plan	Year	Takeaways
Metropolitan Transportation Improvement Program	2024	1. **Corridor Upgrades to Interstate Standards:** ○ **R-5889:** Upgrade corridor from North of I-785 in Greensboro to US 158/NC 14 in Reidsville. ○ **R-5889A:** Upgrade corridor from North of I-785 to NC 150. 2. **Pavement Rehabilitation:** ○ **I-5955:** South Buffalo Creek Bridge area from East of US 220 (Freeman Mill Road) to SR 3037/SR 4240 (East Gate City Boulevard) in Greensboro. ○ **I-5953:** From I-85 to US 70. ○ **I-5955A:** South Buffalo Creek Bridge area, including rehabilitating multiple bridges over I-40 (Bridges 400678, 400367, 400364, 400357, 400349). 3. **Interchange and Intersection Improvements:** ○ **I-5964:** Elm-Eugene Street in Greensboro. ○ **U-5812:** Intersection improvements at multiple points, including Lawndale Drive, Pisgah Church Road, and Martinsville Road. ○ **U-5754:** Enhance I-40/Business 85 Eastbound Ramp onto Northbound US 29/US 70/US 220 and extend the Southbound Ramp onto SR 3762 (Martin Luther King Drive). 4. **Bridge Replacements:** ○ **B-5356:** Replace bridge 400299 over South Buffalo Creek along I-40/Business 85/US 29/US 70/US 220 in Greensboro. ○ **B-5713:** Replace Bridge 400352 over I-40/Business 85 in Greensboro.

		○ **B-5119:** Replace bridges 400291 and 400349 over US 29/US 70/US 220 in Greensboro. 5. **Modernization and Added Infrastructure:** ○ **HL-0046:** Modernize Willow Road to Florida Street in Greensboro, including adding a curb and gutter and constructing sidewalks. ○ **EB-5995:** Construct sidewalk from Pisgah Church Road to Lake Brandt Road in Greensboro. ○ **U-2524C:** Greensboro Western Loop from North of SR 2176 (Bryan Boulevard) to US 220 (Battleground Avenue). 6. **Bridge Rehabilitation:** ○ **I-5955:** Extensive rehab of South Buffalo Creek Bridge and surrounding structures. ○ **B-5119:** Replacement of bridges over key highways in Greensboro. 7. **Traffic Signal and Intersection Enhancements:** ○ **HS-20071:** Intersection improvements at SR 4240 (East Gate City Boulevard/Lee Street) at I-40 westbound ramps, including installing traffic signals and turn lanes. 8. **Roadway Improvements:** ○ **U-2581BA:** Road improvements from SR 3045 (Mount Hope Church Road) to SR 2826 (Birch Creek Road).
2045 Metropolitan Transportation Plan	2020	1. **Renovation of J. Douglas Gaylon Airport (TD-5279)**: ○ Project involves significant renovation and enhancement of J. Douglas Gaylon Airport facilities. ○ Aimed at improving airport infrastructure to support increased passenger and cargo traffic.

		○ Intended to boost regional accessibility and economic growth through improved air transport services. 2. **Expanded Sunday Service and New Service Operational Funding (TL-0012)**: ○ Introduction of expanded Sunday public transit services. ○ Ensures greater accessibility and convenience for residents needing transportation on weekends. ○ This includes operational funding to support the new services and improve overall public transit availability. 3. **Transit Safety Innovations (TT-5207)**: ○ Implementation of advanced safety measures for public transit systems. ○ Focus on enhancing passenger safety through innovative technologies and strategies. ○ Includes infrastructure upgrades and operational improvements to make transit systems more secure and reliable.
Comprehensive Transportation Plan	2020	1. **Route 12A**: ○ Amtrak/Freight Route ○ Regional bus corridor 2. **East Zone Response Zone**: ○ Amtrak/Freight Route ○ Regional bus corridor 3. **Southeast Demand Response Zone**:

		○ Regional bus corridor 4. **Reedy Fork Demand Response Zone**: ○ Regional bus corridor 5. **Route 17**: ○ Urban fixed bus corridors ○ Regional bus corridor
Congestion Management Process	2020	**Overall Growth and Modes of Transport** • GUAMPO has seen considerable growth in most transportation modes since the 2014 CMP update, except for public transport, which has remained at previous levels due to flat or reduced revenues. • The growth includes several miles of new roadways and sidewalks, while public transportation has maintained similar service levels with some route adjustments. **2. Roadway Conditions** • **High Dependence on Cars:** 91.2% of Guilford County's population commutes by car, contributing to an estimated daily VMT of nearly 14 million for the Greensboro Urban Area. • **Improvements:** ○ **Non-Capacity:** Signal timing optimization and new traffic signal system installation with enhanced safety features like flashing yellow arrows. ○ **Capacity:** Completed 36.9 miles of road widening/new construction and various intersection improvements. **3. Pedestrian and Bicycle Infrastructure**

		• Since 2017, 39 sidewalks and 50.4 miles of bicycle facilities (lanes, routes, paths) have been constructed.
		• The BiPed Plan guides the development of a comprehensive system of greenway, bicycle, and pedestrian facilities.
		• **Policies and Programs:**
		  ○ The Walkability Policy aims to make Greensboro more pedestrian-friendly by implementing targeted sidewalk programs and improving safety measures.
		  ○ Vision Zero Greensboro initiative strives to eliminate traffic fatalities and serious injuries through data analysis and safety improvements.
		  ○ Significant growth in greenways and natural surface trails, primarily within the City of Greensboro.
		4. Public Transportation
		• The Greensboro Transit Agency (GTA) managed considerable past growth in ridership but faced recent declines due to financial constraints.
		  ○ **Mobility Greensboro 2040 Plan:** Aims to boost service efficiency and define core routes to improve ridership.
		  ○ GTA serves areas within Greensboro with fixed routes, SCAT for disabled passengers, and HEAT routes for university connections.
		• **Regional Public Transportation:**
		  ○ **PART:** Operates regional bus and vanpool services and has experienced steady ridership growth due to enhanced services.
		  ○ Utilizes federal, state, and local funding for stable financial backing.

		○ Programs like the Vanpool and STRNC promote carpooling and alternative transportation strategies.
GoBORO		**Key Findings:** • The new Crossmax Purple service results from the GoBORO process and connects NC A&T, UNCG, GTCC Greensboro, major retail centers, dense residential areas, and Downtown Greensboro. • People will ride transit if it helps reach their destinations, resulting in higher ridership. • Frequent routes running through Downtown minimize the need for transfers, saving riders time and enhancing the transit system's reliability. • 59% of residents are close to transit in the Draft Network, compared to 52% in the Existing Network, showing modest improvement in proximity. • The Draft Network would bring frequent, applicable service close to about 84,000 residents and 70,700 jobs in Greensboro during most of the day, representing around 30% of the City's population and 43% of the jobs. • Over half of those surveyed prefer a ridership concept across every category. • Regular bus riders, people with lower incomes, and People of Color tend to prefer the Ridership Concept more than non-regular riders, people with higher incomes, and Non-Hispanic White/Caucasian individuals. • Younger respondents prefer the Ridership Concept more than older respondents. • 85% of residents surveyed indicated support for 'some' or 'large' increase in transit funding. • 80% of residents surveyed indicated support for a half-cent sales tax increase for funding. • The Council recommended that 70% of transit resources in the GoBORO Draft Network be allocated toward ridership and 30% toward coverage goals. • Roads with new coverage under the draft network include Creek Ridge Road, Lynhaven Drive, Greenhaven Drive (Route 2A), Hester Park, Groometown Road (Route 2B), West Friendly Avenue to CTC (Route 4), West Market Street to CTC (Route 5A), New Garden Road, North College Road, PTI Airport to CTC (Route 5B), Hilltop Road, and Stanley Road (Route 6B). • Demand response zones effectively provide comprehensive coverage in low-density areas with disconnected streets, such as Reedy Fork, Eastern Greensboro, Southeastern Greensboro, Bryan Park, Keeley Park, and the Publix Distribution Center. These zones operate from 6 a.m. to 10 p.m.

		• The disconnected streets include Reedy Fork, Eastern Greensboro, Southeastern Greensboro, Bryan Park area, Keeley Park Area, and Publix Distribution Center. • The Martin Ave and Green Valley communities may experience reduced job access under the draft network. • Currently, 52% of Greensboro's residents and 64% of jobs are close to transit. • Scaling up service from today's resource level to the level in GoBORO will take multiple years due to bus procurement, infrastructure creation, and staffing, affected by population growth. • Greensboro must invest in sidewalks, bike lanes, bus lanes, trails, safe crossings, bus shelters, and transit hubs to make good transit service possible. • Greensboro should consider a transit overlay on the Land Use and Zoning Maps, tying TOD-supportive regulations to frequent crosstown corridors in GoBORO and making transit and ridership information more visible in public materials. • Communities like Revolution Mill and Westridge Square must be evaluated for reduced accessibility through the draft network. Evaluating demographics in these areas could be beneficial.

Next Steps

Taking into consideration the demographics analysis and the plans reviewed, the next steps for the Greensboro Microtransit Feasibility Study are to overlay the demographics with the recommended GoBORO Demand Response Zones, the existing and recommended fixed route service, and paratransit services. This is to ensure that these recommended zones are in fact creating equitable coverage for the areas of Greensboro that are noted in GoBORO to have reduced accessibility to a fixed route, byway of the new draft network being implemented.

Further analysis will be done on travel patterns and origin and destination data to understand key destinations for travel. A matrix will be created for each demand response zone and how it scores based on connectivity to key demographic markers, origin and destination needs, among other metrics.

Public engagement will begin to speak with key stakeholders in Greensboro. It is of interest how particular community members would like to utilize a service like microtransit.