KITTELSON & ASSOCIATES

ONSLOW COUNTY MICROTRANSIT FEASIBILITY STUDY

Onslow United Transit System (OUTS)

December 30, 2024

Onslow County Microtransit Feasibility Study

Onslow County, North Carolina

Prepared for:
NCDOT - Integrated Mobility Division
Onslow United Transit (OUTS)

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Introduction

Introduction

Onslow United Transit System (OUTS) was awarded a Microtransit Feasibility Study Grant by NCDOT Integrated Mobility Division to study microtransit potential in Onslow County. The purpose of the study was to engage local stakeholders and the public about microtransit, understand local transit and travel patterns, identify the most feasible microtransit zones, and recommend implementation strategies. Microtransit provides technology-enabled transportation service that serves passengers using dynamically generated routes within a specific service zone to supplement existing transportation options. Service may be door-to-door or may have passengers make a short walk to common pick-up or drop-off points near their final destinations. Microtransit offers flexible routes, compared with fixed routes or stops with traditional transit service, and typically utilizes smaller vehicles like minibuses or vans. It also is related but different from current ride hailing services such as Uber and Lyft, as microtransit typically operates within designated zones providing shared rides. Microtransit services are operated all around the country, in rural, urban, and suburban areas, and by agencies of different sizes. The service can be publicly or privately operated. The project team documented three potential microtransit models for OUTS to consider (Table 1):

Table 1. Summary of Potential Microtransit Service Models

Model	Agency Responsibilities	Vendor Responsibilities
Transportation as a Service (TaaS)	• Develop microtransit zones • Define microtransit service parameters and requirements • Oversee performance and service of the vendor • Market the service and educate the public	• Offer an application-based booking options integrated with other travel applications • Trip scheduling and dispatch • Provide technical and customer support functions for the service • Manage driver and vehicle availability to meet agency performance standards • Provide drivers, accessible vehicles, communications services (cell, radio, phone etc.), and maintenance
Software as a Service (SaaS)	• Develop microtransit zones • Define microtransit service parameters and requirements • Provide drivers, vehicles, and maintenance • Market the service and educate the public	• Offer app-based booking options integrated with other travel applications • Provide trip scheduling and dispatch • Provide technical and customer support functions for the service • Manage driver and vehicle availability to meet agency performance standards • Provide drivers, accessible vehicles, communications services (cell, radio, phone etc.), and maintenance"
Hybrid	• Custom combination of responsibilities	• Custom combination of responsibilities

The project team identified a total of 14 potential microtransit zones and provided prioritization recommendations for an initial pilot. Lastly, the project team documented overall recommended next steps for OUTS to consider piloting a microtransit service.

PROJECT OVERVIEW

This study had six key tasks. Table 2 provides an overview of key activities and the feasibility study timeline.

Table 2. Onslow County Microtransit Feasibility Study Overview

Task	Description	Timeline
Local Context	Documented service area history and background, governance and funding, and existing plans and programs at the local, regional, and state level that impact transit in the region	(May 2024-June 2024)
Public and Stakeholder Engagement	Developed a strategy designed to understand how riders in Onslow County may react to changes in the existing service, including a project Steering Committee, stakeholder interviews, public meeting, and online survey	(May 2024-December 2024)
Needs Assessment and Gap Identification	Summarized existing conditions, including a summary of land use, transportation infrastructure and travel patterns, and community demographics. Other elements included three peer agency case studies, potential demand for microtransit service, fixed route analysis, microtransit service model documentation, and a benefit/impact analysis	(May 2024-October 2024)
Cost Estimation and Ridership Demand	Estimated costs of service, such as vehicle requirements and operating cost, as well as ridership and demand	(November 2024-December 2024)
Feasibility and Implementation	Developed marketing steps such as branding and promoting the new service, developing an example request for proposals for a microtransit vendor, and developing cut sheets for the recommended zones	(November 2024-December 2024)
Final Report	Developed final report that highlights the key findings and recommendations of the study	(November 2024-December 2024)

OUTS Vision and Goals

The feasibility study builds on the vision and goals for transportation in Onslow County. The 2009 Onslow United Transit System Community Transportation plan established the following vision:

> *"Jacksonville Transit and Onslow United Transit System will grow the region's public transportation services by creating public buy-in; changing mindsets about transit; and conducting long-range planning, while giving citizens the tools to succeed in life; providing them with mobility options and choices; and offering transit services to everyone."*[1]

Mission: *Be the first choice in safe, reliable, comfortable transportation for everyone in Onslow County*.[1]

During the 2022 North Carolina Department of Transportation (NCDOT)'s Integrated Mobility Division (IMD) Transit Visioning Workshop, OUTS developed additional goals for the agency:

[1] https://www.onslowunitedtransit.org/mission/

Goals:

- Have more flexibility in funding (not restricted by geographic location, trip purpose, disability)
- Cultivate better partnerships

Project Steering Committee

The project team established a steering committee to guide the project and provide feedback on key deliverables. The steering committee had representatives from local government departments, state agencies, and non-profits (Table 3).

Table 3 Steering Committee Members

Name	Organization
Alaric Robinson	Jacksonville Transit Authority
Anthony Prinz	Jacksonville Transit Authority
Bill Jones	Onslow United Transit
Brenda Schuffert	Onslow County Health Department
Clay Calhoun	Onslow County
Danny Ferucci	Onslow United Transit
Fred Fontana	North Topsail Beach
Gregg Whitehead	Town of Richlands
Heather Reynolds	Town of Holly Ridge
Jon Barlow	Town of Swansboro
Kari Sanders	Onslow County
Kevin Bacher	Community Care of the Lower Cape Fear
Shanna Rios	Onslow County Health Department

Public and Stakeholder Engagement

The project team gathered public feedback through two steering committee meetings, stakeholder focus group interviews, a public meeting, and a survey. Engagement occurred throughout the project:

- Website (launched June 2024): https://publicinput.com/onslow-united-transit-system
- Steering Committee Meeting #1 (June 2024)
- Stakeholder focus group interviews (July 2024) with transportation providers, County staff, and city representatives.
- Survey (October 14, 2024, to November 11, 2024). The project team did outreach for the survey via virtual postcard, email listservs, and word of mouth.
- Public meeting (November 11, 2024)
- Steering Committee Meeting #2 (October 2024)

Key takeaways from public and stakeholder engagement are provided in Section 2 Summary of Findings and incorporated into the recommendations.

Section 2
Summary of Findings

Summary of Findings

This section provides a summary of key deliverables and findings throughout the Onslow County Microtransit Feasibility Study.

LOCAL CONTEXT

In 2001, OUTS partnered with the City of Jacksonville to create the region's first fixed route bus service, which operates today though Jacksonville Transit. Jacksonville Transit provides fixed-route bus service within the City of Jacksonville and parts of Onslow County, Express Route service between the city and adjacent military installations, and complementary paratransit service.

To date, OUTS owns and operates a 20-vehicle fleet and continues to coordinate demand response general public transportation and Americans with Disabilities Act (ADA) Complementary Paratransit Service throughout all of Onslow County.[2] Funding for operating and capital costs comes from state, federal, and local sources. Contract revenue funds 67% of the operating cost with the remainder comprising of local, state, and federal funds. Capital costs are funded entirely from state and federal grants and local contributions.[3]

Over the past 15 years, regional and county-wide planning has positioned Onslow County to improve transit accessibility for all residents. Key plans, including the 2009 Onslow County United Transit System Community Transportation Plan and the 2020 Jacksonville Urban Area MPO 2045 MTP, highlight similar priorities: sustainable funding, strong partnerships, and expanding service reach. With state and federal grants covering about a third of its funding, OUTS aims for a resilient funding mix to adapt to future changes. Collaboration with Jacksonville Transit and Department of Social Services (DSS) groups helps streamline services, reducing duplication. Recognizing service gaps, OUTS seeks to connect rural areas to Jacksonville Transit fixed routes. Planned regional transit investments, such as service to public events and military bases, will further require cross-jurisdictional cooperation.

EXISTING CONDITIONS

The project team summarized a variety of data and information about the transit environment in Onslow County, providing a foundation for the development of microtransit services in the area. A crucial task is to understand the existing context of Onslow County, including the performance of the broader transportation system, the population composition, underlying land uses, and existing travel patterns. New microtransit services are informed by this context, as this information helps identify what is working well and where the existing services may be falling short of meeting mobility needs.

Socioeconomic and Demographic Characteristics

In Onslow County, understanding demographic and socioeconomic characteristics is crucial for gauging current and future transit demand. Higher concentrations of residents or jobs typically correlate with

[2] https://www.onslowunitedtransit.org/wp-content/uploads/2024/01/OUTS-Title-VI-Plan_Signed-November-2023.docx-1.pdf
[3] https://jumpo-nc.org/wp-content/uploads/2020/03/2045-MTP-Adopted-3-12-2020.pdf

increased transit ridership, as more people and jobs per acre result in more transit users. Minority populations show a higher tendency to use transit compared to the general population. Low-income populations often depend heavily on transit and may have jobs requiring non-traditional commuting hours. Individuals with disabilities often depend on public transportation for their daily needs. Seniors, defined as those over 65, often prefer using public transit for various reasons, including a greater comfort level with buses compared to driving. Key findings are shown in Figure 1.

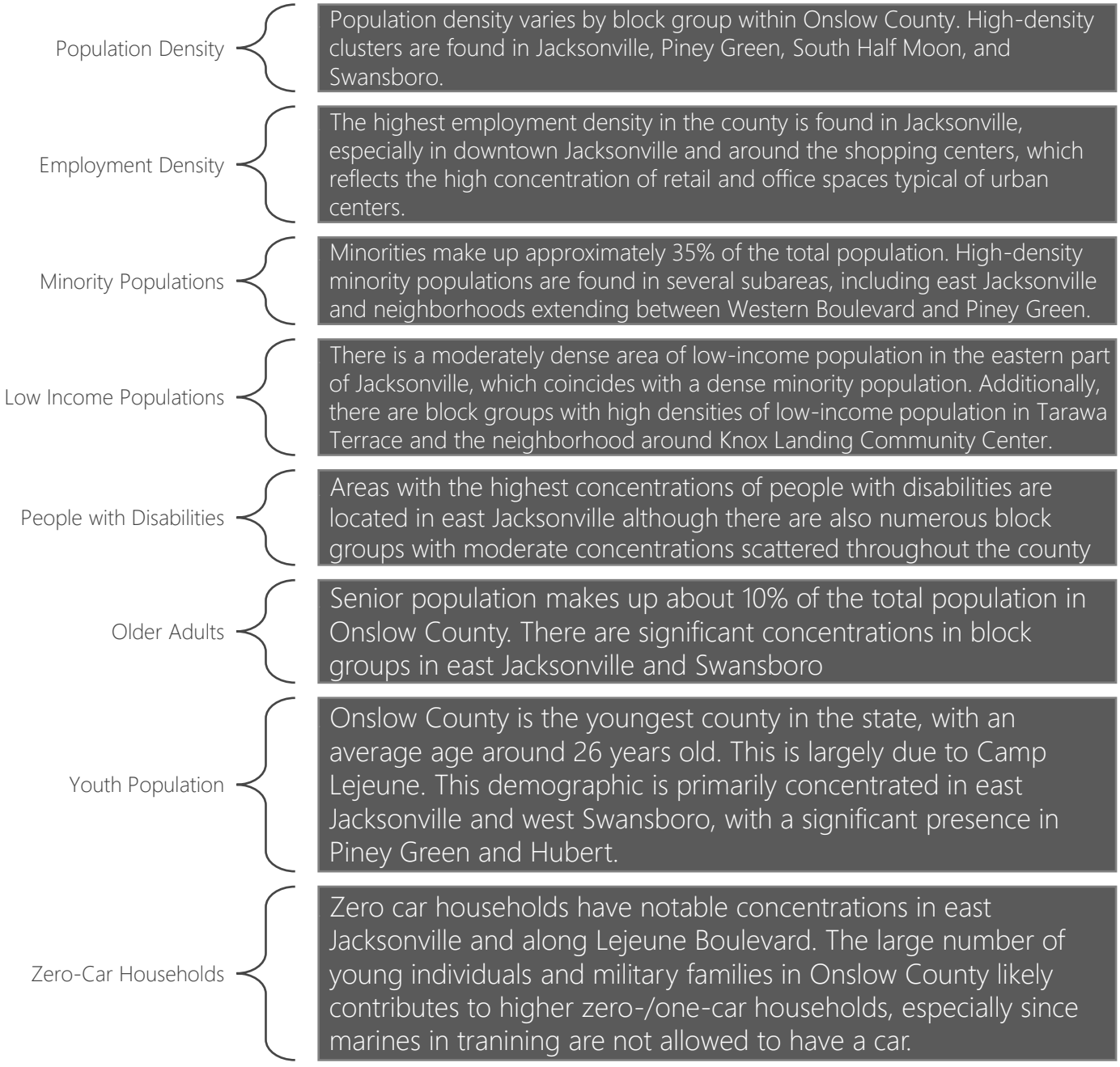

Figure 1. Key Findings for Community Demographics

Transportation Systems

OUTS and Jacksonville Transit are the two transit operators in the county, providing different types of local public transit services. Existing transit system data were received from OUTS, including both OUTS demand response services and Jacksonville Transit fixed-route services. Jacksonville Transit focuses on the urban area by operating four local fixed routes (Figure 2), one express fixed route, and year-round paratransit service.[4] Riders dial a Jacksonville Transit call center to schedule an ADA complimentary paratransit ride and OUTS then operates the service. Scheduling a ride involves calling at least a day beforehand while cancelations must occur at least 2 hours before the scheduled time. [5]

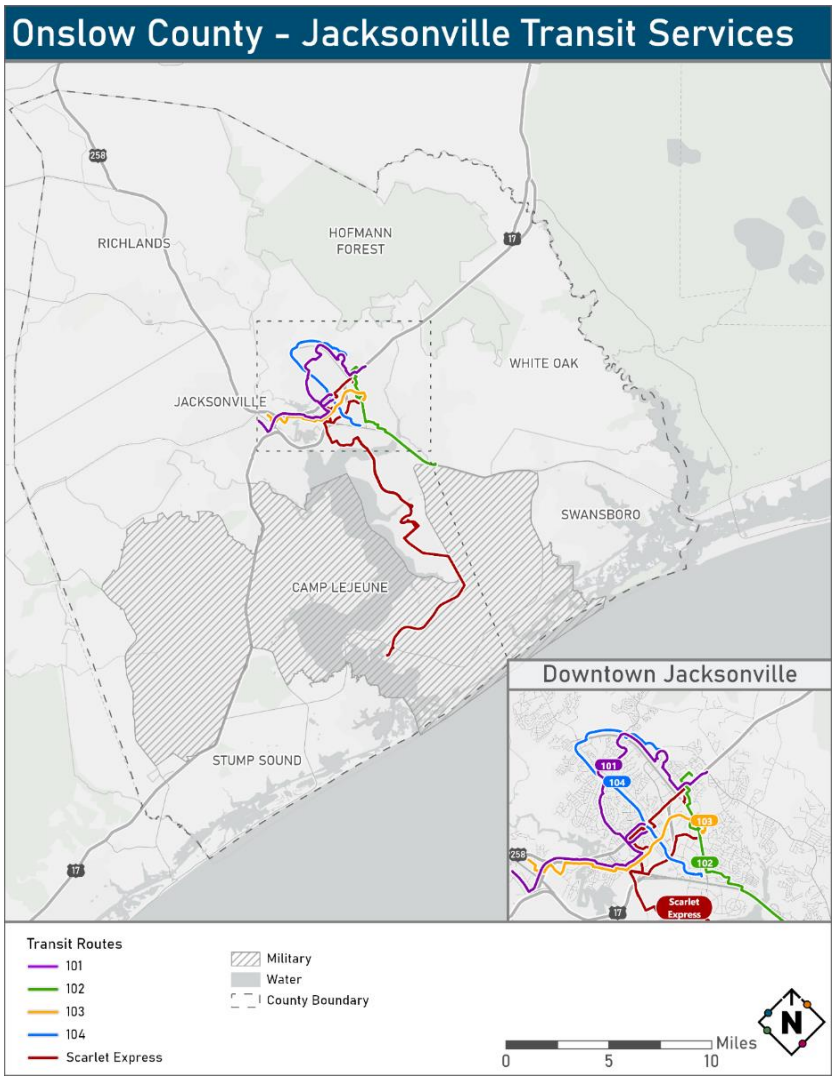

Figure 2. Jacksonville Transit City Routes Map

Besides local government contracts, OUTS contracts annually with Transportation Brokers (MTM & Motivcare) to provide Non-Emergency Medicaid transportation (NEMT) for Medicaid managed care beneficiaries using Prepaid Health Plans (PHPs). Greyhound Bus service is available in Jacksonville and provides connections to other cities in North Carolina.

As part of the transportation system, active transportation such as walking and biking plays a vital role in complementing microtransit services by providing convenient solutions for the first/last mile connection. JUMPO is the metropolitan planning organization that serves the City of Jacksonville, Town of Richlands, Town of Swansboro, Town of Holly Ridge, Town of North Topsail Beach, and Onslow County. JUMPO consists of partners from these areas and also the North Carolina Department of Transportation and Marine Corps Base Camp Lejeune. JUMPO facilitates transportation network improvements including investments related to streets, highways, transit, bicycle, and pedestrian infrastructure. The active transportation system references include the Onslow County Parks and Recreation Master Plan that was

[4] https://www.jacksonvillenc.gov/225/Route-Maps-Schedules

[5] https://www.onslowunitedtransit.org/schedule-or-cancel-a-ride/

completed in October 2021[6], Jacksonville-Onslow Area Bicycle Map[7], and Croatan Regional Bicycle and Trails Plan.[8]

Land Use Systems

Similar to transportation systems, understanding existing zoning and future land use enables OUTS to identify the locations of housing centers, job centers, and major activity hubs. This analysis also helps predict future needs. Currently, about 27 percent of the county falls into military land use and about 12 percent of the county falls in conservation land use. Most residential and commercial areas are located throughout Jacksonville as well as near Swansboro and Richlands.

In the future, conservation areas will continue to dominate the northern part of the county, while Marine Corps Base Camp Lejeune will retain most of the southern land. Residential and commercial zones, representing areas with more potential for microtransit suitability, will continue to be clustered around major cities, including Jacksonville, Swansboro, and Sneads Ferry. Additionally, two new land uses are shown in the future development patterns: Community Growth Activity Center and Community Growth Area. These land uses are confined mostly to Jacksonville and Sneads Ferry.

Key Destinations

The project team identified key destinations, such as employment centers, educational institutions, healthcare facilities, community centers, and recreational areas to ensure proposed microtransit services improve access to essential locations (Figure 3). Major points of interest are mostly concentrated in and around Jacksonville, particularly along Western Boulevard and North Marine Boulevard. This area includes several businesses, schools, and medical centers, as well as entertainment facilities and event centers. There are also clusters of key destinations in Swansboro, Sneads Ferry, and Richlands. Destinations in these areas along the periphery of the county are sparser and mostly confined to businesses, schools, and medical facilities.

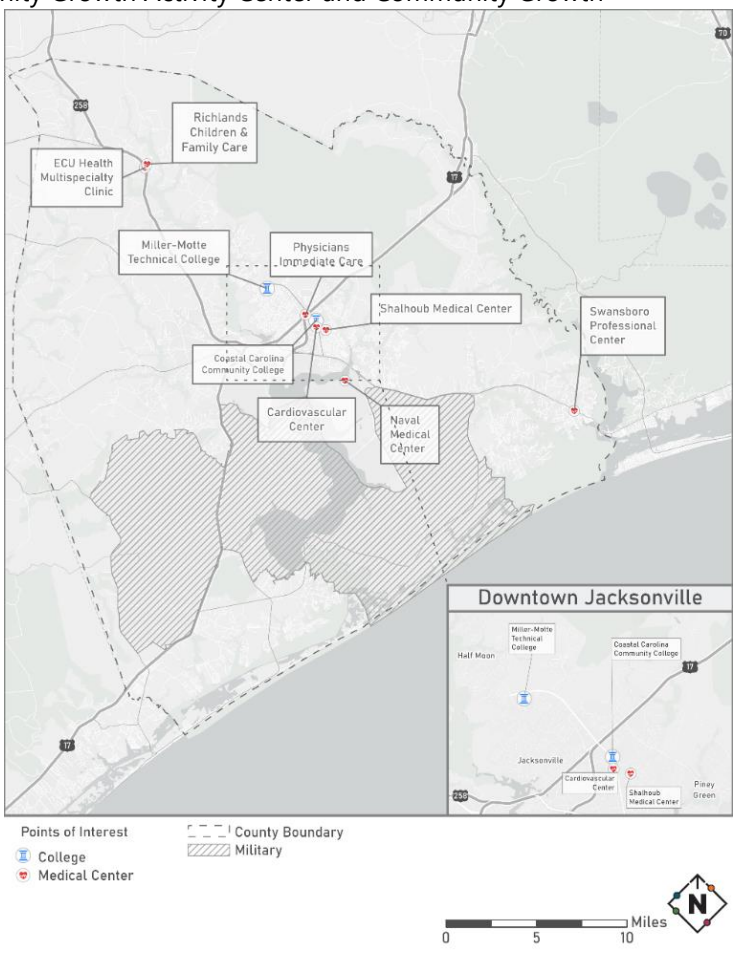

Figure 3. Key Destinations

[6] Onslow-County-Comphrensive-MPpdf (onslowcountync.gov)

[7] lejeunenewriver.usmc-mccs.org/modules/media/?do=inline&id=faf78515-6e30-423d-a7ac-86b06447dbac

[8] Croatan Regional Bicycle and Trails Plan by North Carolina Division of Parks and Recreation - Issuu

ZONE IDENTIFICATION AND EVALUATION

The project team conducted a suitability analysis to determine areas within Onslow County where microtransit service is most likely to succeed based on demographic and socioeconomic characteristics as well as the location of current fixed-route services.

Transit Propensity and Microtransit Suitability

The first step of the analysis was transit propensity. The transit propensity analysis uses both a transit potential and transit need assessment to combine demographic and socioeconomic data. It not only highlights areas that could support transit based on population or employment density, but also uses an equitable approach to highlight areas where residents may be more likely to use transit rather than other modes (Figure 4). These two measures were combined to understand microtransit suitability (Figure 5) and compared to the existing fixed route transit services. While areas identified as high in both transit potential and transit need are typically strong candidates for fixed-route transit services, microtransit can provide an ideal solution for areas with moderate-to-high levels of transit need but lower transit potential (density) to support fixed-route transit. The results show strong potential for microtransit in parts of Jacksonville and throughout Swansboro, White Oak, and areas south of Richlands. Microtransit can enhance fixed-route access by linking to key locations and transit stops. It can also function independently as an intra-zone travel option in areas lacking fixed-route access, including west and north Jacksonville, Half Moon, Piney Green, Swansboro, Sneads Ferry, and areas south of Richlands.

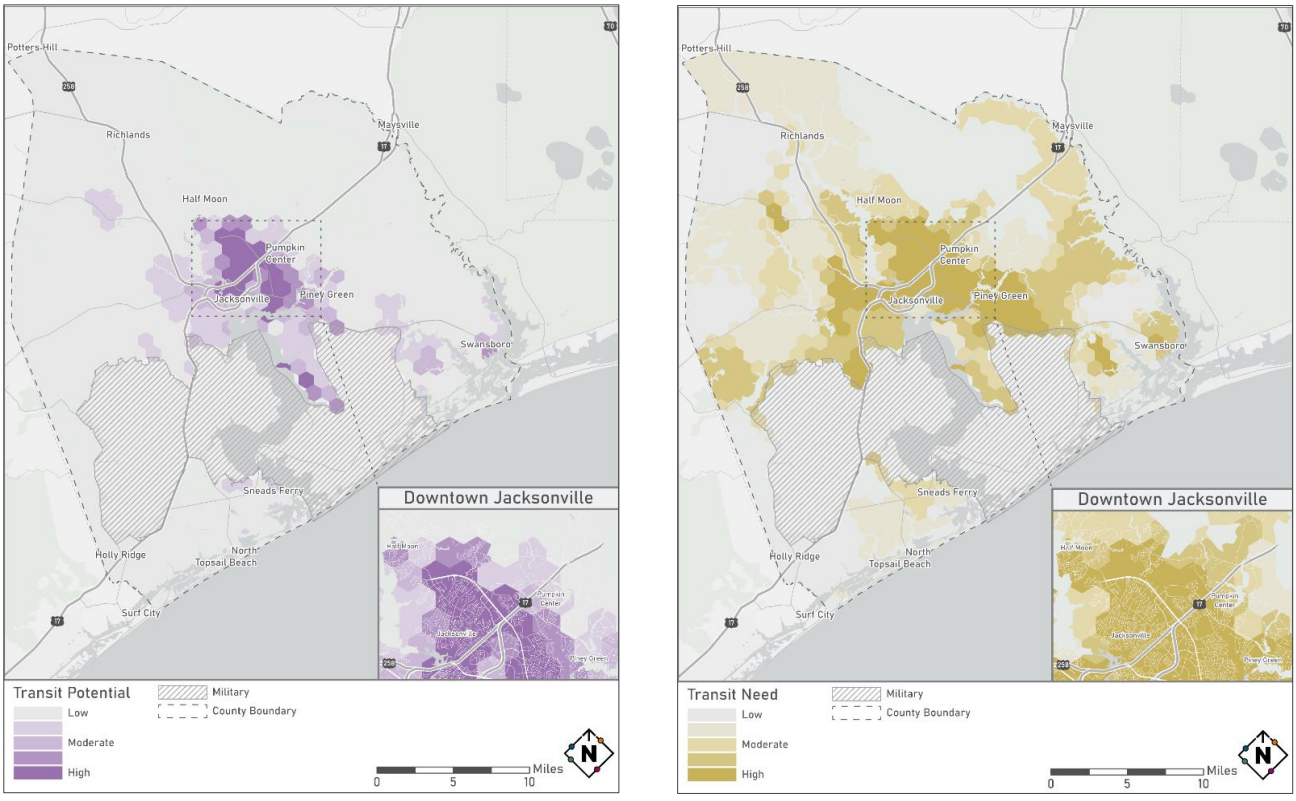

Figure 4: Onslow County Transit Potential (Left) and Transit Need (Right)

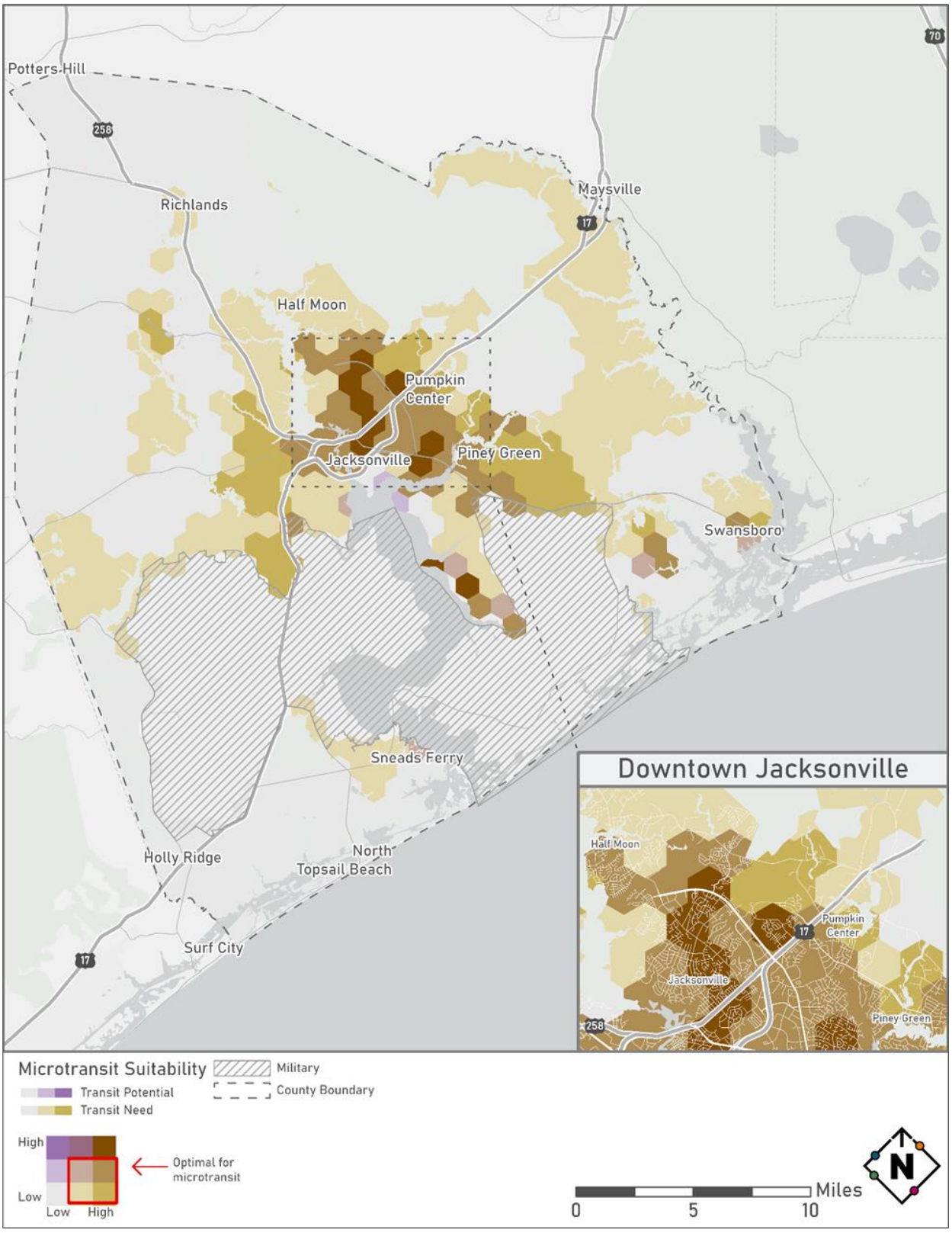

Figure 5: Onslow County Microtransit Suitability

Zone Identification

Using the suitability analysis and the fixed route analysis, the project team grouped areas of high microtransit suitability into zones ranging from five to fifteen square miles. The project team developed fourteen zones throughout Onslow County, covering roughly 97 square miles (approximately 11% of the total county), including two zones with connections to places of interest in adjacent counties (Figure 6). The zones would provide service to approximately 85,904 people (approximately 42% of total population) and 18,667 jobs (approximately 27% of total jobs). Zones were developed to connect residents to shopping options, jobs, social services, and fixed-route transit connections within their community.

The 14 potential zones are as follows:

- Jacksonville Central
- Piney Green West
- Piney Green East
- Camp Lejune
- North Jacksonville
- Swansboro
- West Jacksonville
- Pumpkin Center
- Sneads Ferry / North Topsail Beach
- Hubert
- Catherine Lane
- Dawson Cabin
- Richlands

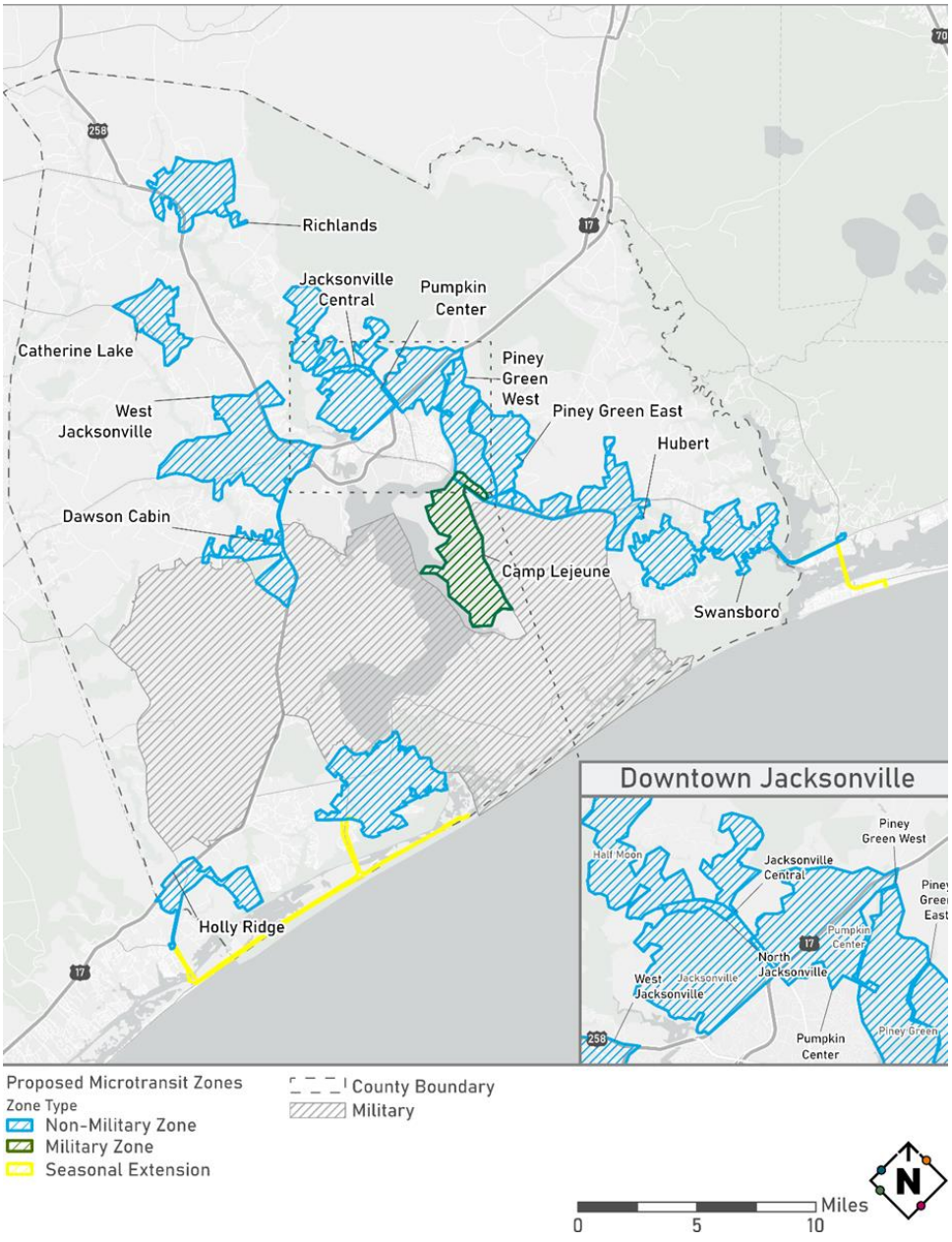

Figure 6: Proposed Microtransit Zones

- Holly Ridge

Zone Evaluation

An evaluation framework helps the County and its partners better understand the local environment of a particular zone (and therefore its likely performance) by assessing the zone against specific performance metrics. The project team outlined five metrics to provide a comprehensive evaluation of potential microtransit success (Table 4).

Table 4. Zone Evaluation Metrics

Metric	Description
Intersection Density	Refers to the number of roadway intersections per square mile. Higher intersection density means more opportunities for pedestrians to access transit stops, and lower intersection density makes fixed routes less efficient, as they follow set paths. Microtransit, however, adapts to real-time requests, dropping passengers at nearby intersections, hubs, or destinations, improving efficiency and reducing travel times in these areas.
Land Use	Calculated by the population-to-jobs ratio, this metric helps identify areas where trip demand is less predictable (mainly residential zones). Microtransit is most effective in moderately populated residential areas with fewer destinations.
Activity Generators	Measures the density of popular destinations like grocery stores within an area. Higher densities of these generators result in more intra-zone trips, ideal for microtransit.
Equity (transit-oriented populations)	Areas with higher populations of minority, low-income, senior, limited English proficiency, and veteran groups are prioritized for microtransit, ensuring accessibility for those more likely to rely on transit.
Transit Connections	Measured by the number of transit stops in a zone, this metric highlights areas where microtransit can enhance first- and last-mile connectivity, linking riders to the broader transit network.

Evaluating microtransit zones through this evaluation criteria helped the project team group zones into use cases. Not all microtransit zones are created for the same purpose. To effectively differentiate each zone based on their desired intent, the project team assessed each zone across four distinct use case scenarios (Figure 7). A use case assigns a particular goal, need, or outcome to each specific zone.

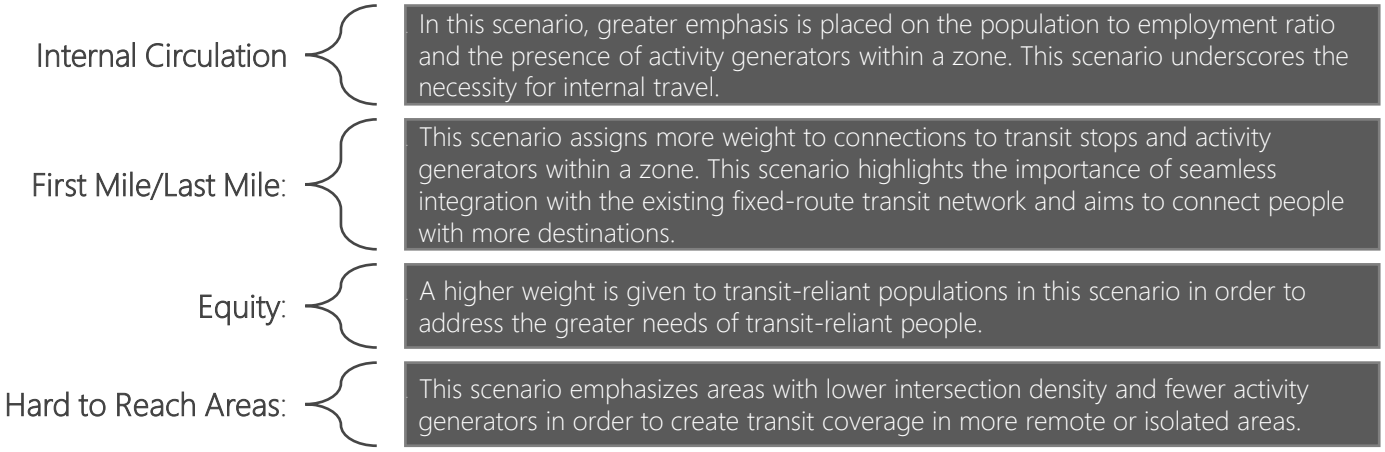

Figure 7. Use Case Summary

To identify which zones best represent each use case, the following scoring criteria were used (Table 5). Results of the analysis are shown in Table 6 and Figure 8.

Table 5. Use Case Analysis Summary

Performance Metrics	Criteria	Points Available			
		Internal Circulation	First/Last Mile	Equity	Hard to Reach
Transit Connections	Number of Fixed Route Transit Stops	1	2	1	1
Equity	Minority, low-income, senior, limited English proficiency, and military populations per square mile	1	2	5	2
Activity Generators	Activity generators per square mile	3	3	1	3
Land Use	Population to jobs ratio	3	2	2	1
Intersection Density	Intersections per square mile	2	1	1	3
	TOTAL	**10**	**10**	**10**	**10**

Table 6. Use Case Scoring Results for Each Zone

Zones	Internal Circulation	First Mile/ Last Mile	Equity	Hard To Reach Areas	TOTAL SCORE
North Jacksonville	7	8	8	7	30
Jacksonville Central	5	7	7	6	25
Piney Green West	6	6	6	6	24
Pumpkin Center	5	6	6	6	23
Hubert	6	5	5	7	23
Swansboro – Summer*	7	5	5	6	23
West Jacksonville	4	5	4	6	19
Holly Ridge – Summer*	6	6	3	4	19
Piney Green East	5	4	6	3	18
Catherine Lake	4	4	5	4	17
Sneads Ferry / North Topsail Beach – Summer*	4	5	4	4	17
Swansboro	4	4	5	4	17
Dawson Cabin	5	3	4	4	16
Camp Lejeune	2	3	5	4	14
Richlands	4	3	2	5	14
Holly Ridge	3	4	2	2	11
Sneads Ferry	3	2	3	2	10

** Summer extension added to these proposed zones in order to evaluate seasonal performance and characteristics*

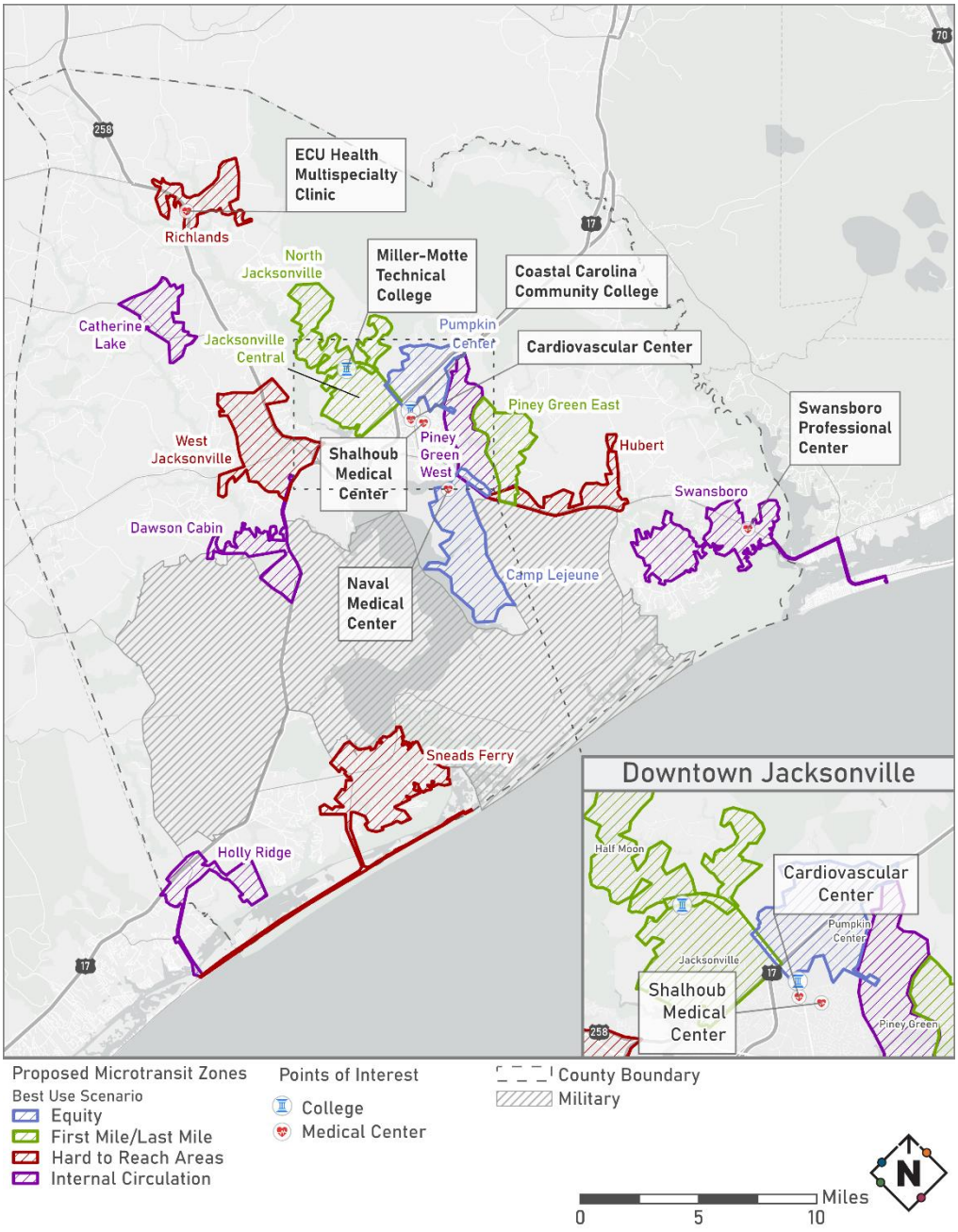

Figure 8: Zones Categories by the Best Use Scenario

While these microtransit zones are categorized based on quantitative assessments of factors such as transit-oriented population and trip generators, the final recommendations for the pilot also incorporate qualitative insights from stakeholders. Engaging with community members, local agencies, and other relevant stakeholders provides essential context and feedback to influence the decision-making process. Community and agency input provided context on feasibility, needs, and barriers, ensuring pilot zones align with both analytical criteria and community expectations. Engagement effort findings are summarized in the following section.

PUBLIC AND STAKEHOLDER ENGAGEMENT

Feedback from the public was gathered using steering committees, stakeholder interviews, a public meeting, and a survey. Highlights of engagement are summarized in Figure 9.

Figure 9. Engagement by the Numbers

Project Steering Committee and Stakeholder Feedback

The project team held larger steering committee meetings and smaller focus groups to understand what the gaps in transportation service are in Onslow County, where they are located, who is affected by the gaps, and how they are affected. The overarching theme from the stakeholder engagement efforts was that Onslow County is a sprawling, rural environment with limited fixed route transit services and diverse transportation needs. The county is home to a wide range of land uses and destinations, including a military base and tourist destinations in the summer. Jacksonville Transit is a city service, not a transit authority, and does not have jurisdiction outside of Jacksonville city lines. These factors pose a challenge to provide fixed-route transit outside of Jacksonville, and some people are not served fully by the existing on-demand and paratransit services in the county, such as OUTS, Healthy Opportunities Pilots, or Non-Emergency Medical Transportation.

The steering committee identified key transportation gaps in Onslow County, particularly for residents outside Jacksonville who lack reliable transit options. These gaps affect low-income individuals, young military families, seniors, undocumented residents, and others with limited access to private vehicles or reliable internet. Key underserved areas include Blue Creek Road/Highway 53, Gum Branch Road, and routes to Albert J. Ellis Airport.

Challenges include fixed-route limitations outside Jacksonville, lack of flexible service for last-minute changes, and long wait times for return trips. Specific populations face issues, such as paratransit users unable to adjust trips on short notice and people unable to carry groceries or bulky items due to vehicle

restrictions. The committee suggested a publicly regulated microtransit service to address these needs and noted a need for better marketing and awareness of existing services.

Public Feedback

Feedback from the public was gathered through the virtual survey and the virtual public meeting. The feedback received from the public was consistent with the feedback received from the steering committee / stakeholders.

The survey had 55 participants. About 20% of respondents missed trips due to unavailable transport, citing cost as a barrier. A majority would use microtransit, especially for curb-to-curb service. Over 80% expressed interest in microtransit services, mainly for grocery trips, shopping, medical appointments, and recreational activities. The most favored zones for microtransit were Jacksonville Central, North Jacksonville, and Richlands. Desired destinations include grocery stores, medical facilities, employment centers, the airport, the beach, and out-of-county locations. Respondents felt a fair price for microtransit would range from $2 to $15, with $5 being most common response. Many participants wanted to see bigger zones and interzonal trips, and some participants wanted the possibility of long-distance trips out of the county and to other towns and cities.

Public meeting feedback highlighted several mobility challenges and gaps in transit coverage in Onslow County. Participants cited specific needs, including transit service in rural areas, ADA accessibility, options beyond medical trips, flexibility for last-minute bookings, and transportation for large families, especially those with car seats. Several locations were identified as difficult to access, such as grocery stores, cross-county routes for Holly Ridge residents, and out-of-county or inter-town travel options. Priority zones for microtransit service, according to attendees, included Sneads Ferry, West Jacksonville, the Piney Green zones, North Jacksonville, Richlands, and Swansboro. They also suggested expanding service in Hubert, broadening the zone around Richlands, and adding more out-of-county options. The feedback about zone geography was incorporated into the zone design.

Table 7 summarizes top microtransit zones identified throughout all engagement efforts.

Table 7. Top 6 Most Highly Ranked Zones Based Identified in the Engagement Efforts

Microtransit Zone	Engagement Type		
	Survey	Public Meeting	Stakeholder Meeting
Jacksonville Central	x		
Richlands	x	x	
North Jacksonville	x	x	x
Piney Green (West and East)	x	x	x
Swansboro		x	x
West Jacksonville	x	x	x

The project team incorporated both the quantitative assessment and qualitative feedback to develop recommendations summarized in the following section.

Section 3
Key Recommendations

Key Recommendations

This section provides a summary of key recommendations from the Onslow County Microtransit Feasibility Study.

SERVICE DELIVERY MODEL

A microtransit service delivery model refers to the division of responsibility in providing microtransit service between public agencies and vendors providing microtransit software and/or operations services. The advantages and disadvantages of each service delivery model are summarized in Table 8.

Table 8. Microtransit Service Delivery Model Advantages and Disadvantages

Service Model	Advantages	Disadvantages
Transportation as a Service (TaaS)	• Minimal staff effort for management • Lower cost • Allows performance standards enforcement • Can transition to hybrid or SaaS model if successful • Faster implementation timeline	• Training independent contractors may be costly • Outsourced customer service may lack quality without close monitoring • Limited market for vendor
Software as a Service (SaaS)	• Operational control and flexibility • In-house staffing and ability to train staff to agency standards • Flexibility with operational contracting, such as local taxi and transportation providers to supplement in-house operations	• High upfront and overall costs, especially for vehicle procurement • Requires more internal capacity • Adds the challenge of recruiting drivers
Hybrid	• Lower-cost option • Customizable to agency needs • Offers more rider choices • Builds or enhances partnerships with TNCs	• Independent contractors may have less training and lower pay than bus operators • Riders must choose between providers if multiple TNCs are involved • Efficiency may decrease with multiple providers

The project team recommends the Software as a Service (SaaS) model with publicly regulated, in-house microtransit operations over turnkey or hybrid models for sustainability and affordability. Onslow County's remote location limits vendor availability. Under the SaaS model, vendors would provide app-based booking, technical and customer support, and performance data (e.g., ridership and trip details). The agency should establish data-sharing requirements in contracts. Peer examples of SaaS-based microtransit services include Johnston County Area Transit System (JCATS) and GoCary.

PILOT ZONE RECOMMENDATIONS

The pilot zone recommendations merge data from the needs assessment with feedback from stakeholders and the public, ensuring they are both data-driven and locally informed. The project team excluded areas currently served extensively by fixed-route transit, like Central and North Jacksonville, from the initial pilot to focus on underserved areas and avoid duplicating existing transit services.

The project team recommends the following six pilot zones:

- Swansboro
- Richlands
- the Piney Green zones
- Sneads Ferry / North Topsail Beach
- West Jacksonville

The project proposes a two-phase pilot for microtransit services (Figure 10):

- **Wave 1**: Launch in Richlands and Swansboro, the zones with the highest demand and potential. Focusing on two zones helps address challenges like zone boundaries, rider awareness, and booking software.
- **Wave 2:** Expand to other high-demand zones, such as Piney Green West, Piney Green East, Sneads Ferry / North Topsail Beach, and/or West Jacksonville, prioritizing areas with limited fixed-route transit to test first/last-mile connections.

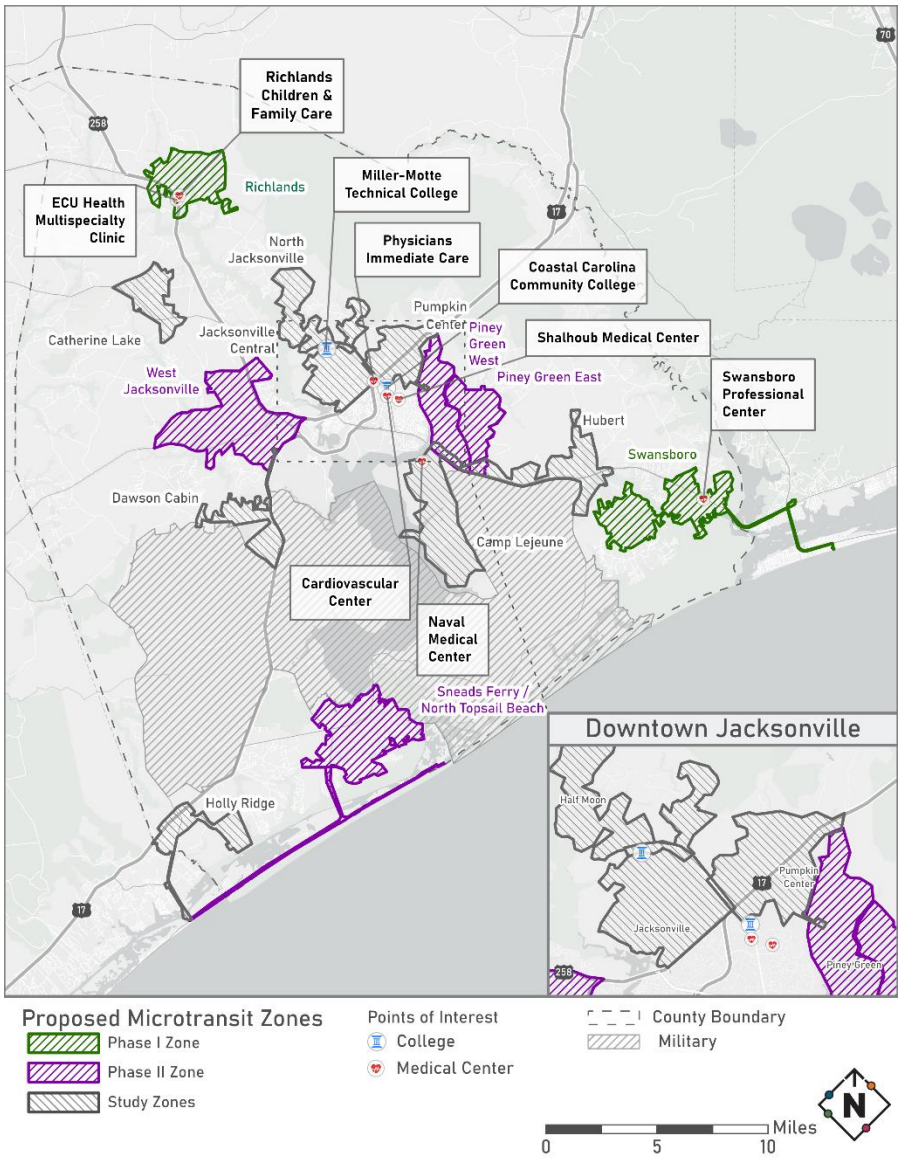

Figure 10. Microtransit Pilot Locations

PILOT COST ESTIMATE

The factors affecting microtransit ridership differ from traditional transit ridership models; as such, the estimates prepared for this report are provisional estimates based off of assumptions for quantitative performance metrics such as target wait time, zone size, average vehicle speed, average trip distance, and projected ridership. Cost estimates are provided in this report based off of projections for the number of vehicles required, recommended service hours, and projected operating costs. As Onslow United Transit System's microtransit pilot is implemented, additional context-specific insights into cost estimates will be gathered through real-world experiences.

Projected Ridership and Vehicle Needs

Figure 11 provides an overview of maximum vehicle need and total daily ridership per zone. Peak ridership for the recommended zones (highlighted in light yellow) ranges between eight to 75 daily trips per zone. Estimated vehicle needs are proportional to projected ridership; the recommended zones are projected to require a maximum of one to five vehicles per zone. Zone-specific information on the projected weekday hourly peak and off-peak number of riders and number of vehicles is provided in

Table 9.

Figure 11. Total Daily Ridership and Maximum Vehicle Need Per Zone

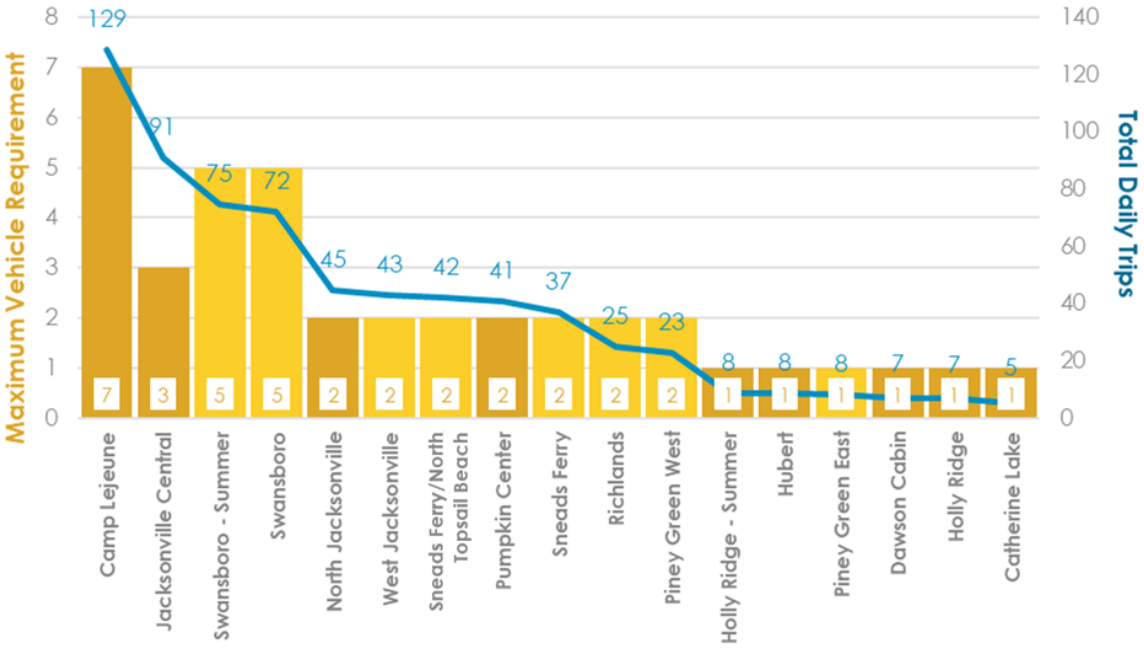

Table 9. Estimated Weekday Peak and Off-Peak Hourly Riders and Required Vehicles

Zone	Peak Hour (7-8AM, 3-4PM)		Off-Peak Hour	
	No. Riders	No. Vehicles	No. Riders	No. Vehicles
Richlands	3-4	2	1-3	1
Swansboro*	7-9	5**	1-6	1-4**
Piney Green West	3	2	1-3	1
Piney Green East	1	1	1	1
Sneads Ferry / North Topsail Beach*	4-5	2	1-4	1-2
West Jacksonville	4-5	2	1-4	1-2

** Includes estimates for both summer extension and regular service*

*** Note that for the pilot, we assume only up to 3 vehicles will be required in any one zone*

These ridership estimates are for existing conditions and assume an ideal scenario where every potential rider has awareness of the service, is informed on how to book a trip, and that there is a vehicle available to pick them up within 15 minutes of their requested pick-up time. In reality, uptake of microtransit is likely to require a ramp-up period as people in Onslow County learn about the new service and how to request a trip; ridership and vehicle needs are likely to be lower than these estimates in the initial implementation of the service.

Pilot Operating Expenses

For the pilot, the span of service was assumed to be from 8 AM to 8 PM on weekdays and from 9 AM to 9 PM on weekends. The unit cost was assumed to be less than OUTS' demand response operating expenses of $82 per vehicle revenue hour and approximately in line with the microtransit operating expenses of OUTS' peer agencies, including the Johnston County Area Transit System, Wilson RIDE, and Cape Fear Public Transportation Authority RideMicro. Microtransit operating expenses at these agencies ranged from $60-$68 per vehicle revenue hour, as reported in NTD's Transit Agency profiles for 2023[9]; therefore, a cost per vehicle-hour of $65 was assumed for the pilot cost estimates. Additionally, the cost estimates assume that no zone will require more than 3 vehicles at a time in any one zone during the microtransit pilot, based on an assumption that there will likely be ramp-up period in which ridership is lower than projected as people in Onslow County become aware of and learn how to use the new service.

The cost estimates for the pilot zones and full pilot are shown below in Table 10 through Table 16. The first phase of the pilot implementation, with service in Swansboro and Richlands, is estimated to cost $1.06 million. The second phase of the pilot, assuming OUTS pilots microtransit in all four of the Wave 2 zones (Piney Green West, Piney Green East, West Jacksonville, and Sneads Ferry / North Topsail Beach), is estimated to cost $1.6 million; therefore, the full pilot estimated operating costs, shown in Table 16, are expected to be $2.67 million. However, OUTS may choose to pilot microtransit in only two or three of the Wave 2 zones, in which case, the operating costs for the full pilot will be lower. More detailed cost

[9] www.transit.dot.gov/ntd/transit-agency-profiles

estimates for each zone are provided in Table 10 through Table 15, so that the estimated operating costs for the full pilot can be adjusted accordingly.

Table 10. Cost Estimates for Pilot Zones - Richlands

Scenario	Span	Max Vehicle Need	Daily Vehicle Hours	Days Per Year	Annual Vehicle - Hours	Cost Per Vehicle-Hour	Estimated Annual Operating Cost
Weekday (non-summer)	Monday – Friday 8:00 a.m. – 8:00 p.m.	2	13	170	2,210	$65	$143,650
Weekend (non-summer)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	1	12	66	792	$65	$51,480
Weekday (May – Sep.)	Monday – Friday 8:00 a.m. – 8:00 p.m.	2	13	90	1,170	$65	$76,050
Weekend (May – Sep.)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	1	12	34	408	$65	$26,520
Potential Holiday Service	No service proposed	0	0	5	0	$65	$0
Total Annual Cost					$297,700		

Table 11. Cost Estimates for Pilot Zones - Swansboro

Scenario	Span	Max Vehicle Need	Daily Vehicle Hours	Days Per Year	Annual Vehicle - Hours	Cost Per Vehicle-Hour	Estimated Annual Operating Cost
Weekday (non-summer)	Monday – Friday 8:00 a.m. – 8:00 p.m.	3	32	170	5,440	$65	$353,600
Weekend (non-summer)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	3	35	66	2,310	$65	$150,150
Weekday (May – Sep.)	Monday – Friday 8:00 a.m. – 8:00 p.m.	3	32	90	2,880	$65	$187,200
Weekend (May – Sep.)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	3	35	34	1,190	$65	$77,350
Potential Holiday Service	No service proposed	0	0	5	0	$65	$0
Total Annual Cost					$768,300		

Table 12. Cost Estimates for Pilot Zones – Piney Green East

Scenario	Span	Max Vehicle Need	Daily Vehicle Hours	Days Per Year	Annual Vehicle - Hours	Cost Per Vehicle-Hour	Estimated Annual Operating Cost
Weekday (non-summer)	Monday – Friday 8:00 a.m. – 8:00 p.m.	1	12	170	2,040	$65	$132,600
Weekend (non-summer)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	1	12	66	792	$65	$51,480
Weekday (May – Sep.)	Monday – Friday 8:00 a.m. – 8:00 p.m.	1	12	90	1,080	$65	$70,200
Weekend (May – Sep.)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	1	12	34	408	$65	$26,520
Potential Holiday Service	No service proposed	0	0	5	0	$65	$0
Total Annual Cost					$280,800		

Table 13. Cost Estimates for Pilot Zones – Piney Green West

Scenario	Span	Max Vehicle Need	Daily Vehicle Hours	Days Per Year	Annual Vehicle - Hours	Cost Per Vehicle-Hour	Estimated Annual Operating Cost
Weekday (non-summer)	Monday – Friday 8:00 a.m. – 8:00 p.m.	2	13	170	2,210	$65	$143,650
Weekend (non-summer)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	2	20	66	1,320	$65	$85,800
Weekday (May – Sep.)	Monday – Friday 8:00 a.m. – 8:00 p.m.	2	13	90	1,170	$65	$76,050
Weekend (May – Sep.)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	2	20	34	680	$65	$44,200
Potential Holiday Service	No service proposed	0	0	5	0	$65	$0
Total Annual Cost					$349,700		

Table 14. Cost Estimates for Pilot Zones – Sneads Ferry / North Topsail Beach

Scenario	Span	Max Vehicle Need	Daily Vehicle Hours	Days Per Year	Annual Vehicle - Hours	Cost Per Vehicle-Hour	Estimated Annual Operating Cost
Weekday (non-summer)	Monday – Friday 8:00 a.m. – 8:00 p.m.	2	19	170	3,230	$65	$209,950
Weekend (non-summer)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	2	20	66	1,320	$65	$85,800
Weekday (May – Sep.)	Monday – Friday 8:00 a.m. – 8:00 p.m.	2	19	90	1,710	$65	$111,150
Weekend (May – Sep.)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	2	20	34	680	$65	$44,200
Potential Holiday Service	No service proposed	0	0	5	0	$65	$0
Total Annual Cost					$451,100		

Table 15. Cost Estimates for Pilot Zones – West Jacksonville

Scenario	Span	Max Vehicle Need	Daily Vehicle Hours	Days Per Year	Annual Vehicle - Hours	Cost Per Vehicle-Hour	Estimated Annual Operating Cost
Weekday (non-summer)	Monday – Friday 8:00 a.m. – 8:00 p.m.	2	22	170	1,430	$65	$243,100
Weekend (non-summer)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	2	24	66	1,560	$65	$102,960
Weekday (May – Sep.)	Monday – Friday 8:00 a.m. – 8:00 p.m.	2	22	90	1,430	$65	$128,700
Weekend (May – Sep.)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	2	24	34	1,560	$65	$53,040
Potential Holiday Service	No service proposed	0	0	5	0	$65	$0
Total Annual Cost					$527,800		

Table 16. Cost Estimates for Pilot Zones – Wave 1&2 Pilot

Scenario	Span	Max Vehicle Need	Daily Vehicle Hours	Days Per Year	Annual Vehicle - Hours	Cost Per Vehicle-Hour	Estimated Annual Operating Cost
Weekday (non-summer)	Monday – Friday 8:00 a.m. – 8:00 p.m.	10	111	170	18,870	$65	$1,226,550
Weekend (non-summer)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	11	123	66	8,118	$65	$527,670
Weekday (May – Sep.)	Monday – Friday 8:00 a.m. – 8:00 p.m.	10	111	90	9,990	$65	$649,350
Weekend (May – Sep.)	Saturday – Sunday 9:00 a.m. – 9:00 p.m.	11	123	34	4,182	$65	$271,830
Potential Holiday Service	No service proposed	0	0	5	0	$65	$0
Total Annual Cost					$2,675,400		

It should be noted that these cost estimates were calculated based off of assumptions made for the various performance metrics of microtransit, which were informed by data from OUTS' peer agencies, industry guidelines, and the forecasted ridership estimates from the first part of this report. The pilot implementation of microtransit in Onslow County will provide greater clarity on the operating costs of a full implementation, especially regarding the minimum number of vehicles required to meet rider demand and the microtransit operating expenses per vehicle hour.

Capital Expenses

The two key capital expenses associated with a new microtransit service are vehicle procurement and software/hardware integration. If OUTS decides to maintain its own vehicles for microtransit operation,

the agency will manage the procurement, storage, and maintenance of microtransit vehicles and associated equipment. Microtransit vehicles typically cost between $90,000 and $130,000, depending on their size and specifications. Additional non-revenue vehicles may be required to facilitate shift handovers directly in the field, rather than at depots. Strategies to minimize the number of non-revenue vehicles needed include scheduling overlapping shifts, carpooling operators, or utilizing surplus non-revenue vehicles. Non-revenue vehicles generally cost between $30,000 and $80,000, depending on their design and features. For the pilot, OUTS may minimize their capital expenses for vehicles by using their own on-demand fleet of vehicles during off-peak hours / when they're not in use. OUTS could also set up partnerships with the towns in Onslow County to use their surplus vehicles.

Integrating microtransit technology involves costs related to software licensing and associated fees, often requiring the purchase of in-vehicle hardware. These technologies may include Mobile Data Terminals, GPS systems, cellular data modems, and cellular data plans. The cost of a cellular data plan depends on data usage, which is influenced by software requirements and update frequency. Data is primarily used for transmitting trip statuses, GPS updates, and facilitating communication between operators and dispatch. In rural areas with limited cellular coverage, alternative transmission methods like radio data may be necessary to ensure effective dispatching; for example, a rural, fare-free agency in Steamboat Springs, CO uses 2-way radios for all communication between vehicles and dispatch. Equipping vehicles with these essential tools typically incurs a modest fee.

Beyond vehicle integration, operational support for microtransit zones may require additional software and hardware, such as fare collection systems (e.g., vending machines, fareboxes, or digital platforms like apps or websites). IT and telephony infrastructure updates, including new desktop computers, software licenses, database upgrades, VoIP phones, or phone system modifications might also be needed. These updates could necessitate additional IT staff or contractor involvement for implementation and maintenance.

Potential Funding Sources

Capital and operating expenses related to providing demand response services are eligible for both Federal Transit Administration 5307 and 5311 formula programs, which can be leveraged for long-term support of microtransit services. Other agencies may also offer formula funding which can support microtransit, such as the Federal Highway Administration's *Congestion Mitigation and Air Quality program* and the *Carbon Reduction Program* (Ride with Via's article "How to Fund On-Demand Public Transportation and Microtransit in 2024). Additionally, the FTA and other federal agencies often offer discretionary or competitive funding opportunities for innovative transit projects, including new or pilot microtransit services. Examples of recent discretionary funding opportunities used by transit agencies to deliver microtransit services include the FTA's *Accelerating Innovative Mobility grant* and the Department of Energy's *Communities Sparking Investment in Transformative Energy grant* (from Ride with Via's article "How 7 Cities Fund Their Microtransit Services").

Additional funding may be available from state, regional, and local agencies, for example, NCDOT's *Mobility for Everyone, Everywhere in NC program*, which was used to launch microtransit services at 11 rural transit systems in North Carolina. Ride with Via, a paratransit software provider, has written a guide for how to fund on-demand transportation (Ride with Via "How to Fund On-Demand Public Transportation and Microtransit in 2024") which contains additional information about funding and

strategies to support microtransit, including ballot initiatives, local partnerships, congestion pricing, and advertising. Ride with Via also publishes funding alerts on their website for microtransit and on-demand services (https://ridewithvia.com/resources/category/funding-alert).

Proposed Fare

Table 17 below shows metrics for the on-demand operating expenses and fare at OUTS' peer agencies who offer microtransit services. In the public engagement phase of this study, most survey participants reported that they thought a fair price for a one-way microtransit trip would be no more than $5; these expectations are in-line with the fares charged by OUTS' peers. The cost per vehicle hour for microtransit service in Onslow County is assumed to be lower than OUTS' 2023 demand response cost of $3.86 per vehicle revenue mile, $81.69 per vehicle revenue hour, and $28.38 per single, one-way trip (unlinked passenger trip). OUTS' peer agencies have similar operating costs per vehicle revenue mile and single, one-way trip, but lower costs per vehicle revenue hour. Given OUTS' current operating cost per vehicle revenue hour and given that the public recommended a fare between about $3 and $5, the project recommends a pilot fare of at least $3 per trip for the microtransit pilot; the value of the fare should be revisited post-pilot once more information is available regarding OUTS' microtransit operating costs.

Table 17. Peer Agency Single Fare and Operating Expenses for Microtransit Service

Agency	Cost Per Single, One-Way Trip	2023 Operating Expenses
Johnston County Area Transit System's (JCATS) QuickRide	$6 per person	$3.70 per vehicle revenue mile $59.12 per vehicle revenue hour $37.90 per single, one-way trip
GoCary Morrisville Smart Shuttle	Free	$10.43 per vehicle revenue mile $144.52 per vehicle revenue hour $95.43 per single, one-way trip
Wilson RIDE	$2.50, plus $1 for each additional passenger	$1.14 per vehicle revenue mile $33.14 per vehicle revenue hour $12.39 per single, one-way trip
Cape Fear Public Transportation Authority RideMicro	$2 per person	$4.89 per vehicle revenue mile $62.95 per vehicle revenue hour $31.86 per single, one-way trip
Hampton Roads Transit OnDemand	$2 per person	$3.38 per vehicle revenue mile $67.65 per vehicle revenue hour $35.15 per single, one-way trip

MARKETING BLUEPRINT

Successful implementation of the proposed zones will require coordinated engagement efforts to raise awareness and generate excitement around the new service. A microtransit pilot will provide OUTS with an opportunity to elevate their presence in Onslow County, and marketing is essential to raising awareness and growing ridership.

Communications Phases and Materials

Two distinct messaging phases – education and encouragement – are recommended to ensure demand does not outpace service capabilities.

- **Phase 1: Education:** Focus on raising awareness and teaching users how to download the app and book rides. Share key details like service hours, zones, stops, and fares. Prioritize positive first experiences and smooth operations while refining the service before promoting high ridership.
- **Phase 2: Encouragement:** Once operations stabilize, encourage ridership with messaging highlighting affordability and convenience. Use paid media to generate excitement and expand outreach.

Marketing materials are a critical component of any marketing campaign and are designed to strategically distribute information to various audiences. These materials can take several forms, including social/traditional media including social media posts and news ride along, digital marketing such as websites or emails, or print materials such as fliers or postcards. It is essential that each of the materials have a clear purpose, key messages, and, where applicable, a specific call to action (CTA). OUTS should employ a diverse set of materials to stay relevant throughout Education and Engagement phases, such as teasers, official announcements, and evergreen content (such as website pages, brochures, maps, posters, and user instructions). Each microtransit zone serves a unique service area, however, and the marketing materials should be tailored accordingly.

Equitable Community Outreach

Reaching underserved populations requires meeting them where they are. OUTS should prioritize ongoing community outreach by dedicating a staff member to engage local groups and employers within each zone. Contacting neighborhood associations and residential communities could allow for inclusion of microtransit information in local newsletters or updates. Broader promotion could be achieved by leveraging local relationships to distribute postcards and emails and by seeking support from local governments and stakeholders. If the budget allows, in-person outreach could be achieved by deploying community teams at neighborhood hubs and shopping centers.

To reinforce visibility, all service vehicles should feature OUTS branding, creating mobile ads and a consistent professional image. Ensuring that the branding is used across all marketing materials, including flyers, brochures, and digital content, will help build recognition for OUTS within the county.

ADDITIONAL RECOMMENDATIONS

Over the course of this study, the public and stakeholders have provided invaluable input to the project and to OUTS. During the steering committee meetings, some additional ideas for strategies for OUTS and microtransit services to succeed were brought forward. One particularly pertinent idea was for OUTS and Jacksonville Transit to form a partnership or merger and establish a countywide transit authority in Onslow County. Currently, Jacksonville Transit is a city service confined to Jacksonville, and OUTS is a 501(c)3 non-profit organization. As independently operating agencies, OUTS and Jacksonville Transit pay redundant overhead costs, which could be consolidated if the two agencies worked together. By forming a single transit authority, OUTS and Jacksonville Transit would be able to shift their orientation and

responsibilities to a regional focus and operate as a quasi-governmental agency. A transit authority would represent an operating structure separate of local county or city governments, allowing multiple cities and counties to be included in the organization without affecting their host governments or requiring one entity to take the lead on behalf of all the rest. Within this structure, the provision of microtransit services into adjacent counties (for example, the Swansboro seasonal extension into Cape Carteret / Carteret County) would be well-supported.

Additionally, OUTS and Jacksonville Transit have different strengths that could play to the advantage of both agencies if they were to form a transit authority. Jacksonville Transit operates fixed-route services, which have higher ridership but are not as flexible and responsive to a community's changing needs as on-demand services. OUTS is not spatially limited to pre-defined routes and excels at providing essential services to the most vulnerable people in Onslow County; however, OUTS is more limited by its resources and experiences a greater demand on its resources due to the dynamic nature of its services. The support of an agency with more predictable service needs and ridership may allow OUTS to make the most of its drivers and vehicles through strategic coordination of services. With both agencies working as one, OUTS' on-demand and microtransit services and Jacksonville Transit's fixed-route transit could supplement one another and provide the widest coverage and most seamless public transportation possible for the people of Onslow County.

Conclusion

The Onslow County Microtransit Feasibility Study in Onslow County aimed to engage stakeholders and the public, analyze local transit patterns, identify potential microtransit zones, and propose strategies for implementation. Based on the findings of the study, the project team recommended a Software as a Service (SaaS) delivery model, allowing for in-house operational control with vendor support for app-based booking, technical assistance, customer service, and performance data, as seen in peer examples like JCATS and GoCary. The study recommended six pilot zones—Swansboro, Richlands, Piney Green West, Piney Green East, Sneads Ferry / North Topsail Beach, and West Jacksonville.

The project team recommended a two-phase pilot, starting in Richlands and Swansboro and then expanding to other high-demand zones, such as Piney Green West, Piney Green East, Sneads Ferry / North Topsail Beach, and/or West Jacksonville. A two-phase marketing plan was also recommended, beginning with an education phase to build awareness and refine operations, which should be followed by an encouragement phase to boost ridership through affordability and convenience messaging. A diverse set of marketing materials, consistent branding across vehicles and media, and tailored outreach efforts will ensure community recognition and engagement, with a focus on reaching underserved populations through partnerships with local groups and in-person efforts where feasible. This strategic approach aims to enhance public transit accessibility, sustainability, and service effectiveness.

By combining a strategic delivery model, targeted pilot zones, and robust marketing and outreach efforts, Onslow County aims to enhance accessibility and public transit efficiency while addressing community needs. Following the completion of this feasibility study, OUTS will work to finalize the business model and marketing plan, continue coordination with agency partners and key stakeholders, and work toward a pilot project for microtransit in Onslow County.

Appendix A: Mobility Hub Cutsheets