CONNECT Beyond

A Regional Mobility Initiative

High-Capacity and Commuter Rail Corridor Identification and Evaluation

April 2021

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Acronyms and Abbreviations

BRT	Bus Rapid Transit
CRC	Centralina Regional Council
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HCT	High-Capacity Transit
LRT	Light Rail Transit
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MTC	Metropolitan Transportation Commission
NAICS	North American Industrial Classification System
RPO	Rural Planning Organization
SIC	Standard Industrial Classification System
TAZ	Transportation (or Traffic) Analysis Zone
TOD	Transit-Oriented Development
V/C	Vehicle-to-Capacity Ratio
VMT	Vehicle Miles Traveled

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Executive Summary

Transportation has been regularly identified by the region's residents as a top priority for regional leaders to address. As the Charlotte region continues to grow, access to safe, reliable, affordable and a well-connected transportation system is one of the most important ways of ensuring equitable participation and benefits for social and economic prosperity.

Thirty-two candidate corridors were identified through a review of applicable planning data including travel forecast information, land use and transportation system data, adopted local and regional plans and policies, and an assessment of existing high-capacity transit (HCT) investments. In addition, seven candidate commuter rail corridors were identified. The identification of candidate corridors was overseen by planning and public works professionals representing the cities, counties, and regional metropolitan or rural planning organizations, and the public was engaged through an online meeting and survey as part of this process to provide feedback.

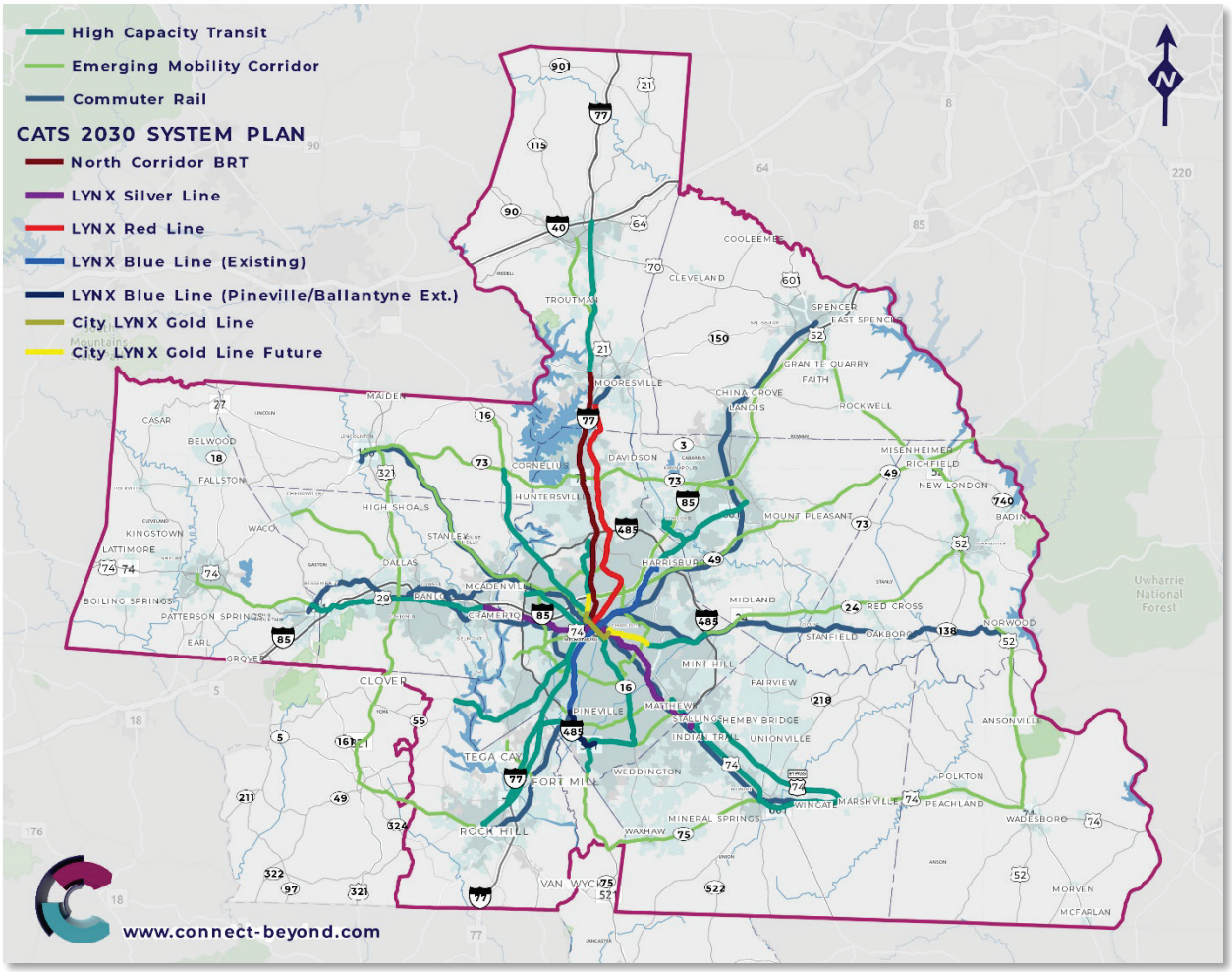
As part of the planning process, it was realized that significant differences exist between the corridors regarding form (urban versus rural), function (city streets versus divided highways), and character (town centers to dense urban neighborhoods and central business districts). To help organize future investment strategies and account for the differences between candidate corridors, a series of common, industry-standard evaluative criteria and measures were considered based on the guiding principles of the CONNECT Beyond effort (discussed below). The application of these criteria and measures helped to differentiate the corridors and understand unique needs, strengths, weaknesses, and opportunities for each corridor. The results of the corridor evaluations, depicted in Figure ES-1, suggest the following:

- Thirteen corridors are identified as recommended HCT corridors. These corridors show attributes and characteristics today that are transit-supportive and therefore could be considered for traditional HCT modes such as light rail, streetcar, or bus rapid transit (BRT).
- Twenty-four corridors are considered Emerging Mobility corridors. These are corridors where additional preparation, such as enhanced transit service, starter service, and/or land use policy changes are warranted to position corridors for future transit investment.

- Seven commuter rail corridors were also considered. Of these, four corridors were identified as candidate commuter rail corridors for further refined planning study, with the remaining three corridors as potential corridors for future consideration.

With 12 counties across two states, and the involvement of 17 transit agencies, Metropolitan Planning Organizations (MPOs) and Rural Planning Organizations (RPOs), the CONNECT Beyond study is attempting to develop a coordinated regional transit investment strategy that speaks to the diverse needs of different audiences. As part of advancing the CONNECT Beyond process, the Centralina Regional Council and Metropolitan Transportation Commission have attempted to help steer the greater Charlotte metropolitan region through development of a long-term vision for the region's transit and transportation system. This vision must allow for flexibility and for each city, county, and regional representative organization to define their own goals and level of investment regarding the greater regional transportation system.

FIGURE ES. 1 RECOMMENDED HCT CORRIDORS, EMERGING MOBILITY CORRIDORS, AND COMMUTER RAIL CORRIDORS



The identification and evaluation of candidate corridors relied on a wealth of empirical data along with qualitative information that provided a comprehensive picture of investment needs in the study area. Most importantly, the project's guiding principles served the foundation for the identification and evaluation of candidate corridors, leading to the recommendations outlined in Figure ES. 1 and discussed at length in this report. The CONNECT Beyond Guiding Principles are:

- Creating Mobility Choice
- Preparing for Future Growth
- Advancing Equity

- Aligning Plans and Local Visions
- Planning for Implementation

The CONNECT Beyond study has and will continue to employ a robust agency, stakeholder, and public engagement program. The public and have been invited to participate in the identification of candidate corridors and have provided valuable feedback on the candidate corridors. Due to challenges imposed by the COVID-19 pandemic, public involvement activities shifted to online engagement strategies and activities including the creation of an interactive project website where comments could be entered on potential candidate corridors and an online survey.

The discussion of the HCT corridor identification and evaluation process and the corridor recommendations provided as part of this report do not specify detailed answers or solutions nor do they specify a recommended mode for the corridors. That work is the responsibility of corridor-focused planning and alternatives analysis efforts in the future and solutions must come as part of future planning efforts specific to each corridor at the city, county, or regional governance level. This report does provide an educational foundation in what HCT is and how it functions, a structured vision for future HCT and commuter rail investments, and general strategies for implementing a long-term vision for the greater Charlotte metropolitan region.

The CONNECT Beyond process has been structured as a visionary planning process for the Charlotte metropolitan region's future mobility framework, building on past planning efforts such as Connect Our Future and the plans and investment programs of the region's MPOs and RPOs. The recommendations contained herein provide a starting point for further study and more refined analysis specific to the specified corridors. Further planning study, such as feasibility studies or alternatives analyses, for each candidate corridor individually will help determine the optimal transit mode or service enhancements for the corridor.

TABLE ES. 1 RECOMMENDED CORRIDORS BY STUDY AREA COUNTY

Study Area County	Corridor Types	Corridors
Anson	Commuter Rail	• CSX Queen City Express Corridor (Charlotte to Wadesboro)
	Emerging Mobility	• Highway 52 Corridor (Salisbury to Wadesboro) • Highway 74 East Wadesboro Extension Corridor (Marshville to Wadesboro)
Cabarrus	Commuter Rail	• Piedmont Corridor (Charlotte to Salisbury)
	HCT	• Highway 29 North (UNCC to Concord)

Study Area County	Corridor Types	Corridors
	Emerging Mobility	• Highway 49 Corridor (UNCC to Richfield) • Highway 73 West Corridor (Lincolnton to Concord)
Cleveland	Emerging Mobility	• Highway 74 West Shelby Extension Corridor (Kings Mountain to Shelby)
Gaston	Commuter Rail	• Norfolk Southern Charlotte-Kings Mountain Corridor (Charlotte to Kings Mountain)
	HCT	• Highway 74 West Corridor (Belmont to Kings Mountain)
	Emerging Mobility	• Highway 27 North Corridor (Uptown Charlotte to Lincolnton) • Highway 321 Corridor (York to Lincolnton) • Highway 279 Corridor (Dallas to Cherryville)
Iredell	Commuter Rail	• LNYX Red Line Extension Corridor (Mount Mourne to Mooresville)
	HCT	• Interstate 77 North Corridor (Mayhew to Statesville)
	Enhanced Mobility	• Highway 21 North Corridor (US 21 / I-77 Interchange to Statesville)
Lancaster	Enhanced Mobility	• Highway 521/Charlotte Highway Corridor (Ballantyne to Lancaster)
Lincoln	HCT	• Highway 16 Northwest Corridor (Uptown Charlotte to Lowesville)
	Enhanced Mobility	• Highway 27 North Corridor (Uptown Charlotte to Lincolnton) • Highway 321 Corridor (York to Lincolnton)
Mecklenburg	Commuter Rail	• Piedmont Corridor (Charlotte to Salisbury) • AC&W Corridor (Charlotte to Norwood) • CSX Queen City Express Corridor (Charlotte to Wadesboro) • Norfolk Southern Charlotte-Rock Hill Corridor (Charlotte to Rock Hill) • Norfolk Southern Charlotte-Kings Mountain Corridor (Charlotte to Kings Mountain) • CSX Charlotte-Lincolnton Corridor (Charlotte to Lincolnton)
	HCT	• Highway 16/Providence Road Corridor (Uptown Charlotte to Ballantyne) • Highway 49/South Tryon Street Corridor (Uptown Charlotte to Lake Wylie) • Freedom Drive/Moores Chapel Road Corridor (Uptown Charlotte to Wildwood Charlotte) • Beatties Ford Road Corridor (Uptown Charlotte to North Lake Mall) • Highway 24/27/ Albemarle Road Corridor (Eastland Charlotte to Mint Hill)

Study Area County	Corridor Types	Corridors
	Enhanced Mobility	• Interstate 485 Corridor (Indian Trail to Pineville) • Various roads in Northwest Charlotte Corridor (Wilkinson Blvd to Sugar Creek) • Various roads in East Charlotte Corridor (Sugar Creek Road to Monroe Road) • Various roads in South Charlotte Corridor (Monroe Road to South Blvd) • Various roads in Southwest Charlotte Corridor (South Blvd to Wilkinson Blvd) • West Boulevard Corridor (Wilmore Charlotte to Garrison Road) • Graham Street Corridor (Uptown Charlotte to Graham Street/Sugar Creek Road)
Rowan	Commuter Rail	• Piedmont Corridor (Charlotte to Salisbury)
	Enhanced Mobility	• Interstate 85 Corridor (Uptown Charlotte to Salisbury)
Stanly	Enhanced Mobility	• Highway 52 Corridor (Salisbury to Wadesboro) • Highway 49 Corridor (UNCC to Richfield) • Highway 24/27 Albemarle Extension Corridor (Mint Hill to Albemarle)
Union	HCT	• Highway 74 East/W Roosevelt Blvd Corridor (Indian Trail to Marshville) • Monroe Expressway/Highway 74 Bypass (Stallings to Marshville)
	Enhanced Mobility	• Highway 75/Waxhaw Highway Corridor (Lancaster/Waxhaw to Monroe)
York	Commuter Rail	• Norfolk Southern Charlotte-Rock Hill Corridor (Charlotte to Rock Hill)
	HCT	• Highway 21 South Corridor (Pineville to Rock Hill) • Interstate 77 South Corridor (Charlotte to Rock Hill)
	Enhanced Mobility	• Highway 160 Corridor (Highway 460 to Highway 521 in Fort Mill, SC)

Introduction

Over the past two decades, the greater Charlotte metropolitan region has experienced unprecedented growth. Strategic public infrastructure investments such as the Blue Line light rail system and the City LYNX Gold Line streetcar in Charlotte, coupled with the region's diversified economic and industry base, have helped attract and retain a rich mixture of residents and workers. This has helped the region remain resilient through turbulent national economic cycles and most recently through the COVID-19 pandemic.

Transportation has been regularly identified by the region's residents as a top priority for regional leaders to address. With 1.4 million additional residents projected to arrive by 2045, or the equivalent of adding the total population of Raleigh to the region, community leaders realize that a variety of mobility options are needed to support and sustain travel within and through the region. As the Charlotte region continues to compete on the global stage, access to a safe, reliable, affordable and a well-connected transportation network using a variety of transportation modes is one of the most important means of ensuring equitable participation and benefits to social and economic prosperity.

As part of the Centralina Regional Council and Metropolitan Transportation Commission's CONNECT Beyond Regional Transit Plan, an assessment of potential high-capacity transit (HCT) and commuter rail corridors for the region was conducted. The project includes a review of other mobility solutions, strategies, and activities that communities in the region may employ to advance regional mobility which may be addressed in future project efforts. Both HCT and commuter rail systems are intended to carry high volumes of passengers with reduced travel times and convenient service. The planning process made use of the latest information related to existing and future population, employment, and transportation conditions in the region and gathered input from jurisdictions and agencies in the region, as well as the general public, on desirable HCT and commuter rail solutions. This report summarizes the process of identifying and evaluating candidate corridors for HCT and commuter rail. This report also provides incremental, sustainable, and cost-effective steps for the implementation of the recommended HCT, Emerging Mobility, and Commuter Rail corridors to serve existing and future travel demand in the region.

Project Background

Transportation has been regularly identified by the region's residents as a top priority for regional leaders to address. As economic conditions, financial outlooks, transportation system

trends, and land use environments change, it is important that plans be updated to account for these changes. Past planning efforts including CONNECT Our Future, an initiative focused on developing a comprehensive regional growth framework across 12 counties in North Carolina and South Carolina, established core values (discussed below) to help guide the region's growth and development.

In conjunction with the work of regional metropolitan planning organizations (MPOs), rural planning organizations (RPOs), and area municipalities, the vision for HCT services in the CONNECT Beyond study area seeks a unified mobility strategy that is responds to the Guiding Principles, and a vision that offers greater transportation choices, enhances economic opportunities, and is equitable to both residents and communities across the region.

Study Area

With the collaboration of municipalities and county governments, regional planning organizations, and various transit agencies, the CONNECT Beyond study area encompasses a two state, 12-county study area to create a bold regional mobility vision for the region (Figure 1).

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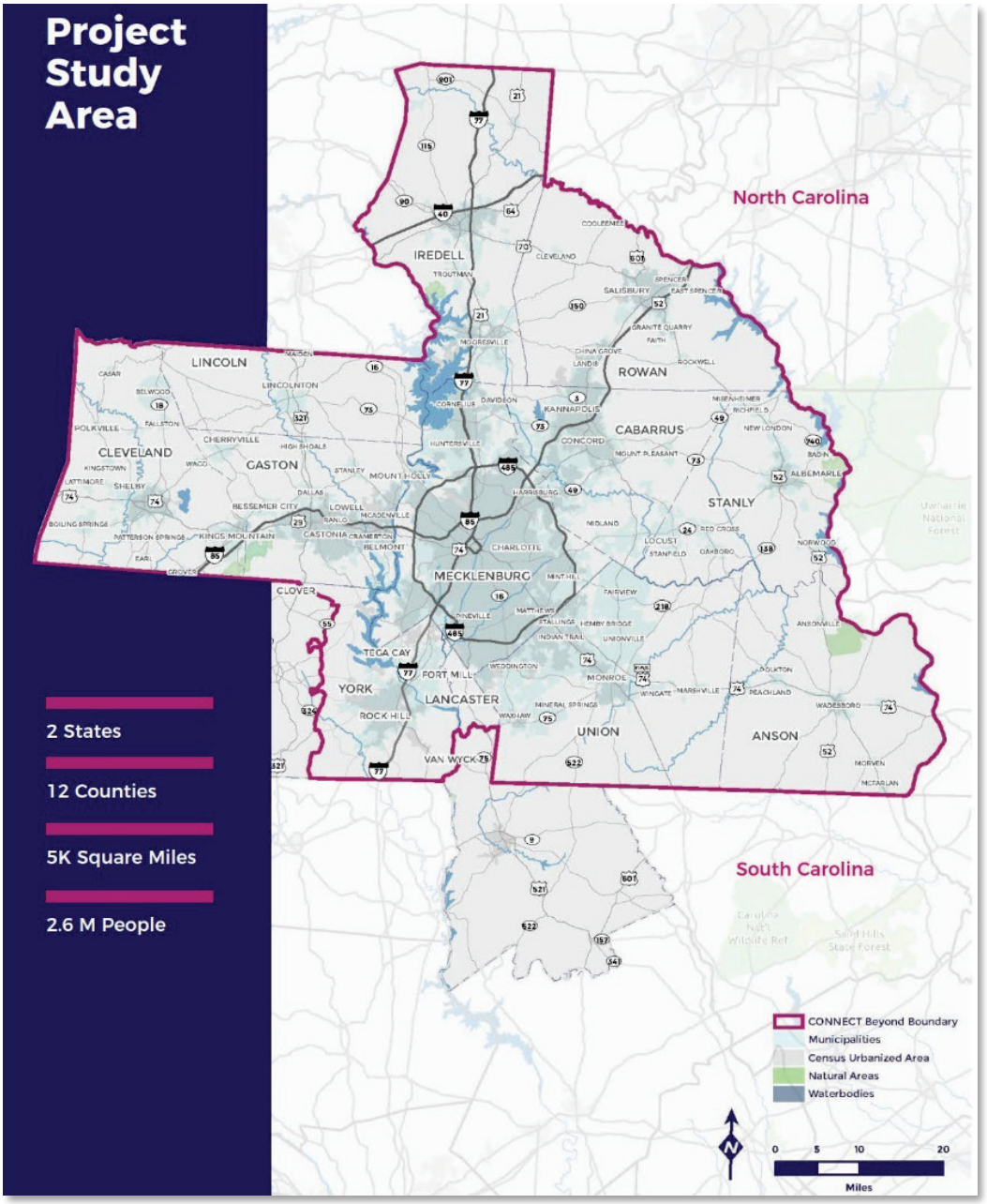
FIGURE 1 CONNECT BEYOND STUDY AREA



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What is High-Capacity Transit?

At its most basic definition, HCT is frequently defined as a transit mode that offers substantially higher levels of passenger capacity with fewer stops and operating at higher speeds than local bus service (resulting in reduced travel times, a key attraction for users). More elaborately, HCT is defined in this study as a set of actions and capital investments to improve transit capacity, reliability, and travel time within major travel corridors. Actions and investments can include changes to the design and operation of streets and signals that benefit transit, changes to transit vehicle fleets, dedicated/identifiable passenger stations, and transit system improvements like off-board fare collection, and even system branding, all of which distinguish HCT from conventional forms of mass transportation. Treatments can be applied systematically across a transit network to improve multiple lines or through a corridor approach to improve one or more transit lines at a time.

The most common forms of HCT include light rail (LRT), bus rapid transit (BRT), and modern streetcars. Other forms of HCT can include commuter and heavy rail systems (found in cities like Boston, New York, Chicago, and Los Angeles), and highway-based commuter express bus services. Commuter-oriented services typically provide service between suburban community centers, park-and-ride facilities, and urban city centers. Some communities identify rapid bus networks as a form of HCT that include features like enhanced passenger stations, unique branding, and higher service frequencies, but do not operate in dedicated transit lanes. Transit priority features, such as queue jump lanes and signal priority, can help make rapid bus service faster and more reliable. Definitions of these features is provided below in this report.

The target market for HCT services is weekday commuting employees traveling from home-to-work in the morning and work-to-home in the afternoon/evening. But commuter rail and bus services are also useful services for special event travel, helping to relieve local roadway networks of excessive traffic for short periods of time during mass gathering events (e.g., live sporting events). It is generally accepted in the public transportation industry that HCT services are planned to operate at 15-minute or better service frequencies, and for 18- to 20-hours of service each weekday. Local fixed-route bus services generally operate between 15- and 30-minute frequencies, with service spans between 16 and 18 hours of service on weekdays. Commuter rail service generally operates during peak travel periods, with scheduled frequencies of between 20 and 30 minutes. The frequency and span of transit service should be tailored to demand to help control operating costs. At this level of planning, service characteristics should be considered, but only speculatively.

Figure 2 displays a matrix of different types of transit services, with a focus on HCT modes and their basic features and typical operating characteristics. All HCT services are most effective when complimented and paired with strong underlying transit services and networks, including local bus service. Effectively, a hierarchy of transit services helps maximize system efficiencies and the movement of people. While each type of HCT has advantages and disadvantages, all forms of HCT can move high volumes of people quickly and efficiently by taking riders out of the automobile congestion.

Regardless of service type, the development of a coordinated HCT network can support the vision of local governments and regional planning organizations to enhance the creation of livable, walkable centers and corridors in the greater Charlotte metropolitan region that can accommodate new jobs and a range of housing types.

How do HCT Investments Serve our Communities?

Increased roadway congestion is already putting pressure on the Charlotte region's transportation system, necessitating solutions that can move large volumes of people across and within the region. With 1.4 million new residents expected in the Charlotte metropolitan region by 2045, HCT can play a crucial role in moving large volumes of people. HCT can also help the region attain land use development goals in urban and urbanizing corridors as it has in peer cities across the United States. While improvements to a local bus network can increase ridership, local bus service has more limited capability to transform land use and drive economic development.

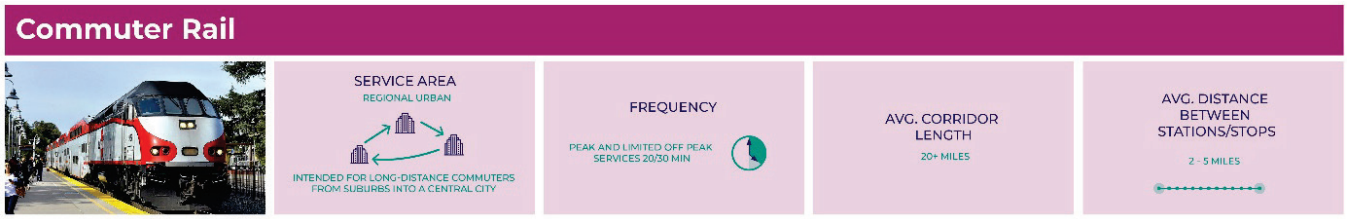
High-capacity transit has been proven to stimulate development in corridors across the United States, making the economic and social benefits far outweigh the investment costs. Perhaps most importantly, concentrated development reduces operating costs for communities.

- **More Riders**: HCT services often attract more riders than regular bus service based on branding, stop/station passenger amenity enhancements, service frequency, and more expedient service (fewer stops and technology improvements to give transit vehicles travel-time advantages over automobiles).
- **More Business**: HCT has proven economic benefits, with land developers and local retailers frequently sighting access to HCT stations as key reason for their decisions related to building and locating their businesses.
- **More Safety**: The implementation of HCT services often includes infrastructure improvements at or around stops and stations such as sidewalks and lighting, pedestrian crossings, and wayfinding information. Additionally, stops and stations are often outfitted with emergency contact features, and transit vehicles can offer safe harbor to those in immediate need.

Commuter Rail Assessment

In parallel with the HCT corridor identification and evaluation process, the Project Team also identified and evaluated potential commuter rail corridors to serve the greater Charlotte metropolitan region. As demands on the Charlotte region's freeway system continue to grow, resulting in increased travel times, commuter-based transit presents a unique solution to corridor congestion.

What is Commuter Rail?



Commuter rail refers to passenger trains that operate along railroad tracks and offer scheduled regional services, often between a central metropolitan hub and adjacent suburbs. On an average weekday in the United States, approximately 1.7 million trips are made on the nation's commuter rail systems. As would be expected, the largest systems serving the metropolitan areas with the highest populations have the most riders. The three systems serving New York City carry approximately 930,000 passengers on the average weekday, roughly 53 percent of all commuter rail passengers in the United States. The system with the lowest daily ridership is the Music City Star serving Nashville, TN, with an average ridership of 1,200 passengers per weekday.

Since most commuter rail services in the United States operate along existing freight railroad trackways, the commuter rail assessment gathered and reviewed applicable data on the ownership, operation, condition, and classification of the existing freight rail trackways in the region and those anticipated to be used for commuter rail purposes. Following an identification and evaluation process, the Project Team identified four corridors as Initial Commuter Rail Corridors and three as Long-Term Commuter Rail Corridors. This distinction was made based on anticipated demand and return-on-investment. Specifically, like the review of HCT corridors, some commuter rail corridors in the region are more prepared than others for the level of investment required, and these corridors are best positioned to capture more trips than other corridors. A full discussion of the commuter rail assessment is provided later in this report.

Funding the Implementation of the Network

The identification of candidate corridors as part of a coordinated network for the CONNECT Beyond planning effort was developed without defined funding sources or budget constraints. The intent of this effort was to create a big-picture vision tailored to the aspirations and needs of the communities and collective region. Naturally, the implementation of an HCT network will require building new infrastructure, acquiring transit vehicles, and expanding budgets to operate and maintain new and enhanced transit services.

Public transportation systems across the United States are often funded through a combination of programs and revenue sources, such as state grants, passenger fares, advertisement revenues and local contributions, and most systems typically rely on federal grants to help cover a significant portion of a system capital costs. Several local, state, and federal funding programs exist that assist communities large and small in the development of multi-modal transportation corridors and services.

The dynamics of funding the CONNECT Beyond vision will be addressed during later phases of the project.

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FIGURE 2. SUMMARY OF HCT AND COMMUTER RAIL MODES AND OPERATING CHARACTERISTICS

Service Type	Photo	Definition	Service and Frequency Type	Average Speed	Stop Spacing	Average Passenger Capacity (per vehicle)	Recommended Density	Examples
High Capacity Transit								
Regional (Heavy) Rail		Service that connects different cities and regions using railroad lines. This is usually used to travel longer distances at high speeds between larger cities or urban areas. Other characteristics include high capacity, fixed station locations, pre-boarding payment, and the placement of one station within each urban area served.	All day, Peak, Off-peak 10 - 60 min.	60 - 75 mph	3 - 15 miles	70 - 190	High	• Between Georgetown & San Antonio (TX) • Between San Jose & Sacramento (CA)
Commuter Rail		Characterized by local short-distance travel operating between a central city and neighboring suburbs. Other features include multi-trip tickets, specific station-to-station fares that are paid prior to boarding, and the presence of only one or two stations in a central business district.	Peak, Limited Off-peak 20 - 30 min.	30 - 50 mph	3 - 15 miles	70 - 190	Medium/High	• Nashville (TN) • Seattle (WA) • Portland (OR)
Light Rail Transit (LRT)		Typically consists of single or double car trains on an electric railway connecting various nodes along a corridor within one urban area. Light rail passenger cars have less ridership capacity than heavy rail cars. Fixed stations are common, although some systems have flexible stop locations.	10 - 30 min.	10 - 30 mph	1 - 2 miles	60 - 175	High	• Portland (OR) • Minneapolis (MN) • Charlotte (NC)
Bus Rapid Transit (BRT)		Characterized by traditional or articulated buses operating within designated lanes, mixed traffic, or a combination. Corridors have fewer stops than traditional bus routes to decrease travel times between termini, and stations are designed for long term use with more passenger amenities than traditional bus stops. Buses may receive priority at traffic signals and intersections.	Peak, Limited Off-peak 15 - 30 min.	15 - 30 mph	.5 - 1 mile	40 - 60	Medium	• Columbus (OH) • Minneapolis (MN) • Richmond (VA)
Other Transit Types								
Streetcar		Medium capacity rail mode that operates in a combination of mixed traffic and exclusive rights-of-way within urban areas. Streetcars typically stop more frequently than light rail, resulting in a lower operating speed. Streetcars tend to have shorter routes that extend less than 3 miles.	Weekday: 10 - 12 Minutes Peak, 15 - 20 min. Off-peak Weekend/Holiday: 30 min.	5 - 25 mph	.25 - .5 miles	90 - 120	High	• New Orleans (LA) • Portland (OR) • Oklahoma City (OK)
Commuter Bus Service		Sometimes referred to as "express" bus service, this type of transit uses traditional bus vehicles to transport riders between the central business district and outlying suburbs. Operates primarily in one direction at a time with service concentrated within peak morning and evening commuter hours. Other characteristics include limited stops and the use of multi-ride tickets.	Peak, Limited Off-peak 30 - 60 min.	15 - 40 mph	varies by area (urban, rural, suburban)	50 - 60	Medium	• Maryland Transportation Administration (MD) • Loudoun County Transit (VA)
Local Fixed Route Service		Characterized by service within a fixed route and on a set schedule, both of which can be modified over time. Buses operate within mixed traffic at the speed of general traffic flow, and payment is accepted on board the vehicle.	20 - 30 min.	15 - 30 mph	varies by area (urban, rural, suburban)	40 - 60	Low/Medium/High	• WMATA (DC) • CATS (NC) • GTA (NC)
Local Circulator		Short-distance local routes that allow residents to easily reach various community destinations (shopping, medical, educational, etc.) and to connect to other transit services. Service operates along a fixed route that typically forms a 2-4 mile loop, and stop locations can be flexible.	30 - 60 min.	10 - 25 mph	.25 - .5 miles	20 - 30	Low/Medium/High	• Baltimore (MD) • Orlando (FL) • Raleigh (NC)
Smart Mobility Options		Transit options frequently used to cover the "first mile" or "last mile" of a rider's trip, bridging the gap between a transit stop and a final destination. This category is comprised of a variety of modes, most of which can be accessed through a smartphone app that allows users to purchase a single ride, multiple rides, or an "unlimited" membership for a given period of time.	On-Demand	varies	typically one stop (destination)	n/a	Low/Medium/High	• Uber • Lyft • Bikeshare • Microtransit

High-Capacity Transit Corridor Identification and Evaluation Process

To identify and evaluate potential corridors where HCT could be implemented in the CONNECT Beyond study area, the Project Team followed a multi-step corridor identification and evaluation process. This process included developing a set of guiding principles, analyzing regional transit conditions, identifying candidate corridors, conducting a Level 1 Corridor Evaluation, conducting a Level 2 Regional Analysis, and making corridor recommendations. Figure 3 depicts the HCT corridor identification and evaluation process.

FIGURE 3. HCT CORRIDOR IDENTIFICATION AND EVALUATION PROCESS

Guiding Principles

This identification and evaluation process began with the CONNECT Beyond Project Team developing a set of guiding principles for the project. A cornerstone of planning processes is the establishment of goals to which a set of projects can aspire to achieve. Over the past year, the CONNECT Beyond Project Team evaluated the existing transit systems in the region and considered what was working well and where gaps, barriers, or needs existed to improve regional mobility. The Project Team looked carefully at regional travel patterns and traffic conditions, existing transportation plans, future land use projections, previous public input, and anticipated population and employment growth trends to identify corridors that would be good candidates for future high-capacity transit lines.

Tasked with developing a vision for the future of the greater Charlotte metropolitan region's mass transportation system and services, the Project Team sought input from stakeholder groups and community members across the CONNECT Beyond region. The engagement of community members, stakeholders, and civic leaders helps to define community priorities and values for transit, and subsequently informs the types of transit services needed in the future.

The Project Team identified the following five CONNECT Beyond Guiding Principles for the project:

1. Creating Mobility Choice
2. Preparing for Future Growth
3. Advancing Equity
4. Aligning Plans and Local Visions
5. Planning for Implementation

Creating Mobility Choice

From past public input, mobility choice is a top priority for residents and leaders in the region. Mobility choice describes the variety of options available to residents and visitors in a region. Mobility choices could include driving a private vehicle, taking public transportation, riding a bike, carpooling, taking a ride-sharing service like Uber or Lyft, riding an electric scooter, or walking. Currently, there are limited mobility choices available to residents and visitors in the region, and many overwhelmingly choose to drive a private automobile to satisfy their transportation needs. Travel forecasts are important predictors of future travel patterns and show exponential growth in the volume of daily trips in the region. Coupled with feedback from local economic developers, planners, and employers, high-capacity transit solutions offer improved mobility choices for residents and visitors in the CONNECT Beyond region particularly in corridors with high ridership potential.

Preparing for Future Growth

Currently, about 2.6 million people live in the CONNECT Beyond region. It is expected that by 2045, 1.4 million people will move to the region, increasing the population to roughly 4 million residents. The region's growing population, whether young professionals or seniors, has specific transportation needs and expectations. Access to reliable, efficient, and well-connected transportation options is essential to ensuring the CONNECT Beyond region maintains a high standard of livability amidst rapidly area growth.

Advancing Equity

Advancing equity is an important part of the CONNECT Beyond vision. While there is no single solution to tackling inequalities and inequity in the region, focusing on improving transportation choices, accessibility and increasing affordable housing is a step in the right direction. Transportation access is a crucial element in providing access to education, jobs, and housing to escape poverty and increase one's economic and social mobility. Lack of reliable transportation can be a substantial barrier to opportunity and social capital. If there are limited or no public transportation options, especially for low-income individuals and families, this creates significant barriers to being able to get to work, access healthcare, shop for groceries, take children to school, access other public services, and participate in activities and social events throughout the region.

Addressing how to improve equitable access to transportation for all of the region's residents, especially those who are transit-dependent is an important consideration of CONNECT Beyond. The Project Team analyzed the region and looked specifically at demographic factors that indicate a propensity to utilize public transit, including holding a minority identity, having a low income, having a disability, being younger than 18 years or older than 64 years, and living in a zero or one car household. These demographic factors help identify areas with the greatest potential for transit utilization. A key component of CONNECT Beyond is to focus on increasing transportation options for those who rely on public transit for their travel needs.

Aligning Plans and Local Visions

As the candidate corridors for HCT were developed and refined, ensuring these corridors align with other planning efforts and local visions for the CONNECT Beyond region was essential. The Project Team met with planning and transit organizations from around the region to ensure the candidate corridors align with and build on plans created by MPOs, RPOs, and local transit system plans.

Planning for Implementation

Finally, the Project Team sought to develop candidate corridors that could be implemented and considered how transit investments could be implemented along these corridors. As the Project Team developed and refined the candidate corridors for HCT service, consideration was given to state and federal funding guidelines and considering existing and planned infrastructure investments. Along the way, the Project Team has endeavored to create cross-jurisdictional partnerships that will be crucial when it is time to implement the regional transit vision

developed by the project. CONNECT Beyond will develop a regional transit vision along with action-oriented strategies to guide individual planning efforts and project implementation.

Analyzing the Regional Transit Conditions

To understand the current and future transit conditions and needs of the CONNECT Beyond region, the Project Team reviewed past and current plans from across the region, conducted an existing transit system evaluation, a transit market analysis, and a transit propensity analysis.

Existing Transit System Evaluation

The process for identifying candidate corridors is perhaps best described as a layer-cake approach. The base layer of the evaluation process began with an understanding of existing conditions. Existing conditions include the locations of the existing LYNX Blue Line LRT and the City LYNX Gold Line streetcar, and the future LYNX Silver Line, the future LYNX Red Line Commuter Rail, the future North Corridor BRT (planned for I-77), and the future LYNX Blue Line LRT Extension (Pineville/Ballantyne). While the Blue Line Extension, Silver Line, and Red Line are still in early stages of planning and project development, the current project definitions provide enough detail for a long-range planning process like CONNECT Beyond to consider the project as part of the foundational layer.

With the baseline of the existing transit systems in the region established, the Project Team conducted a series of planning analyses examining current and future travel markets, transit propensity, and a review of applicable plans and prior studies to help ensure coordination between existing plans and recommended corridors.

Travel Market Analysis

One of the early activities of CONNECT Beyond was to assess the existing and potential travel markets in the CONNECT Beyond study area. A separate technical report on the Travel Market Analysis methods and results was previously published. The purpose of the Travel Market Analysis was to understand projected future travel demand, projected future travel behaviors, and projected future travel patterns in the CONNECT Beyond study area.

The goal of the Travel Market Analysis was to use projected travel data about where and how individuals will travel in the future to better understand existing and future market conditions as they relate to the need for transit service throughout the CONNECT Beyond study area.

There are several factors that drive transit demand, but the primary factors include:

1. **Population and Employment Densities**: Where larger numbers of people live and/or work, there are more people who may use transit.
2. **Development Patterns**: In areas with dense, mixed-use development, a good pedestrian and bicycle environment can be convenient, attractive, and well used.
3. **Socio-economic Characteristics:** Populations more likely to rely on transit can generally be defined by demographic characteristics such as age, income, minority status, and disability status.
4. **Service Availability and Reliability**: Transit is more likely to attract and retain riders when service is reliable, and is travel time competitive with automobile travel.

Since the demand for transit service varies across the CONNECT Beyond study area, the Project Team divided the study area into travel market areas and then evaluated the potential transit demand for different travel area markets throughout the study area. There were three main steps the Project Team followed to develop this Travel Market Analysis: 1). modeling the travel demand, 2). segmenting the study area into travel market areas, and 3). analyzing the projected travel demand and patterns within and between the travel market areas.

The Project Team used a travel forecasting tool called a travel demand model to estimate future travel demand and travel behaviors in the CONNECT Beyond study area. A travel demand model is a statistical computer program that uses socioeconomic input data including population, housing, and employment densities to predict future travel decisions that individuals in a certain area will make. A travel demand model is simply a forecast of future travel that predicts where people will travel to and from, what routes they will take, and what transportation modes they will use.

A travel demand model is an important travel forecasting tool to identify where trips begin and end in a study area. Travel demand modeling is a statistical exercise that attempts to understand average travel behaviors based on observed data from statistically relevant travel survey information which is collected periodically. While it is one of several analytical tools used to understand travel patterns, travel demand models are an important planning tool used to identify and evaluate current and future demands on a region's existing transportation system, and to help decision-makers plan for future investments to the transportation network.

The Project Team used two existing travel demand models, the Metrolina Travel Demand Model and the Statewide Travel Demand Model, to predict the projected travel demand for the CONNECT Beyond study area in 2045. In a travel demand model, the data is organized by

subdividing a larger study area into special zones or geographical units that are called transportation analysis zones (TAZs). The CONNECT Beyond study area has over 3,400 TAZs.

Transportation Analysis Zones (aka Traffic Analysis Zones)

Transportation Analysis Zones (TAZs) are geographic units used in transportation forecasting models to examine trip flows within a metropolitan region. These zones vary in size, typically being smaller in dense urban centers and larger in exurban and rural areas. While based on Census data, the zones incorporate a wealth of other data related to land uses, allowing planners and travel forecasters greater ability to account for changing characteristics of a corridor or region faster than waiting for updates to the decennial Census data.

For each TAZ, a four-step process was used to build a travel demand model.

1. Trip Generation: how many trips are being made?
2. Trip Distribution: where are the trips going?
3. Mode Choice: what transportation mode is being used for each trip?
4. Trip Assignment: what route is each trip taking?

This process was run for each TAZ in the study area and a travel demand model was developed for each TAZ. The model provides projected future travel demand and projected future travel behavior for 2045 for each TAZ.

Since there are over 3,400 TAZ in the CONNECT Beyond study area, the Project Team combined certain TAZ to create larger travel market areas that would be easier to analyze. When clustering and combining TAZ, the Project Team considered a variety of factors including population density, employment density, trip production and attraction densities, jurisdictional boundaries, physical barriers, and existing major transportation networks. The Project Team condensed the 3,400+ TAZs used in the Metrolina Travel Demand Model and the Statewide Model into 55 travel market areas and synthesized the travel demand data for each.

The primary aim of travel demand modeling is to understand where the greatest number of trips are occurring in the study area, including where the trips start and end. By assessing the anticipated future travel patterns in the overall CONNECT Beyond study area (between different travel market areas and within individual travel market areas), the Project Team was able to better understand the varying future transportation demands across the study area and where

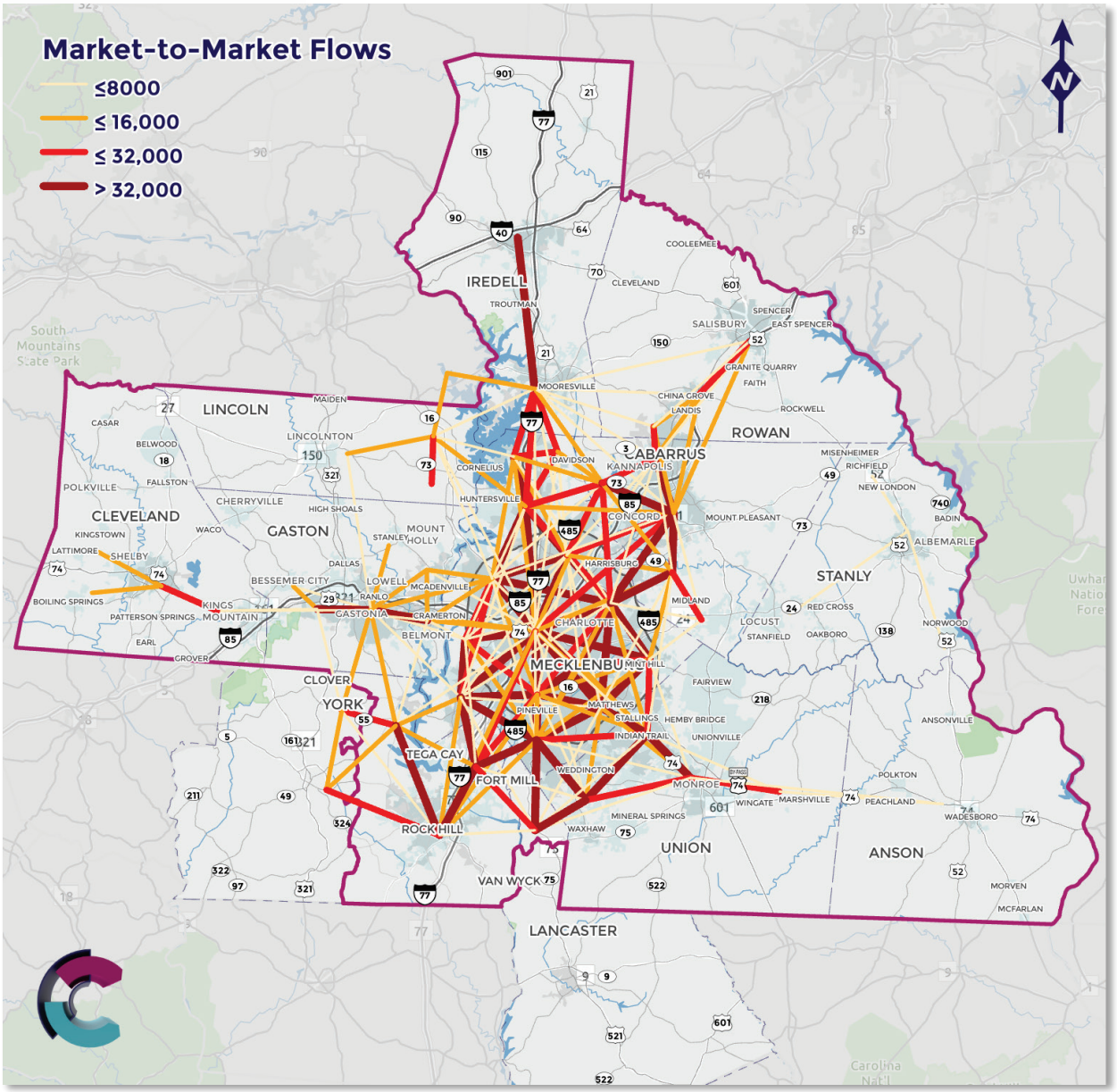
high-capacity transit services may be needed in the future. This is an important macro-level step in the identification of candidate corridors where future high-capacity transit services could potentially be implemented. The Travel Market Analysis also helped the Project Team better understand how local fixed-route networks currently disaggregated from one another may one day be more integrated as the region continues to grow. Regional mobility is better served with interconnected networks, and operating costs of localized networks are better maintained as a result of shared resources and a more integrated system.

The key findings for Travel Market Analysis, are shown in Figure 4 and include the following:

- Trip patterns in the metropolitan region are primarily focused in Mecklenburg County and the City of Charlotte. In general, trip patterns may be described as radial, meaning most trips in the morning are destined for Uptown Charlotte, and return trips in the afternoon or early evening are leaving Uptown Charlotte.
- While a strong proportion of trips are radial, an emerging travel pattern is cross-town trips. These are trips destined points across the region, and not exclusively Uptown Charlotte.
- Census units surrounding Uptown Charlotte and stretching eastward along US 74 show the greatest transit propensity.
- While Mecklenburg County is anticipated to experience the majority of immediate future growth, all counties within the study area are expected to add population and employment.

The Travel Market Analysis conducted for the CONNECT Beyond project reflects an initial look at anticipated trip making behaviors in the horizon year of this planning effort (2045). Generally, the data suggests that the City of Charlotte and Mecklenburg County will continue to be focal points of future growth and development; however, all counties and communities within the study area are anticipated to grow. As such, strategic investments in transportation infrastructure and systems will be necessary in all counties and communities to handle increases in population.

FIGURE 4. CONNECT BEYOND STUDY AREA AVERAGE DAILY TRIP FLOWS



Transit Propensity Analysis

To complement the Travel Market Analysis, the Project Team completed a Transit Propensity Analysis. A Transit Propensity Analysis is an analysis that identifies geographical areas of a city or region that have the greatest potential to use public transportation. Transit propensity measures the likelihood of using public transportation through commonly-available socioeconomic data, typically from the U.S. Census Bureau, selected based on industry research

regarding the potential users of transit services. A higher propensity toward an action suggests a greater likelihood to take the action.

There are several factors that determine transit propensity, but the primary socioeconomic factors that were considered in this Transit Propensity Analysis were:

- Youth Population Density
- Elderly Population Density
- Minority Population Density
- Low-Income Population Density
- Disabled Population Density
- Zero-Car Household Population Density

Factors Contributing to Transit Ridership

Demographic characteristics are key indicators of potential transit utilization by geography, but ridership is also affected by other factors, some of which transit agencies control, and others outside the control of transit or transportation agencies. When planning for a region's future public transportation network and overall mobility, knowing and understanding the internal and external factors that contribute to transit ridership are important considerations. The following represent short lists of key internal and external factors that also influence to transit utilization.

Internal Factors

- Overall Service Area Coverage
- Frequency of Service
- Spans of Service
- Transit Fares
- Public Policy
- Technology
- Marketing/Service Promotion

External Factors

- Transportation Alternatives
- Transportation Costs (e.g., fuel)
- Parking Costs
- Land Use and Land Development Patterns
- Employment Rates and Incomes

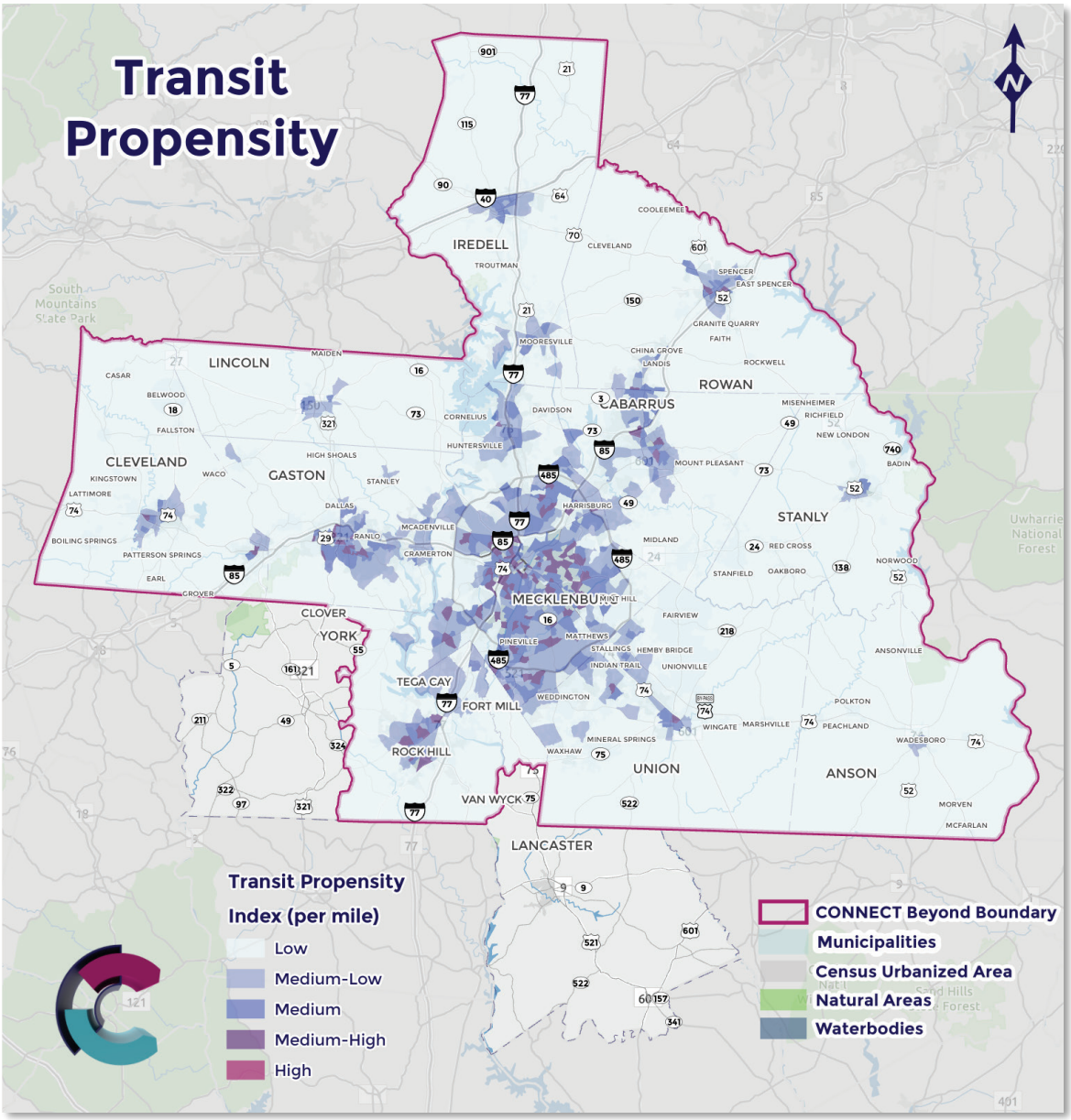
The methodology supporting this Transit Propensity Analysis is derived from:

- Transit Cooperative Research Program (TCRP) Report 28: Transit Markets of the Future
- TCRP Report 3: Workbook for Estimating Demand for Rural Passenger Transportation
- TCRP Report 27: Building Transit Ridership

In general, transit service productivity indicators such as higher ridership routes, coupled with population and employment densities and where future growth is planned, act as early indicators of the travel corridors where future HCT service is warranted. However, the identification of candidate corridors must include social equity considerations, or the equitable distribution of transit investments, as a geographic value layer. It was also desired to ensure jurisdictional equity in HCT investments, referring to equitable investments across the region.

Figure 5 displays the collective results of the Transit Propensity Analysis. The results of the Transit Propensity Analysis are consistent with what was expected. Transit propensity is greatest in dense urban locations of the study area: predominantly east, northeast, and northwest of Uptown Charlotte, in and around the downtowns of Gastonia and Rock Hill, and then clusters around the downtowns of urban centers in the suburban and ex-urban areas of the study area. This analysis considered a variety of demographic factors including age, income, disability status, zero and one-car households, and minority characteristic.

FIGURE 5. TRANSIT PROPENSITY ANALYSIS



Review of Applicable Plans and Prior Studies

Plans and studies previously completed or in progress also informed the development of the initial list of candidate corridors. Regional investment strategies such as the CONNECT Our Future Regional Growth Framework plan serve as important indicators of the region's future growth trajectory and priorities, including housing and environmental quality components. The

identification of candidate corridors was also informed by adopted plans and programs, along with on-going plans and studies.

Planning for HCT services has been on-going in the greater Charlotte metropolitan region for several decades. Spurred by the success of the capital initiatives like the Lynx Blue Line LRT and subsequent Blue Line Extension projects, many community plans have incorporated some form of HCT vision as part of their comprehensive plans or transportation plan updates. The review accomplished two important goals:

1. The plans and prior studies affirmed several candidate corridors considered by this planning effort.
2. The documents provided a foundation for consideration of future HCT investments given land use changes and desired community growth corridors, and how transit investments can work holistically to advance a comprehensive transit and mobility strategy for the region. This is particularly important for suburban, ex-urban (generally considered areas in transition from rural to suburban lands), and rural communities of the study area who will also experience growth in the coming years and become a greater part of the regional transportation discussion and investment program.

In addition to the review of documents, the Project Team also conducted analyses of existing and planned future land uses using geographic information systems (GIS). These analyses helped the team assess the land use characteristics of the candidate corridors, along with their ability now and in the future to enable transit-supportive land uses.

Taking all of the above information into account, the Project Team developed an initial list of candidate corridors for evaluation. The initial list was not artificially constrained to avoid prematurely eliminating any corridors that might have travel benefits. The candidate corridors are identified in the section below.

Contributing Plans and Studies Reviewed

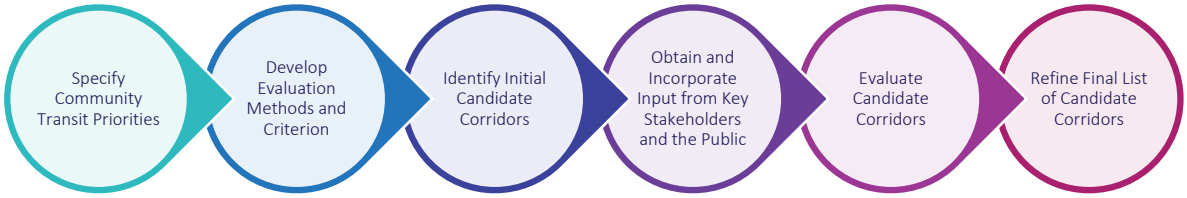
CONNECT Beyond is being conducted in coordination with existing planning and project design efforts. Plans contributing to the identification and review of candidate corridors include (but are not limited too) the following:

- Metropolitan Planning Organization Transportation Plans
- CATS 2030 Transit Corridor System Plan
- Connect Our Future Plan
- Regional Transit Engagement Series
- LYNX Silver Line
- North Corridor/Red Line Study
- Envision My Ride Bus Priority Study

Identify Candidate Corridors

A fundamental goal of the CONNECT Beyond effort is to identify transit needs and projects that will support mobility and continued investment in the greater Charlotte metropolitan region. The identification of candidate corridors began with a blank map canvas. With the planning data assembled, the Project Team began the process of layering the data and information gathered during the Regional Transit Conditions Analyses on the map. As the data layers were added, a picture emerged of where HCT services were most needed to enhance local and regional connectivity, connect emerging growth centers, improve service delivery and quality, and leverage the existing or programmed future HCT investments. Candidate corridors were also identified based on the need to ensure a balanced network, rather than a collection of individual corridors. Specific consideration was given to the geographic distribution and overall role each candidate corridor would play in the greater transit network, with attention also given to ensuring quality connections to other routes and destinations. Figure 6 presents the general approach to the identification of candidate corridors.

FIGURE 6. CANDIDATE CORRIDOR IDENTIFICATION PROCESS



The identification of candidate corridors is focused on corridors rather than specific projects, and assessing the relationships between the corridors identified and the travel market areas served. The identification of candidate corridors was guided by the CONNECT Beyond Guiding Principles, which were articulated through the community and stakeholder engagement process. A range of candidate corridors for potential HCT service areas located throughout the CONNECT Beyond study area were identified based on:

- Existing transportation networks (Existing Transit System Evaluation)
- Existing and future travel patterns and demand (Travel Market Analysis)
- Existing and future potential transit demand (Transit Propensity Analysis)
- Population and employment growth
- Land use growth and changes
- Applicable transit plans and prior studies
- CONNECT Beyond Guiding Principles
- Previous public input (CONNECT Our Future and Regional Transit Engagement Series)
- Additional stakeholder input (CONNECT Beyond Technical Advisory Committee Online GIS Map Comments. See Appendix D)

Using the criteria listed above and input from the CONNECT Beyond Project Management Team (PMT), the Project Team identified an initial set of 32 candidate corridors. When identifying the candidate corridors, the Project Team also considered additional factors, including:

- Creation of an interconnected transit network
- Location of existing services
- Performance of underlying routes and/or route segments

- Geographic distribution of future services
- Social equity considerations
- Speed and reliability factors
- Integration with local and regional transit plans and future investments
- Incorporation with long-range land use and transportation plans

Public and agency input played an important role in the identification of candidate corridors. Input from regional stakeholders and applicable planning documents helped establish the foundation of this planning effort. As described further below, the existing planning efforts of CONNECT our Future and the plans of municipalities, area MPOs and RPOs, and county planning agencies were all considered as part of this existing condition assessment.

An HCT Vision Shaped by Community Values

Public and agency input helped define the Community Transit Priorities and identify needs and opportunities. This input was vital in identifying the initial list of HCT candidate corridors for review and refinement. These priorities served as the guiding principles in the development of the CONNECT Beyond HCT network vision:

Economic Competitiveness

Efficient public transportation is important for the region's economic development, talent attraction and business recruitment.

Transportation Choices

Improve existing services, extend transit's reach to new areas, and promote travel options.

Advance Social Equity

Direct transit investments to corridors and neighborhoods in need.

The list of initial candidate corridors was presented to the CONNECT Beyond Project Management Team (PMT) for consideration. Following input received from PMT members, presentations were made to the established Technical and Policy Advisory Committees that are comprised of representative staff from area cities and transit agencies. Presentations were also made to the MPOs and the RPO who provided further comment on the candidate corridors and additional corridors for the Project Team to consider. The public was also invited to view and comment on the candidate corridors through the project's webpage and an online community survey.

For analysis purposes the candidate corridors remained mode-neutral throughout this process. The mode for the candidate corridors has not been finalized or determined; at this level of planning, it is best not to pre-determine a mode. A detailed project development process must be used to finalize selection of the appropriate HCT mode for each corridor and is a required step to obtain federal funding.

The public and agency engagement work culminated in the identification of 32 candidate corridors, shown in Figure 7. Table 1 lists the corridors and provides a brief narrative description of each.

FIGURE 7. CANDIDATE CORRIDORS

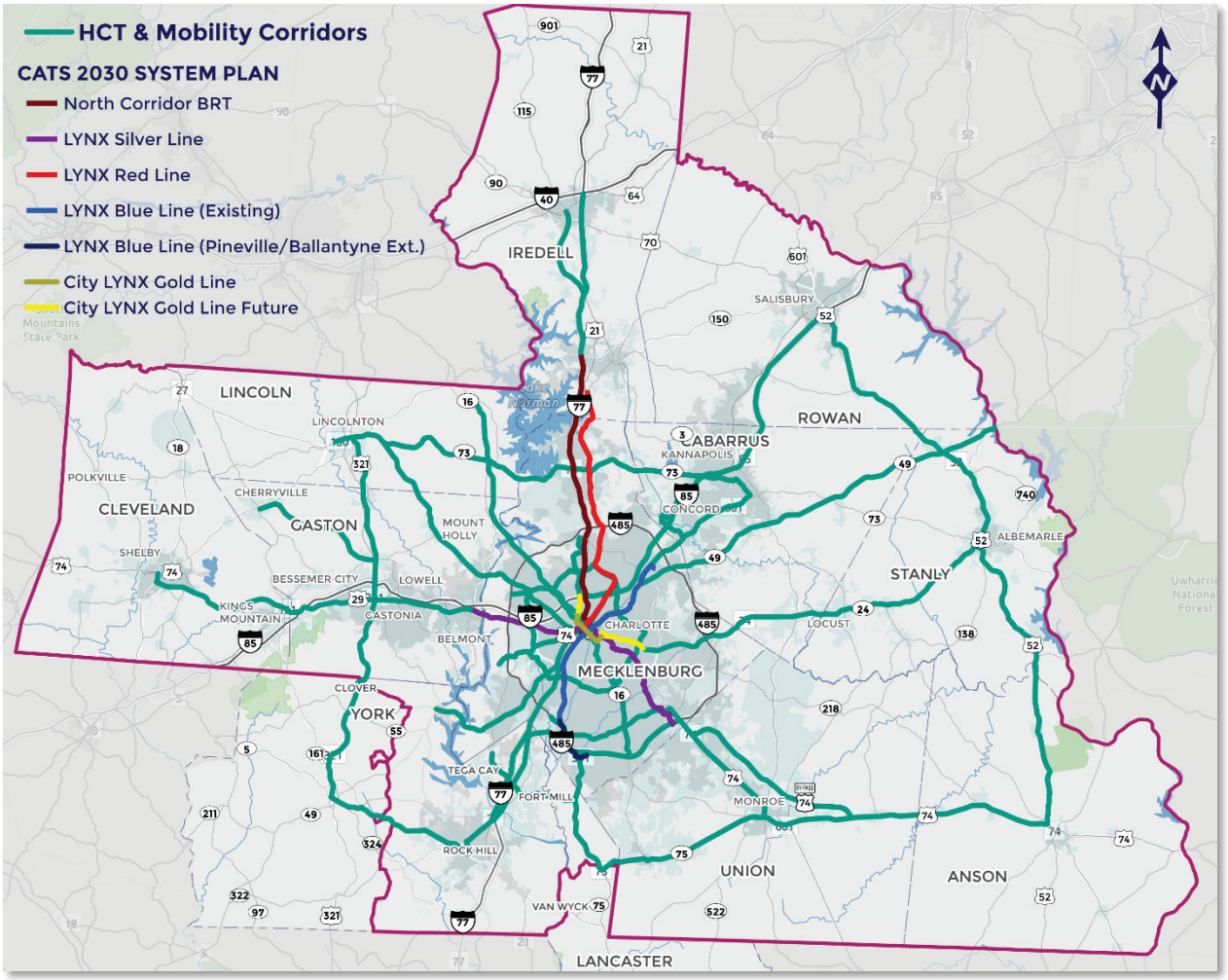


TABLE 1. LIST OF CANDIDATE CORRIDORS AND DESCRIPTIONS

Number	Corridor Name	Description
Candidate Corridor 1	**Highway 16/Providence Road Corridor**	The Highway 16/Providence Road Corridor would extend high-capacity transit service from Uptown Charlotte to Ballantyne, NC. A possible extension of the Corridor along Highway 521 into urbanized Lancaster County, SC was also considered.
Candidate Corridor 2	**Highway 49/South Tryon Street Corridor**	The Highway 49/South Tryon Street would extend high-capacity transit service from Southwest Charlotte to Lake Wylie, SC along Highway 49 Southwest. A possible future connection could be to extend service along Highway 49 to York, SC.
Candidate Corridor 3	**Highway 51/Pineville-Matthews Road Corridor**	The Highway 51/Pineville-Matthews Road Corridor would provide a crosstown high-capacity transit service along Highway 51 between the downtowns of Pineville and Matthews. Beginning at the current Blue Line terminus station at South Boulevard and I-485, this Corridor would connect with the Highway 16/Providence Road Corridor and the future Silver Line LRT Corridor in downtown Matthews.
Candidate Corridor 4	**Highway 74 East/ W Roosevelt Blvd Corridor**	The Highway 74 East/W Roosevelt Blvd Corridor would extend high-capacity transit service from Indian Trail, NC east along Highway 74/W Roosevelt Boulevard to Marshville, NC. Continuing connections to Peachland, Polkton, and Wadesboro in Anson County were also considered.
Candidate Corridor 5	**Highway 74 West Corridor**	The Highway 74 West Corridor would provide high-capacity transit from the proposed end of the LYNX Silver Line in Belmont, NC to Kings Mountain, NC. A continued connection beyond Kings Mountain to Shelby, NC was also considered. A prior commuter rail study was completed that considered a potential commuter rail service between Charlotte and Kings Mountain.
Candidate Corridor 6	**Interstate 77 South Corridor**	The I-77 South Corridor would extend high-capacity transit service between Uptown Charlotte and Downtown Rock Hill, SC with connections to Fort Mill, SC and other points in southwest Charlotte. As a highway-oriented commuter corridor, planning for the corridor should consider speed, reliability, and operational needs, as well as the needs of commuting passengers.
Candidate Corridor 7	**Highway 321 Corridor**	The Highway 321 Corridor between York, SC and Lincolnton, NC is on the urban periphery of Charlotte, but has rapidly grown in recent years and includes land use anchors such as Lincolnton, High Shoals, Gaston College, downtown Gastonia, Clover, and York. This Corridor would connect these communities and nodes in between with future commuter rail or another HCT corridor connections in Gastonia.
Candidate Corridor 8	**Highway 5 Corridor**	The Highway 5 Corridor between York and Rock Hill is seen as an extension of the Highway 321 Corridor, although given continued development of both Rock Hill and York along Highway 5, this Corridor could be implemented separately of the Highway 321 Corridor.

Number	Corridor Name	Description
Candidate Corridor 9	**Highway 73 West Corridor**	The Highway 73 West Corridor would extend high-capacity transit service between Concord and Lincolnton, with connections to Huntersville/Cornelius, Cowans Ford/Lake Norman, and Goodsonville.
Candidate Corridor 10	**Highway 24/27/ Albemarle Road Corridor**	The Highway 24/27/Albemarle Road Corridor would provide high-capacity transit service between Albemarle, NC and Charlotte's Eastland Mall area, where a future transfer station is planned at the terminus of the proposed City LYNX Gold Line streetcar.
Candidate Corridor 11	**Highway 16 Northwest Corridor**	The Highway 16 Northwest Corridor would establish high-capacity transit service between Uptown Charlotte and Denver, NC.
Candidate Corridor 12	**Highway 21 South Corridor**	The Highway 21 South Corridor would provide high-capacity transit service between Pineville, NC, and Rock Hill, SC. The Rock Hill-Fort Mill Area Transportation Study (RFATS) has previously considered the Highway 21 South Corridor between Rock Hill and Pineville as a potential BRT corridor. This Corridor is considered in the context of the I-77 South travel shed between Rock Hill and Charlotte.
Candidate Corridor 13	**Highway 21 North Corridor**	The Highway 21 North Corridor would extend the planned I-77 BRT project from Davidson north to Statesville, generally following Highway 21 North.
Candidate Corridor 14	**Highway 29 North**	The Highway 29 North Corridor would extend high-capacity transit from the current LYNX Blue Line northern terminus at UNCC north to Concord, NC. Two route options are possible: an extension to the Concord-Padgett Regional Airport and/or an extension that provides service directly into Downtown Concord, NC.
Candidate Corridor 15	**Highway 27 Corridor**	The Highway 27 Corridor would extend high-capacity transit service northwest of Uptown Charlotte to the City of Lincolnton, and also serve Mount Holly, Stanley, Alexis and Iron Station.
Candidate Corridor 16	**Various Roads in Northwest Charlotte (From Wilkinson Blvd to Sugar Creek Road)**	The Wilkinson Boulevard to Sugar Creek Road Corridor is part of a loop concept that encircles Uptown Charlotte and would provide crosstown high-capacity transit service and establish connections with future high-capacity transit corridors including the City LYNX Gold Line streetcar and LYNX Silver Line LRT. This Corridor would follow portions of Little Rock Road, Rozzelles Ferry Road, Hoskins Road, Sunset Road, and Gibbon Road.
Candidate Corridor 17	**Various Roads in East Charlotte (From Sugar Creek Road to Monroe Road)**	The Sugar Creek Road and Monroe Road Corridor is part of the loop concept around Uptown Charlotte that would provide crosstown high-capacity transit service to neighborhoods and connect with the existing LYNX Blue Line with several future high-capacity transit corridors including the extension of the City LYNX Gold Line streetcar and LYNX Silver Line LRT projects.
Candidate Corridor 18	**Various Roads in South Charlotte (From Monroe Road to South Blvd)**	The Monroe Road to South Boulevard Corridor is a continuation of the loop concept that would provide crosstown high-capacity transit service to the neighborhoods of south and southeast Charlotte, establishing connections the existing LYNX Blue Line LRT other planned high-capacity transit corridors including the LYNX Silver Line LRT.

Number	Corridor Name	Description
Candidate Corridor 19	**Various Roads in Southwest Charlotte (From South Blvd to Wilkinson Blvd)**	The South Boulevard to Wilkinson Boulevard Corridor is a continuation of the loop concept that would provide crosstown high-capacity transit service to the neighborhoods of southwest Charlotte. This service is envisioned to operate from the LYNX Blue Line LRT Tyvola station to Charlotte Douglas International Airport and the future LYNX Silver Line LRT station at the airport.
Candidate Corridor 20	**Interstate 485 Corridor**	The I-485 Corridor includes the new express lanes being constructed between Matthews and Pineville. This facility will be a toll lane facility similar to what was previously constructed along I-77 north to Mooresville.
Candidate Corridor 21	**Interstate 85 Corridor**	Running from Salisbury to Uptown Charlotte, the I-85 Corridor would implement high-capacity transit service within a freeway facility similar to what is planned for I-77 north to Mooresville, or what is currently under construction along I-485 between Matthews and Pineville.
Candidate Corridor 22	**Highway 160 Corridor**	The Highway 160 Corridor would implement high-capacity transit service along Highway 160 generally between Highway 460 and Highway 521 in Fort Mill, SC.
Candidate Corridor 23	**Freedom Drive /Moores Chapel Road Corridor**	The Freedom Drive/Moores Chapel Road Corridor would extend high-capacity transit service from Uptown Charlotte along Freedom Drive and Moores Chapel Road to an area on the west side of Charlotte known as Wildwood. This corridor is a part of CATS Envision My Ride future high frequency network.
Candidate Corridor 24	**West Boulevard Corridor**	As part of CATS Envision My Ride network, the West Boulevard Corridor would extend high-capacity transit service from Uptown Charlotte to the Charlotte Premium Outlets Shopping Center/Garrison Road.
Candidate Corridor 25	**Graham Street Corridor**	As part of CATS Envision My Ride network, the Graham Street Corridor would extend high-capacity transit service north of Uptown Charlotte to UNCC.
Candidate Corridor 26	**Beatties Ford Road Corridor**	The Beatties Ford Road Corridor would extend high-capacity transit from Uptown Charlotte to the Northlake Mall area. This Corridor would provide high-capacity transit in addition to the future City LYNX Gold Line near the Rosa Parks Transit Center. CATS is planning for the extension of the City LYNX Gold Line on Beatties Ford Road to the Rosa Parks Transit Center. As part of the Envision My Ride network, CATS is planning for higher frequencies of bus service extending to the Northlake Mall shopping center.
Candidate Corridor 27	**Highway 75/Waxhaw Highway Corridor**	The Highway 75/Waxhaw Highway Corridor would extend high-capacity transit service along Highway 75 between Waxhaw and Monroe, establishing a connection with other potential high-capacity transit routes in Monroe. This Corridor could also connect with a possible high-capacity transit service on Highway 521 in Lancaster County, South Carolina.

Number	Corridor Name	Description
Candidate Corridor 28	**Highway 52 Corridor**	During conversation with the Rocky River Regional Planning Organization, the Highway 52 Corridor was identified as a future corridor to consider for transit service with service between Salisbury and Wadesboro. The Corridor would also serve Rockwell, Richfield, Albemarle, Norwood, and Ansonville.
Candidate Corridor 29	**Highway 49 Corridor**	The Highway 49 Corridor would extend the high-capacity transit service from the Blue Line Extension UNCC LRT Station east to Richfield.
Candidate Corridor 30	**Interstate 77 North Corridor**	The I-77 North Corridor would extend high-capacity transit service from Mooresville, NC to Statesville, NC. This Corridor would serve as a potential extension of the currently planned CATS MetroRapid North Corridor BRT that will provide bus rapid transit service in the I-77 Express lanes from Uptown Charlotte to Mooresville, NC.
Candidate Corridor 31	**Monroe Expressway/Highway 74 Bypass Corridor**	The Monroe Expressway/Highway 74 Bypass Corridor would provide high-capacity transit service between Stallings and Marshville and be located along the Monroe Expressway/Highway 74 Bypass. This Corridor is an alternate to Candidate Corridor 4, which is the Highway 74 East/ W Roosevelt Blvd Corridor.
Candidate Corridor 32	**Highway 279 Corridor**	The Highway 279 Corridor was identified following a CONNECT Beyond Advisory Committee meeting and would extend high-capacity transit service between Dallas and Cherryville.

Candidate Corridor Evaluation Process

Following the identification of the 32 candidate corridors, the Project Team conducted a two-tier evaluation and analysis process to evaluate, refine, and sort the candidate corridors.

- **Level 1 Corridor Evaluation**: During the Level 1 Corridor Evaluation, the Project Team evaluated each candidate corridor using criteria and measures related directly to the CONNECT Beyond Guiding Principle statements to assess the readiness (or preparedness) of each candidate corridor for high-capacity transit service.
- **Level 2 Regional Analysis**: During the Level 2 Regional Analysis, the Project Team analyzed regional data on changes in population and employment, anticipated growth in traffic levels and congestion, and examined traditional factors contributing to transit utilization. This examination allowed for a look at how each candidate corridor would best serve future regional mobility needs considering the anticipated growth trends. The candidate corridors were then sorted into two categories: Recommended HCT Corridors and Emerging Mobility Corridors. Thirteen corridors were advanced as Recommended HCT Corridors, and 24 corridors were advanced as Emerging Mobility corridors.

Level 1: Corridor Evaluation

During the Level 1 Corridor Evaluation, the Project Team evaluated each candidate corridor using criteria and measures related directly to the guiding principle statements. The main objective of this effort was to assess the readiness of each candidate corridor for HCT service including their overall preparedness for a HCT investment.

The Level 1 Corridor Evaluation process was designed to evaluate the corridors based on their overall preparedness to help area leaders determine an implementation strategy. The Corridor Evaluation did not focus on transit projects or improvements already underway in the region (e.g., LYNX Blue Line, LYNX Silver Line, City LYNX Gold Line streetcar, I-77 North BRT). Instead, projects in progress (such as the future Blue Line extension to Pineville/Ballantyne or the Silver Line LRT) informed the identification of candidate corridors.

The corridor evaluation criteria included both qualitative and quantitative measures. Qualitative measures are those that are either descriptive or conceptual, and informed by professional experience/judgement. Quantitative measures are counted or measured using actual data. Corridors were given generalized summary performance scores of High, Medium, or Low for qualitative measures. For quantitative measures, the Project Team developed thresholds based on the data to give a similar summary performance score. The corridor evaluation score was intended as a general indicator of potential performance for a candidate corridor regarding the respective evaluation criterion.

Table 2 outlines the evaluation criteria related to each guiding principle statement and the evaluation measures and methods used for each evaluation criterion. Table 3 through Table 7 provide the evaluation rating for each evaluation criterion for every candidate corridor. Table 8 provides the overall evaluation rating for each candidate corridor.

FIGURE 8. CANDIDATE CORRIDOR REVIEW PROCESS

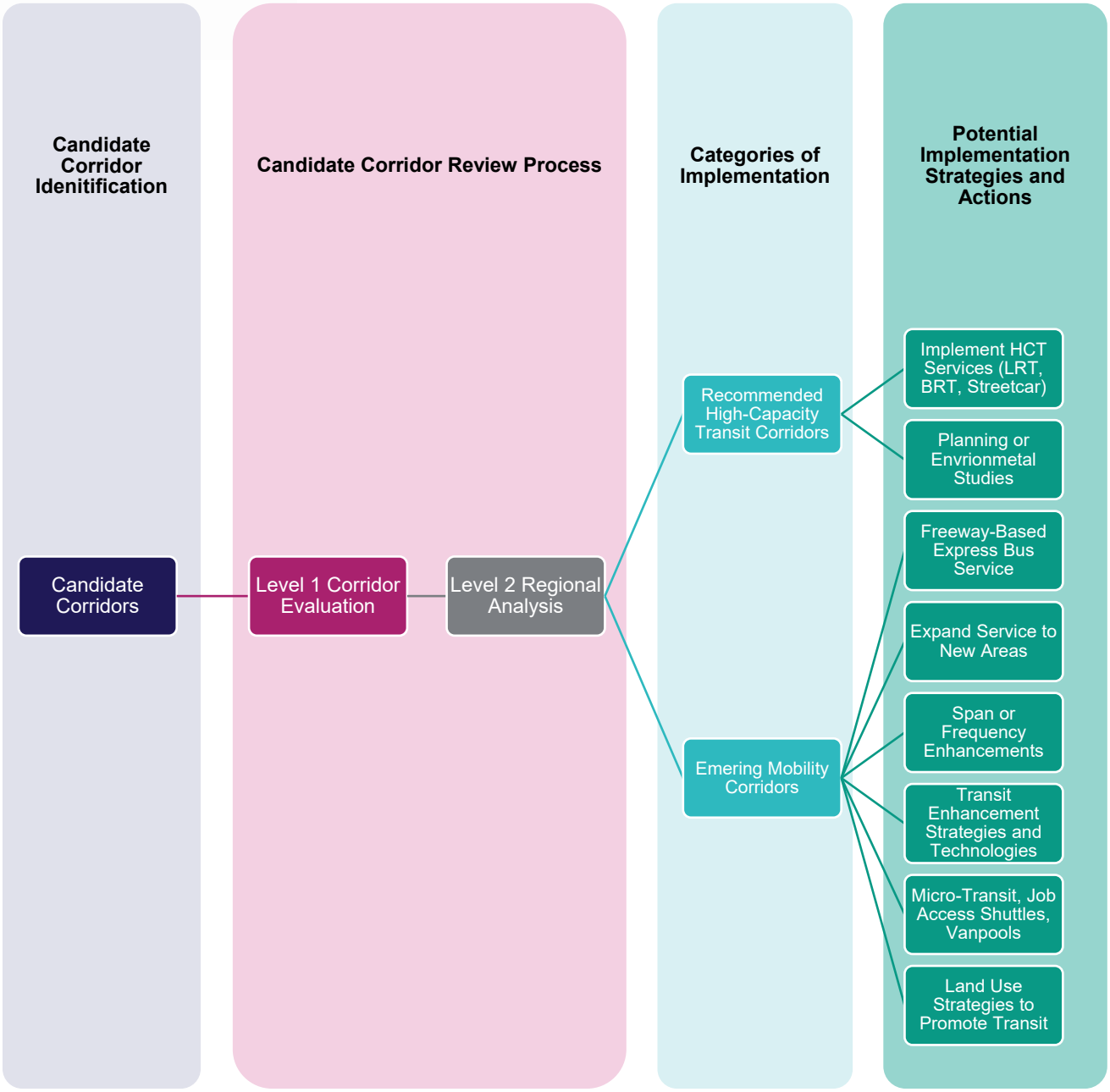


TABLE 2. LEVEL 1 CORRIDOR EVALUATION CRITERIA, MEASURES, AND METHODS

Guiding Principles	Evaluation Criteria	Measure	Method
Creating Mobility Choice	Regional Connectivity	Network integration and operational flexibility	Regional transit system connectivity and operational flexibility to meet future demand
	Public Facilities and Destinations Served	Access to public facilities	Number of public facilities and destinations, within a one-mile radius of a proposed alignment
Preparing for Future Growth	Projected Transit Demand	Future population and employment served (forecast for 2045)	Future population and Employment within one mile of the corridor
	Service in Congested Corridors	Projected congestion in corridor (2045)	Quantitative assessment of highly congested highway and arterial mileage
Advancing Equity	Transit Dependency	Service to households likely to use public transportation (zero- and one-car households)	Percentage of corridor serving census tracts with zero- and one-car car households
	Access to Jobs	Projected job growth in corridor	Comparative summary of job growth by job classification within each candidate HCT corridor
	Opportunities for Historically Underserved Populations	Service to households with incomes below the federal poverty threshold	Assessment of access to opportunities for historically underserved populations
Aligning Plans and Local Visions	Land Use and Transportation Plan Consistency	Corridor consistency with local land use and transportation plans	Compatibility of potential HCT transit corridors with local and regional land use and transportation plans
Planning for Implementation	Environmental Benefits	Built, Natural, and Social Environments	Qualitative assessment of a candidate corridor's ability to improve environmental conditions within the corridor served
	Station Area Development Potential	Transit-supportive economic development	Qualitative assessment of corridor development potential

Creating Mobility Choice

The first set of evaluation criteria considered how the candidate corridors contributed to the creation of a comprehensive transit vision for the Charlotte metropolitan region, and how their implementation could expand regional connectivity and connections to public facilities.

Regional Connectivity

Having good connections to frequent connecting routes increases the capacity of the system to provide timed transfers to large numbers of passengers and increases the overall attractiveness of the transit system. To assess regional connectivity, the number of existing transit routes the candidate corridor would intersect with or that are within the candidate corridor buffered area were determined based on the existing service networks. To not advantage longer candidate corridors or those in more urban environments, the number of intersecting or nearby bus routes was divided by the total corridor length, providing a value of passenger transfer opportunities per corridor mile. All bus routes with the same or nearly-the-same alignment were removed from the number of intersecting routes, as it would be expected that the candidate corridor would replace the existing route entirely. Applying the quartiles method, the candidate corridors could then be organized into categories of High, Medium, or Low based on their normalized value. A score of High was given for candidate corridors with over 2.2 passenger transfer opportunities per corridor mile. For candidate corridors with between 2.1 and 0.7 passenger transfer per corridor mile opportunities, these corridors were given a score of Medium, and for candidate corridors with less than 0.6 passenger transfers per corridor mile received a score of Low.

Public Facilities and Destinations Served

For the public facilities and destinations served criterion, this evaluation measure considered the accessible public facilities including city or town halls, county offices, courthouses, police stations, fire stations, public hospitals, libraries, parks, schools (K-12), and colleges/universities within the buffered area of each candidate corridor. The length of some corridors, or the urban nature of others, meant that count of public facilities served needed to be divided by the length of the corridor, resulting in an approximate number of public facilities per corridor mile. Applying the quartiles method, the candidate corridors could then be organized into categories of High, Medium, or Low based on their normalized value. For corridors serving less than 2.8 public facilities per corridor mile a score of Low was given. Corridors serving between 2.9 and 4.0 public facilities per corridor mile were given a score of Medium, and corridors serving 4.1 or more public facilities per corridor mile were scored as High.

Table 3 provides a summary scorecard for evaluation criterion considered with regard to regional connectivity and public facilities served by the candidate corridors. A score of High means that the corridor could perform well with regard to the criterion, while a score of Low suggests that the candidate corridor is likely to underperform for that criterion. Matrices detailing the scoring methodology for the evaluation measures are available in Appendix C.

As noted, the length of some candidate corridors presented an evaluation challenge. As a result, the Project Team subdivided some corridors based on the review of applicable data (primarily future densities) to help evaluate and specify potential performance results for the criterion. For example, the US 74 East Corridor between Stallings to Wingate shows stronger immediate future performance potential, while a corridor extension to Wadesboro in the horizon year of this planning effort (2045) shows limited potential. However, this helps introduce the discussion of what service options exist to help connect Wadesboro and Anson County as part of the regional public transportation framework. These segments are shown with indented text in the table.

TABLE 3. REGIONAL CONNECTIVITY AND PUBLIC FACILITIES SCORECARD

Corridors	Evaluation Criterion	
	Regional Connectivity	Public Facilities and Destinations Served
Highway 16/Providence Road	High	High
Highway 521/Charlotte Highway	Low	Low
Highway 49/South Tryon Street	Medium	Low
Highway 51/Pineville-Matthews Road	Medium	Medium
Highway 74 East/ W Roosevelt Blvd	Low	High
Highway 74 East Wadesboro Extension	Low	Low
Highway 74 West	Low	Medium
Highway 74 West Shelby Extension	Low	Low
Interstate 77 South	High	Medium
Highway 321	Low	Low
Highway 5	Low	Low
Highway 73 West	Low	Low
Highway 24/27/ Albemarle Road	Medium	Medium
Highway 24/27 Albemarle Extension	Low	Low
Highway 16 Northwest	Medium	Medium
Highway 21 South	High	High
Highway 21 North	Low	High
Highway 29 North	Medium	Medium
Highway 27 North	Medium	Medium

Corridors	Evaluation Criterion	
	Regional Connectivity	Public Facilities and Destinations Served
Wilkinson Boulevard to Sugar Creek	Medium	Low
Sugar Creek to Monroe Road	High	High
Monroe Road to South Boulevard	High	Medium
South Boulevard to Wilkinson Boulevard	Medium	Medium
Interstate 485	Medium	Low
Interstate 85	Medium	Low
Highway 160	Low	Low
Freedom Drive/Moores Chapel Road	High	High
West Boulevard	High	High
Graham Street	High	High
Beatties Ford Road	High	High
Highway 75/Waxhaw Highway	Low	Low
Highway 52	Low	Low
Highway 49	Low	Low
Interstate 77 North	Low	Low
Monroe Expressway/Highway 74 Bypass	Low	Low
Highway 279	Low	Low

Preparing for Future Growth

The second set of evaluation criteria considered each candidate corridor within the context of projected transit demand and service in congested corridors.

Projected Transit Demand

Projected transit demand was evaluated primarily as a function of transit propensity and travel forecasting data. The projected 2045 population and employment densities help determine the sustainability of a candidate corridor, helping to determine whether a corridor will be viable in the future, capturing changes in land use over time.

Future population and employment were considered in the context of the change in population and employment between 2015 and 2045. The total population and employment from the TAZ data within the 1-mile buffered area were summed for each candidate corridor for both 2015 and 2045, and the difference was determined. The resulting difference in total population and employment for each candidate corridor was then normalized by the length of the corridor. Applying the quartiles method, the candidate corridors could then be organized into categories of High, Medium, or Low based on their normalized value. For candidate corridors with values over 5,745.1, these corridors received a score of High. For corridors with values between

5,745.0 and 1,448.7, these corridors received a score of Medium. Finally, for corridors with values below 1,448.6, these corridors were scored as Low.

Service in Congested Corridors

Providing high-quality transit service in congested corridors is a difficult challenge. Delivering service that is competitive with automobile travel times to attract a typical automobile driver in dense, often congested urban corridors is often not possible due to the volume of local traffic, restricted rights-of-way, and competition for roadway space by multiple users: bicyclists, pedestrians, and parked cars.

For this measure, the Project Team utilized the observed change in vehicle-to-capacity (V/C) ratios between 2015 and 2045. In addition, the Project Team also consider the change in vehicle miles traveled, produced conveniently by the regional travel demand forecast models. The assessment of candidate corridors looked at the percentage change in vehicle-to-capacity ratios between 2015 and 2045. For candidate corridors with V/C ratio changes over 79 percent, these corridors received a score of High. For corridors with V/C ratio changes between 78 and 31 percent, these corridors received a score of Medium. Finally, for candidate corridors with V/C ratios at or below 30 percent, these corridors were scored as Low.

In the case of this evaluation criterion, a score of High would reflect a sizable increase in travel within a corridor, and as such a greater need for enhanced transit services.

Table 4 provides a summary scorecard for evaluation criterion considered with regard to preparedness for future growth. A score of High means that the corridor could perform well with regard to the criterion, while a score of Low suggests that the candidate corridor is likely to underperform for that criterion. Similar to Table 3, the Project Team used the same divisions along select corridors to review applicable information and specify potential corridor performance results for the criterion. These segments are shown with indented text in Table 4. Matrices detailing the scoring methodology for the evaluation measures are available in Appendix C.

TABLE 4. PROJECTED TRANSIT DEMAND AND SERVICE IN CONGESTED CORRIDORS SCORECARD

Corridors	Evaluation Criterion	
	Projected Transit Demand	Service in Congested Corridors
Highway 16/Providence Road	Medium	Medium
Highway 521/Charlotte Highway	Medium	Medium
Highway 49/South Tryon Street	Medium	Low
Highway 51/Pineville-Matthews Road	Medium	Low
Highway 74 East/ W Roosevelt Blvd	High	Medium
Highway 74 East Wadesboro Extension	Low	Low
Highway 74 West	Medium	Low
Highway 74 West Shelby Extension	Low	Low
Interstate 77 South	High	Medium
Highway 321	Low	Medium
Highway 5	Low	High
Highway 73 West	Medium	Low
Highway 24/27/ Albemarle Road	Medium	Low
Highway 24/27 Albemarle Extension	Low	Medium
Highway 16 Northwest	Medium	High
Highway 21 South	Medium	Medium
Highway 21 North	High	Medium
Highway 29 North	High	Medium
Highway 27 North	Medium	High
Wilkinson Boulevard to Sugar Creek	Medium	Low
Sugar Creek to Monroe Road	High	Medium
Monroe Road to South Boulevard	Medium	Low
South Boulevard to Wilkinson Boulevard	Medium	Low
Interstate 485	Medium	Medium
Interstate 85	Medium	Medium
Highway 160	Medium	High
Freedom Drive/Moores Chapel Road	High	High
West Boulevard	High	Medium
Graham Street	High	High
Beatties Ford Road	High	High
Highway 75/Waxhaw Highway	Low	High
Highway 52	Low	Medium
Highway 49	Medium	Medium
Interstate 77 North	Low	Medium
Monroe Expressway/Highway 74 Bypass	Medium	High
Highway 279	Low	Low

Advancing Equity

The third set of evaluation factors focused on equity and access to opportunities. According to the Bureau of Labor Statistics, consumer spending on transportation was the largest percentage increase among major household expenditures in 2019, rising 10.1 percent above spending levels in 2018. Vehicle insurance spending was the primary cause of cost increases, but spending on vehicle fuel and maintenance also increased. For context, average annual incomes before taxes rose 5.4 percent in 2019, after increasing by 6.9 percent in 2018.

A peer city comparison provides a quick examination of how the average household transportation costs as a percentage of income in Charlotte compare with other cities of similar size, and what annual spending on transportation in dollar terms looks like. The residential density indicator helps to illustrate how residents in peer cities with greater densities are often experiencing lower annual transportation costs and spending less on transportation as a percent of their income.

Depending on location, the average household in the United States spends between 13 and 19 percent of their monthly household income on transportation expenses. Auto-dependent households typically spend more on transportation expenses, but transportation costs for households with access to public transportation still constitute a sizeable monthly expenditure. Using the City of Charlotte as a yard-stick measure for the greater region, the average Charlotte household spends 22 percent of their annual income on transportation expenses according to the Center for Neighborhood Technology's Housing + Transportation Affordability Index. On average, Charlotte region households are paying around

Peer City Comparison

Charlotte, NC
Transportation Costs (% Income): 22%
Annual Transportation Cost: $13,200
Residential Density[1]: 3.7 HHs/Res. Acre

Atlanta, GA
Transportation Costs (% Income): 19%
Annual Transportation Cost: $10,900
Residential Density[1]: 6.4 HHs/Res. Acre

Nashville, TN
Transportation Costs (% Income): 22%
Annual Transportation Cost: $12,000
Residential Density[1]: 2.2 HHs/Res. Acre

Jacksonville, FL
Transportation Costs (% Income): 23%
Annual Transportation Cost: $12,100
Residential Density[1]: 2.2 HHs/Res. Acre

Indianapolis, IN
Transportation Costs (% Income): 23%
Annual Transportation Cost: $12,000
Residential Density[1]: 3.8 HHs/Res. Acre

Austin, TX
Transportation Costs (% Income): 19%
Annual Transportation Cost: $12,300
Residential Density[1]: 3.8 HHs/Res. Acre

Minneapolis, MN
Transportation Costs (% Income): 16%
Annual Transportation Cost: $10,800
Residential Density[1]: 9.7 HHs/Res. Acre

Source: CNT Housing + Transportation Affordability Index, 2020

$13,200 per year on transportation expenses, and transportation expenses gradually increase with distance from the city's center.

Considered in this context, transportation is a key component to social equity and upward mobility. In view of the data available to the project and a look at planned future transit investment strategies, the Project Team sought to identify candidate corridors that promoted social equity, upward mobility, and jurisdictional equity. The greater Charlotte region is committed to investing in underserved neighborhoods to ensure access and regional equity.

Transit Dependency

High-capacity transit corridors can be beneficial to households with lower incomes and those that do not have reliable or regular access to a vehicle. It is important to note that there is not always a direct correlation between income and car ownership. For several years, a shifting trend was documented in the number of people delaying car ownership in favor of walking, bicycling, using transit, and later the increasing use of ride-sharing services. However, some households remain carless because they cannot afford to own and operate a car and rely on transit for many of their daily travel needs. Therefore, this study considered transit dependency through the lens of both zero vehicle and one vehicle households.

Data on vehicle accessibility was obtained from the American Community Survey (2018 5-Year Estimates) at the block group level. To determine the number of zero- and one-vehicle households that would be served by each corridor, the Project Team selected block groups whose centroids were within the 1-mile buffer of each candidate corridor, and proportionally allocated the total number of zero and one vehicle households based on the percentage of block group's percentage of land area within the corridor buffer. However, simply adding the result would unfairly advantage longer corridors. Therefore, the zero- and one- vehicle households were normalized by the length of the corridor, yielding the number of zero- and one-vehicle households per corridor mile. Applying the quartiles method, the candidate corridors could then be organized into categories of High, Medium, or Low based on their normalized value. A value equal to or greater than 292.5 received a score of High; a value between 292.4 and 106.2 were given a score of Medium, while a value at or below 106.1 was scored as Low.

Access to Jobs

The access to jobs measure considered the growth in jobs by job classification, as available by the data. The rate of positive change (or growth) in population and employment within 1-mile of

each candidate corridor looks at areas with increasing population and employment density, which demonstrate an improving environment for transit-oriented development (TOD).

Esri, the makers of ArcGIS and associated geospatial analytic programs, provides several tools for analyzing business locations and summary data, such as industry type, location, business size, and employee statistics among other publicly-available employment information. This information comes from sources including the North American Industry Classification System (NAICS) and the Standard Industrial Classification (SIC) System and was used to gather applicable information on access to jobs within each candidate corridor.

The American Public Transportation Association (APTA) periodically publishes the report "Who Rides Public Transportation?" a user profile report based on statistically-valid samples and surveys conducted by transit providers across the United States. Included in this report is information on employment profiles of transit users. Using the employment industry classifications provided by NAICS and SIC, the most common employment types that typically use transit were selected based on the published user profile information from APTA's report. The most common job classifications of transit users include construction, manufacturing, wholesale trade, retail (e.g., general merchandise, furniture and home goods), hospitality services (e.g., hotel/lodging, amusements), and educational professions.

Similar to other analyses, the length of some corridors or the urban character of others may unfairly advantage certain corridors over others. The total number of transit-supportive jobs were summed for each corridor and divided by the corridor's length to provide the number of transit-supportive jobs per corridor mile. Applying the quartiles method, the candidate corridors could then be organized into categories of High, Medium, or Low based on their normalized value. Corridors with transit-supportive jobs at or above 213.7 were scored as High, corridors with transit-supportive jobs between 213.6 and 67.8 were score as Medium, and corridors with transit-supportive jobs at or below 67.7 received a score of Low.

Historically Underserved Populations

Traditionally, income has served as a key indicator for above average utilization of public transportation. In general, those individuals or households of more modest means typically lack consistent access to a private automobile and are thus more reliant on public transportation as a primary means of mobility. Empirical studies continue to show the link between income and transit utilization, but also evaluate and typically show a correlation between income and other demographic characteristics, such as minority characteristic, age, and educational attainment.

These studies often also observe trends in ridership through the lens of geography, nothing that areas with more income variability and social dynamics typically have higher rates of transit utilization.

A core tenant of the CONNECT Beyond study is equity, both in terms of social equity (referring to the upward social and economic advancement of all populations within the study area) and jurisdictional equity (referring to the distribution of funds and projects across the metropolitan region). To evaluate the affect each of the candidate corridors could have on serving historically underserved populations, U.S. Census Bureau data were gathered from the American Community Survey (2018 5-Year Estimates) at the Block Group geographic level. In 2019, the federal poverty income threshold for a family of four with two children in Mecklenburg County was $25,926. While this figure is lower for a single person household with no dependents ($13,064), traditional planning analysis looks at households with at least two or more persons per household to be more inclusive in an analysis of income and poverty. The ACS provides data on the number of people ages 18 and over below the poverty threshold.

Using the income threshold of $25,926 as a proxy for the entire CONNECT Beyond study area, the analysis summed all the households living at or below this value in the Census units contributing to each candidate HCT corridor. It is important to note that the ACS data are summarized in $5,000 increments, such as $20,000-$24,999. Therefore, the Project Team opted to include the full range of households with incomes between $25,000 and $29,999. While this would add some households above the federal poverty income threshold, it was felt that the number of additional households was insignificant to result in any statistical bias between candidate corridors.

As with other analysis, just adding the number of households would unfairly advantage longer corridors, so an index value was created first by dividing the total number low-income households in a corridor by the total length of the corridor. Applying the quartiles method, the candidate corridors could then be organized into categories of High, Medium, or Low based on their normalized value. A value equal to or greater than 395.6 received a score of High; a value between 395.5 and 142.7 was given a score of Medium, while a value at or below 142.6 was scored as Low.

Table 5 provides a summary scorecard for evaluation criterion considered with regard to equity factors. A score of High means that the corridor could perform well with regard to the criterion, while a score of Low suggests that the candidate corridor is likely to underperform for that

criterion. Similar to Tables 3 and 4, the Project Team used the same divisions along select corridors to review applicable information and specify potential corridor performance results for the criterion. These segments are shown with indented text in Table 5. Matrices detailing the scoring methodology for the evaluation measures are available in Appendix C.

Transit's Important Role in Alleviating Poverty

Access to reliable public transportation is a vital tool for social advancement and poverty alleviation in major cities across the United States. In 2015, Harvard University published a continuing study on upward mobility and poverty alleviation for low-income populations. Tracking more than 5 million people from their earliest years in the 1980s and 1990s, transportation was the primary determinant for many low-income persons and households looking to escape the continuous cycle of poverty. Across the United States, the story was similar: longer commute times worsened the chances of a low-income persons and households from making upward social and economic progress.

In a similar study, a New York University study examined neighborhoods and accessibility to mass transit, and considered the number of jobs within a 1-hour commute. As may be expected, residents in neighborhoods with lower overall accessibility to transit relied on automobiles as their primary means of mobility. However, for neighborhoods in the middle quartile – those neighborhoods with some access to transit, but still less well served – had the highest rates of unemployment and lowest incomes.

Prior to these two studies, the Brookings Institution's Metropolitan Policy Program published "Missed Opportunity: Transit and Jobs in Metropolitan America," an analysis of the nation's 100 largest metropolitan areas to evaluate transit coverage and service with regard to job accessibility. By the numbers, the Charlotte-Gastonia-Concord metropolitan area ranked 75th out of 100, with 1 being high, and 100 being low. And in 2017, research published in the Regional Science and Urban Economics journal further established the linkage between quality public transportation and deconcentrating poverty, with a focus on suburban areas.

The empirical studies confirm that access to strong, reliable public transportation networks is crucial to social advancement and poverty alleviation, and also pay dividends for metropolitan regions. Public transportation directly impacts social and economic well-being. Expanding transit options through a mixture of HCT, fixed-route, and on-demand service can be especially important to low-income individuals, families, and communities at-large. Communities with greater income and social equality tend to display more positive human health indicators such as educational attainment, better standards of living, reduced rates of obesity and respiratory disease, among other health and welfare statistics. According to APTA, a household can save an average of $10,000 annually by taking public transit.

TABLE 5. ADVANCING EQUITY SCORECARD

Corridors	Evaluation Criterion		
	Transit Dependency	Access to Jobs	Historically Underserved
Highway 16/Providence Road	High	High	Medium
Highway 521/Charlotte Highway	Medium	Low	Low
Highway 49/South Tryon Street	Medium	Medium	Medium
Highway 51/Pineville-Matthews Road	High	High	Medium
Highway 74 East/ W Roosevelt Blvd	Medium	High	Medium
Highway 74 East Wadesboro Extension	Low	Low	Low
Highway 74 West	Medium	Medium	High
Highway 74 West Shelby Extension	Medium	Medium	Medium
Interstate 77 South	High	High	High
Highway 321	Low	Low	Low
Highway 5	High	Medium	Medium
Highway 73 West	Medium	Medium	High
Highway 24/27/ Albemarle Road	Low	Medium	Medium
Highway 24/27 Albemarle Extension	Medium	Low	Medium
Highway 16 Northwest	Low	Medium	Medium
Highway 21 South	Medium	Medium	Medium
Highway 21 North	Medium	Medium	Medium
Highway 29 North	Medium	Medium	Medium
Highway 27 North	Medium	Medium	Medium
Wilkinson Boulevard to Sugar Creek	Medium	Medium	Medium
Sugar Creek to Monroe Road	High	High	High
Monroe Road to South Boulevard	High	High	High
South Boulevard to Wilkinson Boulevard	Medium	Medium	Medium
Interstate 485	Medium	Medium	Medium
Interstate 85	Medium	Medium	Medium
Highway 160	Medium	Medium	Low
Freedom Drive/Moores Chapel Road	High	Medium	High
West Boulevard	Medium	High	High
Graham Street	High	High	High
Beatties Ford Road	High	High	High
Highway 75/Waxhaw Highway	Low	Low	Low
Highway 52	Low	Low	Low
Highway 49	Low	Low	Low
Interstate 77 North	Medium	Medium	Medium
Monroe Expressway/Highway 74 Bypass	Low	Low	Low
Highway 279	Low	Low	Low

Aligning Plans and Local Visions

Planning Consistency

Using current, available future land use data the total acreage of transit-supportive parcels was calculated as a percentage of total acreage of all parcels located within the 1-mile buffer of each candidate corridor. For candidate corridors with transit-supportive land uses equal to or above 29 percent, these corridors received a score of High. For corridors with transit-supportive land uses between 28 and 18 percent, these corridors received a score of Medium. Finally, for corridors with transit-supportive land uses at or below 17 percent, these corridors were scored as Low.

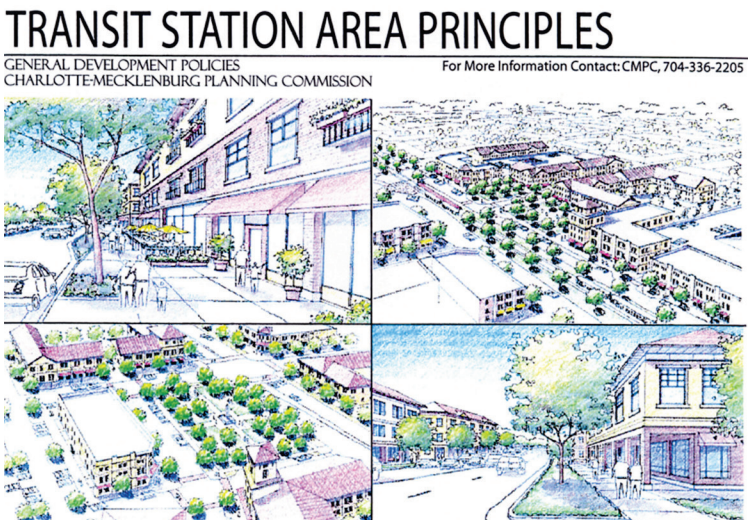
In addition to the quantitative review of land use data, an assessment of consistency with adopted land use or transportation plans was conducted. This qualitative assessment considered whether a candidate corridor would fit with the overall vision for the transportation corridor outlined in adopted plans by the respective local or regional agencies.

Table 6 provides a summary scorecard for evaluation criterion considered with regard to promotion of social mobility and opportunity. Matrices detailing the scoring methodology for the evaluation measures are available in Appendix B.

The Best Transit Plans are also Land Use Plans

"Building an integrated land use and transit system is key to managing the rapid growth occurring in the Charlotte-Mecklenburg area and to invigorating existing communities into better places to live and work. This requires making land use decisions that encourage residents to use transit as an alternative for their daily and occasional travel. It also requires ensuring that the areas around transit stations encourage pedestrian activity and provide for a mix of land uses in a vibrant, active and safe environment."

- *City of Charlotte and the Charlotte-Mecklenburg Planning Commission*



Transit Station Area Principles

TABLE 6. PLANNING CONSISTENCY SCORECARD

Corridors	Evaluation Criterion Planning Consistency
Highway 16/Providence Road	Medium
Highway 521/Charlotte Highway	Medium
Highway 49/South Tryon Street	Medium
Highway 51/Pineville-Matthews Road	Medium
Highway 74 East/ W Roosevelt Blvd	Medium
Highway 74 East Wadesboro Extension	Low
Highway 74 West	High
Highway 74 West Shelby Extension	Medium
Interstate 77 South	High
Highway 321	Low
Highway 5	Low
Highway 73 West	Medium

Corridors	Evaluation Criterion Planning Consistency
Highway 24/27/ Albemarle Road	Medium
Highway 24/27 Albemarle Extension	Low
Highway 16 Northwest	Medium
Highway 21 South	High
Highway 21 North	Medium
Highway 29 North	High
Highway 27 North	Low
Wilkinson Boulevard to Sugar Creek	Low
Sugar Creek to Monroe Road	Medium
Monroe Road to South Boulevard	Medium
South Boulevard to Wilkinson Boulevard	High
Interstate 485	Medium
Interstate 85	High
Highway 160	Low
Freedom Drive/Moores Chapel Road	Medium
West Boulevard	High
Graham Street	Medium
Beatties Ford Road	Medium
Highway 75/Waxhaw Highway	Medium
Highway 52	Low
Highway 49	Low
Interstate 77 North	High
Monroe Expressway/Highway 74 Bypass	Medium
Highway 279	Low

Planning for Implementation

Investments in HCT services are often transformative for surrounding communities and their environments. Major capital infrastructure investments can require additional right-of-way, can include upgrades to existing transportation facilities or even utilities, and certainly have been shown to influence the social fabric of surrounding communities given land value increases. Capital projects must often complete comprehensive environmental reviews, especially if project's seek federal funding, but also as part of local, regional, or state environmental permitting requirements.

Environmental Benefits

There are many evaluation metrics considered as part of environmental reviews to address the health and preservation of natural, built, and social environments. At this stage of each

candidate corridor's definition, it is almost impossible to specify any potential effects to these resources. However, based on data collected for other evaluation measures, some qualitative assessments can be made about a corridor's potential to influence the surrounding environment. For example, several candidate corridors identified may operate within or immediately adjacent to major roadways or regional freeways that are projected to experience growth in traffic volumes and congestion levels in the coming years. The implementation of an HCT service within the corridor would be likely to attract users stuck in traffic, thereby reducing vehicle emissions, noise, and roadway pollutant run-off. Similarly, the Station Area Development Potential measure below assessed the availability of transit-supportive land areas within each candidate corridor. The environmental benefits associated with transit-supportive land uses are greater population and employment density, reduced consumption of natural or open spaces, farmlands, and greater energy efficiency.

The assessment of environmental benefits for each corridor was a qualitative review of how the implementation of HCT service within each corridor might improve surrounding environmental conditions. Using the evaluation ratings for the regional connectivity, planning consistency, historically underserved populations, transit dependency, and service in congested corridors criterion, the ratings were converted to a point structure, with ratings of Low receiving one point, ratings of Medium receiving two points, and ratings of High receiving three points. The points were totaled. Scores above 13 points were given a rating of High for the Environmental Benefits. Score between 12 and 8 points were given a rating of Medium, and scores below 7 were given a rating of Low.

Station Area Development Potential

Station area development potential was also considered both quantitatively and qualitatively. This measure looked at existing and planned land uses at major intersections where HCT transit stations are often located, to generally assess compatibility of a potential station with surrounding land uses. This assessment also accounted for the general availability of land for new development or infill/redevelopment. For each candidate corridor, the total acreage of identified vacant land, city and county owned lands, available spatial information on brownfields, and surface parking facilities was gathered and compared to the percentage of total land within each candidate corridor's 1-mile buffer area. For candidate corridors with developable parcel percentages equal to or above 26 percent, these corridors received a score of High. For corridors with developable parcel percentages between 25 and 13 percent, these corridors received a score of Medium. Finally, for corridors with developable parcel percentages at or below 12 percent, these corridors were scored as Low.

Table 7 provides a summary scorecard for the environmental benefits evaluation criterion. A matrix detailing the scoring methodology for this evaluation measure is available in Appendix B.

TABLE 7. ENVIRONMENTAL BENEFITS AND STATION AREA DEVELOPMENT POTENTIAL

Corridors	Evaluation Criterion	
	Environmental Benefits	Station Area Development Potential
Highway 16/Providence Road	Medium	Medium
Highway 521/Charlotte Highway	Medium	Medium
Highway 49/South Tryon Street	Medium	Medium
Highway 51/Pineville-Matthews Road	Medium	Medium
Highway 74 East/ W Roosevelt Blvd	Medium	High
Highway 74 East Wadesboro Extension	Low	Low
Highway 74 West	Medium	High
Highway 74 West Shelby Extension	Medium	Medium
Interstate 77 South	High	Low
Highway 321	Low	Low
Highway 5	Medium	High
Highway 73 West	Medium	Medium
Highway 24/27/ Albemarle Road	Medium	High
Highway 24/27 Albemarle Extension	Medium	Low
Highway 16 Northwest	Medium	Medium
Highway 21 South	Medium	High
Highway 21 North	Medium	High
Highway 29 North	Medium	High
Highway 27 North	Medium	Low
Wilkinson Boulevard to Sugar Creek	Medium	Low
Sugar Creek to Monroe Road	High	Medium
Monroe Road to South Boulevard	High	Medium
South Boulevard to Wilkinson Boulevard	Medium	Medium
Interstate 485	Medium	Medium
Interstate 85	Medium	High
Highway 160	Medium	Medium
Freedom Drive/Moores Chapel Road	High	Medium
West Boulevard	High	High
Graham Street	High	High
Beatties Ford Road	High	High
Highway 75/Waxhaw Highway	Medium	Medium
Highway 52	Low	Low
Highway 49	Low	Low
Interstate 77 North	Medium	High
Monroe Expressway/Highway 74 Bypass	Medium	Medium
Highway 279	Low	Low

Level 1 Corridor Evaluation Results

During the Level 1 Corridor Evaluation, candidate corridors were evaluated using criteria and measures related directly to the CONNECT Beyond Guiding Principle statements. Based on the evaluation rating for each criterion, every candidate corridor was given an overall evaluation rating or a composite corridor score that indicates how well each candidate corridor aligns with the guiding principles. This Level 1 Corridor Evaluation process was intended to assess the readiness (or preparedness) of each candidate corridor for high-capacity transit service.

TABLE 8. COMPOSITE CORRIDOR SCORES

Corridors	Composite Corridor Score
Highway 16/Providence Road	Medium
Highway 521/Charlotte Highway	Medium
Highway 49/South Tryon Street	Medium
Highway 51/Pineville-Matthews Road	Medium
Highway 74 East/ W Roosevelt Blvd	Medium
Highway 74 East Wadesboro Extension	Low
Highway 74 West	Medium
Highway 74 West Shelby Extension	Medium
Interstate 77 South	High
Highway 321	Low
Highway 5	Medium
Highway 73 West	Medium
Highway 24/27/ Albemarle Road	Medium
Highway 24/27 Albemarle Extension	Low
Highway 16 Northwest	Medium
Highway 21 South	Medium
Highway 21 North	Medium
Highway 29 North	Medium
Highway 27 North	Medium
Wilkinson Boulevard to Sugar Creek	Medium
Sugar Creek to Monroe Road	High
Monroe Road to South Boulevard	Medium
South Boulevard to Wilkinson Boulevard	Medium
Interstate 485	Medium
Interstate 85	Medium
Highway 160	Medium
Freedom Drive/Moores Chapel Road	High
West Boulevard	High
Graham Street	High
Beatties Ford Road	High
Highway 75/Waxhaw Highway	Low

Corridors	Composite Corridor Score
Highway 52	Low
Highway 49	Low
Interstate 77 North	Medium
Monroe Expressway/Highway 74 Bypass	Medium
Highway 279	Low

Level 2: Regional Analysis

Following the Level 1 Corridor Evaluation, the Project Team conducted a Level 2 Regional Analysis to better understand each candidate corridor's ability meet the region's future transportation needs. This analysis used regional travel demand data and findings from the Travel Market Analysis effort (completed previously) to create a picture of where future high-capacity transit services could be most effective and utilized. The Project Team considered projected travel demand and future roadway capacities, examined growth trends associated with population and employment changes throughout the CONNECT Beyond study area, and conducted a preliminary look at where transit services could be most successful based on traditional transit planning performance indicators developed as part of the Transit Propensity Analysis for the project.

During the Level 2 Regional Analysis, the Project Team more closely evaluated and refined the candidate corridors. Following the Level 2 Corridor Analysis, 13 corridors were advanced as Recommended HCT Corridors and 24 corridors were advanced as Emerging Mobility Corridors.

Projected Transit Demand

Travel Market Analysis and Transit Market Areas Index

As part of the Level 2 Regional Analysis, the Project Team closely analyzed the findings of the Travel Market Analysis to better understand the potential transit performance of each candidate corridor. Three key themes emerged as the most telling indicators of potential transit performance for individual corridors: projected population and employment densities, future land uses, and anticipated trips within and between travel market areas. Using the findings from the Travel Market Analysis, the Project Team was able to analyze these trends more closely for each of the candidate corridors to better understand the potential transit performance of each corridor, which helped to inform the corridor recommendations. As explained previously, the primary intent of a Travel Market Analysis is to project future travel patterns, demand, and behaviors for the various travel market areas that make up the CONNECT Beyond study area.

During the Level 2 Regional Analysis, the Project Team evaluated anticipated trip flows between travel market areas. Nationally, public transportation's mode share (the amount of trips made using transit versus all other transportation modes) is between 2 and 3 percent of all trips made on a normal weekday. Mega-regions including Boston, New York, Washington D.C., Chicago, and San Francisco generally see transit mode shares of greater than 25 percent. Comparatively, the CONNECT Beyond study area's transit mode share of all daily trips is around 3 percent. HCT corridors typically have higher transit mode shares than traditional fixed-routes transit services due to the frequency and reliability of HCT service, and the inherent perception among riders of better overall service.

Treating each candidate corridor equally, the Project Team applied a 10 percent mode share factor to the anticipated 2045 trip flows between travel market areas in the study area. This mode share factor was selected to account for the higher mode share that HCT corridors generally attract and presuming that the study area will experience greater mode split in the future due to this planning effort. The data quickly illustrates that travel market areas in geographical areas with greater future densities are anticipated to see the most growth in transit trips.

While the downtowns of regional cities are expected to see density increases, strong growth is also observed in suburban areas of the study area. As evidenced by the data on population growth and change, suburban neighborhoods or open areas with access to the region's freeway network and arterial roadways will absorb a significant amount of future growth. What may be suburban and ex-urban today will transition to become more urban in design and character over the next 25 years. This growth will change the transportation market dynamic, presenting an opportunity now to plan for future HCT corridors in locations that may not warrant service currently, but will in the future.

As expected, travel market areas in more ex-urban and rural regions of the study area are also anticipated to see a growth in transit trips. However, despite growth in anticipated transit trips in ex-urban and rural regions of the study area, this trip growth is more commensurate with express bus or shuttle services during peak travel periods. Large land areas surrounding some candidate corridors will continue to be rural in the horizon year of the CONNECT Beyond study (2045); therefore, it is wise that this study consider alternative transit solutions in these locations that match anticipated demand.

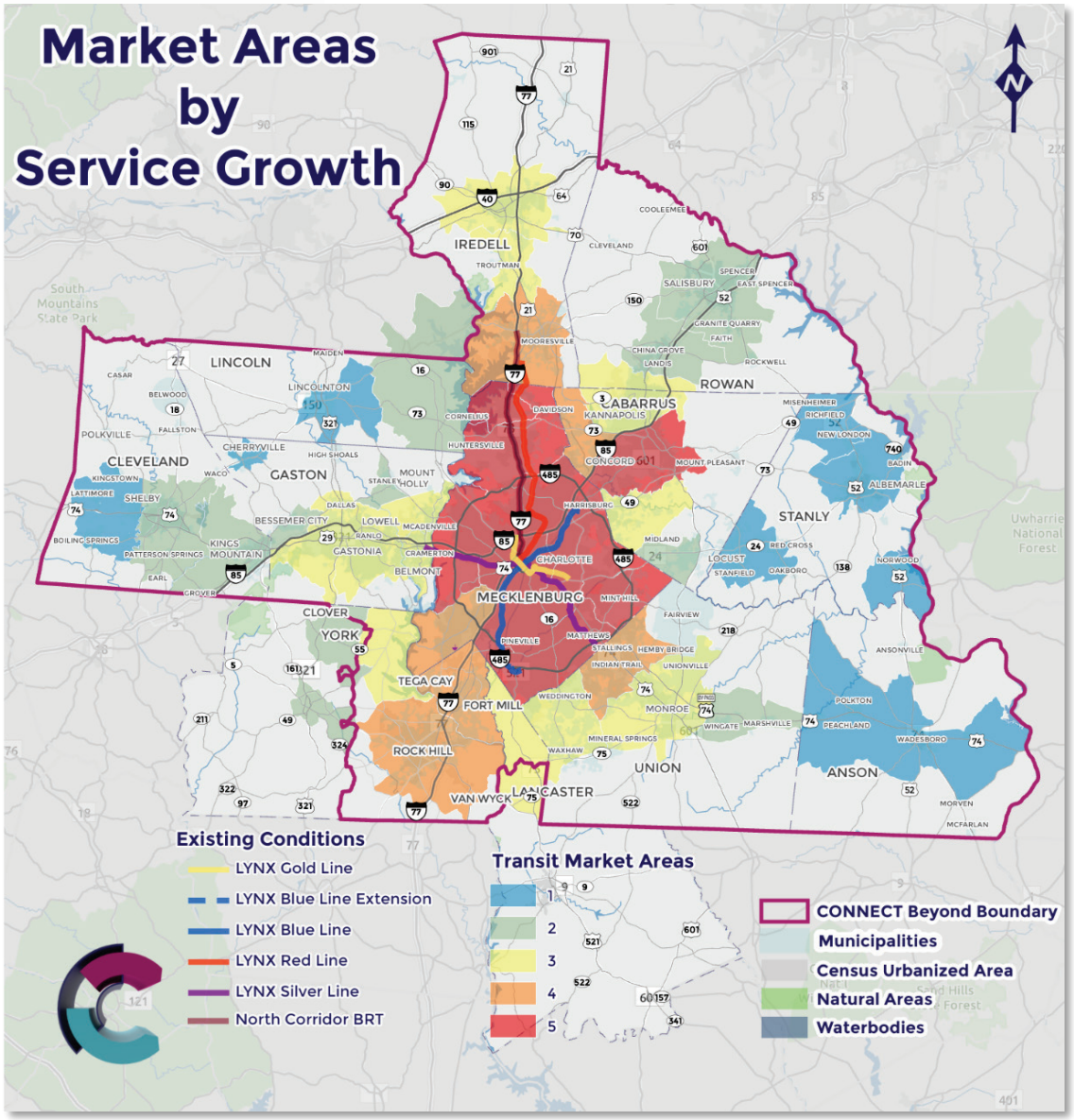
Findings from the Travel Market Analysis, including trip information, density indicators, and mode share projections were used to create a Transit Market Area Index, which measures the market strength for transit services in a specified geography. Table 9 describes the five types of transit market areas included in the index and the typical service types offered in each transit market area.

Figure 9 illustrates the anticipated market strengths in the defined transit market areas.

TABLE 9. TRANSIT MARKET AREAS AND ASSOCIATED SERVICE TYPES

Transit Market Area	Transit Service Types
Area 1	Dial-a-Ride, micro-transit, vanpool, job-access shuttle services
Area 2	Dial-a-Ride, micro-transit, peak period express bus, job access shuttle services
Area 3	Express and limited-stop bus services, suburban fixed-routes, crosstown connector services, dial-a-ride
Area 4	Express and limited-stop bus services, local fixed-routes, suburban fixed-routes, crosstown connector services, commuter-oriented HCT services
Area 5	Local fixed-routes, all-day HCT services, crosstown fixed-route services, neighborhood/downtown circulators

FIGURE 9. TRANSIT MARKET STRENGTH BY TRAVEL MARKET AREA



While many of the candidate corridors receive some level of transit service today, the anticipated growth in population and employment will likely require more frequent service and longer service spans on many routes. As freeways and roads become more congested, reliable transit service will be key to keeping the region moving. A goal should be to use existing infrastructure wisely, by increasing capacity without expanding (or widening) roadways. An example of this is the I-77 North Corridor BRT project and the use of the toll lanes. This is a

strategy the region could deploy as more toll lanes are built, like the toll lanes under construction currently along I-485.

Figure 10 shows the combined change in population and employment density between 2015 and 2045. This figure shows strong growth consolidated around the downtowns of study area communities, the regional highway network, but growth extending southwest and west.

Evaluating the Candidate Corridors against the against Transit Market Area Index was one component of the Level 2 Regional Analysis that allowed the Project Team to evaluate, refine, and make recommendations about these corridors.

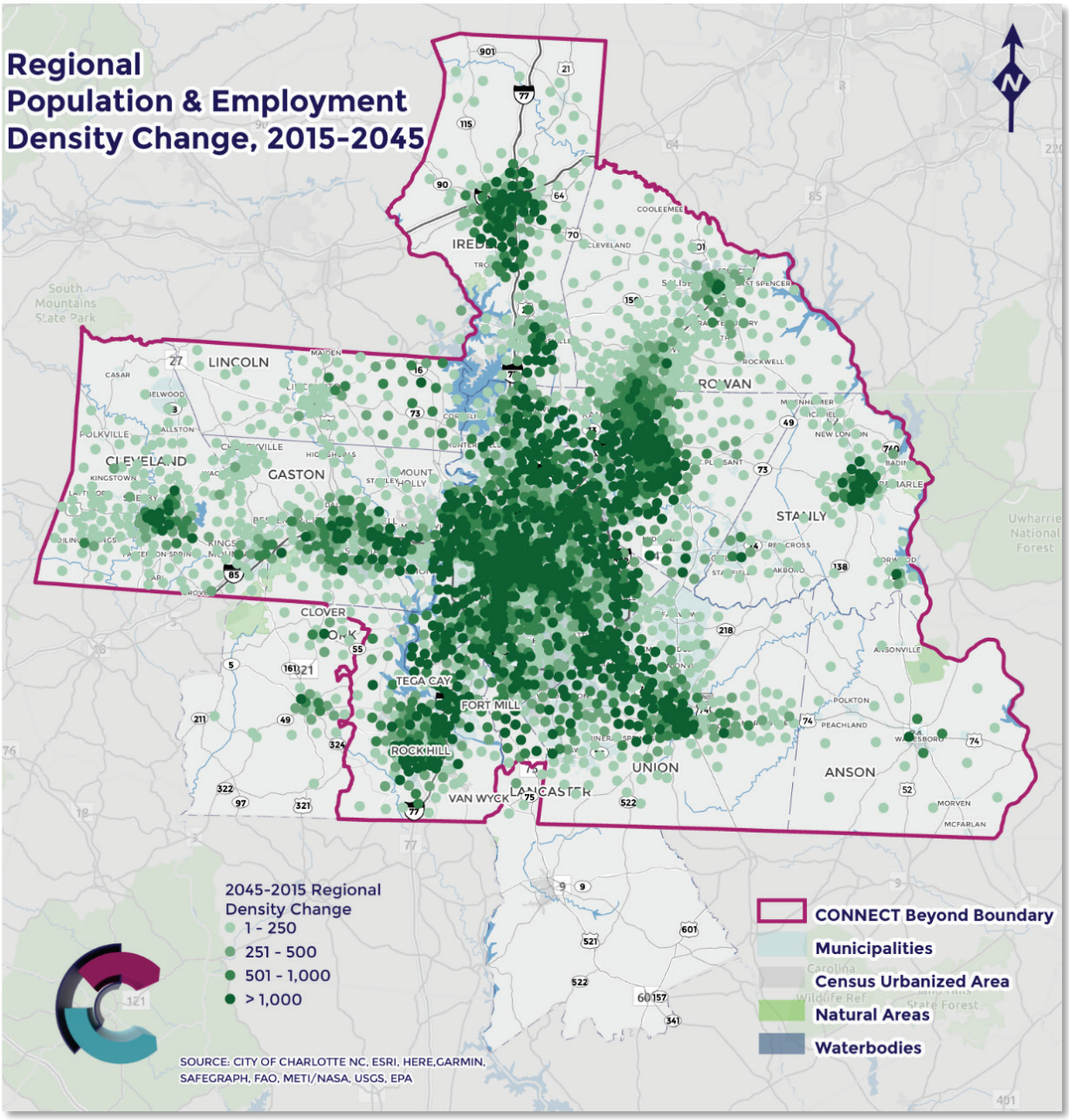
Bicycling, Walking, and Accessibility to Transit

While the focus of this report is the identification of Recommended HCT Corridors and Emerging Mobility Corridors of the future, bicycling, walking, and general accessibility to transit services deserves attention in the conversation about future HCT services and corridors. While future efforts of the CONNECT Beyond study will look at these elements in greater detail, integrated multi-modal networks expand the reach of HCT and traditional transit services.

In 2017, the FTA published the Manual on Pedestrian and Bicycle Connections to Transit, a document that "provides noteworthy practices to help transit and other transportation professionals improve pedestrian and bicycle safety and access to transit." Selected key findings of the report include the following:

- **Culture**: "Agencies and organizations involved in transportation play a role in shaping culture change and adapting their message and programs to it. Some of the best projects come about when cities are able to anticipate future needs and demands and find creative ways to show people how transit, walking, and bicycling can make their lives better."
- **Safety**: "Feeling safe is a foundational element of a system in which people are comfortable walking or bicycling to access transit. If people feel that walking or bicycling is unsafe, either because of traffic or crime, other efforts will be severely constrained."
- **Planning**: "Transit agencies should seek to incorporate walking and bicycling into their capital projects; implement retrofits to stations, station areas, and on-board facilities; and work with local municipalities and other entities to identify opportunities for access and network improvements."
- **Technology**: "Technology offers a great opportunity to help people understand and actualize the potential benefits from walking and bicycling—in terms of understanding how active they are being (e.g., wearable activity tracking technology) and what options are available to them (e.g., maps and apps that include walking, bicycling, and transit, and how to make the connections) and making it easy to connect (e.g., working to integrate payment systems)."

FIGURE 10. CHANGE IN COMBINED POPULATION AND EMPLOYMENT DENSITY (2015-2045)



Projected Traffic Congestion

As part of the Level 2 Regional Analysis, the Project Team analyzed current and future traffic congestion in the CONNECT Beyond study area. By analyzing congestion levels for existing and planned infrastructure in the CONNECT Beyond study area, the Project Team could identify study area highways and roadways that will likely experience increased traffic congestion and poor levels of service (LOS) in the future. This assessment allowed the Project Team to identify candidate corridors that could most effectively offset increased travel demand by implementing new or enhancing existing transit services.

As the region grows, roadway and highway infrastructure will become further constrained with the volume of additional trips expected. By 2045, I-77, I-85, I-485 and significant stretches of US 74 to the east and west of Charlotte, along with US 21 and NC 16 will experience moderate to severe roadway congestion. With longer commute times, transit options that offer travel time savings will become more attractive and can be an effective investment contributing to relieving congestion as the region grows.

Figure 11 shows the vehicle-to-capacity ratios in 2015 and 2017, while Figure 12 displays the vehicle-to-capacity ratios expected in 2045 on the region's highways and arterial roadways. For the vehicle-to-capacity ratios the Project Team had to use two existing travel demand models: the Metrolina Regional Model (MRM) covered 11 of the 12 counties in the study area; and the Statewide Model covered Anson County.

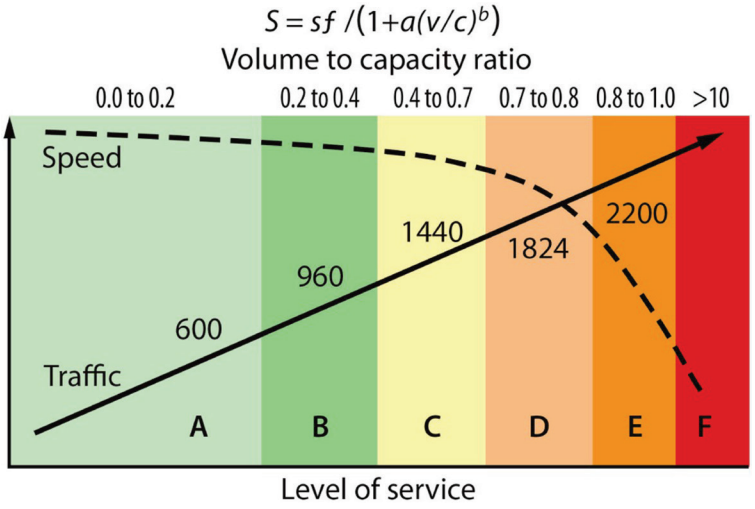
Considering the candidate corridors through the lens of vehicle-to-capacity ratios was one component of the Level 2 Regional Analysis that allowed the Project Team to make recommendations on candidate corridors. This review also considered existing regional HCT services and those already being planned for future implementation (e.g., LYNX Silver Line).

It will be important for any corridors advanced into future stages of planning and or design to conduct more detailed traffic analyses such as Synchro or VISSIM analyses. These analytic programs are tools used by traffic engineering professionals to examine specific traffic needs or impacts resulting from proposed roadway improvements or transit investments. At the current regional scale, vehicle-to-capacity ratios are best suited to demonstrate the anticipated growth in traffic, while at the corridor planning level, LOS analyses can provide a more detailed look at traffic conditions.

What are Vehicle-to-Capacity Ratios?

Vehicle-to-Capacity Ratios are a measurement of a roadway or intersection's operating design capacity (the maximum number of vehicles a road or intersection can accommodate) relative to the observed number of vehicles passing through the roadway or intersection (the volume). The number of vehicles (V) is divided by the total capacity (C). If the result of that calculation is less than one , the roadway segment or intersection has additional capacity. However, the closer the calculation result of vehicles-to-capacity is to the value of one , the less capacity a roadway or intersection has, and therefore the more congested the roadway or intersection is.

Vehicle-to-capacity ratios are not the only measure of traffic congestion. Commonly, traffic engineers and travel forecast experts look to levels of service (LOS) as the primary indicator of traffic congestion. Like school grades, a grade of A through F for roadway segments or intersections is given to denote overall performance during peak travel periods, with A being free-flow conditions, and F being traffic jam conditions. The Transportation Research Board's *Highway Capacity Manual* includes the following diagram of both LOS and vehicle-to-capacity ratios, relative to travel speeds. The diagram shows that as traffic volumes increase, roadway or intersection capacity decreases, the level of service worsens, and travel speeds quickly drop.



Source: Highway Capacity Manual, 1994

FIGURE 11. OBSERVED CONGESTION LEVELS, 2015/2017

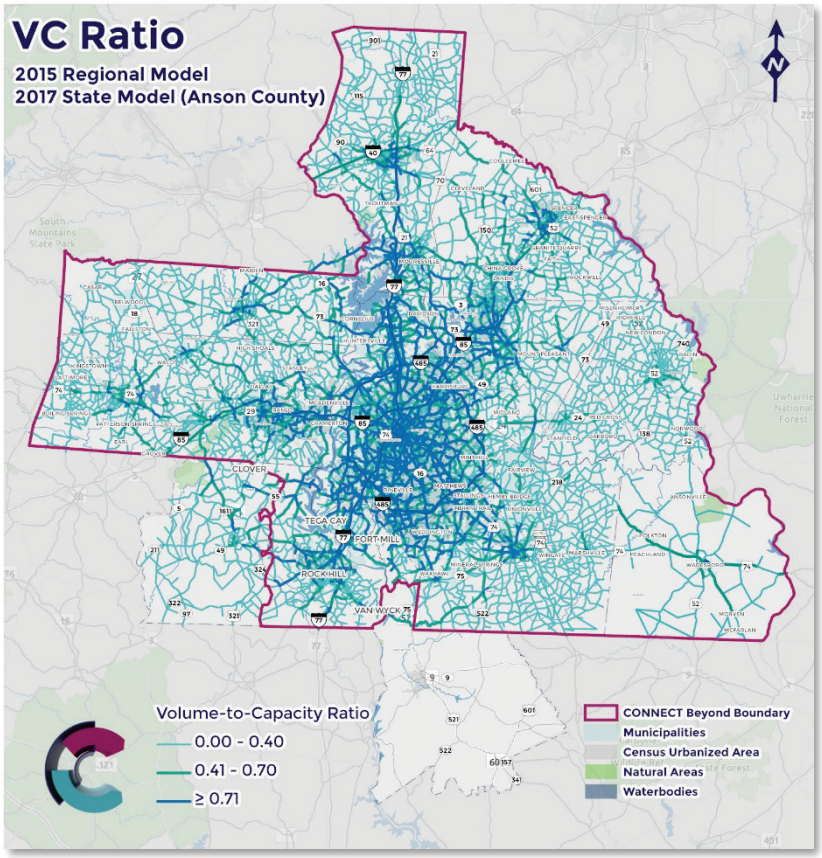
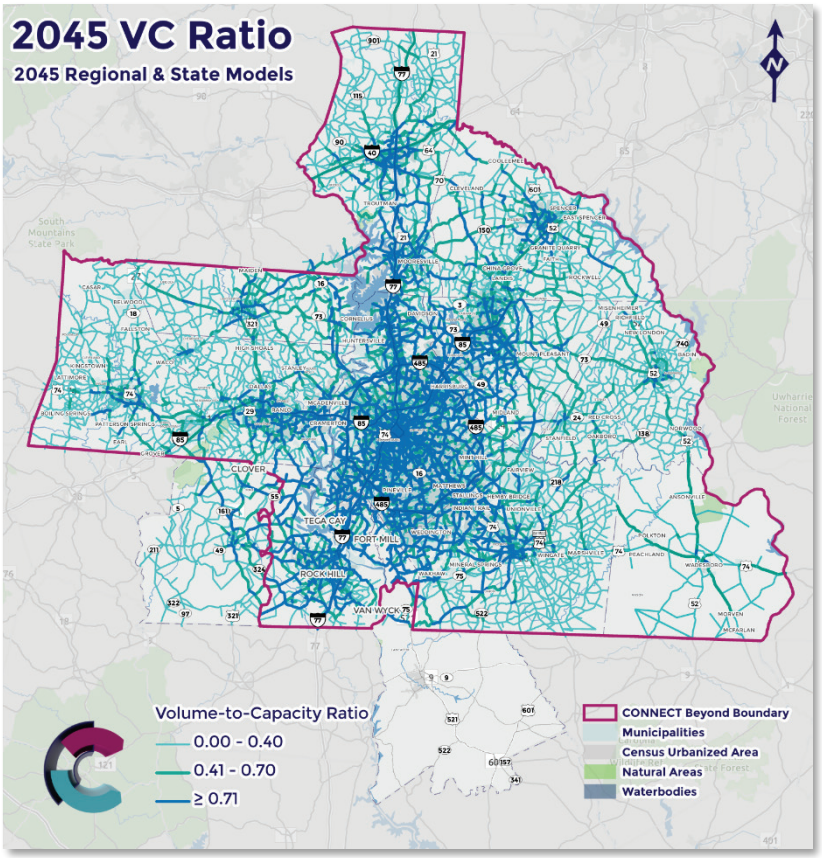


FIGURE 12. ANTICIPATED CONGESTION LEVELS, 2045



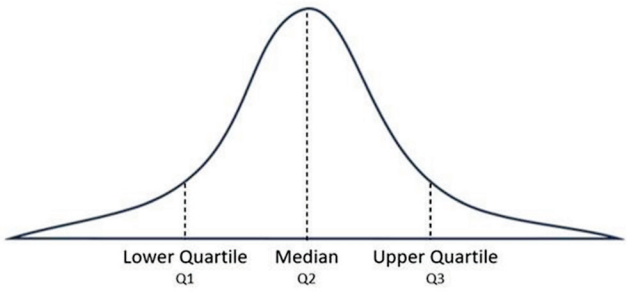
Transit Performance

Transit-Supportive Densities

During the Regional Analysis, the Project Team employed the use of density quartiles to analyze each of the candidate corridors. As discussed, density is the leading determinant of potential transit productivity and performance. The greater the density, the greater the likelihood of persons to use transit services.

What is a Density Quartile?

With over 3,500 TAZ units in the CONNECT Beyond project study area, there is tremendous variation in population and employment density across the metropolitan region. This variation makes a one-size-fits-all approach to implementing an HCT network difficult to justify. Density quartiles divide the observed TAZ densities into quarters, helping to distinguish geographic areas where HCT service would be most productive (generally around or above the upper quartile). For those TAZs with densities closer to the lower quartile, strategies or actions could be considered that may be more cost-effective today and that help prepare a corridor for future HCT service.



The density quartiles were based on the standard deviation of the combined study area population and employment density for the forecast year of 2045. The density quartile approach also allows for a look at corridor segments, illustrating where each corridor may be most productive.

The greater the density, the greater the likelihood of persons to use transit services. The density quartiles analytic approach is described below:

- For corridors with densities in the top 25th percentile, these are the corridors where HCT is most likely to succeed, and where modes like arterial or dedicated BRT, streetcar, and LRT could be considered.

- For corridors in the middle quartile (50th percentile), these are corridors where enhancements to existing local and/or express bus services could be considered in the immediate future to further establish the ridership base of the corridor. Corridors in this quartile could eventually be elevated to receive a greater capital investment, funding permitting.
- The bottom 25th percentile reflect those corridors that lack the densities now and in the future necessary to support a sustained investment in either HCT or enhanced bus services beyond maybe peak period express service. For corridors in this quartile, it is about building a ridership base and an understanding about transit, particularly for those corridors that do not have any transit service today.

With the corridors categorized by quartile, the Project Team could then discuss a variety of strategies tailored to the unique nature of each candidate corridor.

- For those corridors in the upper quartile (or top 25th percentile), these corridors already display attributes and characteristics supportive of a major capital investment in HCT service.
- For corridors in the middle 50th percentile, these are corridors where additional preparedness at relatively low cost could go a long way to establishing a corridor for a future HCT investment. Bus frequency enhancements, service span extensions, extended service, added stop amenities at key boarding/alighting locations, or slightly more robust capital initiatives such as transit-signal pre-emption (or priority) or queue jump lanes may be warranted.
- For corridors in the third quartile (or bottom 25th percentile), these are corridors where mobility solutions are likely the best fit now and into the future. Promoting van pool services, job-access shuttle services, micro-transit (defined below), peak-period shuttle services to mobility centers that offer connections to other transit modes and transportation services.

As discussed, HCT services work more effectively when there are concentrations of housing, jobs, and other complimentary uses surrounding stations or stops. Density is a primary indicator of transit's potential success. But density requirements often vary by transit service type and community designation. In 2014, the Federal Transit Administration (FTA) issued Report No. 0056, *Planning for Transit-Supportive Development: A Practitioners Guide, Section 4: Corridor Planning and Transit-Supportive Development*. The guide provides a general understanding of density ranges by urban environment characteristic necessary to support

various HCT investments. Table 10 summarizes these ranges by HCT mode, as outlined in the FTA's guidance.

TABLE 10. FTA'S GENERAL CHARACTERISTICS OF PREMIUM TRANSIT MODES

Transit Mode	Residential and Employment Density Ranges[1]					
	Urban Core		Urban Centers		Urban Corridors	
	Residential	Employment	Residential	Employment	Residential	Employment
Streetcar	20–35	200–500	N/A	N/A	N/A	N/A
Enhanced Bus	20+	200	10-20	2-5	5-10	2-5
LRT	35+	500	25-35	100–150	12–25	30–40
BRT	35+	500	25-35	100–150	12–25	30–40
Commuter Rail	35+	500+	25-35	100–150	12–25	30–40

Source: Federal Transit Administration Research Report No. 0056 (2014)

[1] Residential densities expressed in dwelling units per acre (du/ac); employment densities expressed in number of employees per acre (emp/ac), presented as minimum suggested densities.

The density quartiles approach discussed above was employed to help distinguish locations within a one-mile buffer of each candidate corridor to assess areas where transit service may be most successful based on anticipated future densities. Figure 13 illustrates this concept for each of the candidate corridors.

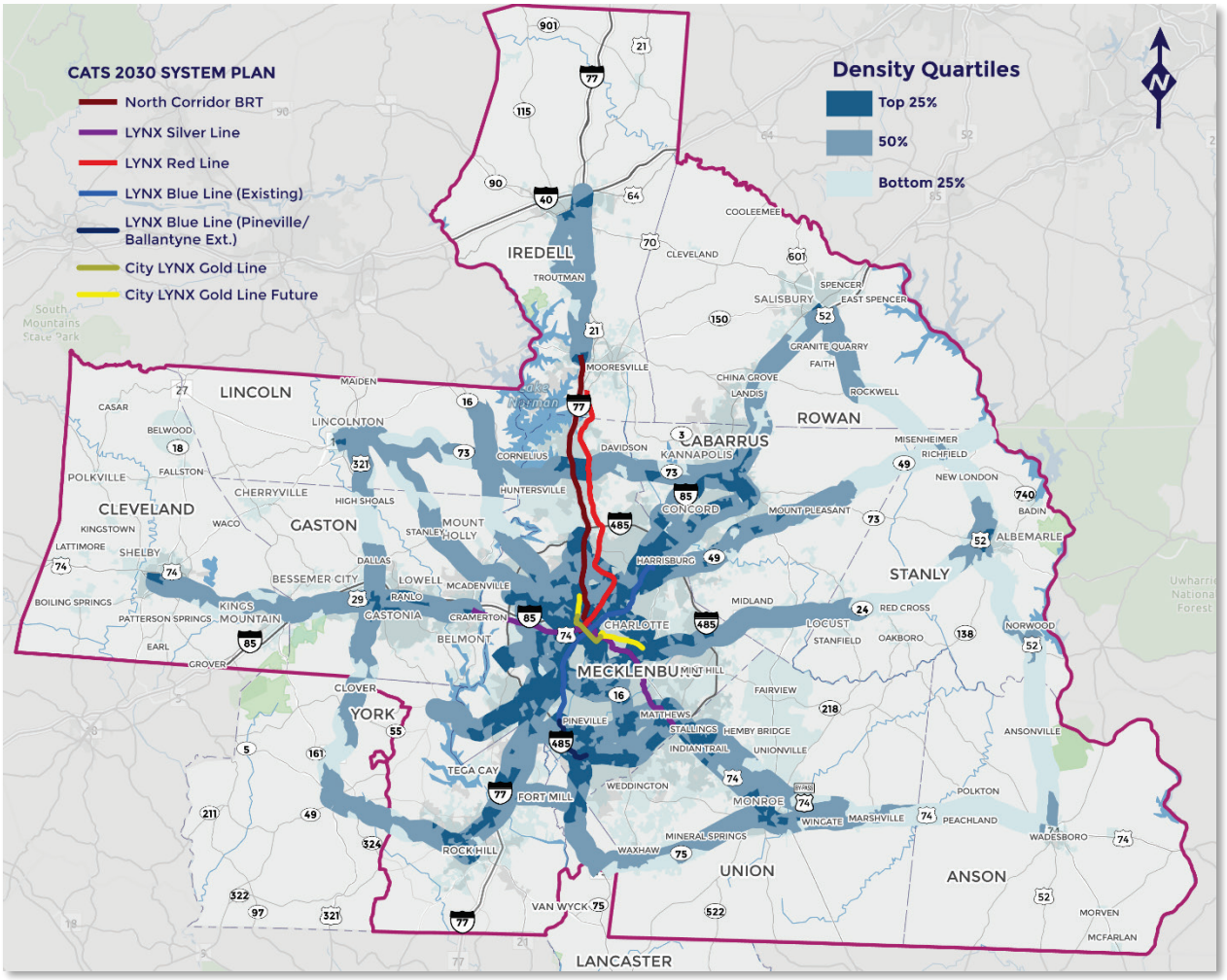
As discussed above, of all factors that contribute to transit service productivity, density is the primary determinant of transit's success in a corridor. When considering both population and employment-based future demand, it is clear that there will be significant future transit demand across the Charlotte metropolitan region. Naturally, Mecklenburg County will continue to be a focal point of regional growth, but Gaston, York, Iredell, Cabarrus, and Union counties are also anticipated to experience significant future growth and development that has the potential to create transit-supportive environments capable of sustaining long-term investments in high-capacity transit.

The data show graduated levels of future densities by percentile. As shown, many of the corridors in Mecklenburg County display future density levels sufficient to warrant HCT investment. Still, there are several corridors extending into Union, Cabarrus, York, and Gaston counties that also display transit-supportive future densities. More broadly, several corridors display a growth in future density commensurate with fixed-route service enhancements that can help position those corridors as a second-wave of potential HCT candidate corridors in the

future. A few corridors remain with future densities below a level sufficient to sustain either fixed-route or HCT service investments. For these corridors, alternative transit solutions and land use policies will be important for positioning the corridors for future investment in transit service.

By evaluating the transit-supportive densities for each candidate corridor, the Project Team was better able to understand the potential transit productivity and performance of each corridor. Understanding the potential transit productivity and performance of each candidate corridor, allowed the Project Team to evaluate, refine, and make recommendations about which corridors should be advanced as Recommended HCT Corridors and which corridors should be advanced as Emerging Mobility Corridors based on the corridor's level of preparedness and potential transit productivity and performance.

FIGURE 13. TRANSIT-SUPPORTIVE DENSITIES BY CANDIDATE CORRIDOR



High-Capacity Transit Corridor and Emerging Mobility Corridor Recommendations

The review of candidate corridors yielded a variety of different findings, many circumstantial to the current and anticipated future corridor characteristics and conditions. As the Charlotte metropolitan region continues to grow, public transportation services can play a significant role in helping shape communities and the region in ways that are efficient and sustainable. As the evaluation and assessment of the candidate corridors progressed, information was developed to support recommendations on the development of an HCT network. The evaluation and analysis of the candidate corridors helped to refine the corridor definitions and to organize the corridors with regard to the creation of a total mobility network.

Given the breadth and scale of the CONNECT Beyond study area, it was recognized early in the planning process that some corridors would be more prepared for HCT investment than others. Some corridors already have fixed-route transit services operating within them, while other corridors do not currently receive transit service. The Project Team was tasked with developing a list of recommended regional HCT investments that catered to the different needs of participating stakeholders. To achieve this, the Project Team developed a "Categories of Implementation" approach for organizing the corridors based on merit. Following the Level 1 Corridor Evaluation and Level 2 Regional Analysis, the candidate corridors were sorted into two Categories of Implementation: Recommended HCT Corridors and Emerging Mobility Corridors. The intent was to help regional planning professionals and decision-makers right-size potential investments in transit in their respective communities.

It is vital to remember that the planning data used for this study reflects a 30-year timeframe. Population and employment will grow incrementally over that time span, not immediately. There will be many future decisions on land use and transportation investments that will influence the recommendations made herein.

In short, the recommendations and strategies for the Recommended HCT Corridors and Emerging Mobility Corridors should not be viewed as prescriptive or necessary immediately, but as a starting point for further deliberation and more detailed planning analysis. The implementation of corridors or the strategies and activities discussed below should be appropriately phased relative to the immediate needs of the corridor and the communities they serve.

Thirteen corridors were identified as Recommended HCT Corridors and recommended for further detailed planning and analysis. Twenty-four corridors were identified as Emerging Mobility Corridors; these corridors could be considered for HCT service as they grow and densify over time, and as regional funding becomes available for their implementation. Planning and policy strategies and actions to help prepare these Emerging Mobility Corridors for future implementation are discussed below.

Table 11 depicts the candidate corridor evaluation process and identifies the resulting Recommended HCT Corridors and Emerging Mobility Corridors. During the candidate corridor evaluation process, it became clear that portions of some corridors were more prepared for an investment in HCT service than others. As a result, some candidate corridors were subdivided, with the portion most prepared for HCT being advanced as a recommended HCT Corridor, and the remaining portion of the corridor being advanced as an Emerging Mobility Corridor. This scenario occurred for longer corridors often extending into ex-urban and rural portions of the CONNECT Beyond study area. Table 11 illustrates which candidate corridors were divided during the candidate corridor evaluation process.

Figure 14 is a map of the CONNECT Beyond study area displaying the Recommended HCT Corridors and Emerging Mobility Corridors.

FIGURE 14. RECOMMENDED HCT CORRIDORS AND EMERGING MOBILITY CORRIDORS

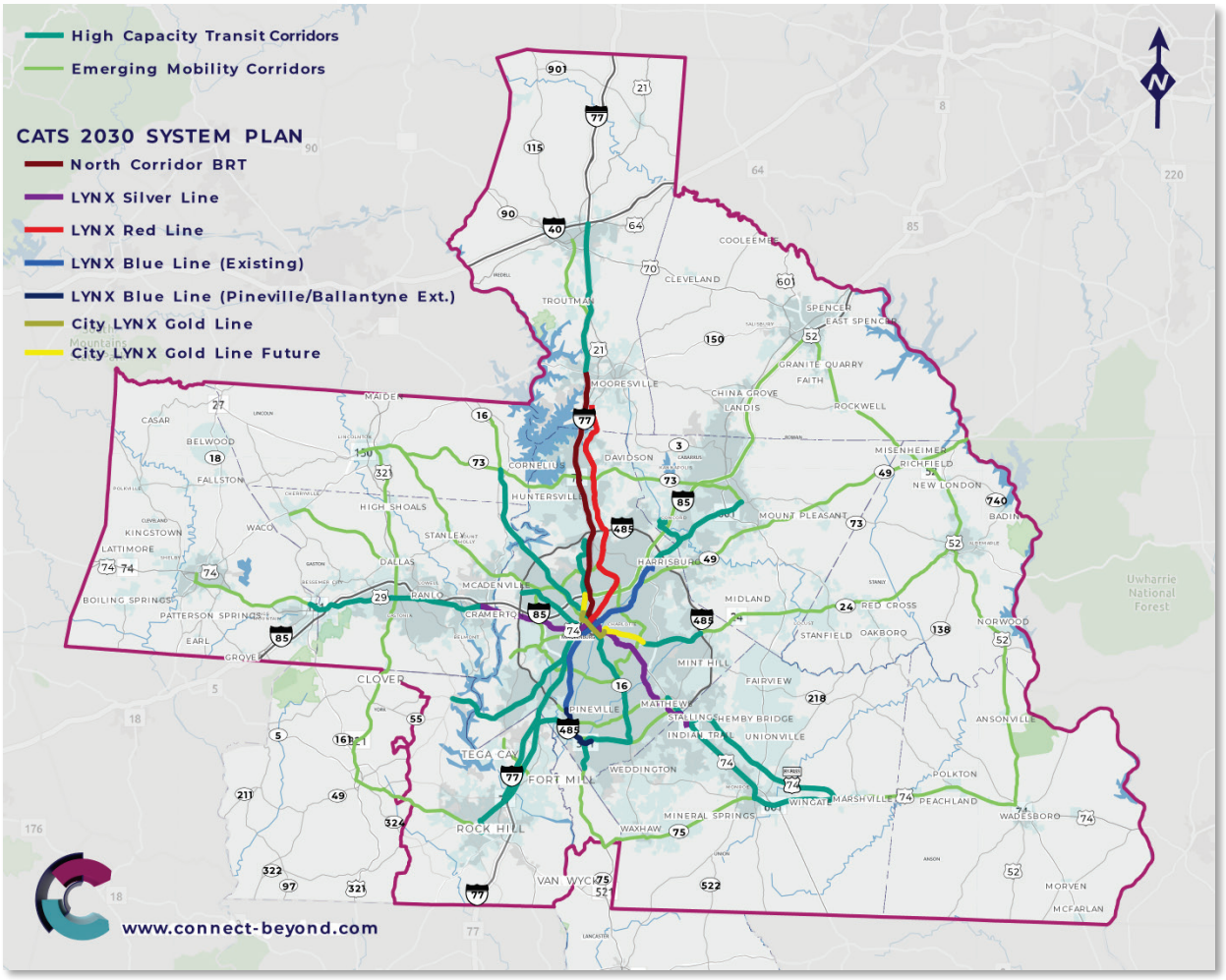


TABLE 11. CANDIDATE CORRIDOR EVALUATION PROCESS

Candidate Corridors	Level 1: Corridor Evaluation	Level 2: Regional Analysis	Recommended Corridors
Candidate Corridor 1 **Highway 16/Providence Road**			**HCT Corridor A:** Highway 16/Providence Road
			Emerging Mobility Corridor A: Highway 521/Charlotte Highway
Candidate Corridor 2 Highway 49/South Tryon Street			**HCT Corridor B:** Highway 49/South Tryon Street
Candidate Corridor 3 Highway 51/Pineville-Matthews Road			**Emerging Mobility Corridor B:** Highway 51/Pineville-Matthews Road
Candidate Corridor 4 **Highway 74 East/ W Roosevelt Blvd**			**HCT Corridor C:** Highway 74 East/ W Roosevelt Blvd
			Emerging Mobility Corridor C: Highway 74 East Wadesboro Extension
Candidate Corridor 5 **Highway 74 West**			**HCT Corridor D:** Highway 74 West
			Emerging Mobility Corridor D: Highway 74 West Shelby Extension
Candidate Corridor 6 Interstate 77 South			**HCT Corridor E:** Interstate 77 South
Candidate Corridor 7 Highway 321			**Emerging Mobility Corridor E:** Highway 321
Candidate Corridor 8 Highway 5			**Emerging Mobility Corridor F:** Highway 5
Candidate Corridor 9 Highway 73 West			**Emerging Mobility Corridor G:** Highway 73 West
Candidate Corridor 10 Highway 24/27/ Albemarle Road			**HCT Corridor F:** Highway 24/27/ Albemarle Road
			Emerging Mobility Corridor H: Highway 24/27 Albemarle Extension
Candidate Corridor 11 Highway 16 Northwest			**HCT Corridor G:** Highway 16 Northwest
			Emerging Mobility Corridor I: Highway 16 Northwest Denver Extension
Candidate Corridor 12 Highway 21 South			**HCT Corridor H:** Highway 21 South
Candidate Corridor 13 Highway 21 North			**Emerging Mobility Corridor J:** Highway 21 North
Candidate Corridor 14 Highway 29 North			**HCT Corridor I:** Highway 29 North
Candidate Corridor 15 Highway 27 North			**Emerging Mobility Corridor K:** Highway 27 North
Candidate Corridor 16 Various Roads in Northwest Charlotte (From Wilkinson Blvd to Sugar Creek Road)			**Emerging Mobility Corridor L:** Various Roads in Northwest Charlotte (From Wilkinson Blvd to Sugar Creek Road)

CONNECT Beyond
A Regional Mobility Initiative

Candidate Corridors	Level 1: Corridor Evaluation	Level 2: Regional Analysis	Recommended Corridors
Candidate Corridor 17 Various Roads in East Charlotte (From Sugar Creek Road to Monroe Road)			**Emerging Mobility Corridor M:** Various Roads in East Charlotte (From Sugar Creek Road to Monroe Road)
Candidate Corridor 18 Various Roads in South Charlotte (From Monroe Road to South Blvd)			**Emerging Mobility Corridor N:** Various Roads in South Charlotte (From Monroe Road to South Blvd)
Candidate Corridor 19 Various Roads in Southwest Charlotte (From South Blvd to Wilkinson Blvd)			**Emerging Mobility Corridor O:** Various Roads in Southwest Charlotte (From South Blvd to Wilkinson Blvd)
Candidate Corridor 20 Interstate 485			**Emerging Mobility Corridor P:** Interstate 485
Candidate Corridor 21 Interstate 85			**Emerging Mobility Corridor Q:** Interstate 85
Candidate Corridor 22 Highway 160			**Emerging Mobility Corridor R:** Highway 160
Candidate Corridor 23 Freedom Drive/Moores Chapel Road			**HCT Corridor J:** Freedom Drive/Moores Chapel Road
Candidate Corridor 24 West Blvd			**Emerging Mobility Corridor S:** West Blvd
Candidate Corridor 25 Graham Street			**Emerging Mobility Corridor T:** Graham Street
Candidate Corridor 26 Beatties Ford Road			**HCT Corridor K:** Beatties Ford Road
Candidate Corridor 27 Highway 75/Waxhaw Highway			**Emerging Mobility Corridor U:** Highway 75/Waxhaw Highway
Candidate Corridor 28 Highway 52			**Emerging Mobility Corridor V:** Highway 52
Candidate Corridor 29 Highway 49			**Emerging Mobility Corridor W:** Highway 49
Candidate Corridor 30 Interstate 77 North			**HCT Corridor L:** Interstate 77 North
Candidate Corridor 31 Monroe Expressway/Highway 74 Bypass			**HCT Corridor M:** Monroe Expressway/Highway 74 Bypass
Candidate Corridor 32 Highway 279			**Emerging Mobility Corridor X:** Highway 279

Recommended High-Capacity Transit Corridors

From the HCT Corridor identification and evaluation Process, **13 Recommended HCT Corridors** were advanced for the CONNECT Beyond study area. These are corridors along which HCT lines could be implemented in the near-future and which would provide the greatest mobility benefits and return on investments. They are currently ready for HCT investments.

In the following pages, the Recommended HCT Corridors are identified and a brief discussion of the rationale for their recommendation is provided. These are the corridors that at present appear to be best positioned for future success in the more immediate timeframe of the CONNECT Beyond plan. Their implementation during the lifetime of the CONNECT Beyond planning effort could have a very positive effect on regional mobility and land use development goals.

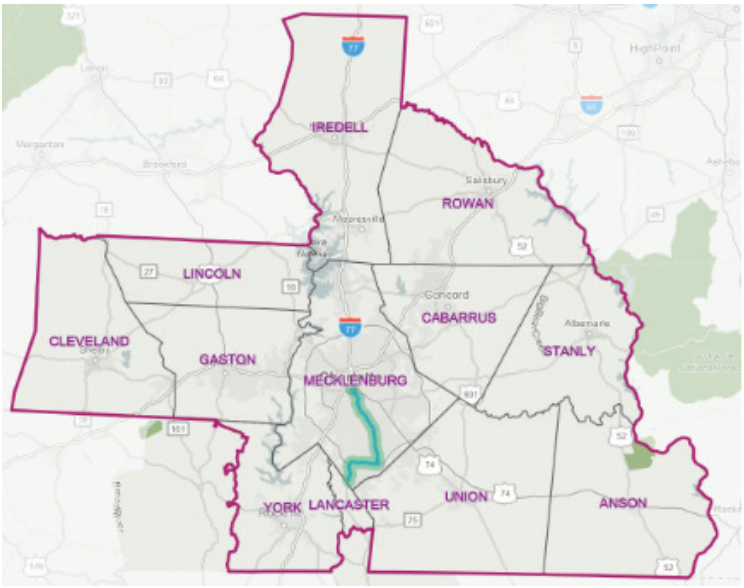
It is important to note that the Project Team and members of the PMT recognized that several candidate corridors serve similar travel markets. For example, the travel shed between Charlotte and Rock Hill is rapidly growing. Two corridors emerged within this travel shed that should be considered for future planning and analysis: I-77 and US-21. The primary tradeoff between these two corridors is speed versus access. In the case of I-77, HCT services along this corridor would be expected to operate at higher speeds making fewer stops at stations located near interchanges. Conversely, the growth of communities along US 21, including Rock Hill, Fort Mill, Kingsley/Baxter, and north to Pineville create opportunities to connect these communities, along with the potential for more convenient park-and-ride access given current land use constraints around interstate interchanges.

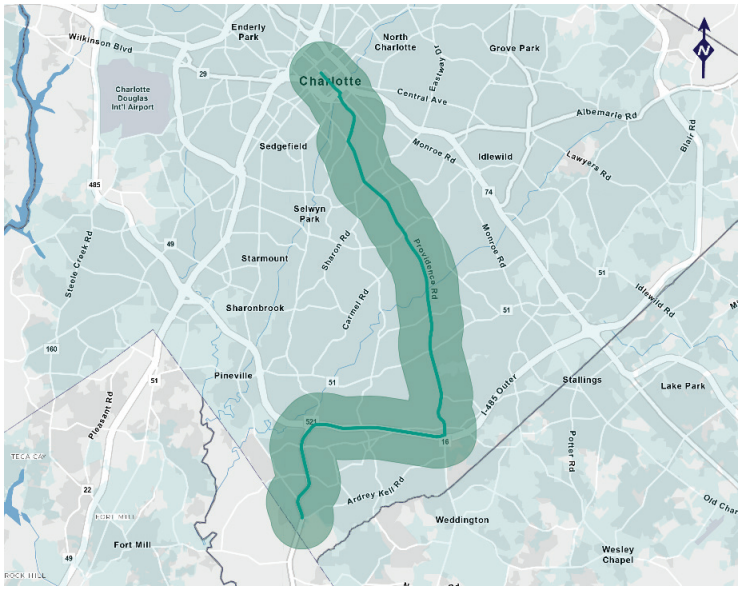
Consideration was also given to a future commuter rail line between Rock Hill and Uptown Charlotte that would serve this travel shed. This same scenario was observed with candidate corridors along I-85 and US 74 in Gaston County, I-85 and US 29 in Cabarrus/Mecklenburg counties, and US 74 in Union County. Additional planning review is warranted for these travel sheds and markets to determine the optimal approach to serving these growing communities with future transit service.

Recommended HCT Corridor A

Highway 16/Providence Road

(Previously Candidate Corridor 1)





Linkage Locations: **Uptown Charlotte to Ballantyne**

The Highway 16/Providence Road Corridor would extend HCT service from Uptown Charlotte to Ballantyne, NC. A possible extension of this corridor along Highway 521 into urbanized Lancaster County, SC was also considered and advanced as Emerging Mobility Corridor A.

Recommended HCT Corridor A Analysis:

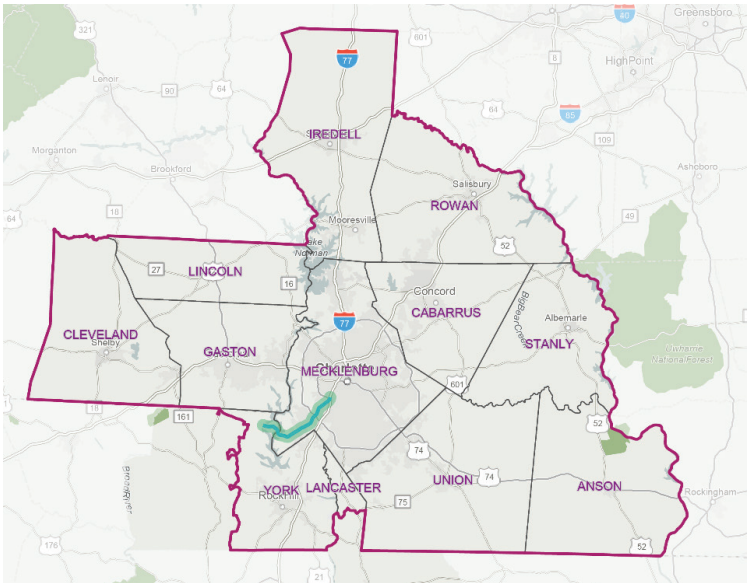
- Recommended HCT Corridor A displays several land use and transportation attributes that create a transit-supportive environment.
    - Multiple development nodes
    - Anchor land use and institutions
    - Supportive populations and employment densities.
- The return-on-investment potential of this Corridor is already strong and is expected to strengthen further.

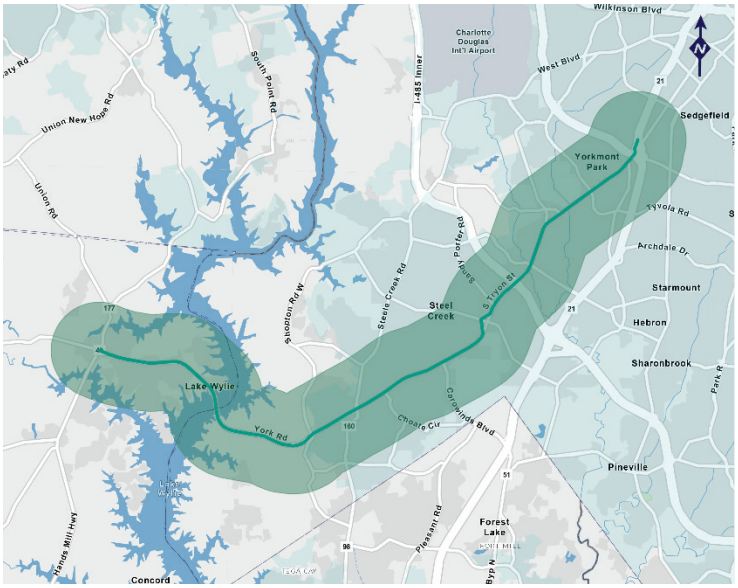
Level 1 Corridor Evaluation Criteria			
Regional Connectivity	● High	Access to Jobs	● High
Public Facilities and Destinations Served	● High	Historically Underserved	○ Medium
Projected Transit Demand	○ Medium	Planning Consistency	○ Medium
Service in Congested Corridors	○ Medium	Environmental Benefits	○ Medium
Transit Dependency	● High	Station Area Development Potential	○ Medium
Overall Composite Score			○ **Medium**

Recommended HCT Corridor B

Highway 49/South Tryon Street

(Previously Candidate Corridor 2)





Linkage Locations: Southwest Charlotte to Lake Wylie

The Highway 49/South Tryon Street Corridor would extend HCT service from Southwest Charlotte Lake Wylie, SC along Highway 49 Southwest. A possible future connection could be to extend service along Highway 49 to York, SC.

Recommended HCT Corridor B Analysis:

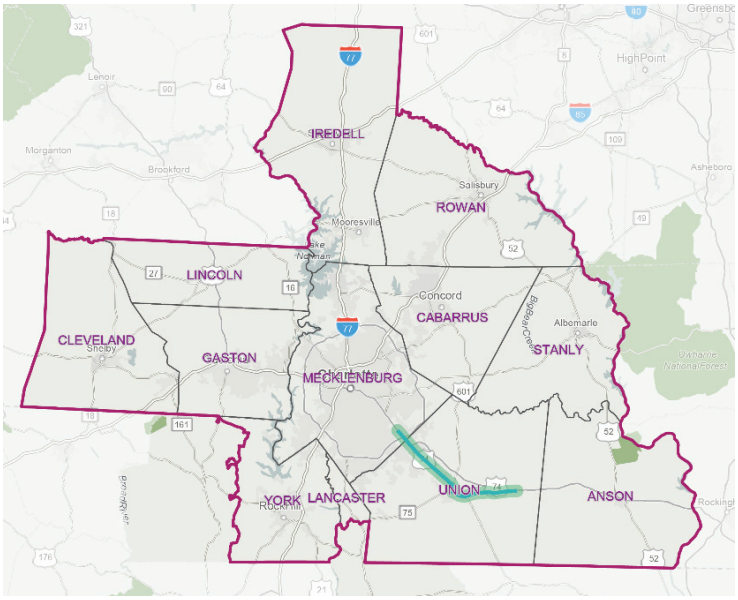
- South Tryon Street in Charlotte/Mecklenburg County is a rapidly urbanizing corridor including housing, retail, commercial, and industrial and logistics warehousing south of Charlotte-Douglas International Airport.
- Presence of institutional anchors along with reasonable land prices suggests this Corridor will continue to grow.
- Existing right-of-way allows for design flexibility to adapt a HCT corridor investment to existing and future conditions.

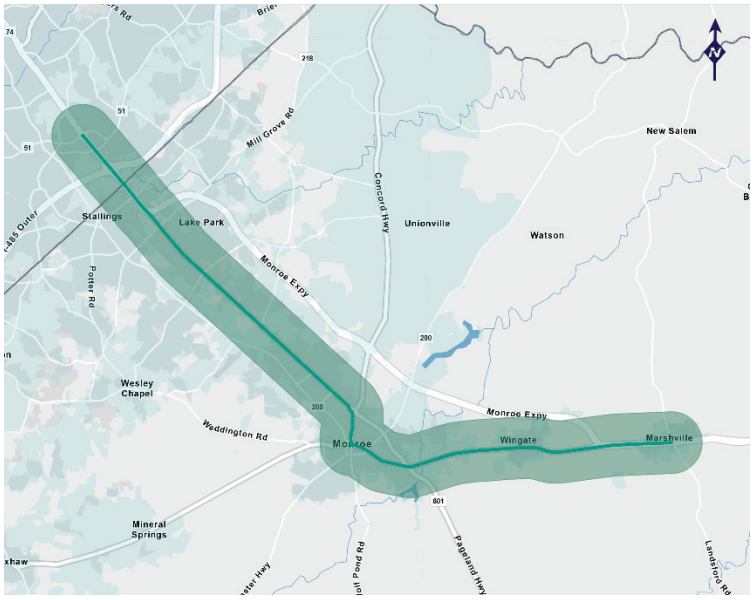
Level 1 Corridor Evaluation Criteria			
Regional Connectivity	○ Medium	Access to Jobs	○ Medium
Public Facilities and Destinations Served	○ Low	Historically Underserved	○ Medium
Projected Transit Demand	○ Medium	Planning Consistency	○ Medium
Service in Congested Corridors	○ Low	Environmental Benefits	○ Medium
Transit Dependency	○ Medium	Station Area Development Potential	○ Medium
Overall Composite Score			○ **Medium**

Recommended HCT Corridor C

Highway 74 East/ W Roosevelt Blvd

(Previously Candidate Corridor 4)





Linkage Locations: **Indian Trail to Marshville**

The Highway 74 East/W Roosevelt Blvd Corridor would extend HCT service from the Indian Trail, NC to Marshville, NC along Highway 74/Roosevelt Boulevard. A possible extension of this corridor from Marshville to Wadesboro was also considered and advanced as Emerging Mobility Corridor. C.

Recommended HCT Corridor C Analysis:

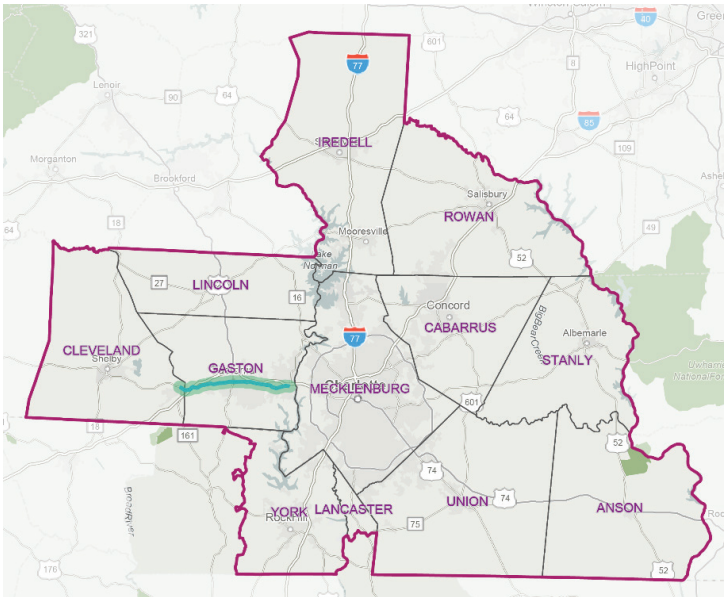
- The Highway 74 East/W Roosevelt Blvd Corridor displays several land use and transportation attributes that create a transit-supportive environment.
- As an alternate option to Recommended HCT Corridor M, the tradeoff between this corridor and the Recommended HCT Corridor M is one of speed versus access.
- Residential and employment growth forecasts, as well as institutions like Wingate University, support growing demand for frequent, expedient transit service.
- Future trip patterns suggest growing volume of trips to Southwest and Uptown Charlotte and points along the corridor.
- Additional planning study is recommended for this corridor in conjunction with Recommended HCT Corridor M to determine the optimal assignment of future HCT services.

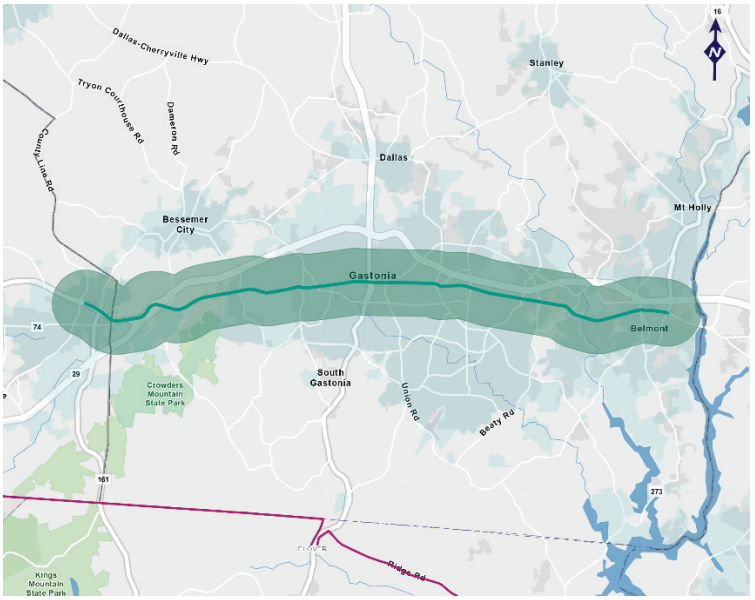
Level 1 Corridor Evaluation Criteria			
Regional Connectivity	○ Low	Access to Jobs	● High
Public Facilities and Destinations Served	● High	Historically Underserved	○ Medium
Projected Transit Demand	● High	Planning Consistency	○ Medium
Service in Congested Corridors	○ Medium	Environmental Benefits	○ Medium
Transit Dependency	○ Medium	Station Area Development Potential	● High
Overall Composite Score			○ **Medium**

Recommended HCT Corridor D

Highway 74 West

(Previously Candidate Corridor 5)





Linkage Locations: Belmont to Kings Mountain

The Highway 74 West Corridor would provide HCT from the proposed end of the LYNX Silver Line in Belmont, NC to Kings Mountain, NC. A continued connection beyond Kings Mountain to Shelby, NC was considered and advanced as Emerging Mobility Corridor D. A prior commuter rail study was completed that considered a potential commuter rail service between Charlotte and Kings Mountain.

Recommended HCT Corridor D Analysis:

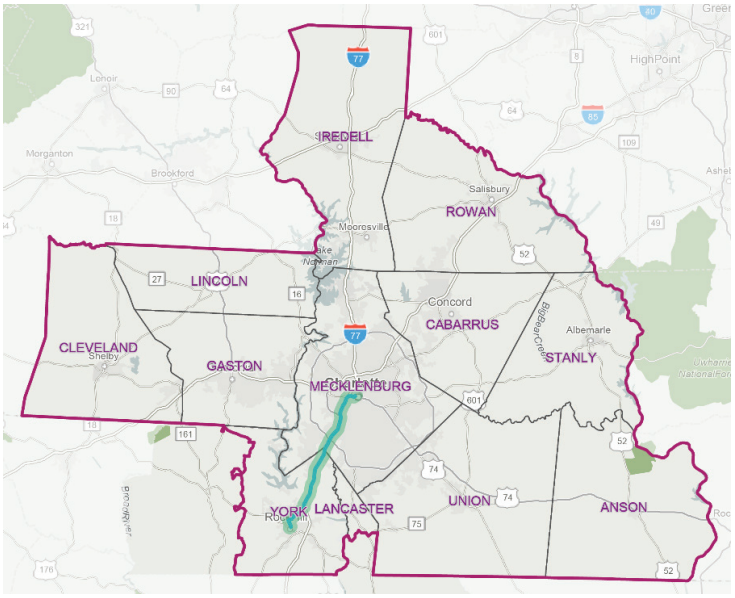
- Recommended HCT Corridor D would link Belmont, Gastonia, and Kings Mountain.
- There is projected to be continued growth and development around this corridor and therefore it is recommended for HCT service.

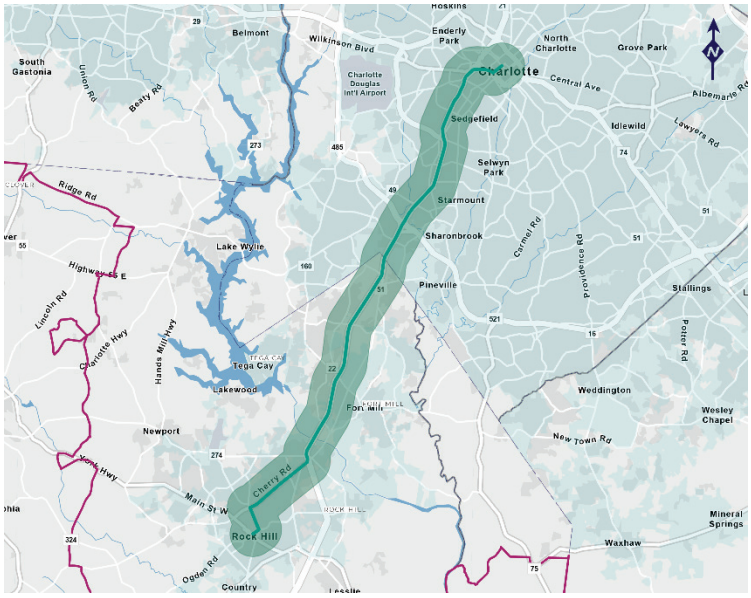
Level 1 Corridor Evaluation Criteria			
Regional Connectivity	○ Low	Access to Jobs	○ Medium
Public Facilities and Destinations Served	○ Medium	Historically Underserved	● High
Projected Transit Demand	○ Medium	Planning Consistency	● High
Service in Congested Corridors	○ Low	Environmental Benefits	○ Medium
Transit Dependency	○ Medium	Station Area Development Potential	● High
Overall Composite Score			○ **Medium**

Recommended HCT Corridor E

Interstate 77 South

(Previously Candidate Corridor 6)





Linkage Locations: **Uptown Charlotte to Rock Hill**

The I-77 South Corridor would extend HCT service between Uptown Charlotte and Downtown Rock Hill, SC with connections to Fort Mill and other points in Southwest Charlotte. As a highway-oriented commuter corridor, planning for this corridor should consider speed, reliability, and operational needs as well as the needs of commuting passengers.

Recommended HCT Corridor E Analysis:

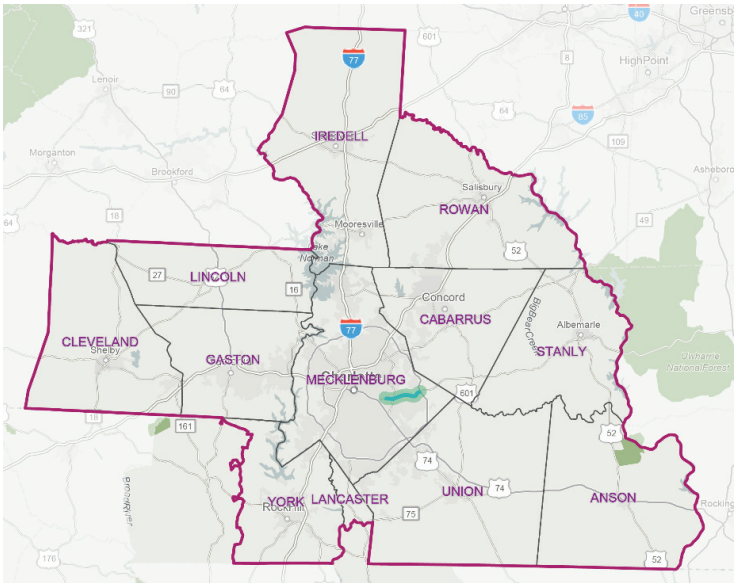
- Continued growth in population and employment surrounding I-77 will contribute exponentially to growth in corridor trips and traffic congestion. While the I-77 corridor may be expanded at certain locations to increase capacity, there are many locations where physical expansion would be cost-prohibitive, necessitating a way to increase the corridor's capacity without expanding the number of travel lanes.
- HCT service with flexible design and construction treatments to provide transit advantages can increase corridor capacity and improve travel speeds for users.
- Additional planning study is recommended for this corridor in conjunction with Recommended HCT Corridor H.

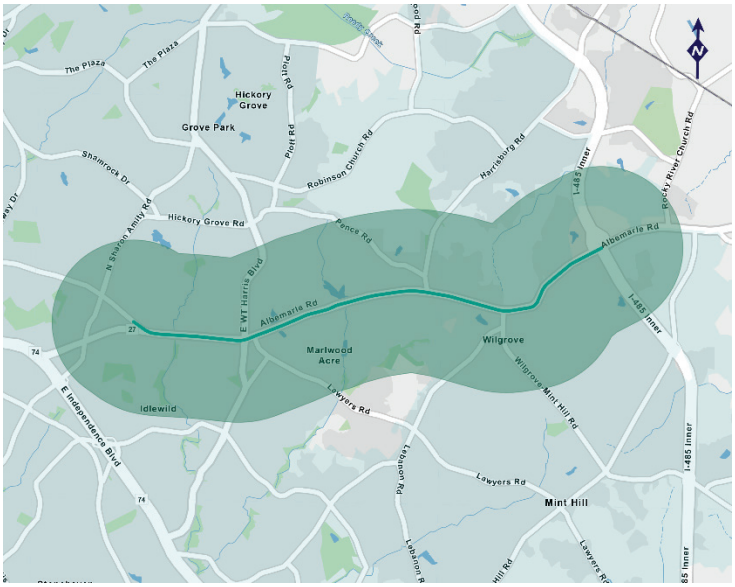
Level 1 Corridor Evaluation Criteria			
Regional Connectivity	● High	Access to Jobs	● High
Public Facilities and Destinations Served	● Medium	Historically Underserved	● High
Projected Transit Demand	● High	Planning Consistency	● High
Service in Congested Corridors	● Medium	Environmental Benefits	● Medium
Transit Dependency	● High	Station Area Development Potential	● Low
Overall Composite Score			● **High**

Recommended HCT Corridor F

Highway 24/27/ Albemarle Road

(Previously Candidate Corridor 10)





Linkage Locations: **Eastland Charlotte to Mint Hill**

The Highway 24/27/ Albemarle Road Corridor would provide HCT service between Mint Hill, NC and Charlotte's Eastland Mall area, where a future transfer station is planned at the terminus of the proposed City LYNX Gold Line.

Recommended HCT Corridor F Analysis:

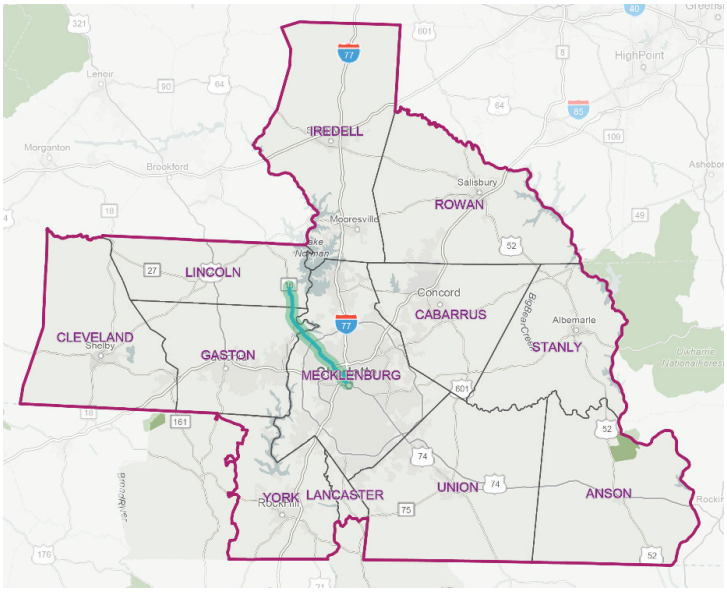
- The Highway 24/27/ Albemarle Road Corridor has strong transit-supportive socioeconomic characteristics, coupled with corridor population growth.
- Strong potential for land use change in the future.
- The future planned extension of the City LYNX Gold Line streetcar along Central Avenue would create a good market to extend HCT out to I-485.

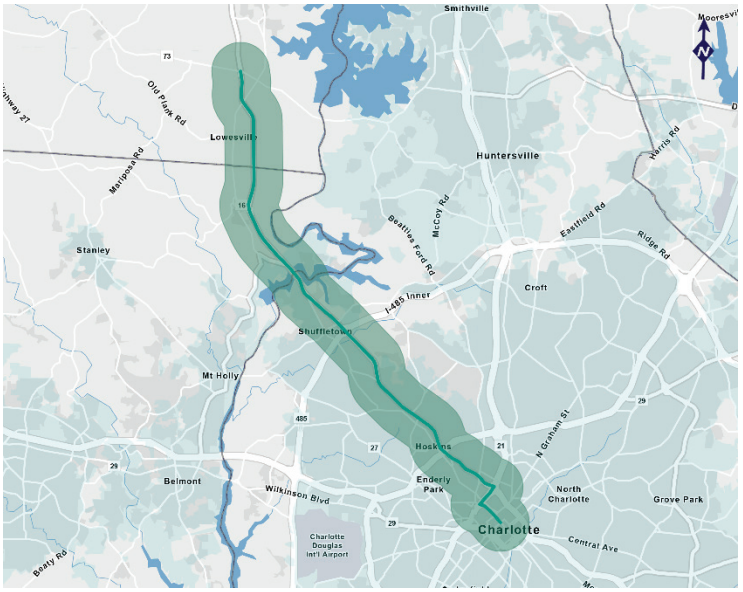
Level 1 Corridor Evaluation Criteria			
Regional Connectivity	○ Medium	Access to Jobs	○ Medium
Public Facilities and Destinations Served	○ Medium	Historically Underserved	○ Medium
Projected Transit Demand	○ Medium	Planning Consistency	○ Medium
Service in Congested Corridors	○ Low	Environmental Benefits	○ Medium
Transit Dependency	○ Low	Station Area Development Potential	● High
Overall Composite Score			○ **Medium**

Recommended HCT Corridor G

Highway 16 Northwest

(Previously Candidate Corridor 11)





Linkage Locations: Uptown Charlotte to Lowesville

The Highway 16 Northwest Corridor would establish HCT service between Uptown Charlotte and Lowesville, NC. A possible extension of this corridor that would connect Lowesville to Denver, NC was also considered and advanced as Emerging Mobility Corridor I.

Recommended HCT Corridor G Analysis:

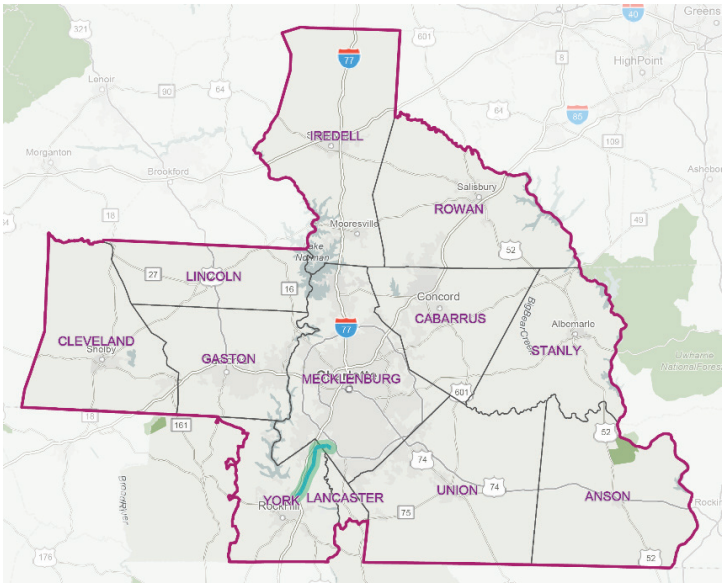
- Population growth surrounding the Highway 16 Northwest Corridor suggests a growing transit market, particularly between Uptown Charlotte and the intersection of Highway 16 Northwest/Highway 73.
- Limited Catawba River crossings coupled with increased growth around this corridor will create traffic bottlenecks. HCT along this corridor could offer alternative mobility options to travelers to bypass such congestion.

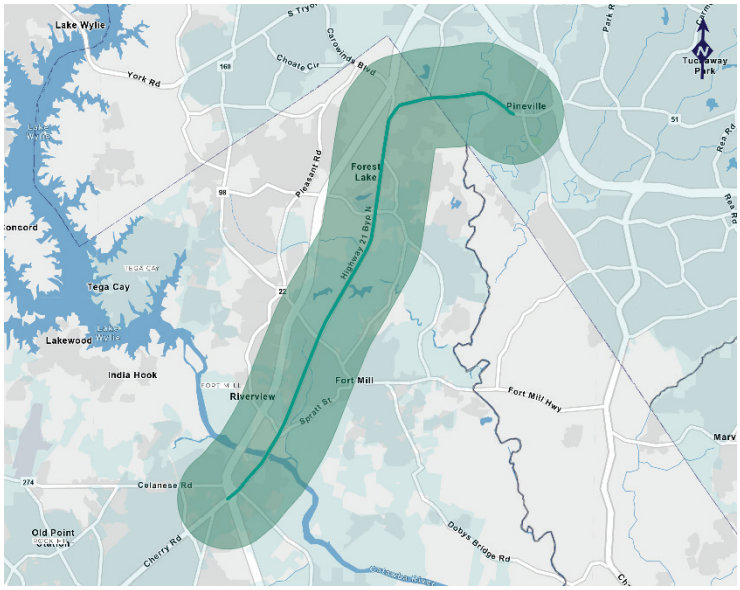
Level 1 Corridor Evaluation Criteria			
Regional Connectivity	○ Medium	Access to Jobs	○ Medium
Public Facilities and Destinations Served	○ Medium	Historically Underserved	○ Medium
Projected Transit Demand	○ Medium	Planning Consistency	○ Medium
Service in Congested Corridors	● High	Environmental Benefits	○ Medium
Transit Dependency	○ Low	Station Area Development Potential	○ Medium
Overall Composite Score			○ **Medium**

Recommended HCT Corridor H

Highway 21 South

(Previously Candidate Corridor 12)





Linkage Locations: **Pineville to Rock Hill**

The Highway 21 South Corridor would provide HCT service between Pineville, NC and Rock Hill, SC. Previously, the Rock Hill-Fort Mill Area Transportation Study (RFATS) considered Highway 21 between Rock Hill and Pineville as a potential BRT corridor. This corridor is considered in the context of the I-77 South travel shed between Rock Hill and Charlotte.

Recommended HCT Corridor H Analysis:

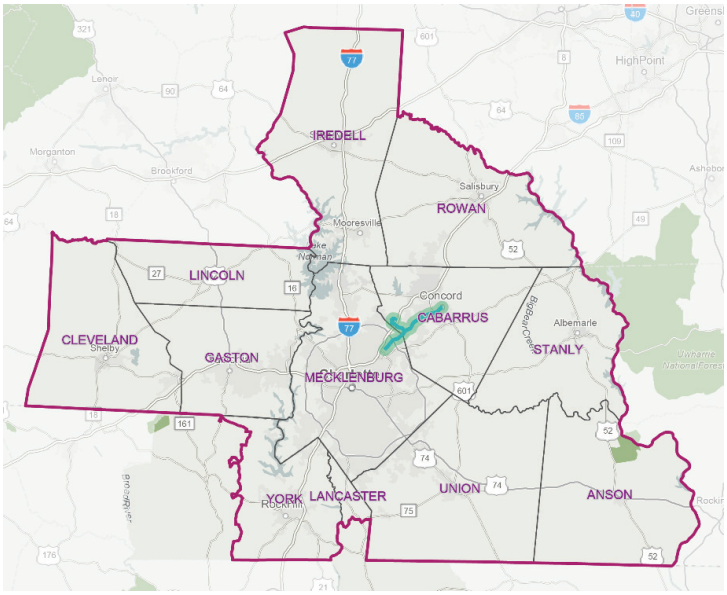
- Planned as part of the RFATS regional transportation investment strategy.
- Growth of Rock Hill, Fort Mill, Kingsley/Baxter, and Pineville coupled with the future LYNX Blue Line extension creates an opportunity for HCT services extending further south.
- The Highway 21 Corridor greatly improves access to adjacent communities and nearby institutions that would not be served by HCT service on I-77 only.
- Travel patterns within the Highway 21 Corridor suggest a market for service to office and industrial technology parks along I-485 in Pineville/Ballantyne and Fort Mill.
- Additional planning study is recommended for this corridor in conjunction with Recommended HCT Corridor E to determine the optimal assignment of future HCT services.

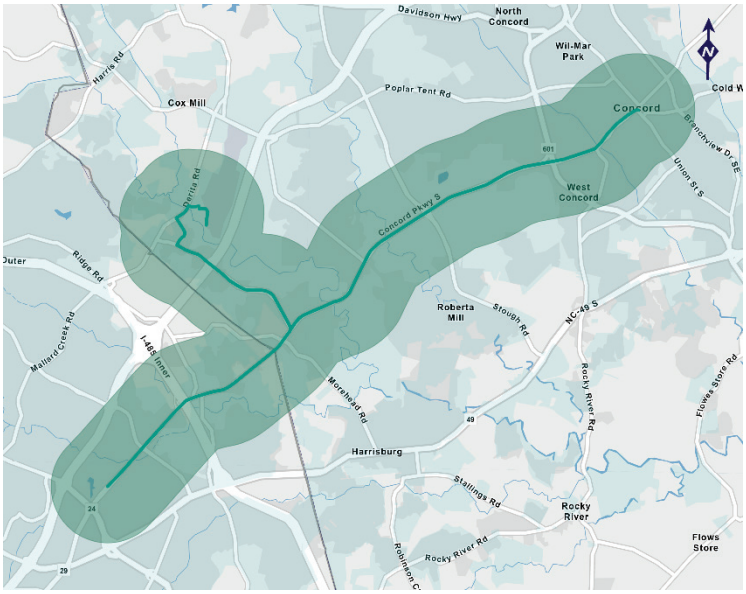
Level 1 Corridor Evaluation Criteria			
Regional Connectivity	● High	Access to Jobs	○ Medium
Public Facilities and Destinations Served	● High	Historically Underserved	○ Medium
Projected Transit Demand	○ Medium	Planning Consistency	● High
Service in Congested Corridors	○ Medium	Environmental Benefits	○ Medium
Transit Dependency	○ Medium	Station Area Development Potential	● High
Overall Composite Score			○ **Medium**

Recommended HCT Corridor I

Highway 29 North

(Previously Candidate Corridor 14)





Linkage Locations: **UNCC to Concord**

The Highway 29 North Corridor would extend HCT from the current LYNX Blue Line northern terminus at UNCC north to Concord, NC. Two route options are possible: an extension to the Concord-Padgett Regional Airport or an extension that provides service directly into Downtown Concord, NC.

Recommended HCT Corridor I Analysis:

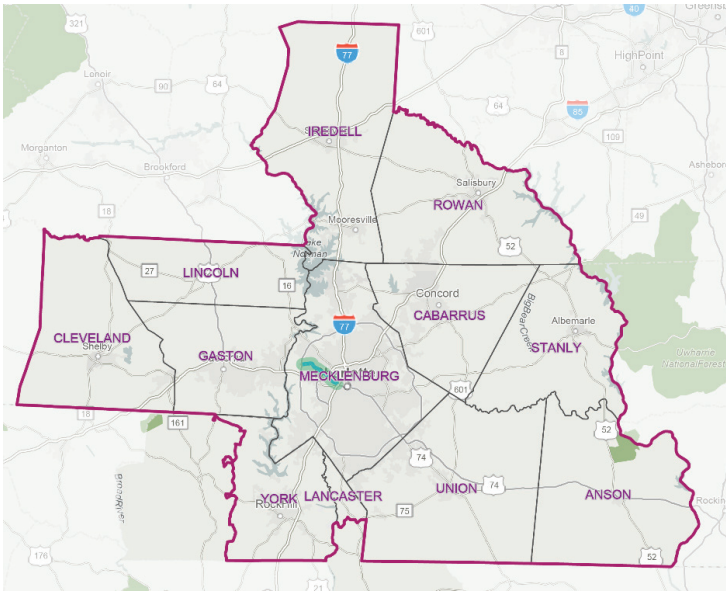
- As the cities of Charlotte and Concord converge around I-485, coupled with regionally-significant anchor land uses like University of North Carolina at Charlotte, Concord Mills, and the Charlotte Motor Speedway, it is foreseeable that Highway 29 North will experience significant corridor growth both in terms of population and employment.
- The Highway 29 North Corridor to Concord, which could connect to the current northern end of the LYNX Blue Line, warrants further planning analysis and review.

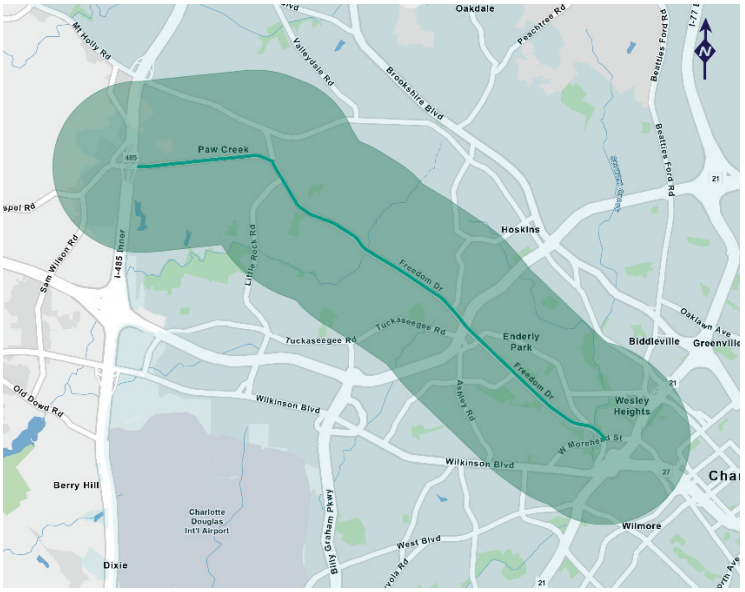
Level 1 Corridor Evaluation Criteria			
Regional Connectivity	○ Medium	Access to Jobs	○ Medium
Public Facilities and Destinations Served	○ Medium	Historically Underserved	○ Medium
Projected Transit Demand	● High	Planning Consistency	○ Medium
Service in Congested Corridors	○ Medium	Environmental Benefits	○ Medium
Transit Dependency	○ Medium	Station Area Development Potential	● High
Overall Composite Score			○ **Medium**

Recommended HCT Corridor J

Freedom Drive/Moores Chapel Road

(Previously Candidate Corridor 23)





Linkage Locations: Uptown Charlotte to Moores Chapel Road/I-485

The Freedom Drive/Moores Chapel Road Corridor would extend HCT service from Uptown Charlotte along Freedom Drive and Moores Chapel Road to an area on the west side of Charlotte known as Wildwood. This corridor is a part of CATS Envision My Ride future high frequency network.

Recommended HCT Corridor J Analysis:

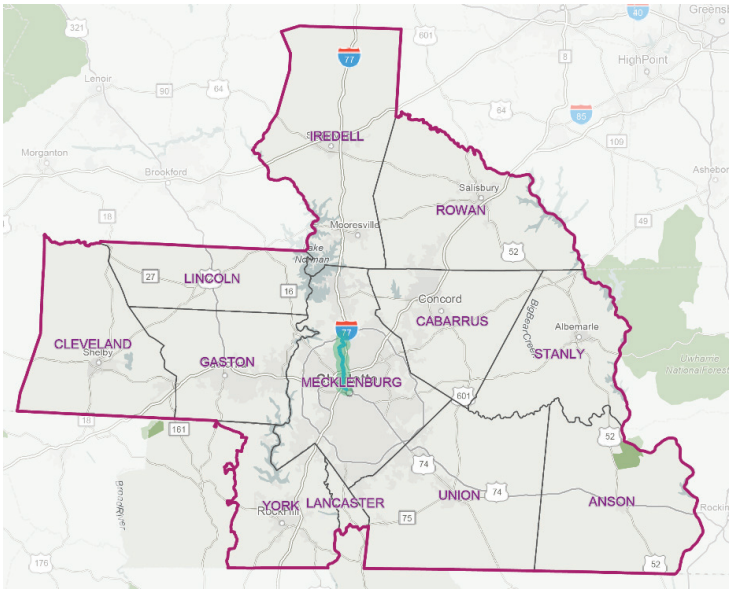
- The Freedom Drive/Moores Chapel Road Corridor has strong underlying socioeconomic characteristics, as well as demographic growth in population.
- This corridor would provide a strong northwest Charlotte/east Gaston County connection for adjacent neighborhoods.
- HCT in this Corridor would create strong connections to existing and future job centers and spur growth around the corridor.

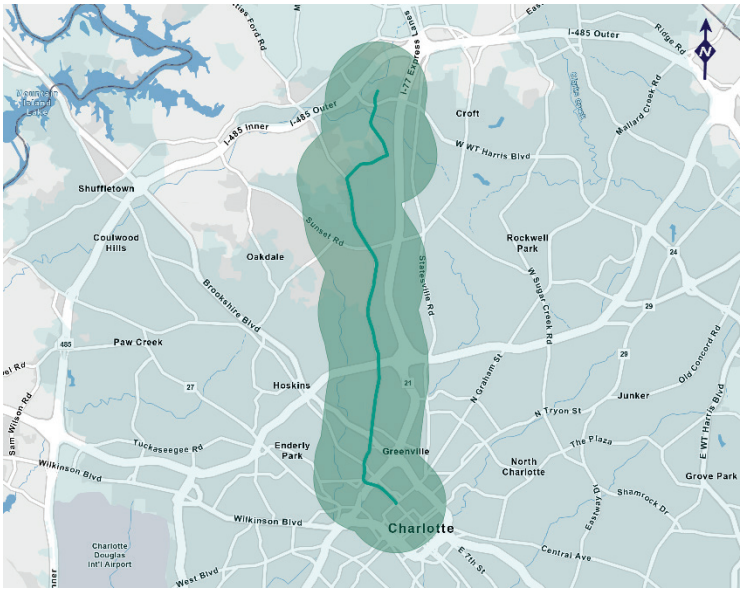
Level 1 Corridor Evaluation Criteria			
Regional Connectivity	● High	Access to Jobs	○ Medium
Public Facilities and Destinations Served	● High	Historically Underserved	● High
Projected Transit Demand	● High	Planning Consistency	○ Medium
Service in Congested Corridors	● High	Environmental Benefits	● High
Transit Dependency	● High	Station Area Development Potential	○ Medium
Overall Composite Score			● **High**

Recommended HCT Corridor K

Beatties Ford Road

(Previously Candidate Corridor 26)





Linkage Locations: **Uptown Charlotte to Northlake Mall**

The Beatties Ford Road Corridor would extend HCT from Uptown Charlotte to the Northlake Mall area. This corridor would provide HCT in addition to the future City LYNX Gold Line near the Rosa Parks Transit Center. CATS is planning for the extension of the City LYNX Gold Line on Beatties Ford Road to the Rosa Parks Transit Center.

Recommended HCT Corridor K Analysis:

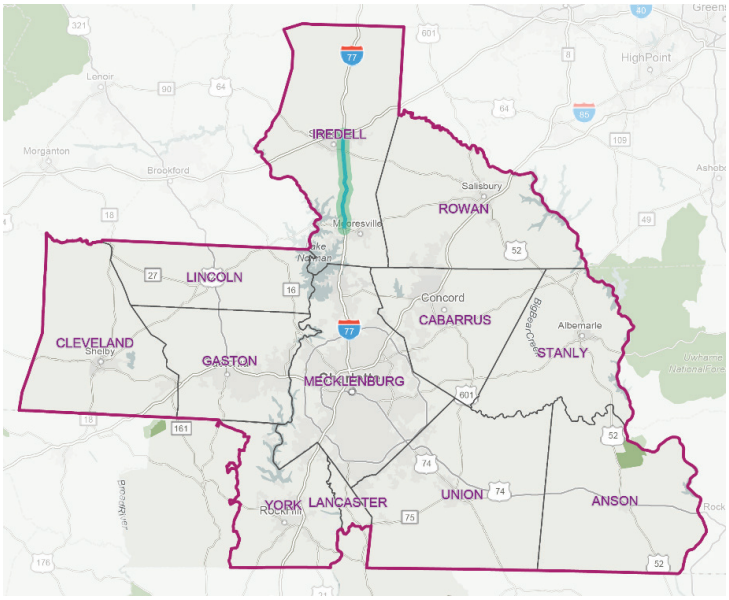
- Future extension of the City LYNX Gold Line streetcar to Rosa Parks Transit Center sets up a future HCT corridor extension to Northlake Mall.
- Strong potential for land use change in the future, consistent with corridor land use vision.
- Wealth of social service and civic offices, and future densities also suggest it could be a successful HCT corridor.

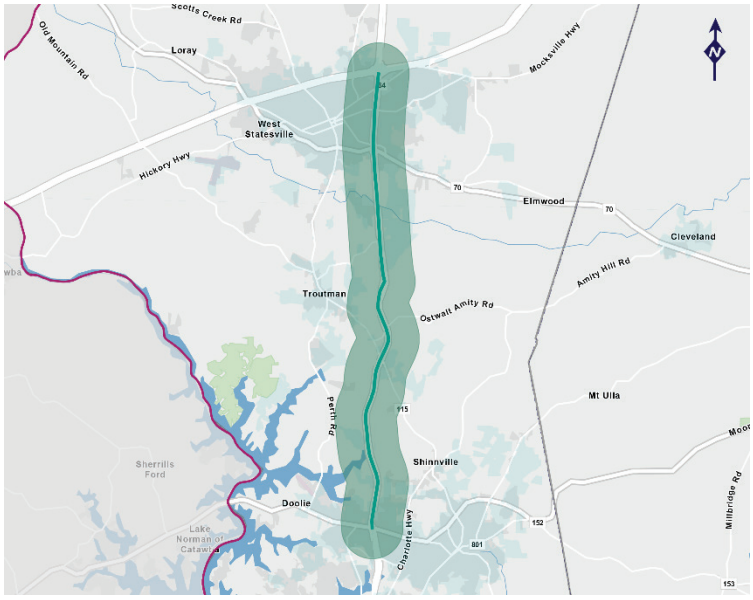
Level 1 Corridor Evaluation Criteria			
Regional Connectivity	● High	Access to Jobs	● High
Public Facilities and Destinations Served	● High	Historically Underserved	● High
Projected Transit Demand	● High	Planning Consistency	○ Medium
Service in Congested Corridors	● High	Environmental Benefits	● High
Transit Dependency	● High	Station Area Development Potential	● High
Overall Composite Score			● **High**

Recommended HCT Corridor L

Interstate 77 North

(Previously Candidate Corridor 30)





Linkage Locations: **Mooresville to Statesville**

The I-77 North Corridor would extend HCT service from Mooresville, NC to Statesville, NC. This corridor would serve as a potential extension of the currently planned CATS MetroRapid North Corridor BRT that will provide bus rapid transit service in the I-77 Express Lanes from Uptown Charlotte to Mooresville, NC.

Recommended HCT Corridor L Analysis:

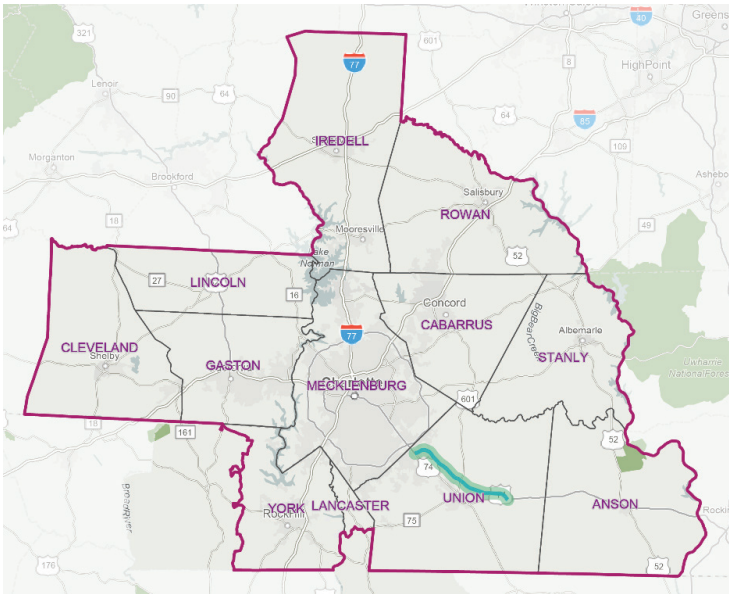
- Growing travel shed along I-77 North between Uptown Charlotte and Statesville.
- Presence of employment nodes and anchor institutions suggests this corridor will see expanded, stable employment growth in the future.

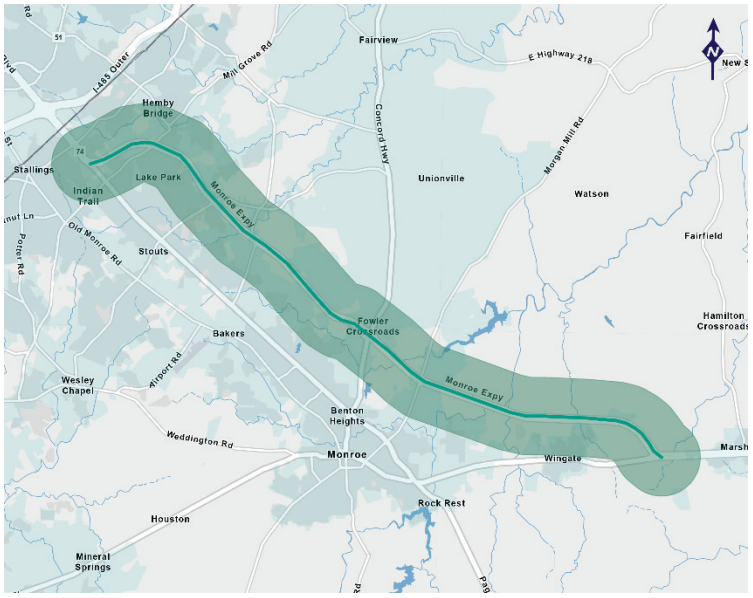
Level 1 Corridor Evaluation Criteria			
Regional Connectivity	○ Low	Access to Jobs	○ Medium
Public Facilities and Destinations Served	○ Low	Historically Underserved	○ Medium
Projected Transit Demand	○ Low	Planning Consistency	● High
Service in Congested Corridors	○ Medium	Environmental Benefits	○ Medium
Transit Dependency	○ Medium	Station Area Development Potential	● High
Overall Composite Score			○ **Medium**

Recommended HCT Corridor M

Monroe Expressway/Highway 74 Bypass

(Previously Candidate Corridor 31)





Linkage Locations: **Indian Trail to Marshville**

The Monroe Expressway/Highway 74 Bypass Corridor would provide HCT service between Stallings and Marshville and be located along the Monroe Expressway/Highway 74 Bypass. This corridor is an alternate to Recommended HCT Corridor C.

Recommended HCT Corridor M Analysis:

- Primary tradeoff between this corridor and Recommended HCT Corridor C is speed versus access.
- As the region continues to grow, Union County is set to absorb a large percentage of that growth along the Highway 74 Corridor. The implementation of HCT services along the Monroe Expressway/Highway 74 Bypass Corridor, coupled with park-and-ride facilities, could significantly extend the reach of regional rapid transit service and help expediently move people from Union County's growth centers into Mecklenburg County.
- Additional planning study is recommended for this corridor in conjunction with Recommended HCT Corridor C to determine the optimal assignment of future HCT services.

Level 1 Corridor Evaluation Criteria			
Regional Connectivity	○ Low	Access to Jobs	○ Low
Public Facilities and Destinations Served	○ Low	Historically Underserved	○ Low
Projected Transit Demand	○ Medium	Planning Consistency	○ Medium
Service in Congested Corridors	● High	Environmental Benefits	○ Medium
Transit Dependency	○ Low	Station Area Development Potential	○ Medium
Overall Composite Score			○ **Medium**

High-Capacity Transit and Modes

The Project Team evaluated the corridors with no particular transit technology in mind, meaning the HCT corridor could be served by any of the following technologies: arterial BRT, dedicated BRT, regional express bus (freeway-based BRT), LRT, or commuter rail. This approach is known as mode-neutral. There are still many planning steps that need to be completed for each corridor to identify an applicable transit technology. The discussion of modes below is not prescriptive, but for consideration of the type of technologies commonly used.

Potential High-Capacity Transit Corridor Modes

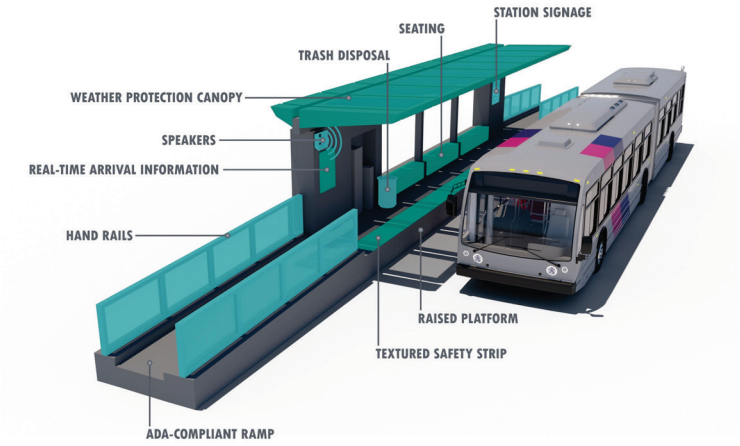
As discussed, the Recommended HCT Corridors identified above already display the necessary attributes capable of sustaining a long-term investment in HCT service. Planning steps needed to advance these corridors include the identification of mode, alignment definition, and consideration of potential station locations. For these corridors, the next phases of planning study and corridor evaluation would be feasibility studies or alternatives analyses that would help distinguish definitional elements of future capital projects. These definitional elements include the general alignment, terminus points, probable station/stop locations, and transit-supportive elements or additional infrastructure needs.

A Primer on BRT Service

The CONNECT Beyond study has committed to staying mode-agnostic during the identification and evaluation of candidate corridors. However, discussions about mode inherently make their way into the conversation, and one mode that has gained growing attention in the region and nationally. Broadly defined, bus rapid transit (BRT) is high-quality transit service that employs features and technologies to improve transit travel speed, reliability, capacity, and passenger comfort, along with providing a unique identity over traditional fixed-route bus service. Features include:

- **High-Quality Service**: Service that features reduced travel times, long spans of service, longer stop spacing, and high frequency of service.
- **Transit Priority Treatments**: Roadway and intersection infrastructure that allows transit vehicles to bypass congested areas.
- **Intelligent Transportation System (ITS)**: Technology features that enable the bus and driver to communicate with traffic signals, stations, and communications centers as well as customers.
- **Off-Board Fare Collection**: Fare collection tools and methods that reduce vehicle boarding times.
- **Enhanced Stations**: Stations typically include sheltered waiting areas, platform level boarding, off-board fare collection, next-bus displays, and other amenities.

The National BRT Institute, a joint venture of the Center for Urban Transportation Research and the FTA, provides a wealth of information on BRT and services operating in North America and around the world. The graphic below provides an illustrative example of BRT features and facilities.



*Station and bus designs shown are conceptual and will be finalized in a later design stage.

Emerging Mobility Corridors

From the HCT corridor identification and evaluation process, **24 candidate corridors** were advanced as **Emerging Mobility Corridors**. These corridors may be good candidates for HCT investments in the future but are currently better suited for other types of transit investments like Enhanced Bus Solutions and Mobility Solutions. Enhanced Bus Solutions are generally for corridors that already receive some form of transit service. Mobility Solution corridors are generally those corridors without some form of existing transit service, but that would connect growing communities with regional transit services at future mobility hubs through cost-conscious transit options. In both cases, service investments would help these candidate corridors build a transit ridership base and position them for future consideration as HCT corridors. Figure 15 is a map of the CONNECT Beyond study area that displays the Emerging Mobility Corridors.

FIGURE 15. EMERGING MOBILITY CORRIDORS MAP

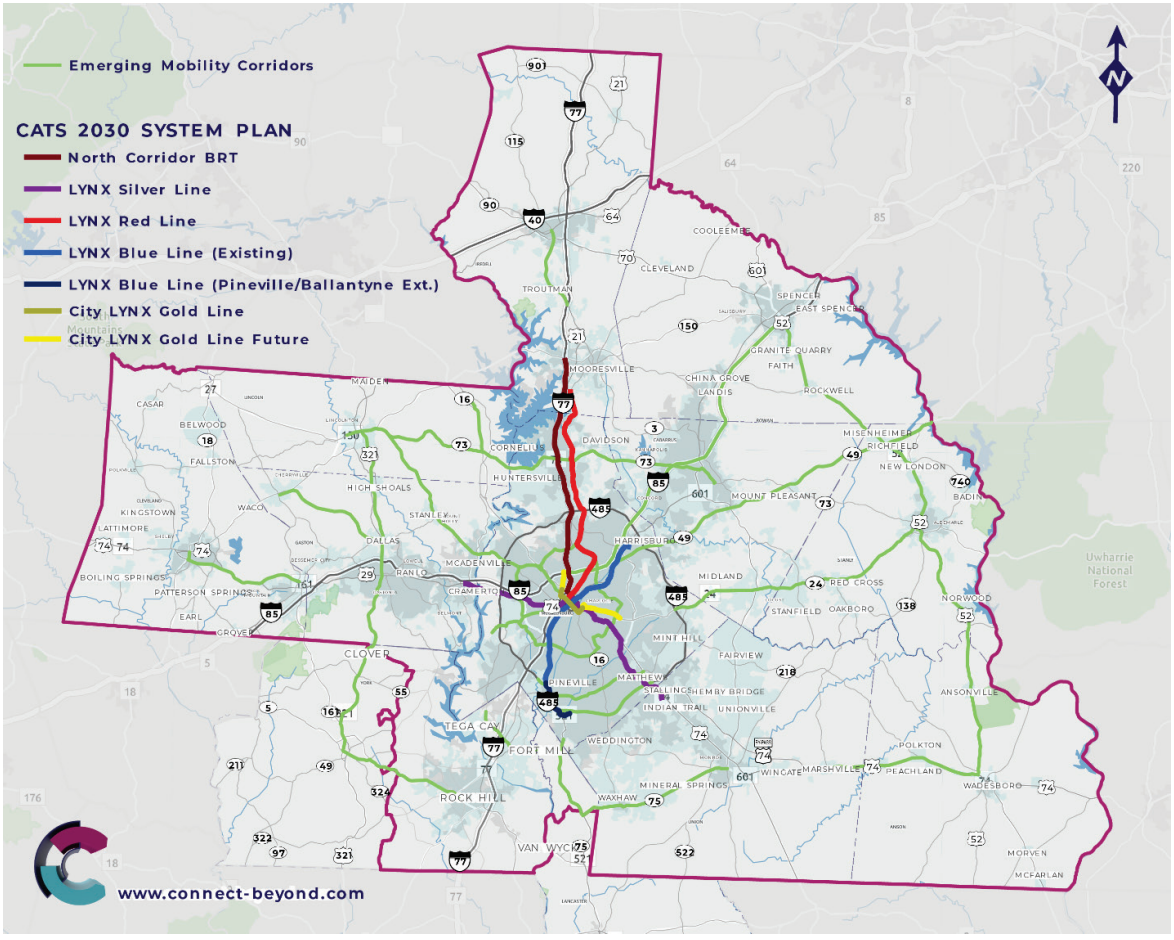


TABLE 12. EMERGING MOBILITY CORRIDORS

Corridor	Location	Discussion
Emerging Mobility Corridor A Highway 521/Charlotte Highway *(Previously Candidate Corridor 1)*	Ballantyne to Lancaster	Highway 521/Charlotte Highway in Lancaster County is not currently served by fixed route bus service. The Corridor's continued development including commercial centers, medical and office complexes, and housing suggest that future service may be warranted. A challenge for this Corridor will be access from adjacent residential neighborhoods, as well as the setbacks of commercial properties. While the Corridor has a significant amount of public right-of-way, the ownership of the roadway as part of the federal highway system may present challenges to the implementation of HCT services. It is recommended that this Corridor receive further planning study, but the attributes are there to warrant consideration of some form of fixed-route transit service in the future.
Emerging Mobility Corridor B Highway 51/Pineville-Matthews Road *(Previously Candidate Corridor 3)*	Pineville to Matthews	The Highway 51/Pineville-Matthews Road Corridor shows decent future ridership potential as a cross-town corridor given the number of neighborhoods, commercial centers, connections to existing and future HCT services, and available public ROW. However, surrounding neighborhoods and build lines of many properties are set back significantly from the street, fronted by surface parking lots, and several neighborhoods are located behind property walls with limited points of neighborhood access and egress. Portions of the Corridor are undevelopable. The demographic profile of the Corridor is generally less transit-supportive than comparable corridors, but future development in housing and commercial density could change this.
Emerging Mobility Corridor C Highway 74 East Wadesboro Extension *(Previously Candidate Corridor 4)*	Marshville to Wadesboro	The 74 East Wadesboro Extension Corridor east of Marshville is anticipated to retain much of its rural character into the future. While pockets of density exist along the Corridor, and there will be growth, mobility solutions in the form of vanpools and job access shuttles, with connections to regional mobility hubs are likely best equipped to meet the transit services needs of this Corridor. With limited existing service, this is a market that needs to grow more incrementally at first.
Emerging Mobility Corridor D Highway 74 West Shelby Extension *(Previously Candidate Corridor 5)*	Kings Mountain to Shelby	Similar to Highway 521/Charlotte Highway in Lancaster County, the Highway 74 West Shelby Extension Corridor extending to Cleveland County and Shelby is a Corridor for future consideration. At present, the dispersed, auto-oriented, rural nature of the Corridor does not suggest that regular fixed-route services would be a wise investment. However, the availability of public right-of-way could present an opportunity over time as development extends west from Gaston County and Kings Mountain. Additional planning and analysis is recommended for this Corridor.
Emerging Mobility Corridor E Highway 321 *(Previously Candidate Corridor 7)*	York to Lincolnton	Outside of Gastonia Transit's service area, the Highway 321 Corridor is not currently served by fixed-route transit service. However, anchored by the cities of Lincolnton, Dallas, Gastonia, Clover, and York, the Corridor includes institutional land uses such as Gaston College, all of which are expected to grow. Service along this Corridor would create a north-south transit spine in the west region of the CONNECT Beyond study area that future services or mobility solutions (e.g., demand-responsive services) could leverage to connect additional communities such as Cherryville or Iron Station with regional transportation services, particularly as HCT services or commuter rail is extended further into Gaston County.
Emerging Mobility Corridor F Highway 5 *(Previously Candidate Corridor 8)*	York to Rock Hill	As both Rock Hill and York continue to grow along South Carolina State Highway 5, corridor trips will increase, necessitating a form of urban mobility to ease congestion. While there is not fixed-route service currently along Highway 5, the potential exists for future fixed-route service such as peak period express service or hourly bi-directional bus service.
Emerging Mobility Corridor G Highway 73 West *(Previously Candidate Corridor 9)*	Lincolnton to Concord	Intermittent portions of the Highway 73 West Corridor are currently served by fixed-route bus service provided by Rider Transit and CATS. With the presence of downtowns and commercial nodes, as well as strategically located mobility hubs that will enable branch services to extend the reach of transit, this Corridor presents an opportunity for good cross-town bus service. As the region grows, particularly north Mecklenburg County, southern Cabarrus County, and east Lincoln County, a service connecting these communities and the mobility hubs will be an important outer-ring cross-town service.
Emerging Mobility Corridor H Highway 24/27 Albemarle Extension *(Previously Candidate Corridor 10)*	Mint Hill to Albemarle	This Corridor is an extension of the Highway 24/27 Corridor linking Uptown Charlotte to the interchange of Highway 24/27 and I-485. The Corridor lacks transit-supportive densities and development patterns to warrant a fixed-route service. However, the anticipated growth of Albemarle would create an anchor community northeast of Charlotte. As such, mobility solutions such as demand-responsive services, job access shuttles, or micro-transit could connect Albemarle and nearby communities with a mobility hub at I-485, enabling passengers to transfer to regional express and local fixed-route services.

Corridor	Location	Discussion
Emerging Mobility Corridor I Highway 16 Northwest Denver Extension *(Previously Candidate Corridor 11)*	Lowesville to Denver	Similar to Albemarle, the growth of Denver, North Carolina, is expected to create an anchor community northwest of Charlotte. With a potential HCT extension along Highway 16 to Lowesville, a connecting service linking Denver to the identified mobility hub in Lowesville near Highway 16 and Highway 73, is advantageous to consider. Mobility solutions could include some form of reduced frequency fixed-route service, or perhaps deviated fixed-route trips of the HCT service periodically running north to Denver. Land use intensification will also be important in order to help create service demand.
Emerging Mobility Corridor J Highway 21 North *(Previously Candidate Corridor 13)*	US 21 / I-77 Interchange to Front Street, Statesville	At the confluence of a potential commuter rail corridor and future BRT corridor, and with the future growth of Mooresville and Statesville, the Highway 21 North Corridor presents an opportunity for transit service enhancement. Given the saturation of potential HCT corridors extending north, this Corridor may be better suited to Enhanced Bus services to act as a complimentary service to HCT.
Emerging Mobility Corridor K Highway 27 North *(Previously Candidate Corridor 15)*	Uptown Charlotte to Lincolnton	The Highway 27 Corridor connecting Charlotte to Lincolnton stretches through mostly rural roads and small towns. No existing transit service is offered on this corridor. However, with potential corridors extending along Highway 16 and Highway 321, mobility solutions that connect the communities of Stanley, Alexis, and Iron Station with future mobility hubs should be considered.
Emerging Mobility Corridor L Various Roads in Northwest Charlotte (From Wilkinson Blvd to Sugar Creek Road) *(Previously Candidate Corridor 16)*	Wilkinson Blvd to Sugar Creek Road	One of four segments that envisions a circulating cross-town service ring around Uptown Charlotte, this segment (Corridor) would connect Charlotte-Douglas International Airport with the transit center at Sugar Creek Road. With many radial routes transporting passengers into Uptown currently, a cross-town service would enable connections outside of uptown, helping to reduce travel times and improve reliability.
Emerging Mobility Corridor M Various Roads in East Charlotte (From Sugar Creek Road to Monroe Road) *(Previously Candidate Corridor 17)*	Sugar Creek Road to Monroe Road	One of four segments that envisions a circulating cross-town service ring around Uptown Charlotte, this segment (Corridor) would connect the transit center at Sugar Creek Road with Monroe Road and the future CATS LYNX Silver Line and City LYNX Gold Line streetcar extension. With many radial routes transporting passengers into Uptown currently, a cross-town service would enable connections outside of uptown, helping to reduce travel times and improve reliability.
Emerging Mobility Corridor N Various Roads in South Charlotte (From Monroe Road to South Blvd) *(Previously Candidate Corridor 18)*	Monroe Road to South Blvd	One of four segments that envisions a circulating cross-town service ring around Uptown Charlotte, this segment (Corridor) would connect Monroe Road with South Boulevard and the Blue Line LRT. With many radial routes transporting passengers into Uptown currently, a cross-town service would enable connections outside of uptown, helping to reduce travel times and improve reliability.
Emerging Mobility Corridor O Various Roads in Southwest Charlotte (From South Blvd to Wilkinson Blvd) *(Previously Candidate Corridor 19)*	South Blvd to Wilkinson Blvd	One of four segments that envisions a circulating cross-town service ring around Uptown Charlotte, this segment (Corridor) would connect South Boulevard and the Blue Line LRT with the Charlotte-Douglas International Airport. With many radial routes transporting passengers into Uptown currently, a cross-town service would enable connections outside of uptown, helping to reduce travel times and improve reliability.
Emerging Mobility Corridor P Interstate 485 *(Previously Candidate Corridor 20)*	Indian Trail to Pineville	Another form or cross-town commuter service, the new express lanes offer a form of dedicated transit lane available to peak period express and intra-corridor commuting trips. With the continued intensification of land uses surrounding I-485 in the south metro, the addition of the managed express lanes, and with the extension of Blue Line LRT service to Pineville/Ballantyne planned, an opportunity exists for expedient transit service linking major interchanges and developments, along with other future HCT services (e.g., Highway 16/Providence Road).
Emerging Mobility Corridor Q Interstate 85 *(Previously Candidate Corridor 21)*	Uptown Charlotte to Salisbury	The I-85 Corridor is already well-traveled, and the addition of some form of express service(s) linking Salisbury and points southwest in Rowan and Cabarrus Counties with Uptown Charlotte is wise to consider. The success of this Corridor is dependent in certain cases on potential extensions of HCT service into Cabarrus County, so it may be wise to consider future planning studies for the I-85 Corridor to match service demand with service need.

Corridor	Location	Discussion
Emerging Mobility Corridor R Highway 160 *(Previously Candidate Corridor 22)*	Hwy 460 to Hwy 521 in Fort Mill	South Carolina and North Carolina Highway 160 between Fort Mill and the Rivergate Shopping Center, with a potential future connection to the Charlotte Premium Outlets at I-485, is a Corridor experiencing significant growth and urbanization. There is not current fixed-route service on this Corridor, but given the pace of development, along with other corridors that are creating concentric growth rings around Charlotte, this Corridor should be considered for some form of fixed-route service in the future given steady increases in trips, growth of shopping and multi-family housing, and the presence of stable institutional land uses that will continue to attract trips for decades to come. This Corridor could one day link easily with several future high-capacity corridors.
Emerging Mobility Corridor S West Blvd *(Previously Candidate Corridor 24)*	Wilmore Charlotte to Garrison Road	While the Corridor includes some higher density residential development and commercial nodes at signalized intersections, future service productivity will be controlled in part by Charlotte-Douglas International Airport. The airport has the authority to restrict development and densities with regard to aeronautical take-off and landing requirements. The Corridor displays attributes that warrant stop enhancements and more frequent service in the near future, but potential is limited between Billy Graham Parkway and I-485. While an HCT service like BRT could operate along West Boulevard, service productivity must be considered with regard to operating cost.
Emerging Mobility Corridor T Graham Street *(Previously Candidate Corridor 25)*	Uptown to Graham/Sugar Creek Road	Graham Street is poised for future growth and redevelopment that could be very transit supportive. However, the addition of commuter rail, coupled with the nearby Blue Line LRT and future City LYNX Gold Line streetcar extension on Beatties Ford Road introduce the potential for duplicative HCT services within the travel shed. Like West Boulevard, stop enhancements and increased service frequencies will help grow a ridership base, particularly if the Corridor experiences a transition to more residential and commercial or light industrial land uses.
Emerging Mobility Corridor U Highway 75/Waxhaw Highway *(Previously Candidate Corridor 27)*	Lancaster/Waxhaw to Monroe	The Highway 75/Waxhaw Highway Corridor is anticipated to retain much of its rural character into the future. While pockets of density exist along the Corridor, and towns including Waxhaw will experience growth, mobility solutions in the form of vanpools and job access shuttles, with connections to regional mobility hubs are likely best equipped to meet the transit services needs of this Corridor. Without existing service, this is a market that needs to grow more incrementally at first.
Emerging Mobility Corridor V Highway 52 *(Previously Candidate Corridor 28)*	Salisbury to Wadesboro	The Highway 52 Corridor is anticipated to retain much of its rural character into the future. While pockets of density exist along the Corridor, and there will be growth particularly in Albemarle and Wadesboro, mobility solutions in the form of vanpools and job access shuttles, with connections to regional mobility hubs are likely best equipped to meet the transit services needs of this Corridor. This is a market that needs to grow more incrementally at first.
Emerging Mobility Corridor W Highway 49 *(Previously Candidate Corridor 29)*	UNCC to Richfield	The Highway 49 Corridor is anticipated to retain much of its rural character into the future. While pockets of density exist along the Corridor, and there will be growth, mobility solutions in the form of vanpools and job access shuttles, with connections to regional mobility hubs are likely best equipped to meet the transit services needs of this Corridor. With limited existing service, this is a market that needs to grow more incrementally at first.
Emerging Mobility Corridor X Highway 279 *(Previously Candidate Corridor 32)*	Dallas to Cherryville	The Highway 279 Corridor is anticipated to retain much of its rural character into the future. While pockets of density exist along the Corridor, and there will be growth, mobility solutions in the form of vanpools and job access shuttles, with connections to regional mobility hubs are likely best equipped to meet the transit services needs of this Corridor. The extension of bus service along Highway 321 will help encourage transit availability and utilization and help potentially extend fixed-route service to Cherryville one day in the future. Without existing service, this is a market that needs to grow more incrementally at first.

The following subsections discuss a range of options and strategies for further consideration as part of future planning efforts for the Emerging Mobility Corridors.

Enhanced Bus Solutions

By 2045, a network of fast, frequent, and reliable HCT services will form the backbone of the regional mobility network. Equally important to the success of the HCT network will be improvements in local and express bus services to complement the investments in HCT service. The following strategies and actions were identified to enhance bus service and further prepare Emerging Mobility Corridors to be elevated one day as the next wave of HCT corridors. These strategies are also scalable, meaning actions or strategies can be implemented quickly or incrementally.

Modes commonly used or considered include fixed-route local buses, local limited stop buses, and express buses. This strategy will be further refined in a subsequent task with transit providers. The Emerging Mobility Corridors along which Enhanced Solutions are implemented will need to work with effective local bus service to support an overall total mobility network.

Service Frequency and Span Enhancements

For potential HCT corridors identified that receive transit service currently, increasing the number of hourly transit trips or extending the span of service are two actions that can help increase transit ridership within a corridor. During weekdays, frequency enhancements could be phased to coincide with peak travel periods, or throughout an entire service day. Span enhancements typically extend service into later evening hours, providing later service for essential workers and those that depend on transit to access jobs. Frequency and span enhancements can also include expansion of services offered on weekends.

Table 13 provides suggested industry minimums for frequent services versus local fixed-route services and commuter services. This table is not derived from a singular source but is common to many peer city transit systems.

Transit 101: Linked and Unlinked Trips

Have you ever wondered what transit planners mean when they say linked or unlinked trips? Well, if you'd really like to impress your friends or dinner guests, here's some industry-insider terminology.

Transit agencies are required to provide ridership count data to the FTA throughout a calendar year. Passenger boardings are typically categorized into two trip categories: linked and unlinked passenger trips.

Linked Trips refer to the total number of riders and measures the number of complete trips, even if a rider makes a transfer. For example, Kevin boards a bus at his origin, makes a transfer in Uptown Charlotte, and ends the trip at his destination. This would be recorded as a linked one-person trip from start to end.

Unlinked Trips refer to the total number of boardings on a vehicle. Passengers are counted each time they board vehicles, no matter how many vehicles they use to travel from their origin to their destination. For example, Sabrina catches the bus at her origin (1) and makes a transfer in Uptown Charlotte (2) that takes her to her destination. In this measure, there are two unlinked trips because there were two vehicles involved.

TABLE 13. SERVICE FREQUENCY COMPARISON

Service Type	Service Span	Peak Frequency	Mid-day/Off-Peak Frequency	Evening Frequency
Frequent Services	4:45 a.m. – 1 a.m.	15 Minutes (or better)	15 Minutes	15 Minutes
Local Fixed-Route	4:45 a.m. – 1 a.m.	20-30 Minutes	30 Minutes	30 Minutes
Commuter Services	5:45 a.m. – 8:30 a.m. 3:30 p.m. – 6:30 p.m.	30 Minutes	N/A	N/A

What are Peak, Off-Peak, and Evening Trips?

Peak Period Service: Refers to weekday a.m. and p.m. service during commute hours, typically between 6 and 9 a.m. in the morning, and between 4 and 7 p.m. in the afternoons/evenings. To match demand, service levels are often higher during peak travel periods than non-peak periods.

Mid-Day or Off-Peak Service: Refers to those times of day not during peak travel periods, when service is adjusted to account for lower demand, generally between 9 a.m. and 3 p.m., and in the early mornings (before 6 a.m.). Service is often lowered to 20-minute headways.

Evening Service: Refers to those services offered between 7 and 10 p.m. Service frequency is generally reduced to between 20- and 30-minutes.

Owl Service: Refers to late night service operating after 10 p.m. into the early morning hours. Service is generally offered at 60-minute headways. This service is generally used by essential workers and those that rely on transit to access jobs.

Freeway-Based Express Bus Services

Rather than relying on dedicated or exclusive busways or transitways, express bus services are tailored around suburban commuters and make use of freeways or divided highways, gathering passengers at a limited number of designated stops and transit centers (park-and-rides). Express buses access freeways for non-stop travel to downtown or key employment locations. This peak-period service would be reversed in the afternoon/evening, taking passengers from the downtown to the suburbs. With the construction of park-and-ride facilities, particularly adjacent to freeways, many express buses are able to deviate from the freeway to the pick-up passengers, then re-enter the freeway for continuance of the trip. The service could also provide bi-directional all-day service with lower frequency during mid-day periods.

Operational enhancements such as direct transit-only lanes on access ramps, queue jumps, bus-only shoulders, or in the case of I-485 dedicated bus lanes all help express buses maintain schedule reliability and deliver passengers from one point to another quickly. Freeway facilities can also enable suburb-to-suburb crosstown travel.

Extend Service to New Areas

Extending existing transit services, such as local fixed-routes or rural connector routes, to new areas is another strategy transit providers have employed to build ridership within a corridor. Service extension must be coordinated with fleet management plans to ensure sufficient fleet are available to maintain service headways (frequencies). This strategy can be effective for suburban communities that have become more than residential developments and now include retail and employment centers not served by high quality bus service currently.

Transit Enhancement Strategies and Technologies

Transit enhancement strategies and technologies generally refer to quickly implementable capital investments that can speed transit service, enhance reliability, create greater passenger amenities, and improve safety.

- **Service Reliability and Priority Enhancements**: Transit services that offer a competitive advantage to driving often see a growth in ridership. The cost of driving and parking often dwarfs the cost of taking transit, helping to make transit a desirable travel option.
    - Business Access Transit (BAT) Lanes: A transit lane that allows use by other vehicles to access adjacent business properties or to make right turns at intersections.
    - Peak Period Transit-Only Lanes: Gives transit priority by restricting parking for set periods of time (typically during peak travel periods) in the peak direction of travel.
    - Intersection Queue Jumps: At signalized intersections, queue jumps are short transit-only lanes that allow buses to advance past queued traffic at the signal. Transit is then given priority to pass through the intersection before automobiles, helping to improve travel times and reliability.
    - Transit Signal Priority (TSP): Gives favorable treatment to buses along signalized arterials. For example, traffic signals can be programmed to reduce stopped delay for buses by offering extended green light time, shortened red light time, or possibly a separate bus-only signal phase.
    - Off-board Fare Collection: Generally combined with proof-of-payment fare enforcement, off-board fare collection allows bus boarding and alighting through any door because passengers have paid their fare prior to boarding the vehicle. This helps reduce how long the bus is stopped at transit stop (dwell time), improving the overall travel times.

- **Passenger Amenities at Stations or Stops**: The transit user's experience is more than just the vehicle. Passengers spend significant time at stations or stops where amenities can make their experience using the transit system more enjoyable and help entice choice riders. A dedicated funding program to improve passenger facilities and amenities at transit stations or stops is recommended. Suggested stop enhancements could include:
    - Numbered Bus Stop Signs: Re-designing bus stop signs to provide stop-specific transit information to include route numbers, a unique stop number, and instructions on how to access real-time bus schedule and wayfinding information.
    - Seating/Public Furniture: Provided independent of bus shelters, some form of seating offers comfort and convenience at bus stops.
    - Real-Time Departure Information: Riders need to have easy, reliable, and up-to-date information regarding the availability and anticipated arrival of the next bus to help them plan their trip.
    - Wayfinding: Includes physical and visual elements (e.g., paths, landmarks, nodes, edges and districts) that orient and aid people in reaching their destination.
    - Lighting: An important safety feature at bus stops and nearby street crossings used to access the bus stops for the comfort of pedestrians and transit users.
    - Sidewalks: Widening and detaching sidewalks from the street with "buffer zones" accommodates heavier and safer pedestrian movements, which improves real and perceived pedestrian safety. Many transit dependent individuals walk to their bus stop, so amenities such as sidewalks are critical for them to safely access the station.
    - Bicycle Parking: Allowing bicycles on buses and providing bicycle accommodations at bus stops can greatly expand the service area of a transit system.

Mobility Solutions

The transit industry has experienced rapid changes in technology and user demand over the past decade, notably with the rise of transportation network companies (TNCs) or rideshare providers that have introduced new means of mobility. In addition to TNCs, transit providers have been re-thinking approaches to traditional services that focus on mobility management strategies of moving persons and the number of persons in each vehicle, rather than the number of vehicles in a corridor. In this way, the focus of transit service turns to policies and

strategies designed to enhance the ability of transit system patrons to reach their destinations and improve accessibility of the system through integrated solutions involving all modes of travel.

The Project Team recommends implementing Mobility Solutions along Emerging Mobility Corridors in the CONNECT Beyond study area that do not receive transit service currently and are not currently prepared to support or sustain an investment in HCT service. However, the review of applicable planning data shows that in the roughly 30-year horizon timeframe of this planning effort, these corridors may warrant fixed-route or commuter express services. Therefore, establishing a ridership base through mobility solutions or other corridor enhancements in the near- and mid-term can help position these corridors for future transit service.

Vanpools and Job Access Shuttles

Broadly defined, vanpools are a form of mass transportation service wherein an operating transit or human services agency provides a vehicle to a group of people who live or work near one another and share similar commuting schedules. The operating costs are predominantly borne by the vanpool or shuttle riders, and in some cases a business also contributes to the operating expense of the service.

Like vanpools, job access shuttle services are commonly reservation-based transportation services providing rides to and from work and activities that are necessary to work. Job Access is a federal grant program requiring that participants not exceed certain income guidelines. More on Transportation Demand Management strategies like this will be discussed in future project efforts.

Microtransit Service

The American Public Transportation Association (APTA) defines microtransit as “small-scale, on-demand public transit services that that can offer fixed routes and schedules, as well as flexible routes and on-demand scheduling.”

The Micro-Transit Experience

In September 2020, the City of Wilson, North Carolina, took the bold step of replacing its fixed-route transit system with an on-demand, micro-transit service. In the face of growing fixed-route challenges, Wilson adopted a strategy that allows users to schedule trips through a mobile application, web portal or by phone, pay for trips online, and track vehicles with real time information. This has led to shorter wait times, shorter trips due to ride matching capability, and door-to-door service for those unable to make it to the assigned pick-up location. City leaders believe this is the way transit will best serve their community moving forward due to the following: equitable transportation, more reliable, convenient, and easy to use for users, and allow public transportation to be an option some users.

Mobility Hubs

Mobility hubs can play a key role in positioning a corridor for future success. As evidenced by the travel market and demographic data, several communities on the outer bounds of the CONNECT Beyond study area are anticipated to see growth and development but long distances separate these communities from other urbanized areas. Mobility centers can serve as a common point for either future fixed-route service or commuter rail service. This strategy is often accompanied with some form of parking, thereby creating a park-and-ride facility. More on mobility hubs will be addressed in the coming efforts of the CONNECT Beyond project.

Complete Streets

"Complete streets" is an approach to urban roadway design that promotes safe, comfortable, integrated transportation environments for all users. The complete streets concept is important for transit in two ways: (1) connectivity with walking and biking modes can significantly increase the travel distance for members of the community, and (2) the safe and efficient movement of transit vehicle along the streets. While this concept is focused on streets in urban centers, and has less applicability to long stretches of roadway, this approach in a growing downtown setting could be advantageous to consider today to help pre-position for an investment in HCT service later.

TRANSIT-SUPPORTIVE CORRIDOR POLICIES

1. Integrating transportation and land use considerations at all stages of the planning process
2. Specifying and designating urban growth areas and nodes along a corridor
3. Emphasizing intensification and the creation of a more compact urban form
4. Encouraging density and a mix of uses that minimize the length and number of vehicle trips
5. Promoting energy efficiency and improved air quality through land

Transit-Supportive Design and Land Use Strategies

Transit improvement strategies have traditionally given prominence to developing a route network with good coverage as a means of attracting the greatest number of riders. Overtime, the notion of transit coverage has transitioned to one of managing mobility across a diverse set of modes working in sync with one another.

Many studies have identified the strong correlation between transit utilization and surrounding land uses. Too often, the conversation regarding transit and land use focuses on Transit-Oriented Development (TOD), broadly defined as compact, walkable, pedestrian-oriented, mixed-use communities centered around high-quality transit facilities. But in the case of CONNECT Beyond, this project seeks to identify entire corridors, each stretching for multiple miles across the Charlotte metropolitan region, connecting with multiple bus routes and multiple development nodes.

Developing a TOD strategy is wise as it relates to transit passenger facilities, but there are extents between transit facilities along a corridor where transit-supportive policies are critical to the overall success of transit within the corridor. Regional transportation planning agencies and local jurisdictions can adopt policies that improve transit operations and facilitate better multi-modal projects. Two possible policies are listed below:

1. Establish a regional policy requiring that funds for all new traffic signals include elements that support transit operations as a condition of funding. This could include inter-connected signals, adaptive controls, and transit signal priority or preemption.
2. Establish a complete streets policy, requiring pedestrian and bicycle projects include transit performance elements that do not preclude transit investments in the future.

The CONNECT Beyond study will include much more detail on transit-supportive land use strategies in subsequent project phases. The above strategies are intended as precursors for later discussions but are common strategies that relate to the implementation of HCT corridors and services.

Next Steps

Demand for transit services is projected to increase in both the near-term and in the long-term (2045) as growth in population and employment in the region continues. Without major transit system upgrades that increase capacity, the region's transportation system is anticipated to operate with severe restrictions. As the CONNECT Beyond project advances to later stages of planning and policy development, the recommendations for candidate corridors and those corridors warranting consideration of fixed-route, express bus enhancements, or mobility solutions provide a preliminary foundation to consider other transportation options and activities that enhance regional connectivity and mobility.

For many reasons including livability, cost, health, and the environment, a growing number of Americans are interested in having a variety of transportation options available to them. People make trips daily for a variety of reasons including work, school, shopping, or recreation. The potential for people to use travel modes other than private automobiles generally relies on each person's proximity to their desired destination, typically the distance between their home and work location. Beyond distance alone, land use density and urban form also play a role in influencing how people travel, and travel can also be influenced by individual circumstances, such as age or disabilities.

As demonstrated, the candidate corridors have experienced tremendous growth in the past decade, and all are expected to see significant future growth in the decades to come. In the past, the solution to congestion was to widen roads and intersections, helping to relieve bottlenecks and rush-hour traffic volumes. However, as funds are increasingly limited, and with the region poised to add millions of new residents in the coming decades, transit and additional

non-motorized transportation options will play an important role in helping to relieve traffic congestion. Equally importantly, transit can also help create senses of place within a community, and foster vibrant, sustainable development patterns.

This study represents the initial assessment of potential public transportation solutions that may be considered as a means of addressing the region's future mobility challenges. Further planning study of the recommended corridors identified is recommended.

Commuter Rail Corridors

In parallel with the identification and assessment of candidate corridors for HCT, the Project Team also identified potential commuter rail corridors serving the greater Charlotte metropolitan region. As demands on the Charlotte region's freeway system continue to grow, resulting in increased travel times, commuter-based transit presents a unique solution to corridor congestion.

What is Commuter Rail?

On an average weekday in the United States, approximately 1.7 million trips are made on the nation's commuter rail systems. As would be expected, the largest systems serving the metropolitan areas with the highest populations have the most riders. The three systems serving New York City carry approximately 930,000 passengers on the average weekday, roughly 53 percent of all commuter rail passengers in the United States. The system with the lowest daily ridership is the Music City Star serving Nashville, TN, with an average ridership of 1,200 passengers per weekday.

Commuter-based rail systems have operating requirements and standards that are mandated by federal and state agencies, industry best practices, and other rail carriers who share the right-of-way. Generally, commuter systems are passenger rail systems most commonly used in congested urban areas as a means of improving travel times and mitigating traffic congestion, providing service between suburbs and urban cores for reaching employment, special events, and intermodal connections. Commonly operating on existing freight railroad tracks, commuter systems typically use diesel-electric or electrically-propelled locomotives (Figure 16), with passenger vehicles that carry approximately 140 seated passengers per car. Passenger vehicles are commonly equipped with amenities including wi-fi service, bathrooms, and bicycle stowage features.

FIGURE 16. COMMUTER RAIL LOCOMOTIVE

Source: *Massachusetts Bay Area Transportation Authority*

Commuter rail systems have fewer stops than LRT, BRT, or streetcar systems, with stations commonly located in the downtowns of suburban communities and a final stop in a region's central downtown. Designed for commuting passengers, the schedule frequency is often oriented around the standard commuting times for the average workday, the morning and afternoon peak travel periods, with few mid-day or late evening trips.

Benefits of Commuter Systems

Potential benefits associated with commuter services include:

- Improved mobility, particularly reduced travel times during peak travel periods, resulting in shorter trips for commuters.
- Higher quality commuter experience at stations and on-board vehicles designed with modern conveniences to meet passenger needs and expectations.
- Connections to employment or activity centers, including mass transportation to special events
- Opportunities for local development in station areas

Regulatory Requirements

Often operating in multi-train consists, where multiple passenger vehicles are linked together and pulled by a locomotive car, commuter rail trains most commonly operate on existing railway tracks and same rights-of-way used by intercity railway freight trains. Through trackage

use agreements, it is not uncommon that agreements between agencies operating commuter rail systems and railroad companies specify that commuter rail trails are operated by railroad employees.

Commuter rail services must comply with federal and state codes and safety regulations. There are several regulatory agencies that have oversight and set standards for commuter rail systems, including the FTA and Federal Railroad Administration (FRA). In addition, individual state transit authorities and agencies may have additional standards that need to be followed. Commuter rail systems should adhere to standards set by industry groups to ensure interoperability between the commuter rail, intercity carriers, and freight networks. Many railroad trackways are owned by private Class 1 railroads who also have their own regulations that a commuter rail system will need to adhere too. These regulations, specified in operating agreements, often give freight rail preferential passage even during the peak travel periods, for example.

Government regulations establish standards that dictate how commuter rail systems can operate and ensure that all commuter rail systems operate in a uniform manner. Some of the standards determine how fast commuter rail trains can operate based on the condition of the track, the minimum headway that is allowed between trains, and the level of pollutants that can be emitted by train locomotives.

Commuter Rail Feasibility & Implementation Analysis

Similar to the implementation of commuter rail corridors elsewhere in the United States, the Project Team focused on existing freight rail corridors and conducted a high-level Feasibility and Implementation Analysis for potential new commuter rail service within the CONNECT Beyond study area. The Project Team reviewed all previous relevant commuter rail and pertinent freight rail studies prepared for any of the regional corridors, and documented the available information for the following corridor elements:

- Identification of owner/operator
- Track type and track class/speeds
- Train frequency – daily, temporal distribution, train type and commodities carried (if freight)

Information on train frequencies and operating schedules past, present, and future was unavailable; however, information on the average daily volume of trains operating along

specific freight lines, including those considered for commuter rail service is available as part of the statewide freight or railroad plans for North and South Carolina.

A map of the proposed Commuter Rail Corridors is provided in Figure 17.

Commuter Rail differences between Light Rail and Intercity Rail

While each form of rail-based mass transportation has comparable features and attributes, commuter-based services like commuter rail have very different components that distinguish the service from other modes. Here's a quick look at some of these differences.

How is Commuter Rail different from Light Rail?

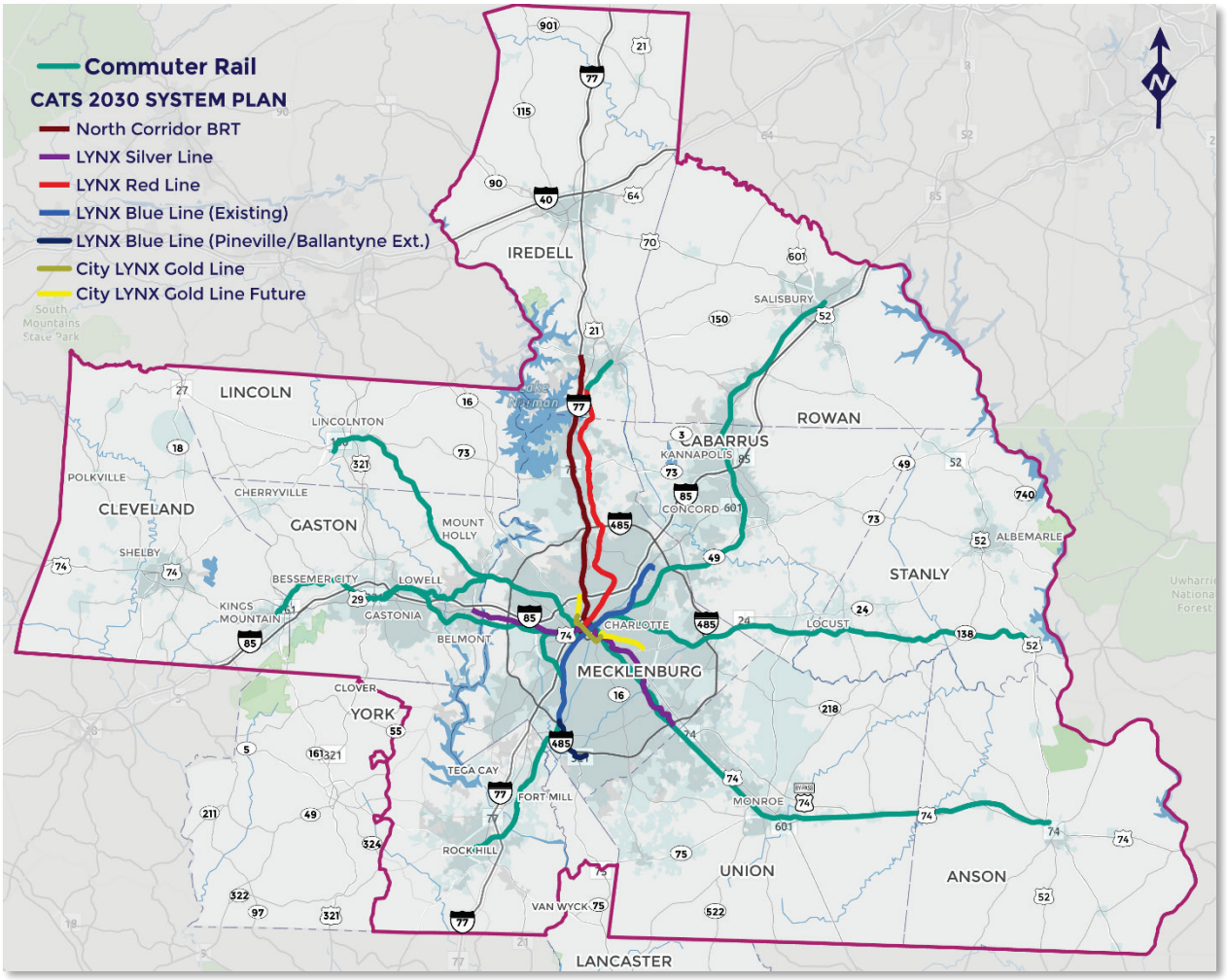
Light rail systems are urban corridor rail services that typically operate for 18 to 20 hours each weekday and on weekends, providing service to stations every 10 to 15 minutes. They require new trackways to be constructed, along with stations spaced at one-half to one-mile apart, in effort to balance travel times and accessibility. Light rail is an ideal solution for urban corridors where buses cannot move the volume of passengers within the corridor quickly enough, particularly in corridors with several closely-spaced major destinations.

Commuter rail is a regional-based railway network that typically uses existing freight rail lines, providing service generally during peak travel periods only. The frequency of service is generally between 30 and 45 minutes between trains, with between 5 and 7 trips made during the service periods (bi-directionally). Stations are spaced miles apart from one another, typically in the downtowns or at park-and-ride locations, and typically operates only during the weekdays with special event service on weekends.

How is Commuter Rail different from Intercity Passenger Rail?

There are many similarities between commuter rail and intercity passenger rail (e.g., Amtrak). Both services have locomotive engines as their lead car, travel in multiple train car consists (passenger cars linked together), and both connect multiple municipalities along the rail line. The most notable differences between commuter rail and intercity passenger rail are that commuter rail systems only serve a defined metropolitan area, like the CONNECT Beyond study area, while intercity passenger rail systems link major metropolitan regions and provide service to some mid-size communities along their route (e.g., Washington D.C. – Greensboro – Charlotte – Atlanta – New Orleans, with stops in Salisbury, Kannapolis, Gastonia). Also, intercity passenger rail operates fewer trips during a day, and service is not always convenient for commuting purposes or typical timeframes.

FIGURE 17. PROPOSED COMMUTER RAIL CORRIDORS



Existing Conditions

Owners and Operators

Ownership and freight rail operations on the trackways identified as candidate Commuter Rail Corridors includes a mixture of different commercial and quasi-public entities. A map of existing rail lines, owners and operators is available online from the North Carolina Department of Transportation and the South Carolina Department of Transportation's Statewide Rail Plan.

Considered clockwise and starting from the north, the candidate Commuter Rail Corridors are owned and operated by the following entities:

- LYNX Red Line Extension Corridor: This Corridor, identified currently as the potential LYNX Red Line Extension Corridor, is owned and operated by Norfolk Southern. This Corridor would be an extension of the LYNX Red Line Corridor, which extends north from Uptown Charlotte to Mount Mourne in southern Iredell County. This LYNX Red Line Extension Corridor would potentially extend the LYNX Red Line Corridor from Mount Mourne to downtown Mooresville. This corridor receives light usage during typical weekdays, and a portion of the corridor is considered Excepted Track that is not suitable by FRA standards for passenger rail service.
- Piedmont Corridor: The Piedmont Corridor connects Raleigh and Charlotte and could be the potential future home of a commuter rail line between Uptown Charlotte and Salisbury. This Corridor is owned by the North Carolina Railroad (NCRR), who lease the trackway to both Norfolk Southern and Amtrak through trackage agreements. This corridor would serve communities such as Salisbury, Kannapolis, Concord, and areas of northeast Charlotte. This corridor would terminate in Uptown Charlotte.
- AC&W Corridor: Running almost directly east of Uptown Charlotte is the Aberdeen, Carolina and Western (AC&W) Railroad line, which generally parallels Highway 24/27 but drops south of Albemarle and terminates near Norwood, NC, which is near the eastern border of the CONNECT Beyond study area. Possible stops could include Midland, Stanfield, Oakboro, and Aquadale.
- CSX Queen City Express Corridor: Running southeast of Charlotte is the Queen City Express line, which connects Charlotte and Wilmington and is owned and operated by CSX Transportation. Along this candidate Commuter Rail Corridor, freight rail operations are generally heaviest between Wadesboro and Monroe, where the trackway splits to serve Charlotte or Rock Hill. Possible stops could include Wadesboro, Polkton, Wingate/Marshville, Monroe, and Matthews/Stallings or Indian Trail.
- Norfolk Southern Charlotte-Rock Hill Corridor: Norfolk Southern owns and operates the trackway between Charlotte and Rock Hill paralleling I-77. This line receives a sizeable volume of freight train traffic daily. Potential stops could include portions of south Charlotte, Pineville/Carowinds, Fort Mill, and Rock Hill.
- Norfolk Southern Charlotte-Kings Mountain Corridor: To the west, the Charlotte-Kings Mountain Corridor is owned and operated by Norfolk Southern. This is defined as the CSX A-Line, their major North-South freight corridor. Similar to other Norfolk Southern lines serving the Charlotte region, this line receives a steady, high volume of freight rail traffic daily. This line would serve Kings Mountain, Bessemer City, Gastonia, Lowell,

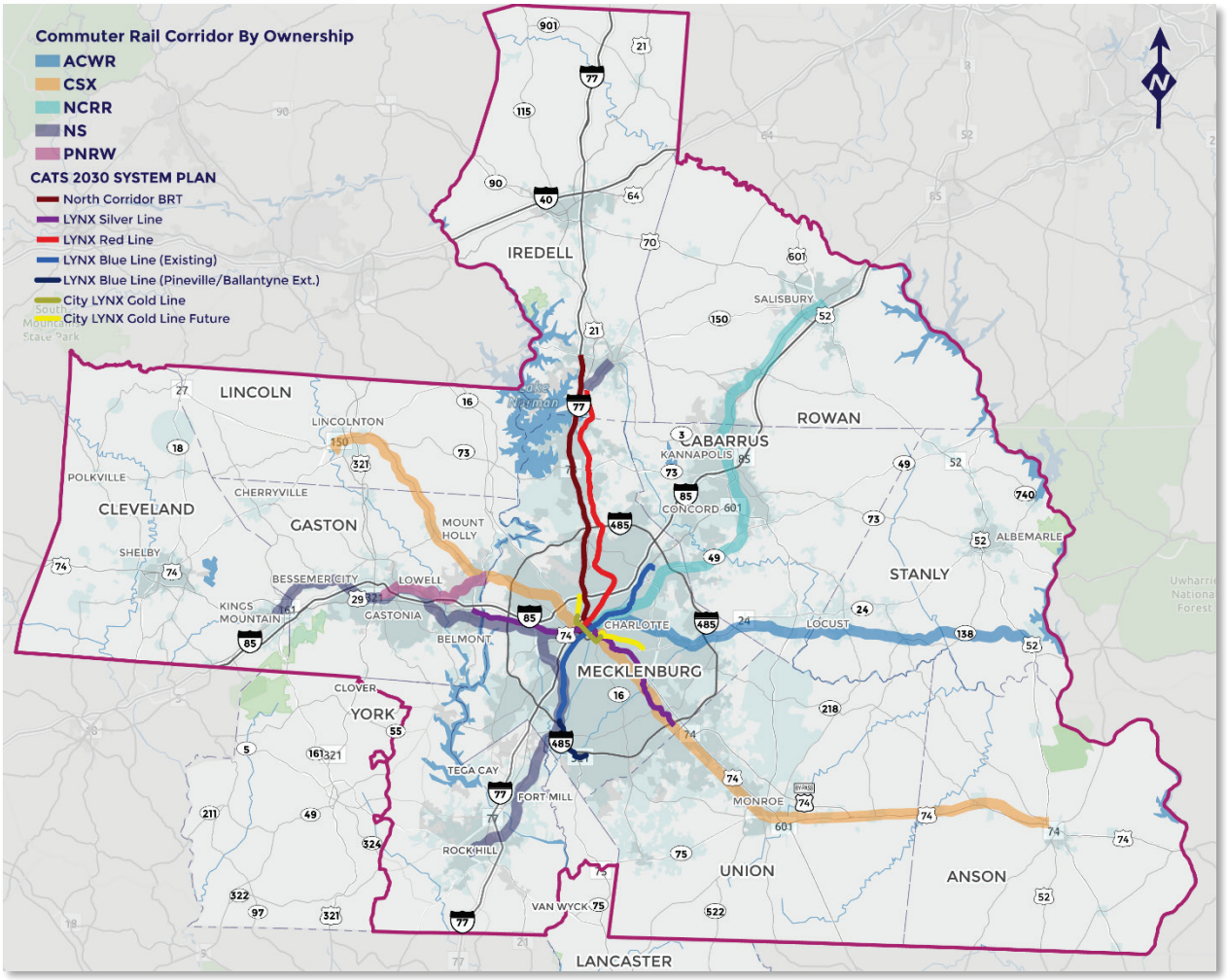
McAdenville, Belmont, and could include a possible stop near the Charlotte-Douglas International Airport.

    - The Project Team considered the Piedmont and Northern Railway (P&N) trackway between Mount Holly and Gastonia as a means of abating any potential interference between freight and passenger rail operations. This short line segment of trackway is currently leased by Norfolk Southern for rail operations.

- CSX Charlotte-Lincolnton Corridor: This railway line between Charlotte and Lincolnton is owned and operated by CSX. This line receives a modest volume of daily freight train traffic. Potential stops could include Mount Holly, Stanley, and Lincolnton.

A map illustrating the proposed Commuter Rail Corridors and the current trackway ownership structure is shown below in Figure 18.

FIGURE 18. PROPOSED COMMUTER RAIL CORRIDORS AND RAIL OWNERS AND OPERATORS



Track Type, Track Class/Speeds, and Train Frequencies

Track classifications, quality, and speeds are overseen by the Federal Railroad Administration (FRA) who first began overseeing trackway standards following passage of the Railroad Safety Act of 1970. As part of its responsibilities, Federal Railroad Administration categorizes trackways in 10 classes, segregated by maximum speed limits. Table 14 outlines the Federal Railroad Administration's track classifications and maximum speeds.

TABLE 14. FEDERAL RAILROAD ADMINISTRATION TRACK CLASSIFICATIONS AND SPEEDS

Track Classification	Freight Speed (mph)	Passenger Speed (mph)	US Code Section
Excepted Track	10	Not Allowed	49 CFR § 213.4
Class 1 Track	10	15	49 CFR § 213.9
Class 2 Track	25	30	49 CFR § 213.9
Class 3 Track	40	60	49 CFR § 213.9
Class 4 Track	60	80	49 CFR § 213.9
Class 5 Track	80	90	49 CFR § 213.9
Class 6 Track	110	110	49 CFR § 213.307
Class 7 Track	125	125	49 CFR § 213.307
Class 8 Track	160	160	49 CFR § 213.307
Class 9 Track	200	200	49 CFR § 213.307

Source: Federal Railroad Administration, 2020

In the study area, most trackways are classified in Classes 2 through 4, with one section of trackway identified as Excepted Track. Naturally, it is advantageous for commuter rail to operate at the highest speeds possible to be travel time competitive with automobiles. Track upgrades are often necessary for commuter rail operations on freight rail trackways to maximize speeds. Table 15 provides a summary of the candidate Commuter Rail Corridors and their current track classifications, and current volume of daily freight trains using the corridor.

TABLE 15. TRACK OWNERSHIP, CLASSIFICATION, AND TRAIN FREQUENCIES BY COMMUTER RAIL CORRIDOR

Corridor	Linkage Location	Owner	Track Classification	Train Frequencies (Average Daily Freight Trips)
LYNX Red Line Extension Corridor	Mount Mourne to Mooresville	Norfolk Southern	Excepted Track	0[2]
Piedmont Corridor	Charlotte to Salisbury	North Carolina Railroad	Class 4	>21 Trips per Day
AC&W Corridor	Charlotte to Norwood	Aberdeen, Carolina and Western Railroad	Class 2	1-5 Trips per Day
CSX Queen City Express Corridor	Charlotte to Wadesboro	CSX	Class 4	>21 Wadesboro to Monroe, 11-20 Monroe to Charlotte
Norfolk Southern Charlotte-Rock Hill Corridor	Charlotte to Rock Hill[1]	Norfolk Southern	Class 4	>21 Trips per Day

Corridor	Linkage Location	Owner	Track Classification	Train Frequencies (Average Daily Freight Trips)
Norfolk Southern Charlotte-Kings Mountain Corridor	Charlotte to Kings Mountain	Norfolk Southern	Class 4	>21 Trips per Day
Piedmont and Northern Railway Corridor	Charlotte to Kings Mountain via Mt. Holly	Piedmont and Northern Railway	Class 3	>21 Trips per Day
CSX Charlotte-Lincolnton Corridor	Charlotte to Lincolnton	CSX	Class 2	6-10 Trips per Day

Source: North Carolina Department of Transportation, 2016 and 2019 online maps

[1] The same track standards and ownership apply in South Carolina.

[2] Trackway mostly used for train storage.

Implementing a Commuter Rail Network

Today, the Charlotte region's experience with passenger rail service outside of LRT comes from the North Carolina Railroad and Amtrak passenger rail service. While loosely comparable to commuter rail service, intercity passenger rail service often has fewer stops by design and makes fewer daily trips, making it difficult to accurately assess commuter rail potential in the CONNECT Beyond study area.

Commuter rail service in the Charlotte metropolitan region would be implemented as a network of several corridors, providing service across the region so that someone starting a trip in Kings Mountain would be capable of traveling to Charlotte or Concord entirely on the commuter rail system. The investment in commuter rail would need to be coordinated with other investments in the transit and transportation network, particularly local bus service to help connect passengers with commuter rail and their intended destinations, as well as Charlotte's future Gateway Station as a key terminus and transfer point. Peer region experience can provide some insight into how a service may operate locally. Table 16 provides a summary of peer regions with operating commuter rail lines that can help give context to how a similar service might operate in the Charlotte region.

TABLE 16. PEER CITY COMMUTER RAIL SYSTEMS

Commuter Rail System	Opening Year	Route Length (miles)	Trains Per Day (Weekday)	Avg. Daily Ridership (Weekday)
Trinity Railway Express (TRE) (Dallas-Ft. Worth, TX)	1996	34	72	7,700
Music City Star (Nashville-Lebanon, TN)	2006	32	12	1,200

Commuter Rail System	Opening Year	Route Length (miles)	Trains Per Day (Weekday)	Avg. Daily Ridership (Weekday)
Northstar (Minneapolis, MN)	2009	40	12	2,400
MetroRail (Austin, TX)	2010	32	36	2,700
A-Train (Denton County, TX)	2011	21	58	2,000

Like the peer regions, starting commuter rail service will most likely begin with one line. Where HCT service benefits directly from population and employment density, commuter rail service should be viewed from the vantage point of corridor congestion levels. At present, the travel sheds and markets showing the greatest increases in overall congestion levels include I-77 North and south of Uptown Charlotte, I-85 northeast of Uptown Charlotte, and Highway 74 between Monroe and Gastonia.

Start-Up of Service

The start-up of commuter rail service is often considered in three phases or levels. The three levels examined include start-up/introductory services, intermediate services, and full commuter rail operation. These levels are described in greater detail below.

1. **Start-Up/Introductory Services**

   Start-up and introductory services are generally limited peak hour; peak direction service composed of three trains inbound in the a.m. peak and three trains outbound in the p.m. peak on one or two rail lines. Special event service is also typically offered. Service times are generally based on the planned arrival time at the final destination point, such as Uptown Charlotte.

2. **Intermediate Services**

   Intermediate services are achieved when more trips are added during the peak periods, such as five trains inbound in the a.m. peak and five trains outbound in the p.m. peak. Alternatively, intermediate service could also include the addition of one or two midday or off-peak trips, or the addition of a new service operating at the introductory service level, offering patrons a new travel option. Special event service is offered normally.

3. **Full Commuter Rail Operation**

   Full commuter rail operational services reflect the full build-out of the commuter rail system. This would include multiple commuter rail lines service the region, with more

than five trains inbound in the a.m. peak and five trains outbound in the p.m. peak, plus mid-day service and possibly trips in the evening hours as well. Special event service is offered normally.

At this time the Charlotte region would be at the start-up and introductory services level.

Ownership Structure

Two ownership options are realistic in the Charlotte region for implementing commuter rail services, public ownership and negotiated lease for trackage rights. The following is additional information on ownership structure:

- Public ownership of the railroad line: This option allows the commuter rail operating agency to control operations and scheduling, likely improving operating times and schedule adherence. The negative aspect is that the agency will be responsible for all track maintenance and upgrades, increasing operating costs.
- Negotiated lease for trackage rights: This approach lowers the capital costs associated with purchasing the railroad line because only the right to operate on the tracks is being purchased, instead of the physical line. A negative aspect is that the freight rail company retains control of scheduling and operations. Freight operators will always favor their own service in terms of scheduling because it is in their best interest in terms of profitability. Agreements (which can be costly) between the agency and the freight operator are essential to ensure that scheduling impacts to commuter rail operations are minimized.

Track Improvements

Commuter rail systems must often make track improvements as a safety requirement for passenger rail service, and to also ensure the continued operation of freight within the corridor. The railroads, as owners and operators of the right-of-way, will ultimately have to coordinate the infrastructure improvements. Track improvements are based upon the condition of the existing roadbed, the planned improvements by both the freight rail owner and commuter rail operator needs, and the existing and projected level of freight and passenger traffic. Track improvements can include added sidings to allow passenger trains and freight trains to pass without delays, new tracks where required to access station locations, upgrades for rail replacement, tie replacement, and rail resurfacing and grade changes, positive train control (PTC), and signalization to improve safety, speed, and capacity.

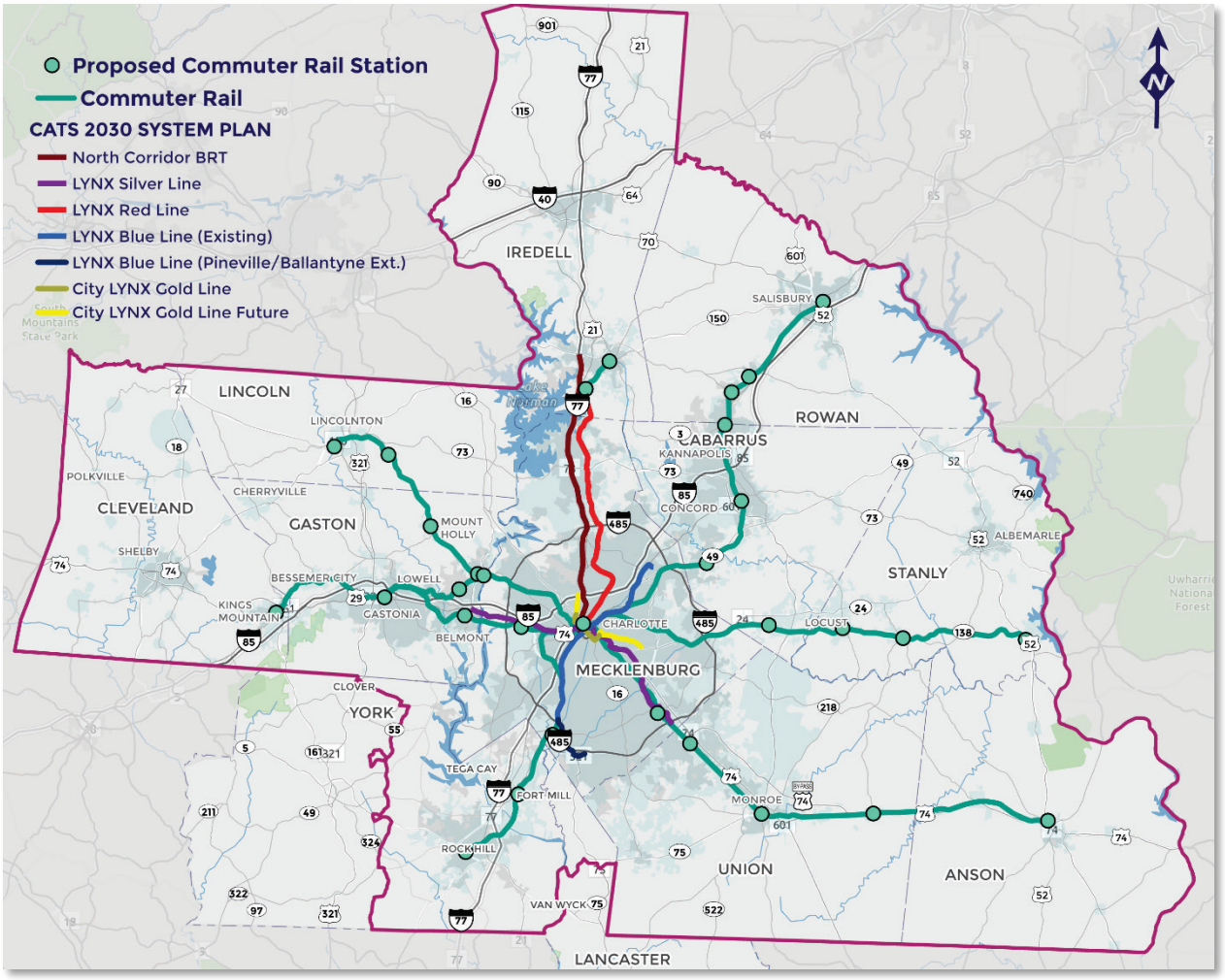
Station Area Planning

The design and location of stations will be a major factor in the success of any proposed commuter rail line. Commuter rail stations and supporting facilities provide the interface between the trains and the passengers who use the service. As such, successful commuter rail stations need to exist compatibly with the surrounding built environment. Land assembly for commuter rail facilities and transit-oriented development projects are essential prerequisites for the successful operation of a commuter rail system.

Commuter rail has the potential to boost land development near stations. The right combination of development and investment near stations can result in increased ridership. The allocation of growth around commuter rail stations is a way to capitalize on public investments in rail transit and help produce a number of local and regional benefits. Examples in the Utah Transit Authority's Provo/Ogden service, and San Bernardino's Redlands Passenger Rail (Arrow) Transit Villages plan.

Figure 19 illustrates the commuter rail corridors and proposed station locations. The station locations were based on previously identified stations specified in past studies or plans, and in cases where plans or studies have not been conducted, the stations were generally identified with regard to the town centers or downtowns of adjacent communities. Regardless, station locations would need to be evaluated as part of individual corridor planning studies.

FIGURE 19. COMMUTER RAIL CORRIDORS AND PROPOSED STATION LOCATIONS



Conceptual Service Operating Plan

Commuter rail service planning is oriented around ridership demand forecasting, capital and operations costing, capacity modeling, and preliminary fleet sizing. For a start-up service, it is recommended that service be limited to the weekday peak travel periods, with between three (3) and five (5) peak directional trips in the morning and afternoon/early evening periods. This would allow travelers some travel flexibility in their travel schedules, helping to make the service more appealing to a broader range of potential users. Should demand warrant, additional trips could be added, such as a mid-day trip offering further flexibility.

One operational concept for start-up service that can help maintain operating costs is to stagger trip patterns. For example, a corridor between Charlotte and Kings Mountain may see

more ridership from Belmont, Lowell, and Gastonia. If five (5) peak trips are made, three trips may terminate in Gastonia, with the two (2) remaining trips extending to Kings Mountain. This service structure is not uncommon among tenured commuter rail systems nationwide.

Maintenance Base and Layover Facilities

A facility for storage of the fleet, fueling and servicing, and routine maintenance and running repair of locomotives and passenger cars will need to be determined. Commuter rail maintenance facilities are the facilities used to repair, maintain, clean, fuel, and store commuter rail vehicles that serve a commuter rail line or system. In addition, control center rail operations and maintenance-of-way (MOW) facilities are necessary and are often components of larger maintenance facilities. MOW includes facilities required to maintain the track, stations, signaling, bridges, at-grade crossings, and other fixed facilities along a given passenger rail corridor. The commuter rail maintenance facility would accommodate train operations and maintenance functions that involve daily, routine activities that are of short duration. Locating the maintenance facility on-line precludes the need to constantly move vehicles to and from an off-line facility for basic inspection and vehicle maintenance.

While more intensive fleet maintenance activities could be performed externally though contractual agreements, with the region's freight railroads, with manufacturers of vehicles or components, or with companies providing railroad support services, it is wise to consider the construction of a heavy maintenance facility with the first line to enter operation.

End-of-line layover facilities will also be necessary at the outer limits of each corridor to store trains over night for initial morning dispatch. Even when a train storage and maintenance facility is provided on-line, layover facilities need to also be provided at the ends of the corridor. This allows equal service to be operated in both directions much sooner than if all the trains had to start or end from one end of a corridor (i.e., reduces operations costs due to the required non-revenue trips from maintenance facility to end of line station). These facilities often include secure storage tracks or vehicle barns, vehicle washing and light maintenance facilities, and space for housekeeping supplies. The yard should be equipped with train electrical hotel receptacles and compressed air systems. Depending on the fare collection strategy, it may be necessary to include a secure cash room in the design of the facility. The layover facility should be located near the terminal station, or stations, at the end of the line to minimize the travel distance between the station and the layover facility.

Integration with other Transit Modes

Commuter system productivity is often better when connections with other transit modes are maximized. The strongest station areas typically are characterized by high levels of connectivity with bus and light rail systems as well as activity/employment centers. The approach to station planning in this study was generalized, in that large areas were identified as targets to site a commuter rail station. Further study will be required to plan for the functionality of these areas as regional transit centers that would serve key destinations and maximize intermodal connections that strengthen the overall productivity of the transit system.

The proposed commuter rail system outlined herein would use the existing freight rail lines, and all lines would pass through Uptown Charlotte's future Gateway Station (presumed to be a terminus stop for each corridor). The existing Blue Line and future Silver Line LRT lines, along with other HCT corridors and a strong fixed-route bus network would help establishing connections between a final commuter rail destination in Uptown Charlotte with other parts of the city and region. Connections to HCT services or with local bus networks in Gastonia, Concord, Statesville, and Rock Hill extend the reach and appeal of commuter rail service.

Along specific commuter rail lines outside of Uptown Charlotte, the travel market information suggests that stations in the downtowns of Belmont, Gastonia, Huntersville, Cornelius, Davidson, Concord, Kannapolis, and Rock Hill have sufficient connections to local fixed-route bus services, and opportunity also exists for non-motorized travel modes to connect with stations.

Commuter Rail Corridor Assessments and Discussion

Creation of a commuter rail network serving the greater Charlotte metropolitan region is very feasible. The opportunity exists in locations to expand rights of way to the existing freight rail lines exclusively for commuter rail trains and stations or to negotiate agreements with the railroads for the use of existing trackways. Commuter rail service would be new transportation mode for the region, with lines focused on long-distance commuter trips that occur during the peak morning and evening travel times when traffic congestion is worst.

During the Feasibility and Implementation Analysis, the Project Team found that each of the seven candidate commuter rail corridors are technically feasible and would provide access to Uptown Charlotte from points across the region. Corridors with more immediate ridership potential include the LYNX Red Line Extension Corridor, the Piedmont Corridor, the NS Charlotte-Rock Hill Corridor, and the NS Charlotte-Kings Mountain Corridor. Following the Feasibility and Implementation Analysis, the Project Team advanced these four corridors as Initial Commuter Rail Corridors. The CSX Queen City Express Corridor connecting Monroe, Wingate, and Wadesboro shows future potential as Union County grows, but the addition of HCT modes may better serve the county's growth areas better in the immediate future. Finally, the CSX Charlotte-Lincolnton Corridor connecting Charlotte to Lincolnton and the AC&W Corridor connecting Charlotte and Norwood should remain on the list as long-term future commuter rail corridors but show less immediate ridership potential. Following the Feasibility and Implementation Analysis, the Project Team advanced these three corridors as Long-Term Commuter Rail Corridors.

FIGURE 20. MORNING COMMUTERS ON SOUND TRANSIT'S SOUNDER COMMUTER RAIL

Source: MyNorthwest.com

A summary of key findings for each corridor has been created that identified strengths and opportunities, along with potential constraints to consider. The assessments are presented below.

CONNECT Beyond
A Regional Mobility Initiative

Initial Commuter Rail Corridors

Following the Feasibility and Implementation Analysis, the Project Team advanced the following four corridors as Initial Commuter Rail Corridors.

Commuter Rail Corridor A

LYNX Red Line Extension Corridor

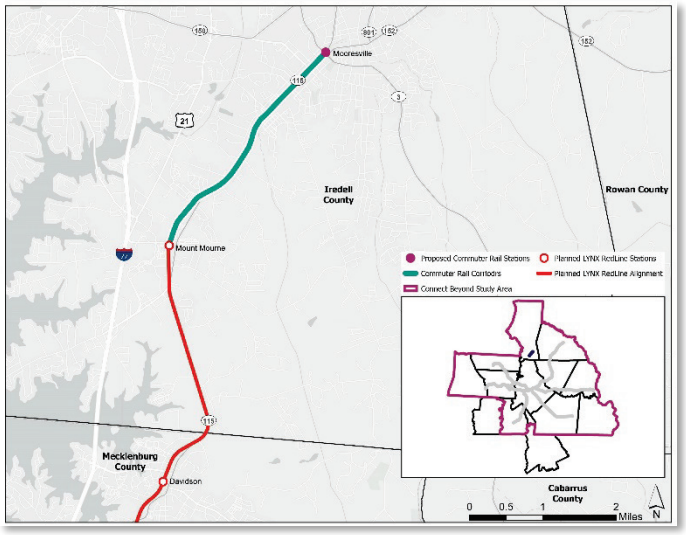
Linkage Locations: Mount Mourne to Mooresville

Strengths and Opportunities

- Provides critically-needed commuter service to north Mecklenburg County and portions of Iredell County within the I-77 commuter corridor.
- Corridor may be straightforward to implement:
  - Existing trackway and ROW
  - Trackway may need upgrades, but less costly than a new track.
- Community and local leadership support for this Corridor.

Constraints

- Portions of the existing trackway north of Cornelius needs investment and rehabilitation.
- Coordination and agreements required with Norfolk Southern.
- Extension to Downtown Mooresville would require new trackway construction.



Commuter Rail Corridor B

Piedmont Corridor

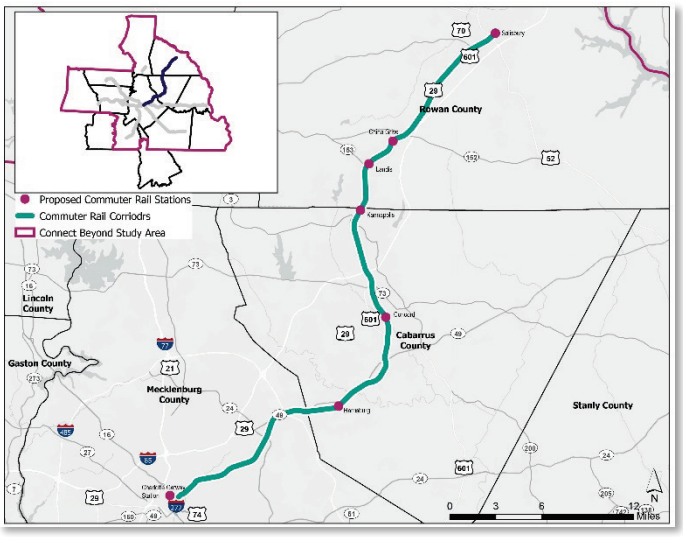
Linkage Locations: Charlotte to Salisbury

Strengths and Opportunities

- Strong commuter service potential linking Cabarrus and Rowan Counties with Charlotte.
- Corridor may be straightforward to implement:
  - Existing trackway and ROW served by intercity passenger rail already.
  - Requires grades, but less costly to implement than new track.
- Community and local leadership support for this Corridor.

Constraints

- Coordination and agreements required with North Carolina Railroad.
- Requires schedule coordination with intercity passenger rail service and freight rail.



Commuter Rail Corridor C

Norfolk Southern Charlotte-Rock Hill Corridor

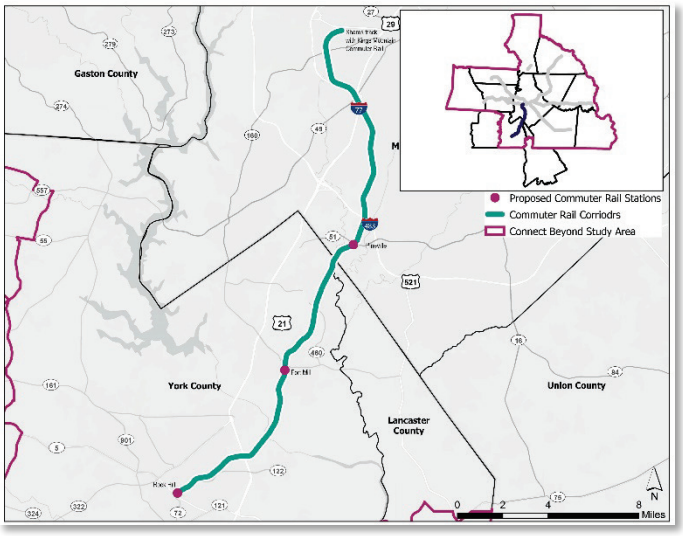
Linkage Locations: Charlotte to Rock Hill

Strengths and Opportunities

- Corridor may be straightforward to implement:
  - Existing trackway and ROW
- Could provide expedient connections within a rapidly growing travel shed that experiences large volumes of daily commuting traffic.

Constraints

- Coordination and agreements required with Norfolk Southern.
- Requires schedule coordination with freight rail service.



Commuter Rail Corridor D

Norfolk Southern Charlotte-Kings Mountain Corridor

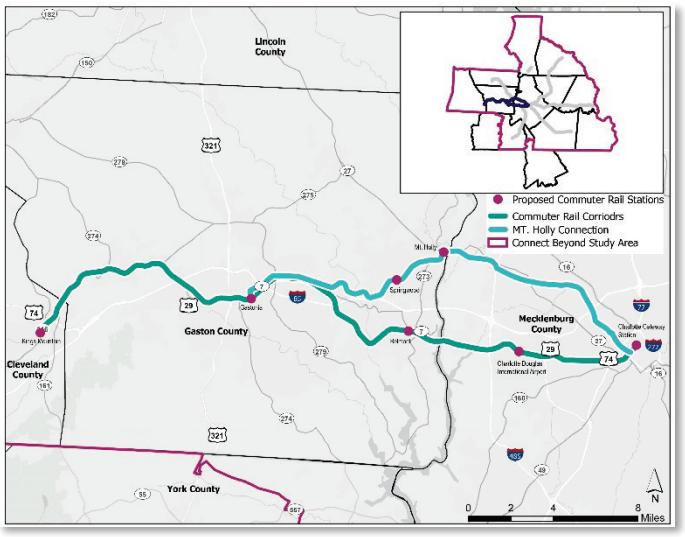
Linkage Locations: Charlotte to Kings Mountain

Strengths and Opportunities

- Corridor may be straightforward to implement:
  - Existing trackway and ROW.
- Could provide expedient connections within a rapidly growing travel shed that experiences large volumes of daily commuting traffic.

Constraints

- Coordination and agreements required with Norfolk Southern.
- Requires schedule coordination with freight rail service.



The assessment of potential commuter rail corridors also considered general implementation aspects of each corridor: sufficient potential ridership, existing conditions of the trackway, and general construction or retrofit needs to meet FRA track safety requirements for passenger rail service. The general assessment of operability suggests that most candidate commuter rail corridors in the Charlotte metropolitan region can be built and operated without impeding the operations of the Class I railroads. Potential ridership along the LYNX Red Line Extension Corridor, the Piedmont Corridor, and the NS Charlotte-Rock Hill Corridor could be adequate to justify investments being made. The NS Charlotte-Kings Mountain Corridor showed more modest ridership in previous study, however as the travel shed along I-85 continues to grow, this corridor warrants further consideration of commuter rail services given the availability of existing infrastructure and relative ease of implementation.

Long-Term Commuter Rail Corridors

Following the Feasibility and Implementation Analysis, the Project Team advanced three corridors as Long-Term Commuter Rail Corridors.

The CSX Queen City Express Corridor shows initial promise as a potential commuter rail corridor. With Union County rapidly growing, the Highway 74 corridor between Charlotte and Monroe/Wingate is expected to see further growth and development, increasing the number of trips in the corridor. Additional planning analysis should be considered in the future for this Corridor.

Commuter Rail Corridor E

CSX Queen City Express Corridor

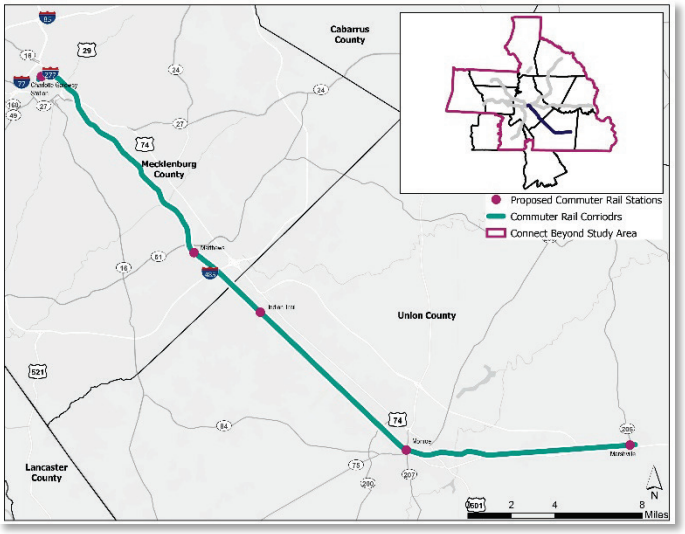
Linkage Locations: Charlotte to Wadesboro

Strengths and Opportunities

- Corridor may be straightforward to implement:
  - Existing trackway and right of way.
- Could provide expedient connections between growing southeast suburbs and ex-urban centers.

Constraints

- Coordination and agreements required with CSX Railroad.
- Requires schedule coordination with freight rail service.
- Likely lower ridership volumes outside of Mecklenburg County and unincorporated Union County.



Corridors that show less immediate promise but should remain for consideration include the AC&W Corridor between Charlotte and Norwood, as well as the CSX Charlotte-Lincolnton Corridor that links Charlotte and Lincolnton. The surrounding population densities and daily trip volumes at present and forecast into the future suggest that these two corridors are unlikely to see ridership levels to justify the expenditure on commuter rail service. The communities are likely better served by a combination of local fixed-route and HCT services.

Commuter Rail Corridor F

Aberdeen, Carolina and Western (AC&W) Corridor

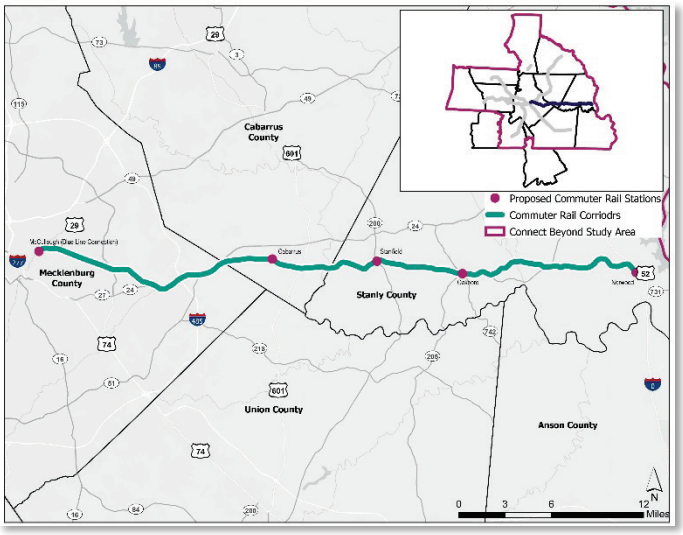
Linkage Locations: Charlotte to Norwood

Strengths and Opportunities

- Corridor can be implemented:
  - Existing trackway and ROW.
- Could provide expedient connections to northeast.

Constraints

- Coordination and agreements required with AC&W Railroad.
- Requires schedule coordination with freight rail.
- Lightly populated communities along this Corridor limits ridership potential for the cost of implementation and operation.
- Conditions of trackway unknown, likely expensive to upgrade for passenger rail service.



Commuter Rail Corridor G

CSX Charlotte-Lincolnton Corridor

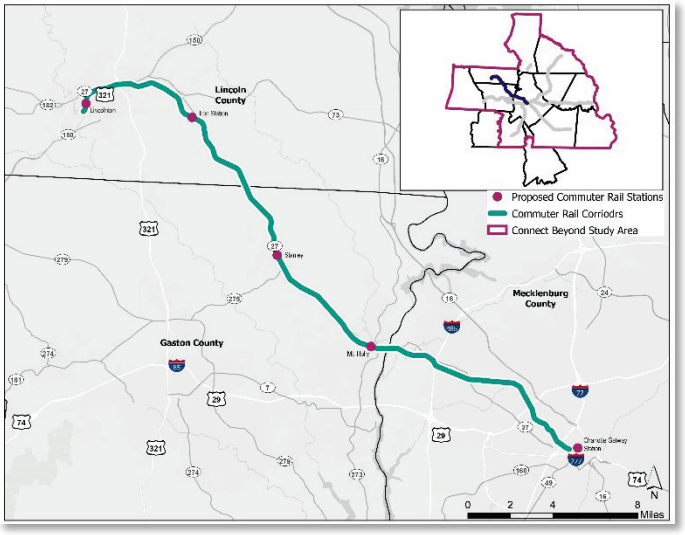
Linkage Locations: Charlotte to Lincolnton

Strengths and Opportunities

- Corridor can be implemented:
  - Existing trackway and ROW.
- Could provide expedient connections within a rapidly growing travel shed with large volumes of daily commuting traffic.

Constraints

- Coordination and agreements required with CSX Railroad.
- Requires schedule coordination with freight rail.
- Lightly populated communities along this Corridor limits ridership potential for the cost of implementation and operation.
- Conditions of trackway unknown, likely expensive to upgrade for passenger rail service.



Advancing the Region's Commuter Rail Program

The next steps necessary to advance regional commuter rail planning will require a series of additional tasks that refine the accuracy of the commuter rail corridor alignments, determine location of stations and maintenance facilities, and estimate costs (both capital and operating). Presented below are the recommendations regarding the feasibility of the commuter rail operation followed by a discussion of next steps to pursue in system implementation.

Planning

It is advantageous to continue considering commuter rail services as part of the transportation network. Looking at the corridors identified, commuter rail service may be most productive with lines serving Salisbury, Kannapolis, and Concord, coupled with service to Rock Hill, Fort Mill, and Pineville, as well as Huntersville, Cornelius, Davidson, and Mooresville, with a possible extension to Statesville. Commuter rail services to Monroe, Wingate/Marshville could also be considered, but those communities may be better served in the near term with bus-related services. Additional study of these corridors is recommended. Further, commuter rail service

should continue to be examined for Gaston County. An update to the Kings Mountain commuter rail study previously completed should be considered in future years.

Funding Strategies

A critical step in the advancement of a regional commuter rail strategy will be to establish a long-term funding and financing strategy specifically for commuter rail. To advance a commuter rail program it will be critical to define revenue streams that would be dedicated to development and on-going operation of a commuter rail system serving the region.

Coordination with Railroads

Every commuter rail system in North America operates entirely or in-part on an existing freight railroad corridor, often on existing freight railroad tracks. Further coordination with the Norfolk Southern, CSX, and ACW railroads is critical to understanding the feasibility of sharing the corridor, and defining train schedules, operational constraints, and needed capacity improvements. To enable this coordination, the following key efforts should be completed:

- Establish a key point of contact and communication protocols: Communication protocols should be established to facilitate continuing stakeholder input and awareness of efforts to further rail planning efforts.
- Investigate options in accordance with a Memorandum of Understanding (MOU): An MOU is often a starting point to address key points of negotiation such as determining right-of-way acquisition compensation, capacity improvements, and levels of service for passenger rail operating on freight railroad trackways.
- Review any state enabling legislation, particularly around liability and indemnification: It is also crucial that any arrangement of operating passenger trains on freight tracks is completely covered by adequate insurance coverage. Railroads are notoriously concerned about liability and indemnification related to safety of train operations or between trains and crossing vehicles. When considering passenger operations on a freight railroad corridor, railroad operators will insist that they are completely relieved of any responsibility or liability for accidents or other incidents that result in injuries or damages associated with passenger rail operations.

Develop a Governance Plan and Structure

When considering proposed passenger rail projects, railroad operators will look for local political support for the project, financial resources, or planned resources, to build and operate the project, and a sensible and realistic infrastructure improvement plan to accommodate the planned passenger rail operations and freight rail operations.

Conclusion and Next Steps

Throughout the course of this study, certain conclusions have emerged that can guide the next steps of transit improvements in the greater Charlotte metropolitan region. A summary of these conclusions across all modes is captured below:

- Demand for transit and greater mobility is growing in the region and this demand cannot be met with the existing transit network. Severe congestion is expected on the region's freeway network, arterial roadways, and spreading to major collectors, and will only get worse if major transit investments are not made.
- A single transit improvement alone will not meet the demand for transit in the future. A transit system, comprised of bus and rail networks in concert with other mobility options that effectively works together, will have the greatest impact on the traffic and travel congestion in the future.
- The transit investments proposed must work in concert with transit system improvements throughout the region to be effective. For example, the Silver Line will be more successful with improvements to the local bus network, coordination with other HCT corridors/modes, investments that promote greater access to surrounding neighborhoods, and connections to other mobility services, and vice-versa.
- There is a growing market for cross-regional travel that should be considered. Cross-regional HCT or enhanced bus services can be very efficient means of mobility, helping to relieve congestion by providing a reliable, expedient service that doesn't require a transfer in a congested downtown environment.
- The majority of daily trips are made to, from, and within Mecklenburg County. The largest travel markets to and from the county are to northern York County, Gaston County, southern Cabarrus County and southern Iredell County. These transit markets warrant viable transit investments to capture new transit riders. Union County is also anticipated to see transit-supportive densities and development. The densification of these areas and new development will make transit a more viable option in the future if land use policies support the transit investment.
- Implementation of major transit investments have the potential to reduce vehicle miles traveled and greenhouse gas emissions. Overall traffic congestion is reduced in the study area with the addition of travel alternatives to driving alone. While the region's freeway system may still be congested due to latent demand, the congestion on surface streets would improve as fewer trips are diverted from the freeway system.

Considered holistically as a hierarchy of service levels, the recommended HCT corridors, commuter rail corridors, and mobility corridors will all play a vital, coordinated role in helping to move the region in the future. For the mobility corridors especially, setting the stage and preparing these corridors for future service enhancements now will be essential. Planning for transit enhancements, including transit-supportive land use policies, mobility hubs, and connections to current and future HCT and commuter rail corridors will help connect communities and corridors. These actions will help achieve the Goals and Visions statements for the CONNECT Beyond project, discussed above.

While the CONNECT Beyond study has remained intentionally mode-agnostic, it is wise to acknowledge BRT as a potential mode capable of addressing some of the near- and longer-term HCT needs in the region. The Charlotte metropolitan region does not yet have experience with BRT, but experience in peer cities has shown BRT to be effective, adaptable, and rapidly deployable tool capable of increasing transit ridership by improving transit travel times and reliability. The transit market assessment showed the importance of providing transit options for the trips that are made within the study area daily. The success of CATS Envision My Ride program provides an early indication of the potential improvements that can be realized with BRT investments, but the real advantages for transit will come only with priority being given to moving people rather than cars along the identified HCT corridors.

Enhancements to the local fixed-route and regional express bus services are low-cost, high-impact and quickly deployable solutions to enhance local and regional mobility. The travel market assessment identified growing travel markets to and from Mount Holly, Fort Mill, Waxhaw, Mint Hill, Shelby, and Pineville/Ballantyne that can be tapped into with the expansion of local or express bus services to these locations in future years. Expansions could include frequency enhancements, span extensions, or the extension of existing services in the future are viable and low-cost options capable of supplementing and supporting HCT service investments. Bus service also has the flexible advantage, capable of being modified as demand grows or changes, and new services can be implemented easily and at lower costs. Additional corridor planning or operations analyses may be a good starting point to help optimize current networks and allocate any additional resources (as available) in future years to help position higher performing routes for future success. Given existing and anticipated congestion on I-77 (north and south of Uptown Charlotte), added freeway express beyond existing express bus service should be considered, as well as policies for bus-only shoulders during peak periods, and possible spot capital improvements to enhance speed and reliability.

This report is intended to serve as a resource for policymakers and staff as they advance the planning for each of the identified alternatives and the overall total mobility network vision of the region. Advancing any of the concepts discussed above will likely require the following steps:

- Working together in support of each jurisdiction's transit projects. With each of the local and regional jurisdictions having specific transit needs, it is sometimes difficult to see beyond the local view. If transit is to be successful in the region, local leaders will need to work together, think regionally, and advocate together for projects that can form the future transit network. It takes a long-term commitment and hard work to realize projects, big or small, but together these projects will greatly improve mobility across the 12-county region.
- Implementing land use plans and policies that support transit will make projects more competitive for federal, state, and regional funds. Not only do the funding criteria hinge on transit ridership, but many of the funding sources also require a direct link to density around transit stations or along transit lines. The more closely aligned the local land use plans are with transit investments and TOD opportunities, the more competitive transit investments will be for limited transit funds.
- Engaging executive level leadership at the regional and local levels to raise the profile of the HCT projects and advocate for transit. It takes more than dedicated staff and public support to implement a project. Without strong leadership from elected officials, projects do not get built. Success of these projects will hinge on having vocal champions that support their implementation.
- Creating a more detailed funding strategy and structure will be needed to secure the funding necessary to implement the proposed projects over the long-term of the CONNECT Beyond plan. Concrete funding plans will be needed, particularly for capital projects that require design and cost estimates. Opportunities for cost savings, phasing of projects, and leveraging of state and federal funds should be pursued.

CONNECT Beyond
A Regional Mobility Initiative

Appendix A
Public Engagement and Community Survey Responses

Community Survey Results Report | Fall 2020 Online Meeting

4/1/2021

Overview

CONNECT Beyond launched an online public meeting and survey seeking public input on candidate HCT Corridors that are being considered for future rapid transit in the 12-county region, including modes such as light rail, commuter rail, bus rapid transit and express bus service. The online public meeting leveraged video content, interactive mapping, dynamic project information, and built-in survey questions to engage and inform the public about the region, partners, planning process, total mobility network, and candidate corridors. The online surveys enabled community members across the 12-county region to provide input about their mobility needs and give feedback on the candidate corridors.

The CONNECT Beyond online public meeting included a public survey with six components – a general survey and five corridor surveys. The general survey asked participants a variety of questions about their demographics, past and current travel behavior, along with a variety of questions relating to regional transit planning. The five corridor surveys focused on participants' support for and opinions about the following candidate HCT Corridors: Anson, Stanly & Eastern Union Counties; Cabarrus & Rowan Counties; Eastern York & Northern Lancaster Counties; Gaston, Cleveland & Lincoln Counties; and Mecklenburg, Iredell & Union Counties.

Outreach and Scheduling

The online public meeting and surveys were hosted from November 17–December 31, 2020 on a specific meeting webpage (connect-beyond.com/meeting). CONNECT Beyond implemented a variety of outreach tactics to promote the survey, including a joint press release from CATS and Centralina, social media posts across multiple platforms, email newsletter announcements, and grassroots campaigning through regional partners. Additionally, two Facebook® Live meetings were hosted on December 10, 2020, one in Spanish at 1:30 p.m. and one in English at 2:30 p.m. Community members were incentivized to complete the survey with a raffle for one of five $100 Visa® Gift Cards and were invited to sign up for the project newsletter at the end of the

corridor survey. The online meeting and surveys remained active and available to the public through the end of the comment period on December 31, 2020.

Connection between General Survey and Corridor Surveys

These surveys used unique session identification numbers ("unique session IDs") saved as cookies on respondent devices to connect demographic and travel behavior information provided in the general survey to the shorter corridor surveys that asked no demographic questions. However, in some cases, the security and privacy settings on a respondent's device prevented the connection of multiple surveys to a single respondent via their unique session ID. Likewise, some respondents may have completed the shorter corridor surveys without taking the more detailed general survey, making it impossible to connect the general survey demographics with their corridor survey responses.

Calculating Survey Respondents

Unique session IDs also helped determine whether more than one survey was completed on the same device. It is possible that multiple individuals completed surveys from the same device, and therefore appear under the same unique session ID, such as a shared computer within one household. It is also possible that one individual completed the surveys multiple times. As a result, the number of surveys completed have been accurately calculated, but the number of respondents is the best approximation based on the number of unique session IDs.

For the purposes of this survey report, the duplicate unique session IDs were only counted as one "respondent" – which can be thought of as a device or household – but all the survey responses are counted and represented. Because in this approach one respondent was able to take the same survey multiple times and provide different answers each time, there are some rare cases, particularly in the corridor surveys, where the total number of responses for a question exceed the number of respondents.

Survey Questions and Results

The opportunity to take the survey was promoted through seven paid social media posts that reached 65,364 people. The CONNECT Beyond website received 1,291 new visitors from September 2020 through January 2021.

An estimated 179 respondents completed 287 surveys between 11/18/2020 and 1/11/2021.

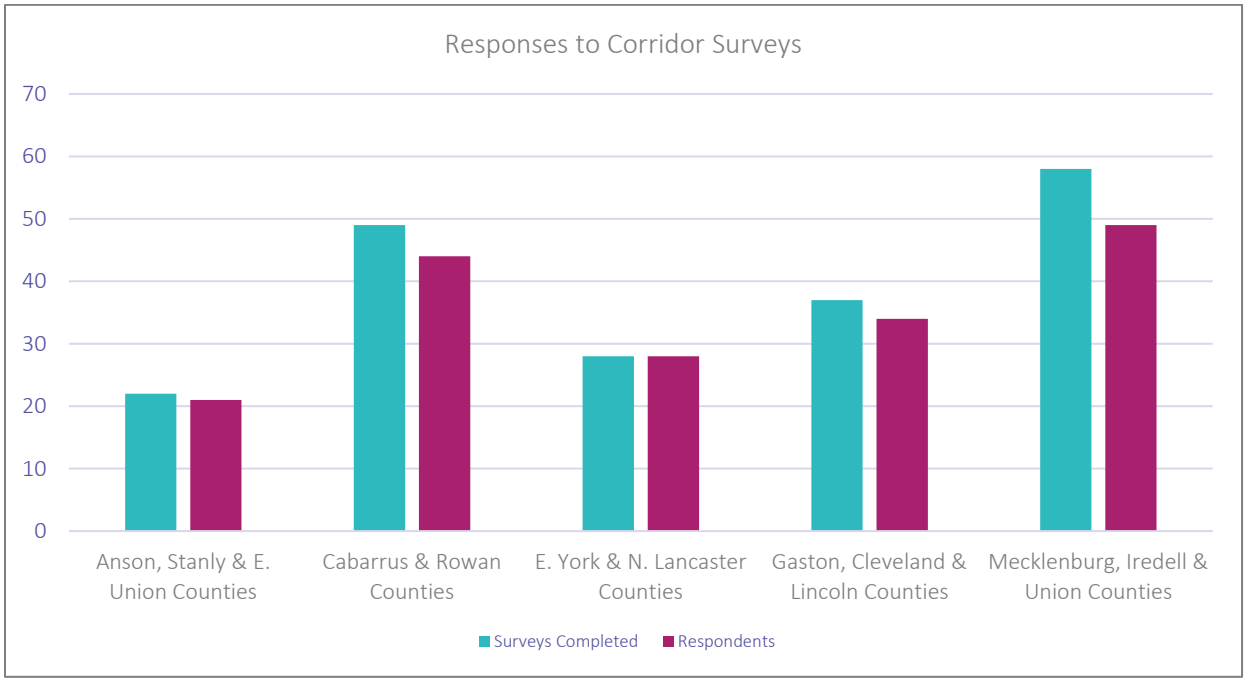
Of these, an estimated 93 respondents completed the general survey and approximately 86 respondents completed corridors surveys, where some respondents only completed the general, some only the corridor, and some completed both components. The following is a more detailed breakdown of survey responses.

Approximately 93 respondents completed 94 general surveys, 69 of whom did not also complete a corridor survey.

Approximately 110 respondents completed 194 corridor surveys, 86 of whom did not also complete the general survey:

- **Anson, Stanly & Eastern Union Counties:** 22 surveys by approximately 21 respondents;
- **Cabarrus & Rowan Counties**: 49 surveys by approximately 44 respondents;
- **Eastern York & Northern Lancaster Counties:** 28 surveys by approximately 28 respondents;
- **Gaston, Cleveland & Lincoln Counties:** 37 surveys by approximately 34 respondents;
- **Mecklenburg, Iredell & Union Counties:** 58 surveys by approximately 49 respondents.

FIGURE 21. NUMBER OF CORRIDOR SURVEYS COMPLETED AND NUMBER OF RESPONDENTS, BY CORRIDOR



Some questions allowed respondents to select more than one response, therefore the sum of responses for those questions can exceed both the number of respondents and the number of surveys completed.

General Survey Questions and Results

The survey questions were organized into three sections: public transit in your area, tell us about your current commute, and demographics.

Of a total 179 respondents, 93 (52 percent) completed the general survey; however, 86 respondents (48 percent) did not complete the general survey, so the demographic information is only representative of those respondents who provided the voluntary demographic data while completing the general survey.

Respondents were asked the following questions, which included several opportunities for respondents to provide answers to open-ended questions.

1. **Tell us where you travel most by answering the following questions:**
    - What zip code do you live in?
    - What zip code do you work in?
    - What zip code do you go to school in?
    - Are there other key destinations you travel to frequently? (e.g., medical services, entertainment, etc.) *[Please separate multiple zip codes using a comma]*

FIGURE 22. TOP 5 TRAVEL LOCATIONS BY COUNTY (DERIVED FROM ZIP CODE)

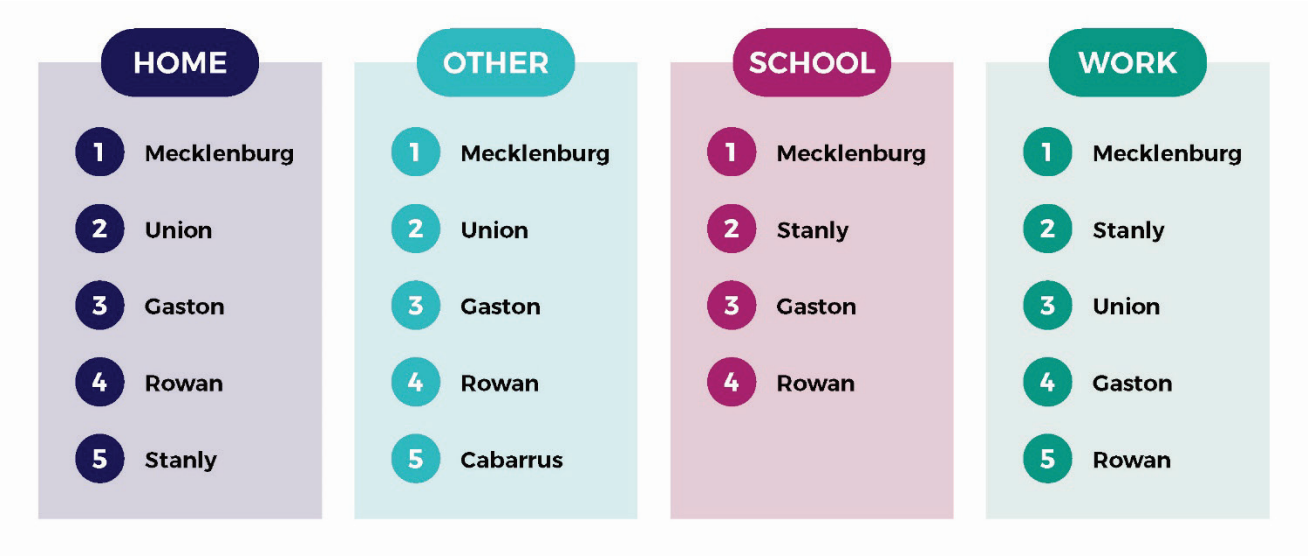
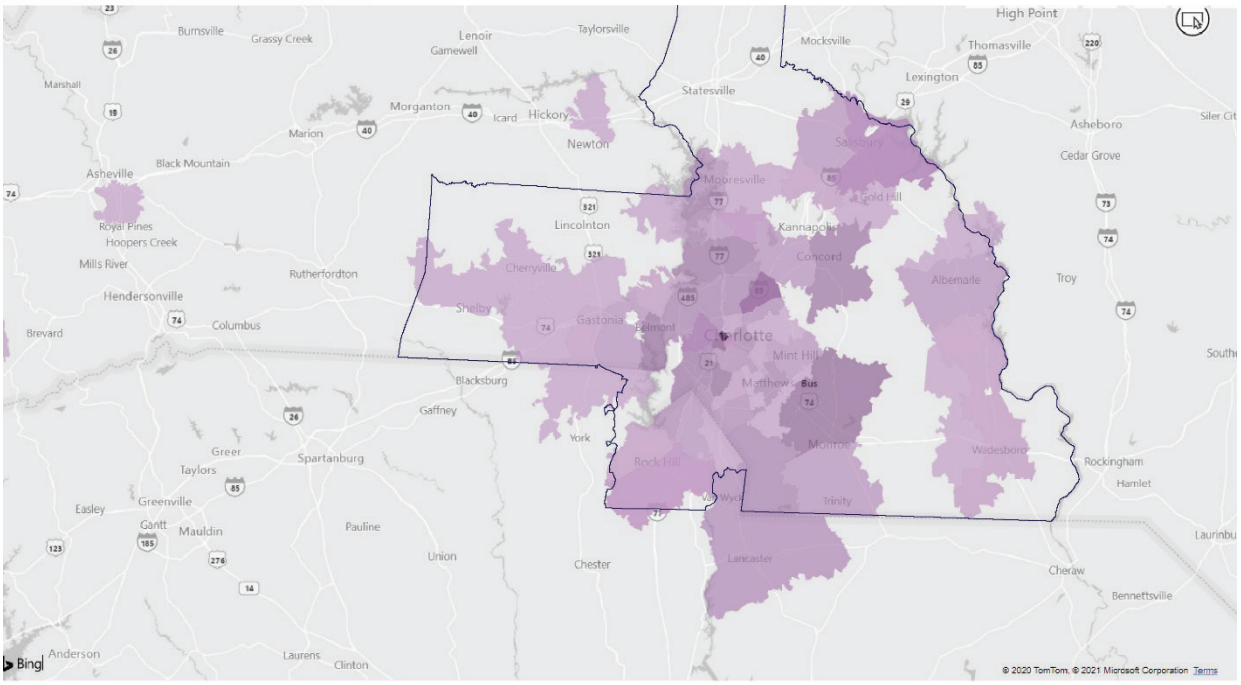


TABLE 17. RESPONDENTS' TRAVEL LOCATIONS BY COUNTY (DERIVED FROM ZIP CODE)

State/County	*Home*	*Other Destination*	*School*	*Work*
North Carolina	86.0% (146)	79.6% (132)	25.8% (54)	39.8% (168)
Anson	1.1% (1)	2.2% (2)	1.1% (1)	1.1% (1)
Buncombe	0.0% (0)	0.0% (0)	0.0% (0)	1.1% (1)
Cabarrus	4.3% (4)	5.4% (5)	1.1% (1)	2.2% (2)
Catawba	1.1% (1)	0.0% (0)	0.0% (0)	0.0% (0)
Cleveland	1.1% (1)	1.1% (1)	0.0% (0)	1.1% (2)
Cumberland	0.0% (0)	0.0% (0)	0.0% (0)	1.1% (1)
Gaston	12.9% (13)	9.7% (10)	3.2% (4)	3.2% (5)
Guilford	0.0% (0)	0.0% (0)	0.0% (0)	1.1% (1)
Iredell	2.2% (2)	2.2% (2)	1.1% (1)	2.2% (2)
Lincoln	1.1% (1)	0.0% (0)	0.0% (0)	0.0% (0)
Mecklenburg	36.6% (85)	39.8% (83)	14.0% (38)	32.3% (124)
Randolph	0.0% (0)	1.1% (1)	0.0% (0)	0.0% (0)
Rowan	8.6% (12)	6.5% (10)	3.2% (3)	1.1% (3)
Stanly	3.2% (7)	1.1% (5)	1.1% (5)	2.2% (16)
Transylvania	0.0% (0)	0.0% (0)	0.0% (0)	1.1% (1)
Union	14.0% (19)	10.8% (13)	1.1% (1)	6.5% (8)
Watauga	0.0% (0)	0.0% (0)	0.0% (0)	1.1% (1)
South Carolina	7.5% (8)	5.4% (12)	2.2% (3)	3.2% (6)
Lancaster	2.2% (2)	1.1% (1)	1.1% (1)	2.2% (2)
York	5.4% (6)	4.3% (11)	1.1% (2)	2.2% (4)
California	3.2% (3)	3.2% (3)	3.2% (3)	0.0% (0)
Ohio	1.1% (1)	1.1% (1)	1.1% (1)	0.0% (0)
Tennessee	0.0% (0)	0.0% (0)	1.1% (1)	0.0% (0)
Wisconsin	1.1% (1)	1.1% (1)	1.1% (1)	1.1% (1)
Unknown	1.1% (1)	4.3% (4)	10.8% (13)	18.3% (51)

*See Appendix A for complete table of responses by city/zip code.

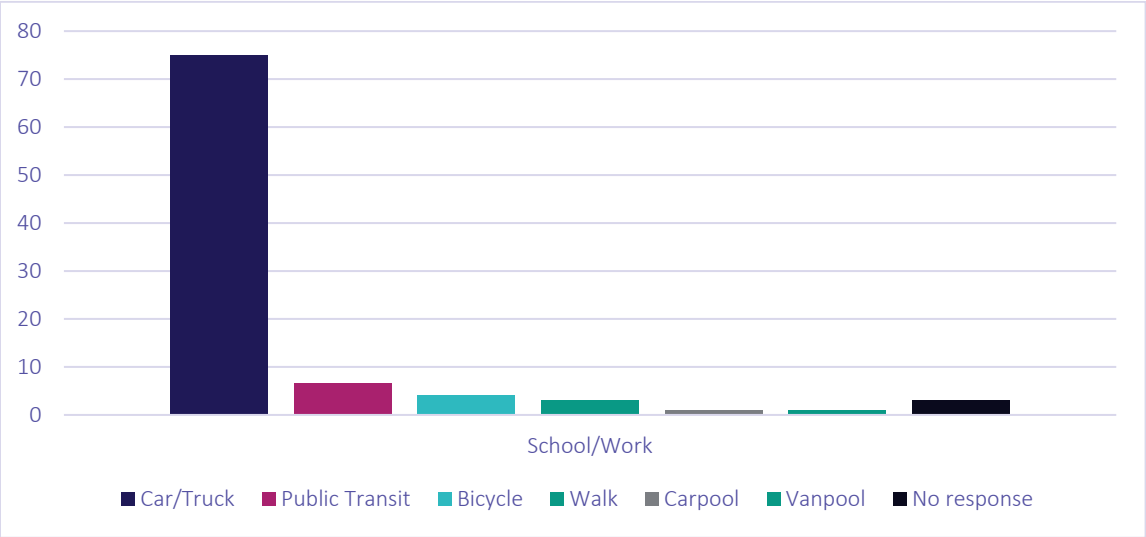
FIGURE 23 RESPONDENTS' TRAVEL LOCATIONS BY ZIP CODE



2. What is your primary method of transportation to get to work/school?

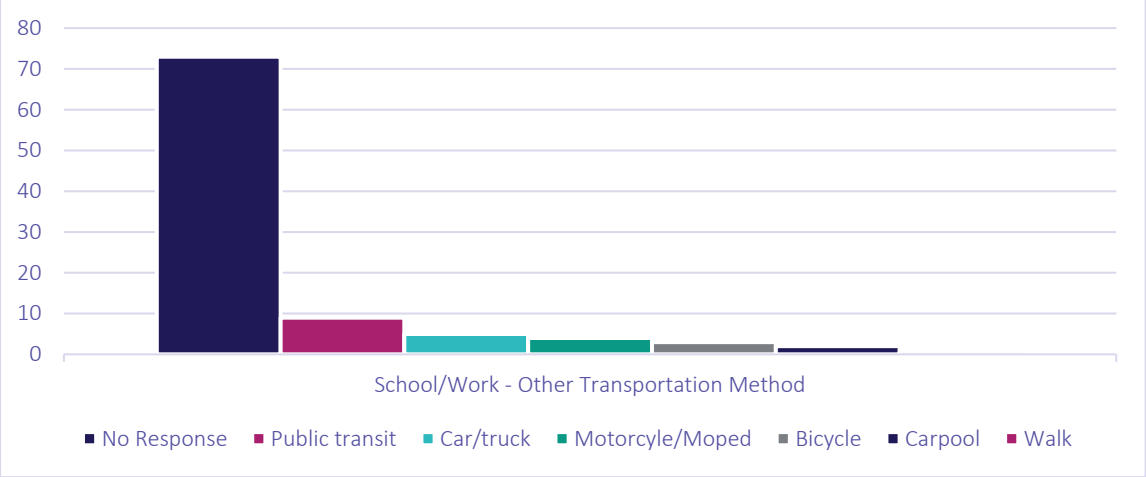
- Car/Truck - Drive Alone: 80.6% (75)
- Public transit: 6% (6.5)
- Bicycle: 4.3% (4)
- Walk: 3.2% (3)
- Carpool: 1.1% (1)
- Vanpool: 1.1% (1)
- Taxi/Ride hail (Uber, Lyft, etc.): 0.0% (0)
- Motorcycle/Moped: 0.0% (0)
- Other (please specify): 0.0% (0)
- No response: 3.2% (3)

FIGURE 24 PRIMARY METHOD OF TRANSPORTATION FOR SCHOOL/WORK



3. **Other primary transportation methods for work or school? [Please separate multiple methods using a comma]**
    - No response: 78.5% (73)
    - Public transit: 9.7% (9)
    - Car/Truck - Drive Alone: 5.4% (5)
    - Motorcycle/Moped: 4.3% (4)
    - Bicycle: 3.2% (3)
    - Carpool: 2.2% (2)
    - Walk: 1.1% (1)

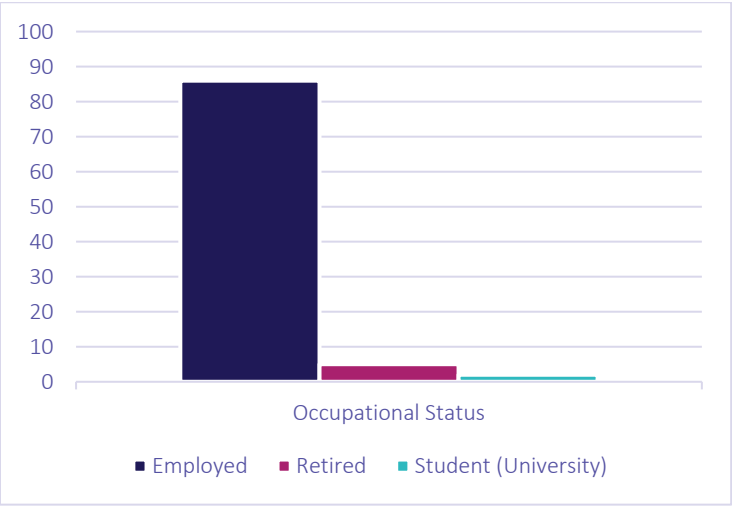
FIGURE 25 OTHER METHOD OF TRANSPORTATION FOR SCHOOL/WORK



3A. What was your occupational status in the last 12 months? [Select the one that best applies]

- Employed: 92.5% (86)
- Retired: 5.4% (5)
- Student (University): 2.2% (2)
- Student (K-12): 0.0% (0)
- Not Currently Employed: 0.0% (0)

FIGURE 26 OCCUPATIONAL STATUS IN LAST 12 MONTHS



4. **When provided with multiple transportation options (drive, public transit, walk, bike, etc.), I base my choice on:**

Respondents were instructed to "Click and drag each item to rank the following in order of importance." The numbers below represent the respondents' average rank of importance where the lower the number, the higher the rank:

- Time – My transportation choice works on my schedule: 2.0
- Reliability – My choice gets me where I need to go consistently on-time: 2.3
- Cost – My transportation choice meets my budget: 3.4
- Comfort – Physical comfort during my commute is important: 3.5
- Environmental impact – My transportation choice takes the environment into consideration: 4.4
- Physical accessibility – I have specific accessibility needs that need to be met: 5.4

5. **Understanding the long-range goals and vision of area residents is vital to the creation of a regional transit plan. When thinking about future transportation improvements across the region, tell us how important each of the following statements are to you.**

Each of the following goals had a selection of the responses: Extremely Important (1), Very Important (2), Moderately Important (3), Slightly Important (4), Not at All Important (5), or Don't Know (6). The numbers below represent the respondents' average rank of importance where the lower the number, the higher the importance:

- Create a safe and connected multi-modal network, including bikes, pedestrians, transit and cars: 1.5
- Provide connectivity and access to retain and attract employers: 1.8
- Provide options that support public health (e.g., walking, biking, trails): 1.8
- Have a positive impact on the environment (e.g., energy efficiency, lowered emissions): 2.0
- Be equitable, benefits and costs should be distributed: 2.1
- Prioritize connections within cities (e.g., access across individual cities): 2.1
- Prioritize connections between cities (e.g., crossing city, county and state lines): 2.2
- Preserve the character of existing communities: 2.7
- Implement emerging technologies (e.g., ride share, autonomous vehicles, e-scooters): 3.4

6. **I, or a member of my family, has used public transit in the past 12 months? (Yes or No)**
    - True: 55.9% (52)
    - False: 44.1% (41)

    6A. If yes, which types of public transit is your family using? Select as many that apply.
    - Light rail: 46.2% (43)
    - No transit type selected: 43.0% (40)
    - Bus: 22.6% (21)
    - Paratransit services for senior citizens and people with disabilities: 2.2% (2)
    - Van pool services: 1.1% (1)

    6B. If yes, which types of public transit would you like to see more available for our region? Select as many that apply.
    - Light rail: 49.5% (46)
    - No transit type selected: 45.2% (42)
    - Bus: 26.9% (25)
    - Paratransit services for senior citizens and people with disabilities: 18.3% (17)
    - Van pool services: 10.8% (10)

    6C. If yes, how often do you use public transit during a typical week?
    - 0 times per week: 69.9% (65)
    - 1 time per week: 14.0% (13)
    - 2-4 times per week: 11.8% (11)
    - 5 or more times per week: 4.3% (4)

7. **Which of the following are reasons that you, or your family members, do not use public transit more often? [Check all that apply.]**
    - Service is not available near my/our home: 60.2% (56)
    - Service is not offered to destinations we visit frequently: 58.1% (54)
    - It takes too long to get to destinations compared to travel by car: 45.2% (42)
    - We just prefer to drive: 28.0% (26)
    - Service is not offered at the time I need it: 25.8% (24)
    - The service is confusing to use: 11.8% (11)

- Other (please specify): 9.7% (9)
- We don't know how to use the service (need information about routes/fees/schedules): 7.5% (7)
- We had a bad experience with the service (treated poorly, arrived late, did not feel safe): 5.4% (5)
- It's too expensive: 3.2% (3)
- The bus is too crowded when I need to take it: 1.1% (1)
- No reason selected: 1.1% (1)

7A. Other reasons I don't use public transit more often

Respondents who selected "Other" to Question 7 were able to type in their answers.

8. Which of the following could we do as a region to encourage you to use a mode of transportation other than driving a personal vehicle to complete your daily trips? *[Select up to three]*

- Expanded transit service coverage: 83.9% (73)
- Provide more bicycle and/or pedestrian connections (trails, bike lanes) to transit stations/stops: 55.2% (48)
- Provide wider availability of emerging transportation options like bike sharing, ridesharing (Uber, Lyft), and electric scooters: 23.0% (20)
- Make transit service less expensive: 14.9% (13)
- Other (please specify): 9.2% (8)

8A. Other means of encouragement for using a mode of transportation other than driving?

Respondents who selected "Other" to Question 8 were able to type in their answers.

9. There are many layers to mobility. Where should the region make public investments to enhance mobility for residents and visitors?

Respondents were instructed to "Click and drag each item to rank the following in order of importance." The numbers below represent the respondents' average rank of importance where the lower the number, the higher the rank:

- Increasing access to public transit service within cities: 2.4
- Connecting public transit stations/stops between systems for ease of travel between cities: 3.0

- Pedestrian facilities (e.g., sidewalks, etc.): 4.0
- "On street" bicycle facilities (e.g., bike lanes, cycle tracks): 4.1
- "Off street" shared use paths/trails: 4.6
- Improving the physical condition of roadways: 5.0
- Improving physical condition of shared use paths and trails: 6.34
- Emerging technologies (e.g., ride share, autonomous vehicles, e-scooters): 6.6
- Other: 8.9

10. To what extent has COVID-19 affected your travel?

- Major affect: 38.7% (36)
- Moderate affect: 24.7% (23)
- Neutral: 5.4% (5)
- Minor affect: 14.0% (13)
- No affect: 11.8% (11)
- No response: 5.4% (5)

10A. Describe how COVID-19 has impacted your travel?

Respondents were able to type in their answers.

11. What, if anything, have been your experiences (good or bad) with accessing the transportation services you need or want? Please specify which service you used.

Respondents were able to type in their answers.

12. What more would you like to tell us about the transportation challenges in your community?

Respondents were able to type in their answers.

13. First & Last Name (optional)

14. Email (optional)

15. How many persons in your household, ages 16 and older, are dependent on public transit or rides from friends/relatives because they do not have access to a car or do not drive?

Respondents were able to type in their answers.

- 0 persons: 64.5% (60)
- 1 person: 9.7% (9)
- 2 people: 8.6% (8)
- 3 people: 4.3% (4)
- 4 people: 1.1% (1)
- No response: 11.8% (11)

16. What is your age?

- 17 or younger: 0.0% (0)
- 18-24: 1.1% (1)
- 24-34: 20.4% (19)
- 35-44: 32.3% (30)
- 45-54: 17.2% (16)
- 55-64: 14.0% (13)
- 65 or older: 9.7% (9)
- No response: 5.4% (5)

17. The Americans with Disability Act (ADA) defines a person with a disability as somebody who has a physical or mental impairment that substantially limits one or more major life activity. Based on this definition, are you or is someone in your household a person with a disability?

- No: 66.7% (62)
- Yes: 9.7% (9)
- Prefer not to answer: 2.2% (2)
- No response: 21.5% (20)

18. Which of the following best describes your race? [Check all that apply.]

- White/Caucasian: 78.5% (73)
- African American/Black: 8.6% (8)
- Prefer not to disclose: 7.5% (7)
- Asian/Pacific Islander: 2.2% (2)
- Other (please specify): 2.2% (2)
- American Indian: 1.1% (1)

- No response: 6.5% (6)

18A. Other specified race?

Respondents were able to type in their answers.

19. What is your gender identity?

- Male: 52.7% (49)
- Female: 37.6% (35)
- Transgender: 0.0% (0)
- Do not identify as male, female, or transgender: 0.0% (0)
- Prefer not to disclose: 4.2% (4)
- No response: 5.4% (5)

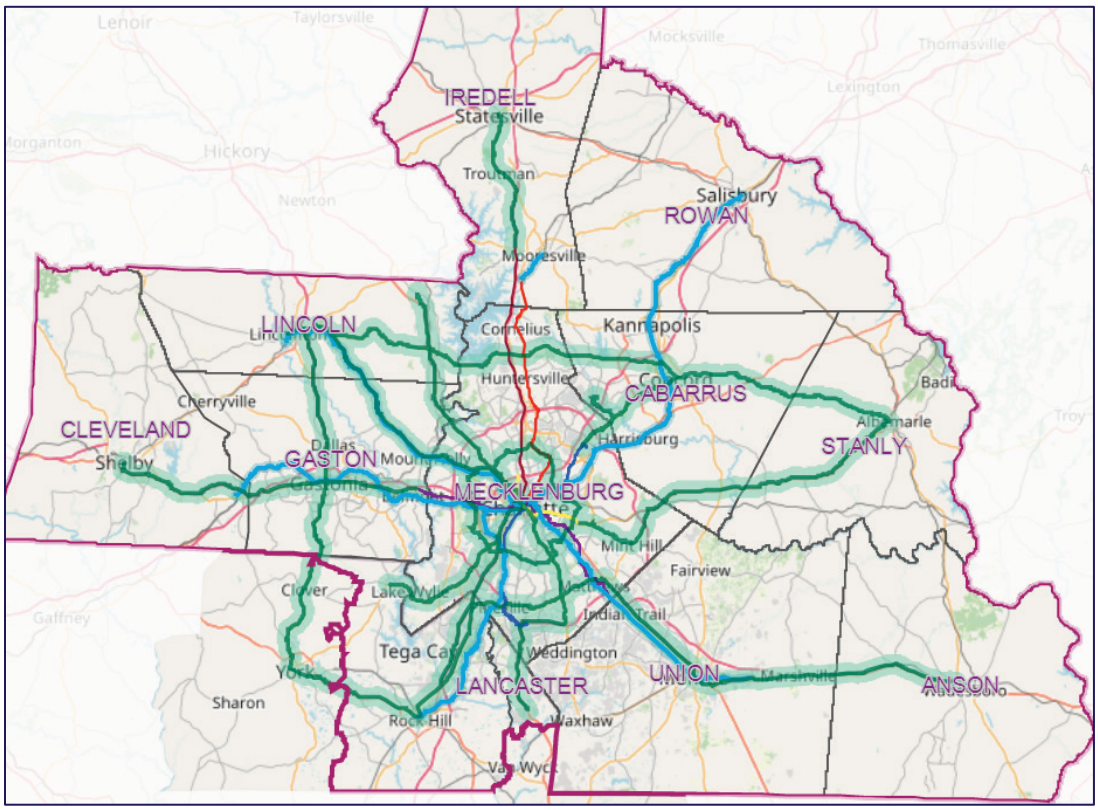
20.Are you a veteran of the U.S. Armed Forces?

- Non-Veteran: 86% (80)
- Veterans: 14% (13)

Corridor Survey Questions and Results

The corridor-specific surveys were identical for each of the five candidate HCT corridors. These surveys were tightly focused on the respondents support for and opinions of the candidate corridor. Where the unique session ID matched that of a general survey where demographic information was provided, that demographic information was connected to the corridor survey response.

FIGURE 27 CANDIDATE HIGH-CAPACITY TRANSIT CORRIDORS



Anson, Stanly & Eastern Union Counties

Twenty-two surveys were completed by approximately 21 respondents. Of these, 66.7percent said they were likely to take HCT through these corridors, 52.4 percent were moderately or very likely to support expanding HCT in the region, and 57.1 percent found the candidate corridors moderately, very, or extremely helpful to their pre-COVID travel needs.

How likely are you to take high-capacity transit through these corridors *over driving or another form of transportation* if they are frequent, convenient, and affordable?

- Yes: 66.7% (14)
- Not sure: 28.6% (6)
- No response: 4.8% (1)

Do you support expanding high-capacity transit in the region? (Yes, No, or Not sure)

- Very likely: 42.9% (9)
- Moderately likely: 9.5% (2)
- Neither likely nor unlikely: 4.8% (1)
- Moderately unlikely: 9.5% (2)
- Very unlikely: 28.6% (6)
- No response 4.8% (1)

How helpful are the candidate high-capacity transit corridors to your travel needs? Think pre-COVID-19.

- Extremely helpful: 33.3% (7)
- Very helpful: 9.5% (2)
- Moderately helpful: 14.3% (3)
- Slightly helpful: 14.3% (3)
- Not at all helpful: 23.8% (5)
- No response: 4.8% (1)

Cabarrus & Rowan Counties

Forty-nine surveys were completed by approximately 44 respondents. Of these, 79.5 percent said they were likely to take HCT through these corridors, 59.1 percent were moderately or very likely to support expanding HCT in the region, and 68.1 percent found the candidate corridors moderately, very, or extremely helpful to their pre-COVID travel needs.

How likely are you to take high-capacity transit through these corridors *over driving or another form of transportation* if they are frequent, convenient, and affordable?

- Yes: 79.5% (35)
- No: 9.1% (4)
- Not sure: 9.1% (4)
- No response: 2.3% (1)

Do you support expanding high-capacity transit in the region? (Yes, No, or Not sure)

- Very likely: 38.6% (17)
- Moderately likely: 20.5% (9)

- Neither likely nor unlikely: 9.1% (4)
- Moderately unlikely: 4.5% (2)
- Very unlikely: 25% (11)
- No response 2.3% (1)

How helpful are the candidate high-capacity transit corridors to your travel needs? Think pre-COVID-19.

- Extremely helpful: 22.7% (10)
- Very helpful: 29.5% (13)
- Moderately helpful: 15.9% (7)
- Slightly helpful: 15.9% (7)
- Not at all helpful: 11.4% (5)
- No response: 4.5% (2)

Eastern York & Northern Lancaster Counties

Twenty-eight surveys were completed by approximately 28 respondents. Of these, 89.3 percent said they were likely to take HCT through these corridors, 75 percent were moderately or very likely to support expanding HCT in the region, and 78.6 percent found the candidate corridors moderately, very, or extremely helpful to their pre-COVID travel needs.

How likely are you to take high-capacity transit through these corridors *over driving or another form of transportation* if they are frequent, convenient, and affordable?

- Yes: 89.3% (25)
- Not sure: 7.1% (2)
- No: 3.6% (1)

Do you support expanding high-capacity transit in the region? (Yes, No, or Not sure)

- Very likely: 64.3% (18)
- Moderately likely: 10.7% (3)
- Neither likely nor unlikely: 7.1% (2)
- Moderately unlikely: 7.1% (2)
- Very unlikely: 7.1% (2)
- No response 3.6% (1)

How helpful are the candidate high-capacity transit corridors to your travel needs? Think pre-COVID-19.

- Extremely helpful: 39.3% (11)
- Very helpful: 25.0% (7)
- Moderately helpful: 14.3% (4)
- Slightly helpful: 10.7% (3)
- Not at all helpful: 10.7% (3)

Gaston, Cleveland & Lincoln Counties

Thirty-seven surveys were completed by approximately 34 respondents. Of these, 88.2 percent said they were likely to take HCT through these corridors, 64.7 percent were moderately or very likely to support expanding HCT in the region, and 58.9 percent found the candidate corridors moderately, very, or extremely helpful to their pre-COVID travel needs.

How likely are you to take high-capacity transit through these corridors *over driving or another form of transportation* if they are frequent, convenient, and affordable?

- Yes: 88.2% (30)
- Not sure: 5.9% (2)
- No: 2.9% (1)
- No response: 2.9% (1)

Do you support expanding high-capacity transit in the region? (Yes, No, or Not sure)

- Very likely: 50.0% (17)
- Moderately likely: 14.7% (5)
- Neither likely nor unlikely: 5.9% (2)
- Moderately unlikely: 11.8% (4)
- Very unlikely: 14.7% (5)
- No response 2.9% (1)

How helpful are the candidate high-capacity transit corridors to your travel needs? Think pre-COVID-19.

- Extremely helpful: 32.4% (11)
- Very helpful: 20.6% (7)
- Moderately helpful: 5.9% (2)

- Slightly helpful: 17.6% (6)
- Not at all helpful: 20.6% (7)
- No response: 2.9% (1)

Mecklenburg, Iredell & Union Counties

Fifty-eight surveys were completed by approximately 49 respondents. Of these, 95.9 percent said they were likely to take HCT through these corridors, 89.8 percent were moderately or very likely to support expanding HCT in the region, and 89.8 percent found the candidate corridors moderately, very, or extremely helpful to their pre-COVID travel needs.

How likely are you to take high-capacity transit through these corridors *over driving or another form of transportation* if they are frequent, convenient, and affordable?

- Yes: 95.9% (47)
- Not sure: 2.0% (1)
- No: 2.0% (1)
- No response: 2.0% (1)

Do you support expanding high-capacity transit in the region? (Yes, No, or Not sure)

- Very likely: 77.6% (38)
- Moderately likely: 12.2% (6)
- Neither likely nor unlikely: 2.0% (1)
- Moderately unlikely: 0% (0)
- Very unlikely: 8.2% (4)
- No response 2.0% (1)

How helpful are the candidate high-capacity transit corridors to your travel needs? Think pre-COVID-19.

- Extremely helpful: 51% (25)
- Very helpful: 20.4% (10)
- Moderately helpful: 18.4% (9)
- Slightly helpful: 6.1% (3)
- Not at all helpful: 2.0% (1)
- No response: 4.1% (2)

Observations and Recommendations

CONNECT Beyond aims to capture the voices from all impacted groups and communities. Of a total 179 respondents, 93 (52 percent) completed the general survey which included voluntary demographic identification. Based on the demographics of these general survey respondents, the survey yielded an over-representation of the following groups: male, white, ages 24-44, without disability, vehicle dependent, and employed. In turn, the survey yielded an under-representation of the following groups: female, non-white, ages 18-24 and 54+, with disability, public transportation dependent, students, retirees, and rural residents. Nearly half of survey respondents did not complete the general survey and therefore are not represented in the demographic analysis.

CONNECT Beyond is planning four targeted listening sessions to intentionally recruit under-represented groups for public input. Each listening session should aim to have 15 participants with balanced representation consisting of at least: one veteran, one person with a disability, three retirees/students, three people that experience digital divide, three people that depend on public or micro-mobility, six people from a racial-ethnic group, six women, and ten people between the ages of 18-24 and 54+. Each of the four listening sessions should target a different geographic area with a hyper focus on suburban and rural areas.

TABLE 18. RESPONDENTS' TRAVEL LOCATIONS BY CITY (DERIVED FROM ZIP CODE)

State/City	Home	Other Destination	School	Work
North Carolina	*86.0% (80)*	*68.5% (37)*	*57.1% (24)*	*85.1% (74)*
Albemarle	1.1% (1)	3.7% (2)	0.0% (0)	0.0% (0)
Asheville	0.0% (0)	1.9% (1)	0.0% (0)	0.0% (0)
Balsam Grove	0.0% (0)	1.9% (1)	0.0% (0)	0.0% (0)
Belmont	5.4% (5)	3.7% (2)	4.8% (2)	3.4% (3)
Bessemer City	0.0% (0)	1.9% (1)	0.0% (0)	0.0% (0)
Charlotte	26.9% (25)	50.0% (27)	26.2% (11)	41.4% (36)
Cherryville	1.1% (1)	0.0% (0)	0.0% (0)	1.1% (1)
China Grove	0.0% (0)	0.0% (0)	2.4% (1)	1.1% (1)
Concord	4.3% (4)	3.7% (2)	2.4% (1)	5.7% (5)
Conover	1.1% (1)	0.0% (0)	0.0% (0)	0.0% (0)
Cornelius	1.1% (1)	3.7% (2)	0.0% (0)	0.0% (0)
Dallas	1.1% (1)	0.0% (0)	0.0% (0)	0.0% (0)
Davidson	0.0% (0)	3.7% (2)	0.0% (0)	0.0% (0)
Denver	1.1% (1)	0.0% (0)	0.0% (0)	0.0% (0)
Fayetteville	0.0% (0)	1.9% (1)	0.0% (0)	0.0% (0)
Gastonia	2.2% (2)	1.9% (1)	2.4% (1)	4.6% (4)

State/City	Home	Other Destination	School	Work
Granite Quarry	0.0% (0)	0.0% (0)	2.4% (1)	0.0% (0)
Greensboro	0.0% (0)	1.9% (1)	0.0% (0)	0.0% (0)
Huntersville	4.3% (4)	5.6% (3)	0.0% (0)	0.0% (0)
Indian Trail	4.3% (4)	5.6% (3)	0.0% (0)	1.1% (1)
Kings Mountain	0.0% (0)	1.9% (1)	0.0% (0)	0.0% (0)
Marshville	0.0% (0)	1.9% (1)	0.0% (0)	0.0% (0)
Matthews	2.2% (2)	5.6% (3)	2.4% (1)	2.3% (2)
McAdenville	1.1% (1)	0.0% (0)	0.0% (0)	1.1% (1)
Monroe	4.3% (4)	5.6% (3)	2.4% (1)	8.0% (7)
Mooresville	2.2% (2)	3.7% (2)	2.4% (1)	1.1% (1)
Mount Holly	2.2% (2)	0.0% (0)	0.0% (0)	0.0% (0)
New London	0.0% (0)	1.9% (1)	0.0% (0)	1.1% (1)
Norwood	2.2% (2)	1.9% (1)	2.4% (1)	0.0% (0)
Pineville	2.2% (2)	5.6% (3)	2.4% (1)	0.0% (0)
Polkton	1.1% (1)	0.0% (0)	0.0% (0)	0.0% (0)
Rockwell	0.0% (0)	0.0% (0)	2.4% (1)	0.0% (0)
Salisbury	8.6% (8)	1.9% (1)	0.0% (0)	5.7% (5)
Shelby	1.1% (1)	1.9% (1)	0.0% (0)	1.1% (1)
Statesville	0.0% (0)	0.0% (0)	0.0% (0)	1.1% (1)
Trinity	0.0% (0)	0.0% (0)	0.0% (0)	1.1% (1)
Valle Crucis	0.0% (0)	1.9% (1)	0.0% (0)	0.0% (0)
Wadesboro	0.0% (0)	1.9% (1)	2.4% (1)	2.3% (2)
Waxhaw	5.4% (5)	0.0% (0)	0.0% (0)	1.1% (1)
South Carolina	*7.5% (7)*	*5.6% (3)*	*4.8% (2)*	*5.7% (5)*
Clover	0.0% (0)	0.0% (0)	0.0% (0)	1.1% (1)
Fort Mill	4.3% (4)	1.9% (1)	2.4% (1)	4.6% (4)
Lancaster	2.2% (2)	3.7% (2)	2.4% (1)	1.1% (1)
Rock Hill	1.1% (1)	1.9% (1)	0.0% (0)	1.1% (1)
Unknown	*6.5% (6)*	*35.2% (19)*	*38.1% (16)*	*10.3% (9)*

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Appendix B
Composite Scorecard

Corridors	Regional Connectivity	Public Facilities	Project Transit Demand	Service in Congested Corridors	Transit Dependency	Access to Jobs	Historically Underserved Populations	Planning Consistency	Environmental Benefits	Station Area Development	Composite Corridor Score
Highway 16/Providence Road	High	High	Medium	Medium	High	High	Medium	Medium	Medium	Medium	Medium
Highway 521/Charlotte Highway	Low	Low	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Medium
Highway 49/South Tryon Street	Medium	Low	Medium	Low	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Highway 51/Pineville-Matthews Road	Medium	Medium	Medium	Low	High	High	Medium	Medium	Medium	Medium	Medium
Highway 74 East/ W Roosevelt Blvd	Low	High	High	Medium	Medium	High	Medium	Medium	Medium	High	Medium
Highway 74 East Wadesboro Extension	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Highway 74 West	Low	Medium	Medium	Low	Medium	Medium	High	High	Medium	High	Medium
Highway 74 West Shelby Extension	Low	Low	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Interstate 77 South	High	Medium	High	Medium	High	High	High	High	High	Low	High
Highway 321	Low	Low	Low	Medium	Low	Low	Low	Low	Low	Low	Low
Highway 5	Low	Low	Low	High	High	Medium	Medium	Low	Medium	High	Medium
Highway 73 West	Low	Low	Medium	Low	Medium	Medium	High	Medium	Medium	Medium	Medium
Highway 24/27/ Albemarle Road	Medium	Medium	Medium	Low	Low	Medium	Medium	Medium	Medium	High	Medium
Highway 24/27 Albemarle Extension	Low	Low	Low	Medium	Medium	Low	Medium	Low	Medium	Low	Low
Highway 16 Northwest	Medium	Medium	Medium	High	Low	Medium	Medium	Medium	Medium	Medium	Medium
Highway 21 South	High	High	Medium	Medium	Medium	Medium	Medium	High	Medium	High	Medium
Highway 21 North	Low	High	High	Medium	Medium	Medium	Medium	Medium	Medium	High	Medium
Highway 29 North	Medium	Medium	High	Medium	Medium	Medium	Medium	High	Medium	High	Medium
Highway 27 North	Medium	Medium	Medium	High	Medium	Medium	Medium	Low	Medium	Low	Medium
Wilkinson Boulevard to Sugar Creek	Medium	Low	Medium	Low	Medium	Medium	Medium	Low	Medium	Low	Medium
Sugar Creek to Monroe Road	High	High	High	Medium	High	High	High	Medium	High	Medium	High
Monroe Road to South Boulevard	High	Medium	Medium	Low	High	High	High	Medium	High	Medium	Medium
South Boulevard to Wilkinson Boulevard	Medium	Medium	Medium	Low	Medium	Medium	Medium	High	Medium	Medium	Medium
Interstate 485	Medium	Low	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Interstate 85	Medium	Low	Medium	Medium	Medium	Medium	Medium	High	Medium	High	Medium
Highway 160	Low	Low	Medium	High	Medium	Medium	Low	Low	Medium	Medium	Medium
Freedom Drive/Moores Chapel Road	High	High	High	High	High	Medium	High	Medium	High	Medium	High
West Boulevard	High	High	High	Medium	Medium	High	High	High	High	High	High
Graham Street	High	High	High	High	High	High	High	Medium	High	High	High
Beatties Ford Road	High	High	High	High	High	High	High	Medium	High	High	High
Highway 75/Waxhaw Highway	Low	Low	Low	High	Low	Low	Low	Medium	Medium	Medium	Low
Highway 52	Low	Low	Low	Medium	Low	Low	Low	Low	Low	Low	Low
Highway 49	Low	Low	Medium	Medium	Low	Low	Low	Low	Low	Low	Low
Interstate 77 North	Low	Low	Low	Medium	Medium	Medium	Medium	High	Medium	High	Medium
Monroe Expressway/Highway 74 Bypass	Low	Low	Medium	High	Low	Low	Low	Medium	Medium	Medium	Medium
Highway 279	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low

CONNECT Beyond
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Appendix C
Evaluation Criterion Data Tables

CONNECT Beyond
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Regional Connectivity

Corridors	Values					
	Corridor Length (Miles)	Local Fixed-Routes	Express Routes	Total Route Connections	Route Connections per Corridor Mile	Rating
Highway 16/Providence Road	20.3	33	19	52	2.6	High
Highway 521/Charlotte Highway	8.9	0	0	0	0.0	Low
Highway 49/South Tryon Street	14.9	10	2	12	0.8	Medium
Highway 51/Pineville-Matthews Road	11.5	8	6	14	1.2	Medium
Highway 74 East/ W Roosevelt Blvd	13.6	3	4	7	0.5	Low
Highway 74 East Wadesboro Extension	16.1	0	0	0	0.0	Low
Highway 74 West	18.3	6	1	7	0.4	Low
Highway 74 West Shelby Extension	13.4	1	0	1	0.1	Low
Interstate 77 South	25.1	41	19	60	2.4	High
Highway 321	36.2	7	1	8	0.2	Low
Highway 5	13.6	4	1	5	0.4	Low
Highway 73 West	42.3	8	4	12	0.3	Low
Highway 24/27/ Albemarle Road	6.2	7	2	9	1.5	Medium
Highway 24/27 Albemarle Extension	28.5	0	0	0	0.0	Low
Highway 16 Northwest	25.8	31	20	51	2.0	Medium
Highway 21 South	11.1	41	19	60	5.4	High
Highway 21 North	8.8	4	0	4	0.5	Low
Highway 29 North	16.1	9	2	11	0.7	Medium
Highway 27 North	31.5	31	20	51	1.6	Medium
Wilkinson Boulevard to Sugar Creek	13.5	9	7	16	1.2	Medium
Sugar Creek to Monroe Road	9.7	17	8	25	2.6	High
Monroe Road to South Boulevard	9.1	16	10	26	2.9	High
South Boulevard to Wilkinson Boulevard	8.1	12	4	16	2.0	Medium
Interstate 485	15.1	10	5	15	1.0	Medium
Interstate 85	39.7	13	13	26	0.7	Medium
Highway 160	10.3	0	1	1	0.1	Low
Freedom Drive/Moores Chapel Road	6.8	12	14	26	3.8	High

Corridors	Values					
	Corridor Length (Miles)	Local Fixed-Routes	Express Routes	Total Route Connections	Route Connections per Corridor Mile	Rating
West Boulevard	8.2	10	11	21	2.6	High
Graham Street	5.0	29	19	48	9.5	High
Beatties Ford Road	9.6	31	20	51	5.3	High
Highway 75/Waxhaw Highway	16.3	0	0	0	0.0	Low
Highway 52	57.4	3	0	3	0.1	Low
Highway 49	36.7	6	2	8	0.2	Low
Interstate 77 North	15.1	4	0	4	0.3	Low
Monroe Expressway/Highway 74 Bypass	17.8	0	1	1	0.1	Low
Highway 279	12.9	1	0	1	0.1	Low

All values shown are for planning-level analysis only and are therefore subject to change. Additional study for each corridor is necessary to provide more accurate detail.

Public Facilities and Destinations Served

Corridors	Values			
	Corridor Length (Miles)	Total Public Facilities	Public Facilities per Corridor Mile	Rating
Highway 16/Providence Road	20.3	90	4.4	High
Highway 521/Charlotte Highway	8.9	8	0.9	Low
Highway 49/South Tryon Street	14.9	29	2.0	Low
Highway 51/Pineville-Matthews Road	11.5	33	2.9	Medium
Highway 74 East/ W Roosevelt Blvd	13.6	58	4.3	High
Highway 74 East Wadesboro Extension	16.1	21	1.3	Low
Highway 74 West	18.3	70	3.8	Medium
Highway 74 West Shelby Extension	13.4	30	2.2	Low
Interstate 77 South	25.1	94	3.7	Medium
Highway 321	36.2	75	2.1	Low
Highway 5	13.6	32	2.3	Low
Highway 73 West	42.3	68	1.6	Low
Highway 24/27/ Albemarle Road	6.2	20	3.2	Medium
Highway 24/27 Albemarle Extension	28.5	38	1.3	Low
Highway 16 Northwest	25.8	94	3.6	Medium
Highway 21 South	11.1	93	8.4	High
Highway 21 North	8.8	62	7.1	High
Highway 29 North	16.1	49	3.0	Medium
Highway 27 North	31.5	109	3.5	Medium
Wilkinson Boulevard to Sugar Creek	13.5	32	2.4	Low
Sugar Creek to Monroe Road	9.7	46	4.8	High
Monroe Road to South Boulevard	9.1	35	3.9	Medium
South Boulevard to Wilkinson Boulevard	8.1	29	3.6	Medium
Interstate 485	15.1	33	2.2	Low
Interstate 85	39.7	111	2.8	Low
Highway 160	10.3	7	0.7	Low
Freedom Drive/Moores Chapel Road	6.8	39	5.8	High
West Boulevard	8.2	42	5.1	High
Graham Street	5.0	41	8.1	High
Beatties Ford Road	9.6	68	7.1	High
Highway 75/Waxhaw Highway	16.3	29	1.8	Low
Highway 52	57.4	80	1.4	Low
Highway 49	36.7	64	1.7	Low
Interstate 77 North	15.1	11	0.7	Low
Monroe Expressway/Highway 74 Bypass	17.8	14	0.8	Low
Highway 279	12.9	23	1.8	Low

Projected Transit Demand

Corridors	Corridor Length (Miles)	Values		Rating
		Population + Employment Difference (2045-2015)	Population + Employment Difference per Corridor Mile	
Highway 16/Providence Road	20.3	112,057	5,515.7	Medium
Highway 521/Charlotte Highway	8.9	27,819	3,125.9	Medium
Highway 49/South Tryon Street	14.9	64,224	4,319.7	Medium
Highway 51/Pineville-Matthews Road	11.5	18,887	1,635.4	Medium
Highway 74 East/ W Roosevelt Blvd	13.6	85,238	6,279.0	High
Highway 74 East Wadesboro Extension	16.1	6,246	387.7	Low
Highway 74 West	18.3	27,727	1,518.5	Medium
Highway 74 West Shelby Extension	13.4	15,416	1,149.2	Low
Interstate 77 South	25.1	22,7671	9,063.5	High
Highway 321	36.2	21,262	587.2	Low
Highway 5	13.6	15,588	1,144.3	Low
Highway 73 West	42.3	78,437	1,853.2	Medium
Highway 24/27/ Albemarle Road	6.2	11,834	1,910.6	Medium
Highway 24/27 Albemarle Extension	28.5	27,063	949.3	Low
Highway 16 Northwest	25.8	119,251	4,626.2	Medium
Highway 21 South	11.1	38,633	3,473.8	Medium
Highway 21 North	8.8	71,915	8,182.0	High
Highway 29 North	16.1	113,550	7,050.5	High
Highway 27 North	31.5	111,179	3,534.9	Medium
Wilkinson Boulevard to Sugar Creek	13.5	37,446	2,776.7	Medium
Sugar Creek to Monroe Road	9.7	57,804	5,974.4	High
Monroe Road to South Boulevard	9.1	35,479	3,917.2	Medium
South Boulevard to Wilkinson Boulevard	8.1	41,273	5,119.9	Medium
Interstate 485	15.1	56,610	3,746.1	Medium
Interstate 85	39.7	130,783	3,293.5	Medium
Highway 160	10.3	27,453	2,658.7	Medium
Freedom Drive/Moores Chapel Road	6.8	51,974	7,666.0	High
West Boulevard	8.2	92,927	11,302.8	High
Graham Street	5.0	50,146	9,951.5	High
Beatties Ford Road	9.6	99,517	10,405.3	High
Highway 75/Waxhaw Highway	16.3	22,434	1,378.7	Low
Highway 52	57.4	24,500	426.9	Low
Highway 49	36.7	74,144	2,021.7	Medium
Interstate 77 North	15.1	17,928	1,187.2	Low
Monroe Expressway/Highway 74 Bypass	17.8	29,257	1,640.0	Medium
Highway 279	12.9	1,232	95.8	Low

Service in Congested Corridors

Corridors	Values			
	V/C 2015	V/C 2045	Percent Change	Rating
Highway 16/Providence Road	678	1,112	64%	Medium
Highway 521/Charlotte Highway	42	71	71%	Medium
Highway 49/South Tryon Street	216	279	29%	Low
Highway 51/Pineville-Matthews Road	255	292	15%	Low
Highway 74 East/ W Roosevelt Blvd	283	455	61%	Medium
Highway 74 East Wadesboro Extension	21	26	24%	Low
Highway 74 West	313	379	21%	Low
Highway 74 West Shelby Extension	82	102	24%	Low
Interstate 77 South	870	1,525	75%	Medium
Highway 321	175	256	46%	Medium
Highway 5	107	210	95%	High
Highway 73 West	362	456	26%	Low
Highway 24/27/ Albemarle Road	94	122	29%	Low
Highway 24/27 Albemarle Extension	69	123	78%	Medium
Highway 16 Northwest	505	917	81%	High
Highway 21 South	843	1,481	76%	Medium
Highway 21 North	103	145	41%	Medium
Highway 29 North	234	342	46%	Medium
Highway 27 North	525	945	80%	High
Wilkinson Boulevard to Sugar Creek	152	194	28%	Low
Sugar Creek to Monroe Road	260	355	37%	Medium
Monroe Road to South Boulevard	309	392	27%	Low
South Boulevard to Wilkinson Boulevard	204	265	30%	Low
Interstate 485	321	434	36%	Medium
Interstate 85	732	1,048	43%	Medium
Highway 160	21	105	394%	High
Freedom Drive/Moores Chapel Road	189	342	81%	High
West Boulevard	266	454	71%	Medium
Graham Street	268	508	90%	High
Beatties Ford Road	427	793	86%	High
Highway 75/Waxhaw Highway	73	136	86%	High
Highway 52	115	172	50%	Medium
Highway 49	205	331	61%	Medium
Interstate 77 North	156	213	36%	Medium
Monroe Expressway/Highway 74 Bypass	71	155	119%	High
Highway 279	64	75	18%	Low

Transit Dependency

Corridors	Values			Rating
	Corridor Length (Miles)	Zero + One Auto Households	Zero + One Auto Households per Corridor Mile	
Highway 16/Providence Road	20.3	8,111	399.2	High
Highway 521/Charlotte Highway	8.9	1,682	189.0	Medium
Highway 49/South Tryon Street	14.9	3,155	212.2	Medium
Highway 51/Pineville-Matthews Road	11.5	3,998	346.2	High
Highway 74 East/ W Roosevelt Blvd	13.6	2,500	184.2	Medium
Highway 74 East Wadesboro Extension	16.1	223	13.8	Low
Highway 74 West	18.3	3,519	192.7	Medium
Highway 74 West Shelby Extension	13.4	1,455	108.5	Medium
Interstate 77 South	25.1	4,012	647.7	High
Highway 321	36.2	1,338	46.9	Low
Highway 5	13.6	7,564	293.4	High
Highway 73 West	42.3	6,854	272.9	Medium
Highway 24/27/ Albemarle Road	6.2	2,807	77.5	Low
Highway 24/27 Albemarle Extension	28.5	2,117	155.4	Medium
Highway 16 Northwest	25.8	4,410	104.2	Low
Highway 21 South	11.1	2,065	185.7	Medium
Highway 21 North	8.8	1,413	160.8	Medium
Highway 29 North	16.1	2,706	168.0	Medium
Highway 27 North	31.5	5,868	186.6	Medium
Wilkinson Boulevard to Sugar Creek	13.5	3,931	291.5	Medium
Sugar Creek to Monroe Road	9.7	5,082	525.3	High
Monroe Road to South Boulevard	9.1	4,486	495.3	High
South Boulevard to Wilkinson Boulevard	8.1	1,402	173.9	Medium
Interstate 485	15.1	4,235	280.2	Medium
Interstate 85	39.7	6,402	161.2	Medium
Highway 160	10.3	1,153	111.7	Medium
Freedom Drive/Moores Chapel Road	6.8	2,310	340.7	High
West Boulevard	8.2	1,392	169.3	Medium
Graham Street	5.0	2,775	550.7	High
Beatties Ford Road	9.6	4,315	451.2	High
Highway 75/Waxhaw Highway	16.3	1,191	73.2	Low
Highway 52	57.4	2,000	34.8	Low
Highway 49	36.7	2,951	80.5	Low
Interstate 77 North	15.1	1,631	108.0	Medium
Monroe Expressway/Highway 74 Bypass	17.8	1,615	90.5	Low
Highway 279	12.9	780	60.7	Low

Access to Jobs

Corridors	Values			
	Corridor Length (Miles)	Jobs Accessed by Transit	Jobs Accessed by Transit per Corridor Mile	Rating
Highway 16/Providence Road	20.3	6,100	300.3	High
Highway 521/Charlotte Highway	8.9	576	64.7	Low
Highway 49/South Tryon Street	14.9	2,909	195.7	Medium
Highway 51/Pineville-Matthews Road	11.5	2,828	244.9	High
Highway 74 East/ W Roosevelt Blvd	13.6	3,205	236.1	High
Highway 74 East Wadesboro Extension	16.1	263	16.3	Low
Highway 74 West	18.3	2,344	128.4	Medium
Highway 74 West Shelby Extension	13.4	1,010	75.3	Medium
Interstate 77 South	25.1	7,965	317.1	High
Highway 321	36.2	1,678	46.3	Low
Highway 5	13.6	980	71.9	Medium
Highway 73 West	42.3	2,993	70.7	Medium
Highway 24/27/ Albemarle Road	6.2	812	131.1	Medium
Highway 24/27 Albemarle Extension	28.5	738	25.9	Low
Highway 16 Northwest	25.8	4,121	159.9	Medium
Highway 21 South	11.1	1,393	125.3	Medium
Highway 21 North	8.8	667	75.9	Medium
Highway 29 North	16.1	1,916	119.0	Medium
Highway 27 North	31.5	3,957	125.8	Medium
Wilkinson Boulevard to Sugar Creek	13.5	1,171	86.8	Medium
Sugar Creek to Monroe Road	9.7	2,069	213.8	High
Monroe Road to South Boulevard	9.1	3,294	363.7	High
South Boulevard to Wilkinson Boulevard	8.1	1,722	213.6	Medium
Interstate 485	15.1	3,108	205.7	Medium
Interstate 85	39.7	4,493	113.1	Medium
Highway 160	10.3	1,011	97.9	Medium
Freedom Drive/Moores Chapel Road	6.8	1,343	198.1	Medium
West Boulevard	8.2	2,454	298.5	High
Graham Street	5.0	2,313	459.0	High
Beatties Ford Road	9.6	3,459	361.7	High
Highway 75/Waxhaw Highway	16.3	699	43.0	Low
Highway 52	57.4	1,529	26.6	Low
Highway 49	36.7	1,602	43.7	Low
Interstate 77 North	15.1	1,424	94.3	Medium
Monroe Expressway/Highway 74 Bypass	17.8	860	48.2	Low
Highway 279	12.9	375	29.2	Low

Historically Underserved Populations

Corridors	Corridor Length (Miles)	Values		Rating
		Households at/or Below Federal Poverty Threshold (2019)	Households in Poverty per Corridor Mile	
Highway 16/Providence Road	20.3	7,268	357.7	Medium
Highway 521/Charlotte Highway	8.9	753	84.6	Low
Highway 49/South Tryon Street	14.9	3,418	229.9	Medium
Highway 51/Pineville-Matthews Road	11.5	3,869	335.0	Medium
Highway 74 East/ W Roosevelt Blvd	13.6	3,909	288.0	Medium
Highway 74 East Wadesboro Extension	16.1	565	35.1	Low
Highway 74 West	18.3	7,242	396.6	High
Highway 74 West Shelby Extension	13.4	3,203	238.8	Medium
Interstate 77 South	25.1	5,685	917.8	High
Highway 321	36.2	1,819	63.8	Low
Highway 5	13.6	8,120	315.0	Medium
Highway 73 West	42.3	13,854	551.5	High
Highway 24/27/ Albemarle Road	6.2	7,279	201.0	Medium
Highway 24/27 Albemarle Extension	28.5	4,329	317.8	Medium
Highway 16 Northwest	25.8	6,729	159.0	Medium
Highway 21 South	11.1	2,993	269.1	Medium
Highway 21 North	8.8	1,985	225.8	Medium
Highway 29 North	16.1	5,301	329.1	Medium
Highway 27 North	31.5	9,858	313.4	Medium
Wilkinson Boulevard to Sugar Creek	13.5	5,321	394.6	Medium
Sugar Creek to Monroe Road	9.7	11,620	1201.0	High
Monroe Road to South Boulevard	9.1	4,781	527.9	High
South Boulevard to Wilkinson Boulevard	8.1	2,935	364.1	Medium
Interstate 485	15.1	3,547	234.7	Medium
Interstate 85	39.7	13,494	339.8	Medium
Highway 160	10.3	1,299	125.8	Low
Freedom Drive/Moores Chapel Road	6.8	4,831	712.6	High
West Boulevard	8.2	4,094	498.0	High
Graham Street	5.0	4,731	938.9	High
Beatties Ford Road	9.6	6,691	699.6	High
Highway 75/Waxhaw Highway	16.3	1,923	118.2	Low
Highway 52	57.4	3,977	69.3	Low
Highway 49	36.7	5,145	140.3	Low
Interstate 77 North	15.1	2,187	144.8	Medium
Monroe Expressway/Highway 74 Bypass	17.8	1,558	87.3	Low
Highway 279	12.9	1,135	88.3	Low

Planning Consistency

Corridors	Values			Rating
	Transit-Supportive Acres	Total Corridor Acres	Percent Transit-Supportive Corridor Acreage	
Highway 16/Providence Road	7,380	30,260	24%	Medium
Highway 521/Charlotte Highway	3,190	17,240	19%	Medium
Highway 49/South Tryon Street	4,720	24,020	20%	Medium
Highway 51/Pineville-Matthews Road	4,480	18,410	24%	Medium
Highway 74 East/ W Roosevelt Blvd	10,980	38,370	29%	Medium
Highway 74 East Wadesboro Extension	1,870	27,550	7%	Low
Highway 74 West	9,270	27,700	33%	High
Highway 74 West Shelby Extension	5,160	21,950	24%	Medium
Interstate 77 South	12,320	37,920	32%	High
Highway 321	9,610	57,690	17%	Low
Highway 5	3,830	22,550	17%	Low
Highway 73 West	12,790	65,630	19%	Medium
Highway 24/27/ Albemarle Road	3,130	10,850	29%	Medium
Highway 24/27 Albemarle Extension	7,110	44,920	16%	Low
Highway 16 Northwest	10,630.0	41,730	25%	Medium
Highway 21 South	12,050	37,540	32%	High
Highway 21 North	6,130	23,490	26%	Medium
Highway 29 North	11,630	23,390	50%	High
Highway 27 North	6,460	49,020	13%	Low
Wilkinson Boulevard to Sugar Creek	2,420	19,800	12%	Low
Sugar Creek to Monroe Road	4,310	15,640	28%	Medium
Monroe Road to South Boulevard	3,020	14,250	21%	Medium
South Boulevard to Wilkinson Boulevard	5,690	12,820	44%	High
Interstate 485	5,790	23,460	25%	Medium
Interstate 85	21,490	59,990	36%	High
Highway 160	1,760	13,430	13%	Low
Freedom Drive/Moores Chapel Road	2,340	11,900	20%	Medium
West Boulevard	5,970	13,800	43%	High
Graham Street	2,240	9,300	24%	Medium
Beatties Ford Road	3,880	15,250	25%	Medium
Highway 75/Waxhaw Highway	4,780	26,370	18%	Medium
Highway 52	5,810	90,590	6%	Low
Highway 49	7,080	56,965	12%	Low
Interstate 77 North	10,850	24,420	44%	High
Monroe Expressway/Highway 74 Bypass	7,520	27,860	27%	Medium
Highway 279	3,760	22,140	17%	Low

Environmental Benefits

Corridors	Values						
	Regional Connectivity	Planning Consistency	Historically Underserved	Transit Dependency	Congested Corridors	Total	Composite Rating
Highway 16/Providence Road	3	2	2	3	2	12	Medium
Highway 521/Charlotte Highway	1	2	1	2	2	8	Medium
Highway 49/South Tryon Street	2	2	2	2	1	9	Medium
Highway 51/Pineville-Matthews Road	2	2	2	3	1	10	Medium
Highway 74 East/ W Roosevelt Blvd	1	2	2	2	2	9	Medium
Highway 74 East Wadesboro Extension	1	1	1	1	2	6	Low
Highway 74 West	1	3	3	2	1	10	Medium
Highway 74 West Shelby Extension	1	2	2	2	1	8	Medium
Interstate 77 South	3	3	3	3	2	14	High
Highway 321	1	1	1	1	2	6	Low
Highway 5	1	1	2	3	3	10	Medium
Highway 73 West	1	2	3	2	1	9	Medium
Highway 24/27/ Albemarle Road	2	2	2	1	1	8	Medium
Highway 24/27 Albemarle Extension	1	1	2	2	2	8	Medium
Highway 16 Northwest	2	2	2	1	3	10	Medium
Highway 21 South	3	3	2	2	2	12	Medium
Highway 21 North	1	2	2	2	2	9	Medium
Highway 29 North	2	3	2	2	2	11	Medium
Highway 27 North	2	1	2	2	3	10	Medium
Wilkinson Boulevard to Sugar Creek	2	1	2	2	1	8	Medium
Sugar Creek to Monroe Road	3	2	3	3	2	13	High
Monroe Road to South Boulevard	3	2	3	3	1	12	High
South Boulevard to Wilkinson Boulevard	2	3	2	2	1	10	Medium

Corridors	Values					Total	Composite Rating
	Regional Connectivity	Planning Consistency	Historically Underserved	Transit Dependency	Congested Corridors		
Interstate 485	2	2	2	2	2	10	Medium
Interstate -	2	3	2	2	2	11	Medium
Highway 160	1	1	1	2	3	8	Medium
Freedom Drive/Moores Chapel Road	3	2	3	3	3	14	High
West Boulevard	3	3	3	2	2	13	High
Graham Street	3	2	3	3	3	14	High
Beatties Ford Road	3	2	3	3	3	14	High
Highway 75/Waxhaw Highway	1	2	1	1	3	8	Medium
Highway 52	1	1	1	1	2	6	Low
Highway 49	1	1	1	1	2	6	Low
Interstate 77 North	1	3	2	2	2	10	Medium
Monroe Expressway/Highway 74 Bypass	1	2	1	1	3	8	Medium
Highway 279	1	1	1	1	1	5	Low

The evaluation criterion ratings for Regional Connectivity, Planning Consistency, Historically Underserved Populations, Transit Dependency, and Service in Congested Corridors were converted to a point scale. Score of High equaled three points, Medium two points, and Low point. The points were totaled. Scores above 13 points were given a rating of High for the Environmental Benefits. Score between 12 and 8 points were given a rating of Medium, and scores below 7 were given a rating of Low.

Station Area Development Potential

Corridors	Values			
	Developable Parcel Acres	Total Corridor Acres	Percent Developable Corridor Acreage	Rating
Highway 16/Providence Road	5,935	30,260	20%	Medium
Highway 521/Charlotte Highway	2,716	17,240	16%	Medium
Highway 49/South Tryon Street	3,381	24,020	14%	Medium
Highway 51/Pineville-Matthews Road	3,847	18,410	21%	Medium
Highway 74 East/ W Roosevelt Blvd	10,658	38,370	28%	High
Highway 74 East Wadesboro Extension	2,710	27,550	10%	Low
Highway 74 West	7,679	27,700	28%	High
Highway 74 West Shelby Extension	4,625	21,950	21%	Medium
Interstate 77 South	1,848	37,920	5%	Low
Highway 321	3,172	57,690	5%	Low
Highway 5	5,903	22,550	26%	High
Highway 73 West	10,949	65,630	17%	Medium
Highway 24/27/ Albemarle Road	6,369	10,850	59%	High
Highway 24/27 Albemarle Extension	790	44,920	2%	Low
Highway 16 Northwest	9,978	41,730	24%	Medium
Highway 21 South	10,816	37,540	29%	High
Highway 21 North	6,258	23,490	27%	High
Highway 29 North	11,359	23,390	49%	High
Highway 27 North	5,556	49,020	11%	Low
Wilkinson Boulevard to Sugar Creek	2,174	19,800	11%	Low
Sugar Creek to Monroe Road	3,384	15,640	22%	Medium
Monroe Road to South Boulevard	2,777	14,250	19%	Medium
South Boulevard to Wilkinson Boulevard	3,235	12,820	25%	Medium
Interstate 485	5,370	23,460	23%	Medium
Interstate 85	15,411	59,990	26%	High
Highway 160	1,866	13,430	14%	Medium
Freedom Drive/Moores Chapel Road	2,683	11,900	23%	Medium
West Boulevard	5,110	13,800	37%	High
Graham Street	2,586	9,300	28%	High
Beatties Ford Road	4,481	15,250	29%	High
Highway 75/Waxhaw Highway	3,407	26,370	13%	Medium
Highway 52	7,002	90,590	8%	Low
Highway 49	6,157	56,965	11%	Low
Interstate 77 North	6,275	24,420	26%	High
Monroe Expressway/Highway 74 Bypass	3,602	27,860	13%	Medium
Highway 279	1,728	22,140	8%	Low

CONNECT Beyond
A Regional Mobility Initiative

Appendix D
Technical Advisory Committee GIS Online Map Comments

CONNECT Beyond
A Regional Mobility Initiative

Technical Advisory Committee Online GIS Map Comments

Name	Contact (Email)	Organization	Comment
Jaime Tippett Poe		Rider	Current area is used for paratransit transfers, would like to see future opportunity to transfer paratransit users into Charlotte.
Theresa	Theresa.torres@unioncountync.gov	ACTS	Connection point to other systems
Theresa	Theresa.torres@unioncountync.gov	ACTS	Connection point
Bradley	Bradley.johnson@co.iredell.nc.us	ICATS	Connect to Rowan Co. and City of Salisbury
Rowan Express connection		Rider	currently serves as a mini-regional hub. Future smaller hub
Andy/LJ		Rider	Connectivity with CATS in Huntersville
ICATS			The express route does not transfer in Cornelius. It now goes straight into Charlotte.
ICATS			Potential transfer hub/location
ICATS			Potential future transfer hub
Michelle Nance	mnance@centralina.org	Centralina Regional Council	Needed connector between TNC and future Express Service on Hwy 16; convenience station a possibility.
Michelle Nance	mnance@centralina.org	Centralina Regional Council	Great collector location for Stanly County commuters.
Michelle Nance	mnance@centralina.org	Centralina Regional Council	Connection between Rock Hill Transit and CATS (location estimated)
Rebecca Cherry		Cherry Consulting	FUTURE Pax Transfer location
Quick Trip		Cabarrus County	best place to meet Rowan for a swap
Concord Mills		Cabarrus County	Best Place to meet Mecklenburg for a swap
Vincent Wong		City of Gastonia	Transit Center
Vincent/Stephanie		City of Gastonia	Transfer Point. 3 route that interact here
Vincent		City of Gastonia	Future transfer point (potential Mobility Hub). Sport facility with a lot of retail, hotel, etc.
Vincent		City of Gastonia	At capacity for headways and counts. Need to develop a plan to better serve this area. Potential mobility hub.

Name	Contact (Email)	Organization	Comment
Rebecca Cherry		SCUSA	Potential passenger transfer location at Walmart (1876 W. Main St. W., Locust) for SCUSA and CATS / MTS
Tanya Byrd	tbyrd@co.anson.nc.us	Anson County Transportation System	
Wendy Duda			Service is needed from CATS to Fort Mill within the Charlotte UZA
PMT		HDR	Potential future mobility hub - 5-4-2021
PMT		HDR	Potential future mobility hub - 5-4-2021
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PMT		HDR	Proposed future mobility hubs - 5-4-2021
PMT	HDR		Potential future mobility hub - 5-14-2021
PMT		HDR	Potential future mobility hub - 5-14-2021
PMT		HDR	Potential future mobility hub - 5-14-2021
PMT		HDR	Potential future mobility hub - 5-14-2021
PMT		HDR	Potential future mobility hub - 5-14-2021
PMT	HDR		Potential future mobility hub - 5-14-2021
Andy Christy / L.J.		Rider	Highest performing route.
Andy Christy /L.J.		Rider	High performing route
ICATS			NC 3 to connect Mooresville to Kannapolis
ICATS			NC 150 would be a good corridor to consider in the future
ICATS			NC 152 would be a good corridor to consider in the future
L.J. Weslowski		Rider	Future airport growth and opportunity for job access and future employment.

Name	Contact (Email)	Organization	Comment
Theresa	Theresa.torres@unioncountync.gov	ACTS	Connection with other systems
Rider			Future gap in the system. Lots of growth expected in this area
Rider			Future growth area - how will transit serve this area?
Rider			Dialysis needs - requests are being made but no current service exists
Vincent/Stephanie		City of Gastonia	Would like to serve this area better in the future.
Waxhaw Connector	tghitea@waxhaw.com	Town of Waxhaw	Please take the Town of Waxhaw into consideration for a transit connection to the Lancaster or Monroe hub.
Bus-Only Lane	Ajonelle.Poole@ci.charlotte.nc.us	CATS	
Alex Moore	amoore@fortmillsc.gov	Town of Fort Mill	Possible HCT?
Alex Moore	amoore@fortmillsc.gov	Town of Fort Mill	Possible HCT?
Alex Moore	amoore@fortmillsc.gov	Town of Fort Mill	Possible HCT?
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Big visions for this corridor- Contact City of Kannapolis Planning for corridor redevelopment plans.
Randi			Please make sure we look at this RR corridor for commuter rail
Snuggs			Hwy 49 is of interest
Snuggs			Hwy 52 is of interest to connect Salisbury to Wadesboro
Andrew C. Bryant	abryant@lincolncounty.org	Lincoln County	Substantial flows from eastern Lincoln to North Mecklenburg May warrant commuter bus especially during 73 construction.
Andrew C. Bryant	abryant@lincolncounty.org	Lincoln County	Spur line used by Duke Energy to supply coal to Marshall Steam Station. No activity on line in several years. Must be protected for future rail service.
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Rapidly developing multi-use development along this corridor
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Corridor with existing or heavy opportunity for industrial/manufacturing/distribution.

CONNECT Beyond
A Regional Mobility Initiative

Name	Contact (Email)	Organization	Comment
Chris Herrmann	cherrmann@rfatsmpo.org	RFATS MPO	The RFATS Policy Committee has requested evaluation about a potential connection from the Fort Mill area of York County and the US 521 area of Lancaster County.
Jason L		CATS	Edit the commuter rail line coming out of Uptown to reflect this line
Jorge		HDR	Extend commuter rail corridor
Waxhaw Connector	tghitea@waxhaw.com	Town of Waxhaw	Please take the Town of Waxhaw into consideration for a transit connection to the Lancaster or Monroe hub.
Alex Moore	amoore@fortmillsc.gov	Town of Fort Mill	Possible HCT?
Chris Herrmann	cherrmann@rfatsmpo.org	RFATS MPO	The RFATS Policy Committee has requested evaluation about a potential connection from the Fort Mill area of York County and the US 521 area of Lancaster County.
Randi			Please make sure we look at this RR corridor for commuter rail
Alex Moore	amoore@fortmillsc.gov	Town of Fort Mill	Possible HCT?
Snuggs			Hwy 49 is of interest
Snuggs			Hwy 52 is of interest to connect Salisbury to Wadesboro
Anson County Facility Feasibility Study	tbchambers@ncdot.gov	NCDOT - IMD	Study completed in 2016; will be funded as part of Statewide 5339(b) FTA Grant in 2019.
ICATS Facility Feasibility Study (Active)	tbchambers@ncdot.gov	NCDOT - IMD	Study is active and should complete soon; Funded as part of Statewide 5339(b) FTA Grant.
Cleveland Cty Community Transportation Service Plan (2011)	tbchambers@ncdot.gov	NCDOT - IMD	
Cabarrus Cty Community	tbchambers@ncdot.gov	NCDOT - IMD	

Name	Contact (Email)	Organization	Comment
Transportation Service Plan (2015)			
Lincoln Cty Community Connectivity Plan (2017)	tbchambers@ncdot.gov	NCDOT - IMD	
Union Cty Community Connectivity Plan (2019)	tbchambers@ncdot.gov	NCDOT - IMD	File is too large to attach.
New MUSC Hospital	rburhans@lancastersc.net	Lancaster County SC	New 100-bed MUSC hospital
Beginning of Southern Panhandle SAP Area		Lancaster County	Plan completion expected end of 2020
Meg Fencil	meg.fencil@sustaincharlotte.org	Sustain Charlotte	This area has experienced rapid population growth in recent years. With the outlet mall and lots of young families, traffic congestion has increased. There is still a lot of undeveloped land in the area.
Meg Fencil	meg.fencil@sustaincharlotte.org	Sustain Charlotte	Statesville will be an important North-South connection for the transit network. However, more street crossings are needed in this area to make riding transit safe and appealing.
Meg Fencil	meg.fencil@sustaincharlotte.org	Sustain Charlotte	CNT's Urban Opportunity Agenda identifies this area as a transit desert without access to entry-level jobs. See attached screenshot. The interactive map is at: https://uoa.cnt.org/
Remove overlapping Silver Line	kevin.walsh@hdrinc.com		
Indian trail			Work with local communities to incorporate local plans
Cornelius			Land use and transit supportive policies for HCT

CONNECT Beyond
A Regional Mobility Initiative

Name	Contact (Email)	Organization	Comment
Statesville			Abandoned RR
Will Washam	william.washam@charlottenc.gov	CDOT	Mobility Hub at Birkdale. Greenway connectivity between Birkdale and Downtown Cornelius is possible with projects that are built or funded and in design.
Andrew C. Bryant	abryant@lincolncounty.org	Lincoln County	eastern Lincoln growth is outpacing Lincolnton area. EL commuters are more uptown centric than Lincolnton.
David Hooper			Is there concern regarding having two HCT corridors that close to each other?
Dam Road			Dam Road near Walmart
HCT?			Lots of growth. Need something.
Michelle N			Significant growth
David			Any thoughts about conflicts with freight corridors and the growth of freight. Should we avoid freight growth corridors?
Erika Martin	emartin@mooresvillenc.gov	Town of Mooresville	Mooresville's plans call for a park and ride/future transit hub stop in the vicinity of Mt. Mourne. Specifically, such a facility has been considered along the new EWC.
Travis	travis.johnson@charlottenc.gov		HCT from Mooresville to Charlotte along I-77
Ron		iCATS	Recent bus network change to provide service from Mooresville to Charlotte. Follow up with Ron.
Lake Wylie	christopher.stephens@yorkcountygov.com	York County	Extend CATS bus route to HWY 274.
Phil			Does the 73 corridor from Concord to Albemarle as a HCT corridor make sense? Maybe another mode or mobility improvement?
snepal	snepal@harrisburgnc.org		HCT corridor along Hwy 49 parallel to commuter rail corridor.
Jason L			I-85 and 74/29 Corridor should both be considered. Bus on shoulder? Highway construction and NCDOT coordination
Randi			Garden Pkwy - Potential HCT corridor in the future

Name	Contact (Email)	Organization	Comment
Juan G. Garcia	juan.garcia@gastongov.com	Gaston County	Proposed Industrial and Mixed-use Residential development between Gaston and Lincoln counties
Randy	Rshank@stanlycountync.gov	SCUSA	The 73 corridor seems unrealistic through Concord. A better option is 52 to Richfield and 49 into CLT
Penelope Karagounis	pkaragounis@fortmillsc.gov	Town of Fort Mill	Proposed new 100 Bed Hospital -Fort Mill Medical Center
Pam DiGiovanni			Mega Site - Follow up to get more information
Ken		Stanly County Airport	New layout plan (master plan)
Lee Snuggs		RRRPO	Updating land use plan with Centralina
Jane Love	janel@cityofgastonia.com	Gaston Cleveland Lincoln MPO	ALT-CLT HSR Tier 1 preferred alt (Greenfield) proposes a station about here; though development is occurring here and elsewhere along the route. Gaston portion of the Alt map is attached.
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	S&D Coffee (top ten private employer Cabarrus County)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Atrium Health (top ten private employer Cabarrus County)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Amazon (top ten private employer Cabarrus County)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Amazon (top ten private employer Cabarrus County)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Amazon (top ten private employer Cabarrus County)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Speedway Motorsports (top ten private employer Cabarrus County)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Shoe Show (top ten private employer Cabarrus County)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	ACN (top ten private employer Cabarrus County)

Name	Contact (Email)	Organization	Comment
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Corning (top ten private employer Cabarrus County)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Hendrick Motorsports (top ten private employer Cabarrus County)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Great Wolf Lodge (top ten private employer Cabarrus County)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Concord Mills Mall (#1 tourist attraction in NC)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Sysco (top ten private employer Cabarrus County)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Rowan Cabarrus Community College (South Campus)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Cabarrus County DHHS
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Cabarrus Health Alliance
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Cooperative Christian Ministries (local food bank)
Andy Christy	christya@concordnc.gov	Concord Kannapolis Area Transit	Social Security and Vocational Rehab
David Hooper		RFATS	Panthers New Headquarters and Practice Facility
Phil Conrad	pconrad@mblsolution.com		The Harrisburg Station is an effort led by North Carolina Railroad Company and is proposed to be located at the intersection of NC 49 and Ruckus Road/Saddle Creek Court in Harrisburg.
Jason L		CATS	Remove commuter rail line section from Uptown south to where the rail line intersects
Jorge		HDR	Commuter rail hub at Gateway

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