

6: PUBLIC TRANSPORTATION

INTRODUCTION

The transit element of *Horizon 2040* evaluates recent and ongoing transit planning efforts and recommends policy-based strategies and system-level service improvements to enhance access and mobility for area residents.

The transit recommendations build upon previous and ongoing planning efforts and evaluate opportunities to create a system that serves existing and potential needs of the area while satisfying state and federal eligibility requirements for financial assistance. The plan's recommended improvements for Greenlink and Clemson Area Transit's existing service and programs were influenced by the *Horizon 2040* guiding statements and community input.

Transit Overview

Transit operators play an important role in the region's transportation system, which has the goal of providing people choices for how they move through the region. Given the limited resources available for transit, these operators seek to balance ridership (maximizing the amount of riders that can be attracted and served and not necessarily where people feel entitled to transit or where it is badly needed) with geographic coverage (how much service area is covered with the resources available, even if people around the service don't and won't use the service). These objectives often conflict as focusing on increasing ridership may require allocating resources on more densely populated areas, thereby limiting the total area the system can serve.

Transit riders generally fall along a spectrum ranging from captive riders to choice riders:

- **Captive riders** do not have access to or the ability to use a personal vehicle. For them, transit

options are essential. These riders include persons too young to drive, the elderly, persons with disabilities, and those without the financial means to own a personal vehicle.

- **Choice riders** could have access to a personal vehicle but instead choose to use transit. These riders include persons who decide not to own a personal automobile and those who decide to use transit for work, social, medical, or personal trips. Choice riders use transit to save money and for convenience, comfort, or environmental principles.

This theory traditionally assumes that the best way to improve transit is to increase the amount of choice riders, thereby increasing revenues and providing improved services to captive riders. However, choice riders usually make up only a small portion of overall ridership and the resources used to attract choice riders can reduce services for captive riders who depend on transit.

Before people become willing choice riders, transit service must be reliable and convenient. There are certain things that even choice riders must do, such as get to work on time. Therefore, a transit system's goal should be to provide service that is useful—service that gets people where they need and want to go in. By focusing on making transit both useful and convenient, it will better accommodate all users—captive, choice, and all others.

As an update to the traditional rider classifications, transit riders fall under the following categories:

- **Occasional riders** use transit infrequently and for diverse reasons; some use transit to go “downtown” or another transit-accessible place, while others use transit as a backup mode.

- **Commuters** take transit regularly but almost exclusively for work trips.
- **All-purpose riders** take transit regularly and for multiple reasons.

This theory recognizes that useful transit is simply a question of whether transit fits a rider's transportation needs.

Growth patterns in the study area make convenient transit service more complex and expensive to operate. To encourage transit use and provide more choice in transportation, a safe, comfortable customer delivery system with attractive and convenient amenities must be developed around bus stops. The customer delivery system requires a network of sidewalks, safe street crossings, and lighting. The efficiency of transit also depends on an interconnected street network suitable for bus traffic and convenient ways for riders to shift between public transportation modes. For these reasons, transit cannot be considered in isolation. The strategies presented in this chapter support improvements to the larger transportation system.

Types of Transit

People are more likely to use transit when service is convenient, dependable, and easy to use. While this level of service requires a complete network of roads, sidewalks, and bikeways, it also demands that the type of transit service matches the surrounding development context and ridership types and levels. Numerous types of transit exist, including.

- **Bus:** A common frequent-stop transit service using rubber-tired passenger vehicles powered by diesel, gasoline, battery, or alternative fuels within mixed traffic on streets. Service includes standard, circulator, and express (i.e., commuter).
- **Trolley:** A variation of bus transit that uses rubber-tired passenger vehicles powered by diesel, gasoline, battery, or alternative fuels within mixed traffic on streets. Vehicle design mimics vintage streetcars.

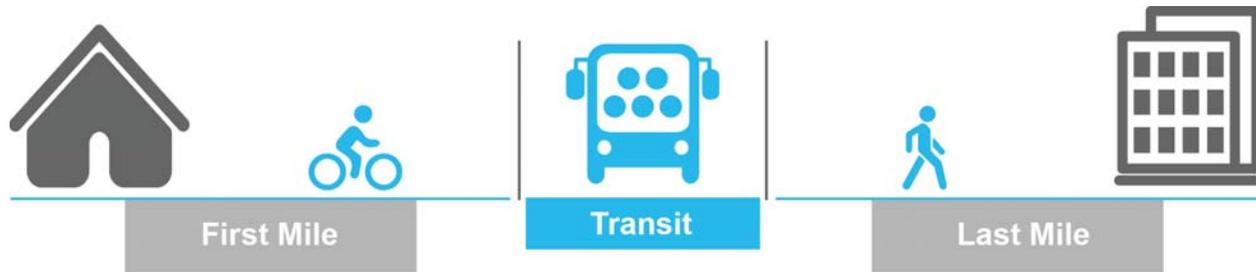


- **Light Rail Transit (LRT):** An electric railway with lighter volumes compared to heavy rail transit and characterized by one- or two-car passenger rail cars on fixed rails in shared or exclusive rights-of-way. Power typically drawn from an overhead electric line.
- **Heavy Rail Transit (HRT):** An electric railway characterized by high-speed passenger rail cars operating on fixed rails within separate rights-of-way from all other modes.
- **Personal Rapid Transit (PRT):** Small automated vehicles operating on specially-built fixed guideways with vehicles sized for individual or small-group travel.



Last Mile Problem

Unfortunately, transit services usually are unable to drop riders off directly at their destinations, creating something called the “last mile” problem. Transit riders rely on a good network of sidewalks, trails, and bike ways to move between transit services and their final destinations. The sidewalk network in the GPATS region is dilapidated, disjointed, and disconnected. Where sidewalks do exist, there often is adjacent traffic moving so fast it discourages use. Therefore, planning for active transportation infrastructure in tandem with transit routes is critical to the system’s success.



Source: ActiveSwitch.ca

RELEVANCE TO THE GUIDING PRINCIPLES

Early in the process, the *Horizon 2040* team established guiding principles for the development of recommendations. The transit improvements in this chapter were developed using these guiding statements.



Culture and Environment

An efficient transit system with adequate ridership has the potential to reduce congestion and emissions, providing environmental benefits to the entire region.



Growth and Development

Transit should be coordinated with land use decisions to create high quality transit corridors that are economic development tools and support ease of mobility.



Safety and Security

Improvements to the overall transportation system should focus on ensuring that transit riders have a safe way to access the transit system and reach their destination, including context sensitive street design that minimizes travel speeds, accommodates transit vehicles, and coordinates with other modes.



Economic Vitality

A functional and efficient transit system serves many destinations and provides access to jobs, health care, and commercial developments for a healthy regional economy.



Mobility and Accessibility

Transit is an important element of a balanced transportation system that allows residents to move easily through the region without a personal vehicle.



System Preservation and Efficiency

Increasing options for transit allows people to choose how they travel, which can lead to shared rides that minimize traffic, extending the lifespan of infrastructure.

Existing Services

GTA

Greenville Transit Authority (GTA dba Greenlink) primarily serves the Cities of Greenville, Mauldin, and Simpsonville, along with unincorporated Greenville County, with 11 fixed routes. Depending on the route, the frequency of the service ranges from 30–60 minutes. The majority of its services occur on weekdays, with fewer service hours on Saturdays. Besides the downtown trolley, no service is provided on Sundays and holidays. Greenlink recently conducted a Comprehensive Operational Analysis (COA), completed in 2017. One of the biggest challenges Greenlink faces is a lack of funding, while paratransit costs are continually increasing.

Peer Comparison

The planning team compared Greenlink’s service to five similarly-sized cities throughout the Carolinas, including Columbia, SC; Charleston, SC; Winston-Salem, NC; Greensboro, NC; and Asheville, NC. Compared to the peer average, Greenlink operates far fewer vehicles, provides fewer passenger miles and trips, and covers a much wider service area. However, Greenlink is extremely cost efficient, having the lowest operating expenses per peak vehicle trip, revenue mile, and revenue trip.

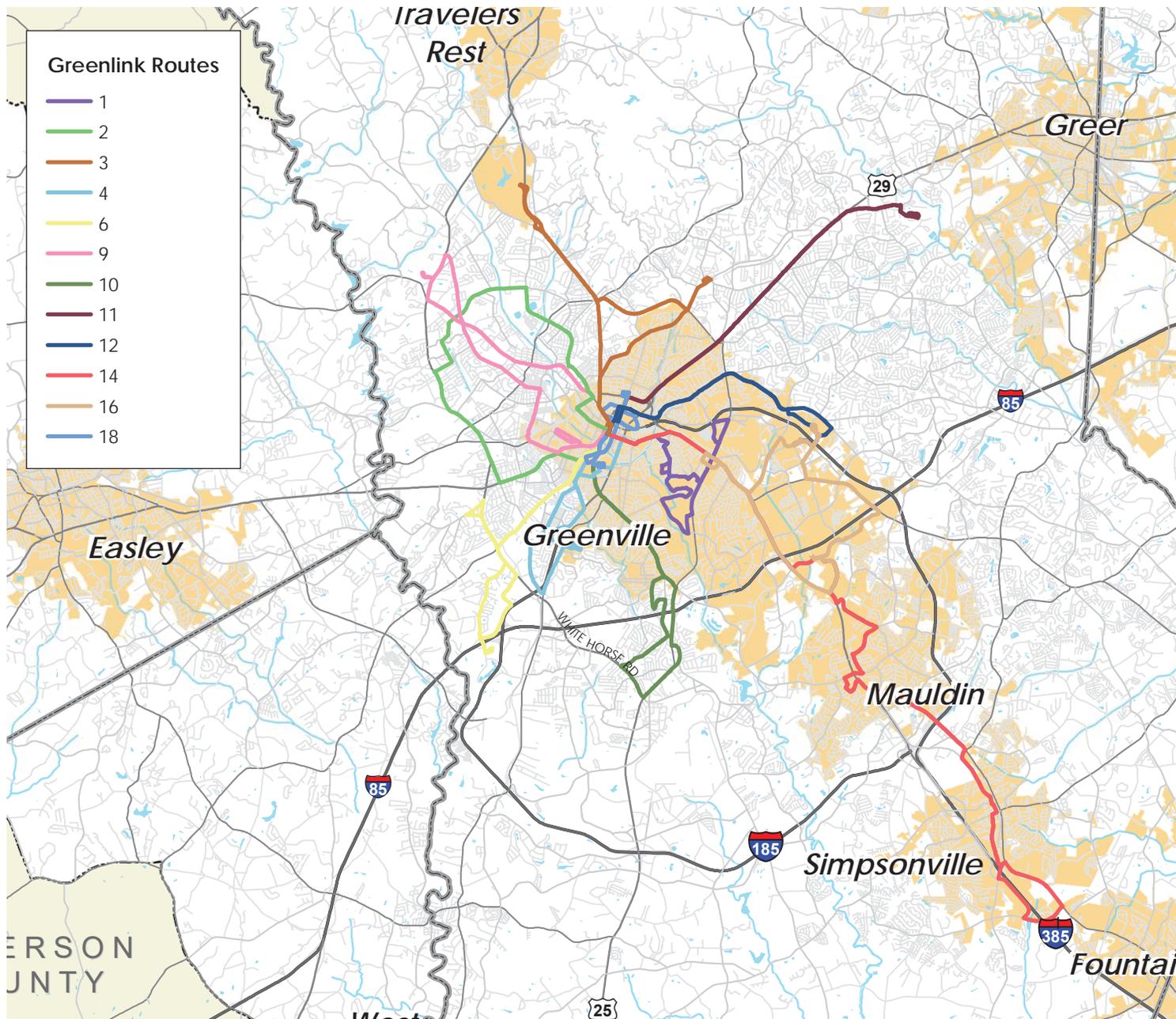
CAT

Clemson Area Transit (CAT) primarily serves the City of Clemson and Clemson University with 10 routes. This includes service to Seneca, Central, Southern Wesleyan University, Pendleton, and Tri-County Technical College. Depending on the route, the frequency of the service ranges from 7–60 minutes. The vast majority of its

services occur on weekdays, with little service on Saturdays and even less on Sundays and holidays. CAT just concluded a study that examined the state of its current service and ways to improve. One of the biggest challenges CAT faces is local traffic congestion, which causes delays along the routes. The Clemson Commuter route, which runs from the Clemson campus to Greenville, previously was operated by GTA before being taken over by Clemson University, who closed it to the public, allowing only Clemson students and staff to ride the route at this time.

Peer Comparison

A peer analysis of the CAT system recently was performed as part of the 2017 Clemson Reimagining Study, which found that CAT had the second-lowest operating cost per revenue hour of all systems in North Carolina, South Carolina, and Georgia. It also is the fourth most productive of the systems when judged by passenger boardings per revenue hour. CAT’s routes vary widely in their per-passenger operating cost due largely to the relative popularity of the campus-area routes compared to the low ridership of the commuter routes. The Red route has the highest weekday ridership at 3,000 daily boardings and has the lowest operating cost at \$0.77 per passenger. By contrast, the Seneca Express route has just 196 daily boardings and costs more than \$4.00 per passenger.



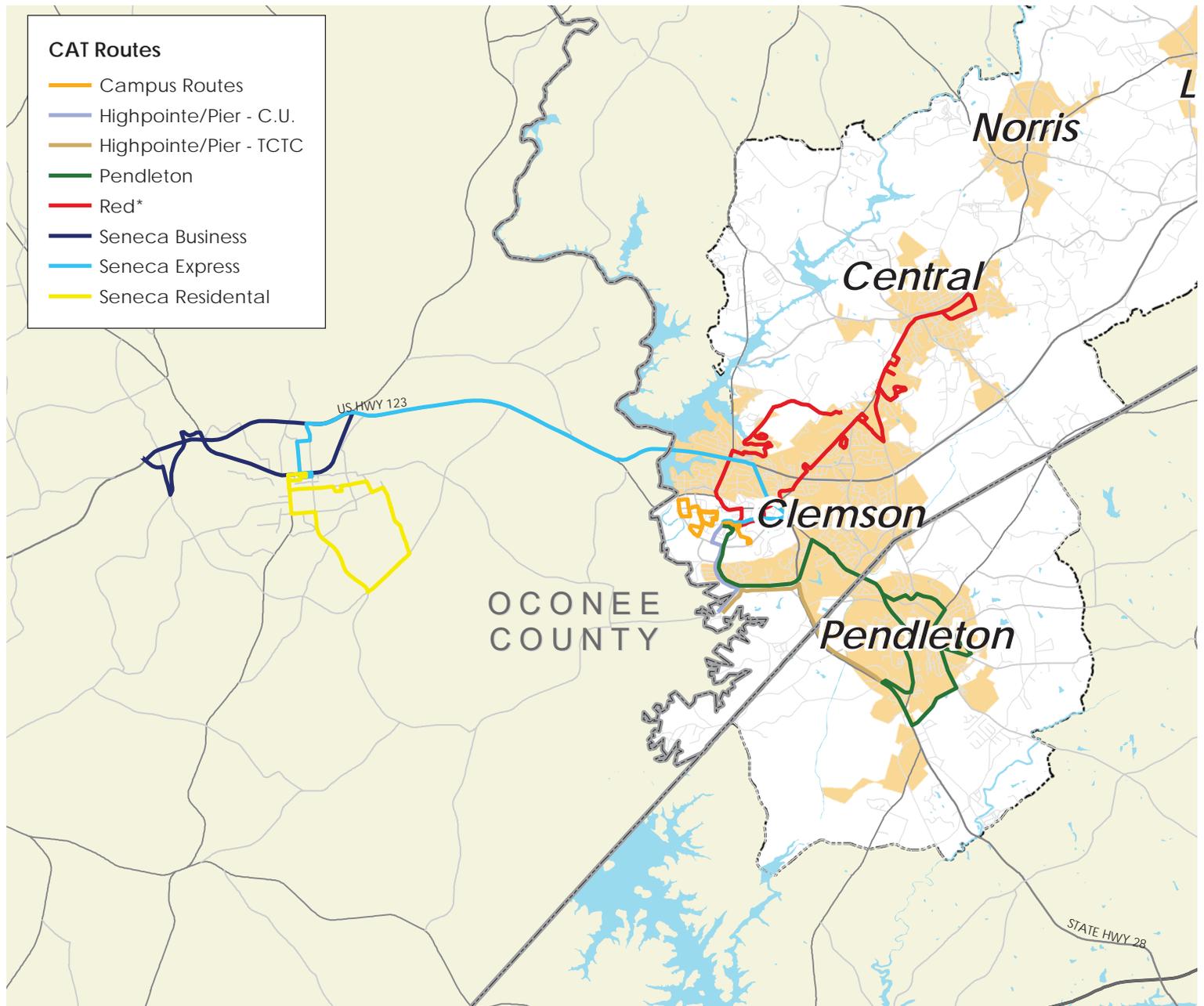
Existing Greenlink Routes

Greenlink currently operates 11 fixed routes and a downtown trolley on a “hub and spoke” system centered around the Downtown Transit Center in Greenville. Routes serve much of Greenville, areas of Mauldin, Simpsonville, and Travelers Rest, and part of the unincorporated area surrounding Greenville.

Existing CAT Routes

CAT operates 10 routes in the area around Clemson University. Three campus circulator routes (the Orange, Purple, and Blue) are consolidated on the map at right into a single line for simplicity.

The Red, Seneca, and Pendleton routes operate all year, while campus routes operate only during the fall and spring academic semesters.



Public Perception

Local residents, business owners, and officials provided input at many points throughout the planning process, such as at open house events, focus group workshops, and in a set of surveys. This constant engagement helped guide development of the *Horizon 2040* recommendations and further the project team's understanding of the region's existing transportation system. These comments generated insight into the region's perception of the public transportation system. Findings include:

- Many support the desire to increase the region's regional transit and transit-oriented development as a way to decrease highway spending and slow urban sprawl
- Many expressed a desire to expand the current transit service areas and service hours
- 63% of respondents to the December 2016 statistically valid survey said the region needs more public transportation
- 51% of respondents said they would like to see rapid transit in the region, while 39% said they would like better local bus service
- In the MetroQuest survey, respondents support "making it easier to travel between homes and jobs" as a top priority, indicating commuting is a major challenge for GPATS residents
- Some stakeholders expressed a need to plan for the long-term future through premium transit options, such as light rail, BRT, and high-speed rail connections to places outside the region

These findings indicate that public transportation in the region is generally thought of to be inadequate and in

need of improvements. The most frequently suggested improvements, both through *Horizon 2040* outreach process and Greenlink's COA, include:

- Increased frequency
- Service expansion to reach more destinations
- Expanded service hours
- Updated amenities, including real-time arrival information and on-board Wi-Fi

Challenges

Funding for capital improvements and operations remains one of the biggest constraints for CAT and Greenlink. Aging fleets and the need for vehicle replacement is a continual challenge as each system needs to continue to provide safe and reliable service for the foreseeable future.

Additionally, population in the GPATS region is largely dispersed, making the provision of convenient transit service more complex and expensive to operate. To encourage transit use and increase transportation options, the transit system must develop in tandem with a comprehensive network of sidewalks, safe street crossings, and bicycle infrastructure to allow riders easy travel to and from stops. The efficiency of transit also depends on an interconnected street network suitable for bus traffic and convenient for riders shifting between public transportation modes.

Changing Role

The role of transit has changed in recent years with technological advances and demographic trends. Services, such as Uber and Lyft, allow those without vehicles to call for a ride that takes them from door to door. The popularity of these services may decrease traditional transit ridership over the coming years but it also has the potential to increase the number of urban dwellers who live without vehicles. This would potentially increase the total ridership pool. Additionally, current trends suggest that fewer young people are getting drivers' licenses than in the past, potentially increasing the role of transit in our communities. Future LRTPs will more closely examine this issue as services develop and have a broader effect on transit.

Recommendations and Considerations

Greenlink’s current regional mobility planning efforts present a major opportunity to revamp transit beyond the outdated hub and spoke system. Transit can become a viable option that serves the needs of all rider types by connecting more communities, focusing on serving regional activity centers, and developing a comprehensive network that links routes throughout the area.

Priority Corridors

Over the years, there have been multiple transit projects and initiatives in the Upstate. Among these are several TIGER Grants to establish new transit corridors in Greenville County to connect all incorporated cities. These corridors include two primary routes: the Gold Line that would operate along US 276, connecting the municipalities of Travelers Rest, Greenville, Mauldin, Simpsonville and Fountain Inn; and the Blue Line, which would connect Greer to the network via US 29 and SC 291.

Since the expansion of the GPATS region after the 2010 census, another priority corridor has been identified along US 123 and SC 9 to connect Clemson, Central, Norris, Liberty, Easley and Greenville.

Transit in the GPATS area should develop to serve the needs of the local workforce and the transit-dependent community.

The map on the facing page depicts priority transit corridors that link major employment centers, medical services, and educational centers as well as serve the needs of the GPATS population. A system using similar

alignments would serve more employees than the region’s current routes and provide transit service to more communities within the region.

Policy Recommendations

- Expand service to connect more communities within the metro region.
- Provide extended service hours that better serve the needs of employers and employees.
- Prioritize service to areas that depend on transit as their primary means of mobility and to high-growth corridors as a means of traffic mitigation.
- Dedicate a percentage of Guideshare funding to transit system capital improvements.

Land Use Connection

To support higher transit ridership within the region, land use controls should encourage higher-density, mixed-use development near transit corridors. Among the most important investments will be Transit-Oriented Development (TOD), which is characterized by walkable, mixed-use development focused around transit service. These development types support increased transit ridership and the efficient use of land and also are a tool for economic growth.

In addition, pedestrian and bicycle connections near transit facilities must be prioritized to ensure the success of the overall system. A high quality sidewalk, trail, and bicycle network allows passengers to easily transfer between services or reach their final destination. It also encourages convenient and accessible use of public transportation.

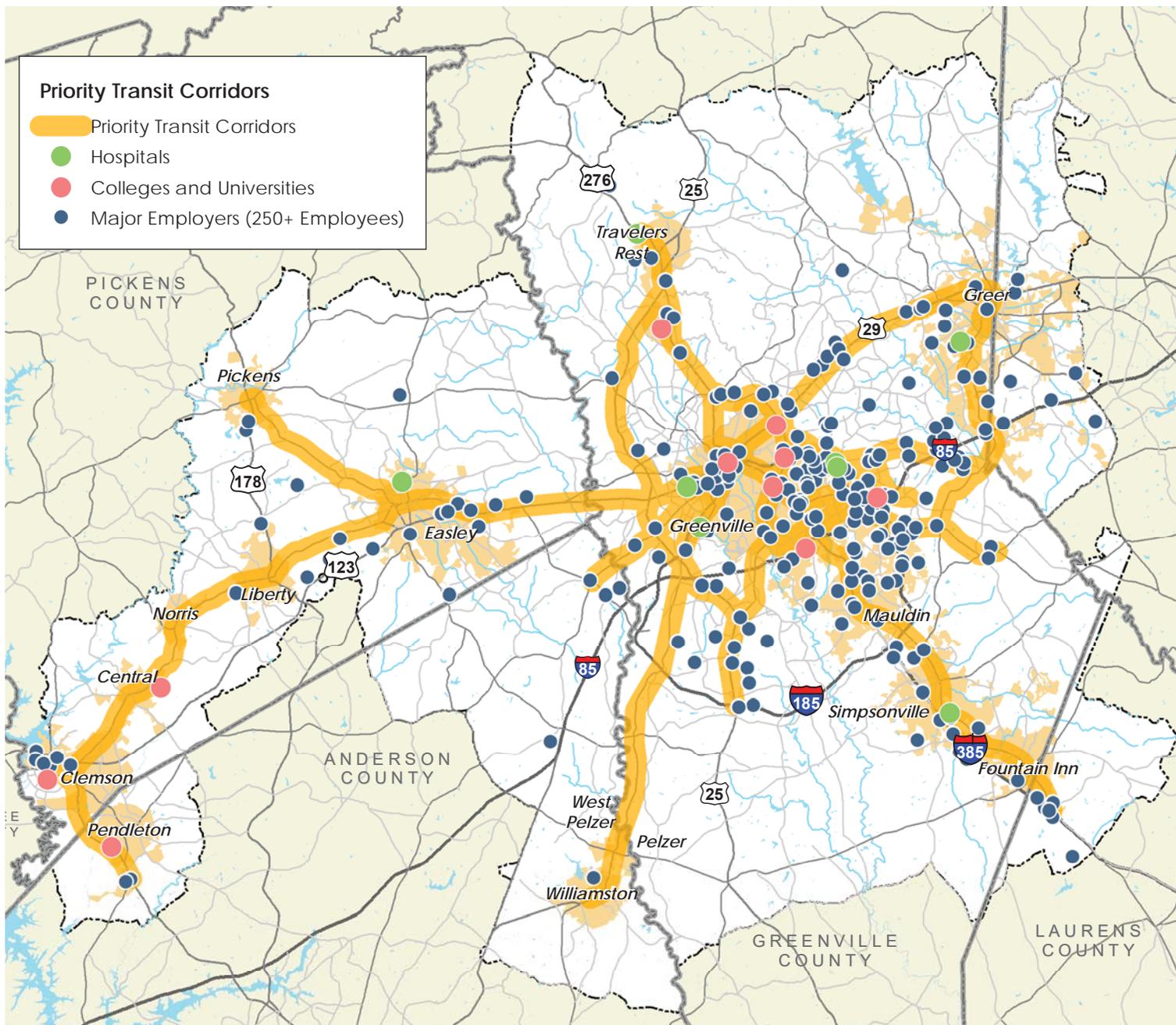
Coordination With Other Planning Efforts

Transit in the GPATS region is currently provided by two independent service providers—Greenlink and CAT. Each conducts its own planning efforts to assess short- and long-term transportation needs, evaluate routing and operations, and plan for capital improvements. GPATS’ role in regional transit is to act as an advisor to the transit service providers, assess and plan for long-term mobility needs on a regional scale, and coordinate the region’s apportionment of Federal Transit Administration (FTA) funding.

Because each service provider operates and plans improvements independently, the *Horizon 2040* transit recommendations provide policy and program guidance and regional system improvement guidance. However, GPATS depends on the transit providers’ detailed planning efforts to carry forward the regional transit vision.

The recommendations in this chapter were guided by many previous plans and planning efforts moving forward should continue to use the regional vision outlined in previous plans to assure the mobility needs of the GPATS region are met. These include:

- Greenlink Transit Vision and Master Plan (2010)
- Greenlink Transportation Development Plan (2011)
- GCEDC Personal Rapid Transit Evaluation Study (2014)
- Clemson Area Transit Reimagining Study (2017)
- Greenlink Comprehensive Operational Analysis (2017)
- Greenlink’s TIGER VII and VIII Plans



Priority Corridors

The map to the left shows corridors within the GPATS area that should be prioritized for transit expansion and development of high-quality transit service as the region considers future transportation investments. Together, the priority corridors connect nearly all municipalities within the region and offer connections to many major employment, healthcare, and educational destinations. By highlighting these corridors, the planning team does not intend to suggest specific routes, but rather to draw focus to connections the region should prioritize.

REGIONAL PASSENGER RAIL

Role in the Region

Amtrak currently provides passenger rail service to the GPATS region, using the Norfolk-Southern-owned “Crescent Corridor” that stops in Clemson and Greenville. Currently, service is provided at off-peak times, with the southbound train passing between 5–6AM and the northbound train between 10–11PM.

Current ridership of passenger rail is minimal and so is not modeled or factored into current regional travel patterns. Land uses around the Crescent Corridor have developed independently of the service in the past decades and the Clemson and Greenville stations are isolated from compatible uses, such as higher-density residential and mixed-use commercial development.

Planning for the Future

The prospects for improved regional Passenger Rail service have been explored for decades, but most recently, it was the focus of two major planning efforts:

- [Georgia Department of Transportation's \(GDOT\) Passenger Rail Corridor Investment Plan, Tier 1 Environmental Impact Statement \(EIS\)](#). Initiated in 2013, this environmental study is currently analyzing potential routes for improved passenger rail service between Atlanta, GA and Charlotte, NC. All three of the proposed routes pass through the GPATS region. The analysis is scheduled for completion in 2018, with additional analysis immediately following to analyze alignments and stations. GPATS regional planning for passenger rail will follow suit as the Georgia DOT's (GDOT) efforts progress.

- The Federal Railway Administration (FRA) is developing a nationwide passenger rail network for federal funding prioritization, starting with region-wide planning efforts. Throughout 2017, meetings were held for the [Southeast Regional Rail Plan](#) and a report is due in 2018. GPATS has served in a stakeholder capacity for this plan and results will be incorporated into future planning efforts.

As this system will be planned, determined, constructed, and operated by forces outside GPATS and largely beyond its decision-making jurisdiction, no recommendations regarding routes and stations are being made. However, this LRTP fully supports development of improved regional passenger rail systems.

Mobility Options

With potential for improved passenger rail service to connect the GPATS region to Atlanta, Charlotte, and points beyond, GPATS recognizes the need to coordinate transportation systems and land use

development to accommodate regional systems. Should improved passenger rail service be implemented throughout GPATS, the intensity of the chosen rail type will have a direct effect on existing infrastructure.

Improved Standard Amtrak Service



Upgrades to the Crescent Corridor, increased service, and shorter travel times could result in passenger rail assuming some intercity commuting traffic, particularly between Greenville, Clemson, and Spartanburg.

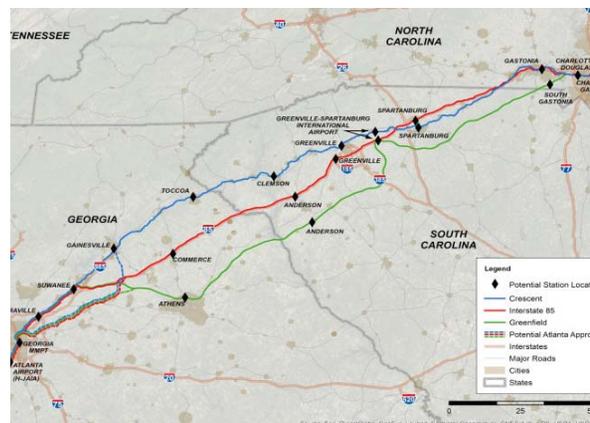
New Amtrak Services

Establishing new lines dedicated to passenger rail service would improve the system and increase ridership. New service should focus on linking commuter sheds, particularly to Columbia, Charleston, and Asheville, NC.

High-Speed Rail Service



Upgrading the Crescent Corridor or establishing new rail lines to accommodate rail speeds in excess of 200 miles per hour (MPH) would have a major impact on the ability to commute beyond existing vehicular travel times. Specifically, the Atlanta and Charlotte regions would become viable commute destinations. The inverse would also be true; commuters outside the region would be able to commute to the region without stressing the roadways.



Hyperloop/Mag-Lev



Exploratory and advanced technologies for passenger rail service are expected to increase competition for intercity, regional, interregional, and even national riders. With speeds

in excess of 400 MPH, commuting distances quickly become irrelevant, allowing residents throughout the Southeast and beyond to commute to the GPATS region and GPATS residents to commute wherever they wish to work, regardless of the job's location.

Recommendations

These options all depend on a user's ability to access stations. While regional residents may not need automobiles to reach stations, inbound users might rely on vehicular travel to do so. Space constrains and some users' reluctance to travel by vehicle to catch a train demand the exploration and provision of alternative modes, including transit, bicycle, and pedestrian infrastructure. The region should expect development at higher densities around stations and plan to mitigate these stresses to infrastructure.

GPATS is committed to actively planning for improved passenger rail service and to adapting to the circumstances as improvements are realized. Fortunately, GPATS and its member jurisdictions will have plenty of time to adapt infrastructure and land use policies once improved passenger rail service is announced, as it will take a number of years to implement. In the interim, GPATS is committed to improving the transportation modes that support regional rail stations.

PASSENGER AVIATION

Role in the Region

Air travel in the GPATS area continues to grow at a stable pace. Commercial flights are handled by the Greenville-Spartanburg International Airport (GSP), located at the eastern edge of GPATS, and numerous local airports and private airstrips serve as needed. The existing facilities have sufficient capacity to meet the needs of the region for the foreseeable future, but plans must be in place to accommodate new facilities when they are needed.

Planning for the Future

The GSP Master Plan, which can be found at <https://www.gspairport.com/airport-planning-documents/>, states that, with their current traffic projections, the "ultimate development of the GSP site" must occur by 2053. However, this will create adequate capacity for the foreseeable future. While this is beyond the horizon of this LRTP, it should be noted that increased air traffic at the region's only commercial airport will result in increased vehicular traffic. As GSP also serves freight operations, increased freight movement will also need to be considered. Additionally, GSP loses traffic to Atlanta and Charlotte, which have larger airports with more direct connections to farther locations. While GSP can provide connections to Atlanta and Charlotte, depending on flight timing and connection costs, fliers may choose to drive to another airport. As GSP's service grows, flights and markets will increase, making GSP a more attractive alternative to other airports.

Recommendations

While airport operations fall outside GPAT's jurisdiction, coordination with airports would yield partnerships that benefit the entire region. GSP should be at the table when discussing any regional or super-regional planning effort and GPATS should consider the local airports as well, particularly the Greenville Downtown Airport and the Pickens County Airport.

As service demands at GSP increase, the road and highway infrastructure will become more stressed, as will the means to connect passengers who do not possess a vehicle or wish to park at GSP, especially incoming passengers who need transport to their final destination. To this end, public transit service needs to be established at GSP, with connections to existing transit services. GPATS should also consider automated transportation network connections should these services be needed in the GPATS region.

As GSP is nearing capacity, it will also be prudent to keep the Greenville Downtown Airport and the Pickens County Airport in mind as possible partners in commercial service to relieve stress loads on GPS operations.