



**Wake Transit Bus Plan**

# **Service Guidelines and Performance Measures**

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# 1 Overview

## Introduction

In 2016, Wake County residents voted to fund the Wake Transit Plan. The Wake Transit Plan recommended a variety of transit services designed to link communities in Wake County and the surrounding region. It also included a range of solutions from high-capacity services, such as frequent bus routes, to lower capacity options, such as demand-response services. As part of investing in and growing the transit network, the Wake Transit Plan assured voters that their tax resources would be invested prudently and sustainably. The Wake Transit Plan Service Design Guidelines and Performance Measures are designed to help the Wake Transit Plan meet balance the two goals of implementing the Wake Transit Plan and maintaining financial sustainability.

The Wake Transit Plan Service Guidelines and Performance Measures establish a framework and rationale for the operation and investment in transit services in Wake County. Service design guidelines set consistent standards by service type, so that similar types of service are implemented the same way across the county, so riders can trust that services will be available when they need them. Performance measures track and report on the productivity of individual services and the overall network. The combined framework is intended to communicate a clear, consistent, and equitable investment strategy that is understandable to the Wake Transit Bus Plan's stakeholders, including transit riders, transit operators, elected officials, and taxpayers.

The service guidelines, route classifications, and performance measures included in this report reflect service operations and development envisioned by the Wake Transit Bus Plan. While the framework is designed to be flexible and accommodate changes, the Transit Planning Advisory Committee (TPAC) recommends that the guidelines, standards, measures, and targets are reviewed at least once every four years to ensure they continue to represent best practices and are successfully guiding development of the Wake Transit Bus Plan. Indeed, this set of Service Guidelines and Performance Measures, adopted in 2023 is an update of the original document produced in 2018.

## Wake Transit Plan and Individual Transit Providers

Wake County's transit providers—GoRaleigh, GoTriangle, GoCary, and GoWake Access — have agency specific service guidelines and performance measures that direct their local investments. These locally developed guidelines and measures both shape and communicate development and monitor the performance of transit service funded through local resources. An overview of the existing standards and guidelines used by individual providers is included as **Appendix A**.

The service guidelines and performance measures recommended as part of the Wake Transit Bus Plan consider—but do not entirely replicate—existing local measures and standards. Instead, the Wake Transit Bus Plan guidelines and measures are intended to supplement local policies

## Service Guidelines and Performance Measures





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and be utilized in parallel with any local measures and standards. The recommended guidelines and measures also reflect best practices developed by transit agencies across the United States.

It is anticipated that the service design guidelines and performance measures will be approved by both the Wake Transit Governing Boards and individual transit providers and be used to govern investments associated with the Wake Transit Bus Plan

## Key Terms

To help clarify key terms used throughout the report, below are four important definitions:

 GUIDELINE	 STANDARD	 MEASURE	 TARGET
A <b>guideline</b> is a policy that leads or directs a course of action to achieve a certain goal.	A <b>standard</b> sets the minimum investment required to reach the service classification. For example, this report sets standards for the span of service expected for demand-response service.	A <b>measure</b> is a reference point against which performance is evaluated. Measures can be evaluated against a baseline value or against a specific target.	A <b>target</b> is the defined value set for individual measures. For example, a target might be 20 passengers per revenue hour.

## Transit Service Guidelines and Performance Measure Goals

Aside from the adage “you can’t manage what you don’t measure,” there are several reasons why service guidelines are critical for transit agencies. Transit service guidelines and performance measures should:

- **Reflect the vision and goals of the overall transit network:** Transit service guidelines and performance measures reflect community values for transit service. An agency that values extensive geographic coverage above concentrating service in high-demand corridors will adhere to a different set of service guidelines and performance measures than one that focuses on most-efficiently serving demand. There is not a standard or accepted set of service guidelines and performance measures. However, the Wake Transit Bus Plan service guidelines and performance measures are designed to reflect the value of good transit service. Namely service that is efficient, effective, and customer friendly.
- **Ensure consistency among Wake County transit service providers:** The Wake Transit Bus Plan is in a unique position of developing a network of transit services that will be implemented by multiple independent operators. Establishing overarching service

guidelines and performance measures that apply to all operators will set baseline expectations for a consistent, integrated, and coordinated network of services.

- **Provide transparency:** Service guidelines and performance measures provide benchmarks and performance indicators that reflect realistic and appropriate levels of productivity and cost-effectiveness. These indicators track the development of the network and can be shared with elected boards and members of the public. Accordingly, the service guidelines and performance measures must be easy to understand, directly related to network goals, and instill confidence in the stakeholders.
- **Establish evaluation criteria for all services:** Service guidelines and performance measures include evaluation metrics and tools to shape, define, and evaluate individual transit routes and the emerging transit network. The guidelines will direct attention and investments to specific parts of the network. They will also create a clear, consistent, and equitable framework for decision-making and investment.
- **Prioritize funding:** By conducting frequent service evaluations, transit providers can identify areas of short-term and ongoing additional funding needs. As an example, longer-term projects such as expanding park-and-ride facilities may not arise in traditional transit guidelines, standards, and measures, but they are critical in ensuring ridership growth if capacity is maximized.
- **Support Federal Transit Administration (FTA) compliance:** Transit service will be implemented using a combination of local and state funding, as well as FTA federal funding. Transit operators who receive FTA funding are required to adhere to a series of policies and regulations, including requirements associated with Title VI of the Civil Rights Act of 1964. The FTA monitors these requirements through a triennial review process. However, by integrating service guidelines and performance measures into management practices, there is an assurance of compliance. The guidelines, standards, measures, and targets included in this document are consistent with the FTA Circular 4702.1B (Title VI), which includes establishing service guidelines for vehicle loads and headways, on-time performance, service availability, and equitable distribution of transit amenities and vehicle assignments.

## 2 Transit Service Policies, Design Principles and Best Practices

### Overview

Transit service design guidelines are intended to match the product (type of transit service) with the market (who is going to use it). While the entire document describes the transit service policies and design principles that guide implementation of the Wake Transit Plan, this section focuses on the key decisions that create the building blocks for other parts of the process. This includes – for example – the policies and options for allocating service by area and the categorization of service types. These policies lead to Service Design Guidelines (Chapter 3) and the Performance Measures (Chapter 4).




























### Service Coverage/Availability

Service coverage standards guide the development of new services, not existing services. They are used to evaluate when to provide new services, including the characteristics of any new service, such as the service type and quantity. **The Wake Transit Plan has set a strategic direction for new services, so that transit service will be available to 55% of the population and 81% of the jobs within Wake County.** As of 2021, the Wake Transit Plan was close to meeting these goals and by 2027, the investments project that the plan will meet the goals for residential and job access within  $\frac{3}{4}$  of a mile of all day transit service.

In a rapidly growing and urbanized area, like much of Wake County, it is likely that the Wake Transit Plan will need to continue to update bus services to match the underlying markets. Transit market analyses prepared for the Wake Bus Plan in 2023 estimate the need for future services based on population and employment forecasts and available development plans. As mentioned, new bus services should reflect the underlying markets and needs for service and be coordinated with population and employment densities, demographic data and development factors such as the supply and/or cost of parking, traffic conditions, etc. (see Figure 1).



Figure 1 | Transit Supportive Population and Employment Densities

LAND USE			TRANSIT	
Land Use Type	Residents per Acre	Jobs per Acre	Appropriate Types of Transit	Frequency of Service
 Downtowns & High Density Corridors	>45	>25	 Light Rail  BRT  Rapid Bus  Local Bus	 10 mins or better
 Urban Mixed-Use	30-45	15-25	 BRT  Rapid Bus  Local Bus	 10-15 minutes
 Neighborhood & Suburban Mixed-Use	15-30	10-15	 Local Bus	 15-30 minutes
 Mixed Neighborhoods	10-15	5-10	 Local Bus  Micro-transit	 30-60 minutes
 Low Density	2-10	2-5	 Micro-transit  Rideshare  Volunteer Driver Pgm	 60 mins or less or On Demand
 Rural	<2	<2	 Rideshare  Volunteer Driver Pgm	 On Demand

Source: Thresholds based on research by Nelson\Nygaard.

## Service Allocation

Service allocation guidelines refer to the balance of transit investment between “ridership” and “coverage” oriented service (see Figure 2). Most transit agencies and systems offer a balance between these types of services. Ridership-oriented transit services typically operate in higher-density urban areas; these routes are almost always more resource intensive because they operate frequently, for longer hours of the day and carry higher numbers of riders. Coverage-oriented services operate in rural or lower-density suburban areas; they tend to be less resource intensive but less productive. In some areas a combination of services is appropriate, such as feeder routes or shuttles that provide connections to higher-capacity transit services, like bus rapid transit or light rail (see Figure 2).

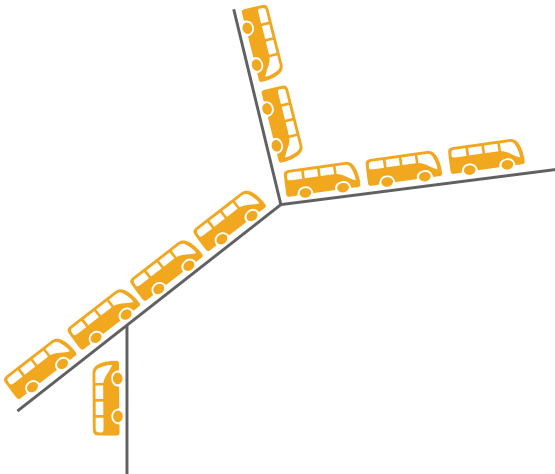

Policy guidelines shape how transit investments are allocated between these two types of services. The Wake Transit Plan set a goal for the entire Wake Transit Plan of providing approximately 70% of the Transit Plan’s operating dollars to “productivity” services that will be justified by high ridership. For purposes of the Wake Transit Plan ridership or productivity routes, are defined as bus routes that operate every 30 minutes or better. The Plan allocates the

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remaining 30% to coverage-oriented services. The Wake Bus Plan broadly defines coverage-oriented services as bus routes with frequencies of more than every 30 minutes.

As of 2023, the Wake Transit Plan has made significant progress towards that goal, with the network currently balanced with roughly 55% ridership and 45% coverage-oriented routes. By 2027, the 2023 Wake Bus Plan investments will shift the network to 68% ridership and 32% coverage.

Figure 2 | Productivity Model and Coverage Services

Productivity Services	Coverage Services
<p>The productivity model concentrates service on collector streets that serve denser areas with extensive pedestrian infrastructure. Service tends to be more direct, faster, and more productive (i.e., carrying more riders). Productivity oriented bus services tend to assume most people will walk to and from their bus route. Ridership-oriented services tend to feature higher frequencies, operate longer service spans, and carry more riders than coverage-oriented services. Examples include light rail and bus rapid transit, but also high frequency bus corridors.</p>	<p>The coverage model spreads bus service on more streets and more local services, even if service is less frequent. Coverage services provide nearby access to bus service with shorter walks. Coverage services tend to have lower frequencies and shorter spans of service. They also tend to carry fewer riders, as compared with ridership-oriented services. Examples include community bus routes, microtransit and dial-a-ride.</p>
	

Transit Service Policies

Transit providers directly control the product and set characteristics such as service quality (cleanliness of the vehicle, reliability of service, friendliness of the driver, etc.), service design (how efficiently the service transports passengers to their desired destinations), and the price of the trip or fare. However, transit agencies have less direct control over their operating



environments and many of the most significant factors influencing transit ridership, such as land use, including the number of people within walking distance of a transit route (density); the safety, comfort, and attractiveness of the built environment; the type of development (housing, jobs, shopping, etc.); and the amount and cost of parking.

Density is the largest single factor influencing transit demand, as the number of people within walking distance of a bus route determines the overall demand for travel, or market size. Accordingly, if there are more people living or working within walking distance (e.g., denser development), there are more potential users of the service. Further, because land tends to be more expensive in high-density communities, these areas also feature less parking and are more likely to charge for parking. Land use also shapes transit demand; office space, for example, usually has higher demand on weekdays while shopping areas may have demand on weekdays and weekends. Other critical factors influencing transit ridership are parking (limited parking and/or parking fees make transit relatively more attractive and pedestrian facilities, like sidewalks, crosswalks, and manageable street crossings.

The context of transportation and land use helps orient two of the building blocks that shape the service guidelines and performance standards: service allocation and route classifications.








## Route Classifications

Wake County is a large and diverse region. Consequently, the Wake Transit Plan consists of a variety of services, including high productivity/high-capacity services (frequent transit) to lower productivity, coverage-oriented services (local bus routes or demand-response services). Given different types of service require different levels of investment and have different operating expectations, the Wake Bus Plan uses a route classification system to categorize service types and set standards based on classifications. The classification system also facilitates investment and development of individual routes, by allowing individual routes to move up and down the classification hierarchy. This means that a route that over-performs the expectations for its classification category, could be “upgraded” with additional investment in service hours and frequency if it can meet the defined performance expectations.

In 2023, the Wake Bus Plan updated the classifications of bus routes funded by the Wake Transit Bus Plan: frequent routes; local routes; community routes; microtransit services; demand-response services; all-day regional routes; and peak-only routes. (Figure 3). Each service type is linked with service level guidelines and productivity measures outlined in subsequent sections. Bus routes included in the 2023 Wake Bus Plan are classified and listed in Appendix B.

Transit service design principles generally discourage route branches and service deviations because they complicate rather than simplify service. As a result, branches and deviations should be justified based on ridership or coverage goals and be judged according to the same standards as other similar routes when they are required.

Figure 3 | Transit Service Types in the Wake Transit Bus Plan

Service Type	Characteristics
 <b>Frequent Routes</b>	<p>Frequent routes are high-capacity, high productivity services that should operate along densely developed primary arterials with 15-minute or better headways during the day on weekdays. They form the “backbone” of the service network and provide connections to network hubs. Most other routes will connect to them, and routes should be simple and direct.</p>
 <b>Local Routes</b>	<p>Local routes also operate along primary arterials, but in areas of less dense development patterns. They also typically are anchored at a transit hub, either downtown or at the end of a frequent route or BRT. These routes offer relatively frequent, simple, and direct service, usually within neighborhoods or between local destinations. Routes are typically productive with moderate to strong ridership.</p>
 <b>Community Routes</b>	<p>Community routes serve low-density communities and neighborhoods, providing local connections or bringing passengers to transit hubs or higher capacity services. Community routes are exclusively focused on widening geographic service coverage, or “filling in the gaps” of the transit network. Productivity is usually low.</p>
 <b>All-Day Regional Routes</b>	<p>All-day regional routes provide longer-distance service connecting the major activity centers across jurisdictions on weekdays and weekends. They provide the backbone of the region’s transit network, and prioritize connecting transit centers to facilitate transfers. They have limited stops to provide fast travel times and use freeways and expressways where appropriate.</p>
 <b>Peak-Only Routes</b>	<p>Peak-only routes operate during traditional commuter peak-periods only, designed primarily to bring people from residential areas to employment centers. They make few stops, often at park &amp; ride facilities or transit centers, before traveling non-stop to the employment center via highways or freeways.</p>
 <b>Microtransit Services</b>	<p>Microtransit is an on-demand service in rural or low-density communities and can be operated directly by the transit agency or contracted with Transportation Network Companies. Services are typically curb-to-curb or door-to-door within a specified zone or based around designated “nodes”.</p>
 <b>Demand-Response Services</b>	<p>Demand-response service offers curb-to-curb or door-to-door service upon request. Services are well suited for serving low-density areas and can be provided by a range of providers, from traditional transit agencies to app-based ride-hailing providers. Demand-response service includes ADA paratransit service, which operates under specific FTA guidelines, serving individuals with disabilities and older adults</p>

## Transit Service Design Guidelines

While “good” bus routes can look different depending on their role or function within the network, they should all be relatively simple for both existing and new riders to understand. They should also be coordinated within the large system or route to facilitate transfer and access. The following section highlights best practices and service design guidelines to help service providers develop a network of logical, consistent, and user-friendly services.

### **Transit is best supported by mixed uses and density.**

Bus routes are more efficient when they serve areas of high transit demand, or areas where people live (i.e., residential density) and work (i.e., employment density). While density of jobs or residents are good indicators of transit demand, a mix of land use in the same areas can produce even more demand and either alone. Mixed use areas create a steady demand for transit throughout the day and evening. Other transit-supportive land uses include commercial and institutional areas, which attract large numbers of employees, patrons, and guides.

### **Service Should be Simple.**

A simple transit route design and simple schedules will attract more riders than a complex transit system. For people to use transit, they must be able to understand it, and simpler services are easier for riders to rely on them.

### **Routes Should Operate Along a Direct Path.**

Routes should be designed to operate as directly as possible to keep travel time lower while maintaining access to key destinations.

The fewer turns a route makes, the easier it is for riders to understand. Conversely, circuitous paths are disorienting and difficult to remember, which can impact the reliability of the route. Direct routes also maximize average speed for the bus and minimize travel time for passengers while maintaining access to service.

### **Route Deviations Should be Minimized.**

As described above, service should be as direct as possible. Consistent with this idea, the use of route deviations—traveling off the most direct route—should be minimized.

There are instances when deviating service from the most direct route is appropriate, such as avoiding a bottleneck or providing service to major shopping centers, employment sites, medical centers, schools, etc. In these cases, the benefits of deviating service from the main route must be weighed against the inconvenience caused to passengers already on board. Route deviations should be implemented only if:

- The deviation will increase the route’s overall productivity.
- The number of new passengers served is equal to or greater than 25% of the number of passengers inconvenienced by the additional travel time on any particular deviated trip
- The deviation does not interfere with the provision of regular service frequencies and/or the provision of coordinated service with other routes operating in the same corridor

- Pedestrian access to a large trip generator is unsafe due to a lack of infrastructure, or inaccessible due to a dendritic street pattern

In most cases, where route deviations are provided, they should operate for the entire service period. Exceptions are during times when the sites that the route deviations serve have no activity—for example, route deviations to shopping centers do not need to serve those locations early in the morning before employees start commuting to work.

## **Major Routes Should Operate Along Arterials.**

Frequent and local routes should operate on major roadways and should avoid deviations to provide local circulation. Riders and potential transit users typically have a general knowledge of an area's arterial road system and use that knowledge for geographic points of reference. The operation of bus service along arterials makes transit service faster and easier for riders to understand and use. This principle applies only to routes with a productivity-based strategy.

## **Routes Should be Symmetrical.**

Routes should operate along the same alignment in both directions to make it easy for riders to know how to return to their trip origin location. For example, if a route follows High Street into downtown, it should use High Street on its outbound trip. Exceptions can be made in cases where such operation is not possible due to one-way streets or turn restrictions. In those cases, routes should be designed so that the opposite direction alignments run parallel as closely as possible.

## **Routes Should Serve Well-Defined Markets.**

Service should be developed to serve well-defined markets. Ideally, major corridors should be served by only one route of each service type—for example, one frequent route and one local route, and not by multiple frequent routes or multiple local routes. Exceptions can and should be made when multiple routes should logically operate through the same corridor to unique destinations.

## **Services Should be Well-Coordinated.**

When multiple routes operate through the same corridor but serve different destinations, service should be coordinated to maximize utility and minimize redundancy. To avoid bunching buses and to balance loads, major routes of the same service type using the same corridor should be scheduled to operate at similar frequencies and should alternate trips at even intervals.

Most routes intersect with other routes at transfer centers, stations, and street intersections. At major transfer locations, schedules should be coordinated to the greatest extent possible to minimize connection times for the predominant transfer flows.

## **Service Should be Consistent.**

Routes should operate along consistent alignments and at regular intervals (headways). People can easily remember repeating patterns but have difficulty remembering irregular ones. For example, routes that provide four trips an hour should depart every 15 minutes. Limited

exceptions can be made in cases where demand spikes during a short period to eliminate or reduce crowding on individual trips.

## **Vehicle Type Should be Appropriate for Service.**

Transit vehicles should be matched to service types by vehicle type and capacity. For example, the standard fixed-route transit vehicle is typically a 40' transit bus and is appropriate for most services. However, high ridership routes may warrant 60' articulated vehicles, and conversely, lower ridership routes such as local routes or shuttles may only require 30' vehicles. Flex service and demand-response vehicles typically utilize smaller vehicles.

Additionally, as required by Title VI, transit providers must distribute vehicle assignments evenly throughout the system so newer vehicles are equitably deployed across the service area.

## 3 Service Level Standards

Service level standards help transit providers determine how much transit service to provide, given the underlying local market and operating conditions. Setting expectations for service levels also creates a coordinated and consistent network of service by establishing uniform standards for each service type.

The service level standards work in concert with the service productivity measures (Chapter 4) to create a network that is easy for operators to communicate with riders and stakeholders. The standards should work collectively to create a transit network that is productive and efficient.

The combined standards and measures also create a framework for expanding and contracting bus service. Transit operators can provide more service on any route or market, as deemed appropriate, but must provide at least the minimum proposed standard to meet the service type requirements.

The service level standards are determined based on five standards:

1. **Span of Service:** Sets route start and end times.
2. **Service Frequencies:** Recommends how often transit service is operated.
3. **Passenger Loads:** Establishes acceptable levels of passenger volumes relative to the number of available seats.
4. **Bus Stop Spacing and Amenities:** Recommends stop spacing and amenity investments.

As discussed, service level standards set required minimum service levels for each route type, including hours of service, service frequencies, and acceptable passenger loads. Investments in a route may be increased (longer service span or increased frequency), if or when ridership increases to levels that exceed maximum loading standards. Conversely, service may be reduced when ridership falls below the minimum productivity measures. Likewise, service spans may be lengthened to extend service earlier in the morning and later at night, if minimum productivity targets can be met.

### Minimum Span of Service

The span of service—operating hours—is the length of time a route is available, typically measured by the time a bus route begins and ends. It determines how usable an individual bus route is for riders. Consistent standards and expectations for the span of service also ensure the network overall will be able to offer connections and transfers between routes. However, operating hours are one of the most important factors in determining how much a route will cost. Developing an appropriate span of service—one that will meet rider and network needs, but not result in empty buses—is an essential component of an effective transit network.

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Service standards establish the required minimum span of service for each route type (Figure 4). The span of service varies by day of the week (weekdays, Saturdays, and Sundays), recognizing that the amount of activity, and consequently the need or demand for transit service, varies by day of the week. The standard reflects the **shortest** period of time that different route types of service should operate. The span of service for any individual route can be greater—but not less—than the standard. While transit operators may extend the span of service for any particular route, these trips must meet the minimum productivity and efficiency expectations for that category of service (see Section 4).

Figure 4 | Minimum Span of Service (Hours of the Day)

	Frequent Route	Local Route	Community Route	All Day Regional Route	Peak Only Route	Microtransit
Weekday	18	16	14	14	6	12
Saturday	18	16	12	12	Optional	Optional
Sunday	17	12	10	12	Optional	Optional

<sup>1</sup> Does not supersede ADA paratransit legal requirements.

## Minimum Service Frequencies

Service frequency reflects the time interval between two vehicles traveling in the same direction on the same route, or how often the bus serves a particular stop. Service frequency is critical to establish transit service as an attractive and viable travel mode, and significantly influences transit ridership. Like span of service, frequency has a significant impact on operating costs. For example, improving a route from a 60-minute frequency to a 30 minute-frequency doubles the route's operating costs. Because operating high-frequency service is so expensive, transit service frequency can vary throughout the day (i.e. peak and off-peak periods) to reflect existing or potential demand. Service frequencies are also set to ensure there are enough vehicles on the route to accommodate passenger volumes while not exceeding recommended loading standards.

The required service frequencies for routes in the Wake Transit Bus Plan are shown in Figure 6. These service frequencies set the *minimum* expectation for the frequency of bus service to ensure network compatibility. Consistent with the span of service expectations, transit operators are permitted to provide higher service frequencies. However, these additional trips are expected to meet the minimum productivity expectations for the category of service (see Section 5).

Service frequencies are listed in terms of “clock face intervals” (e.g., every 10, 15, 20, 30, or 60 minutes) as these intervals are easier for passengers to remember and can help facilitate better transfer connections between routes. Whenever possible, frequencies should be set at regular clock-face intervals. However, there are two key exceptions:

- Where individual trips must be adjusted away from clock face intervals to meet shift times, work times, transfer connections, coordinate with pulse schedules, or other special circumstances.



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- Where the desired frequency of service causes round trip recovery time to exceed 20% of the total round trip vehicle time. In such cases, the inefficiency of the schedule outweighs the benefit of a clock face schedule.

Figure 5 | Minimum Service Frequency (Frequency in Minutes)

	Frequent Route	Local Route	Community Route	Microtransit*	All-Day Regional Route	Peak-Only Route
<b>Weekdays</b>						
<i>Early AM</i>	30	60	60	—	60	—
<i>AM Peak</i>	15	30	30	20	60	3 peak direction trips
<i>Midday</i>	15	30	60	20	60	—
<i>PM Peak</i>	15	30	30	20	60	3 peak direction trips
<i>Night</i>	30	60	60	—	60	—
<b>Saturdays</b>						
<i>All Day</i>	30	60	60	Optional	60	Optional
<b>Sundays</b>						
<i>All Day</i>	30	60	60	Optional	60	Optional

\*Microtransit frequency is predicted wait time

Note: “—” indicates that the standard does not apply. Also, the standard applies to services that are provided, and does not imply that all services will be provided at all times.

## Vehicle Loads

Vehicle loads refer to the number of riders on the bus relative to the seating capacity of the vehicle. Vehicle loads are typically measured in terms of maximum standards to capture the time (or portion of the route) when the greatest number of riders are on the vehicle at the same time. They are also expressed in percentages to reflect the number of people on the vehicle in proportion to the number of seats. A standard of 100%, for example, sets a goal of ensuring every passenger has a seat. A standard of 120% allows for some standing passengers. If a bus route consistently exceeds the vehicle loading standards, additional capacity (more or larger buses) should be added to the route.

Transit providers can adjust services to keep the number of passengers on their vehicles at a comfortable level, always within the limits of safety. In peak periods, this means that some passengers may be expected to stand for a portion of the trip. In off-peak times and/or for services that operate over longer distances, service will be designed to try to provide a seat to all customers. Transit operators maintain passenger loads within acceptable levels by matching capacity to demand. They can accomplish this by matching vehicle types with ridership levels (i.e. assign larger vehicles to higher ridership routes) by increasing (or decreasing) the frequency of service.

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The Wake Transit Plan service standards set requirements for the maximum average vehicle loads by service type and time of day (Figure 6). The standard reflects the average number of passengers relative to seating capacity for both the peak and off-peak periods, at the busiest point on the route.

**Figure 6 | Average Vehicle Loading Maximums**

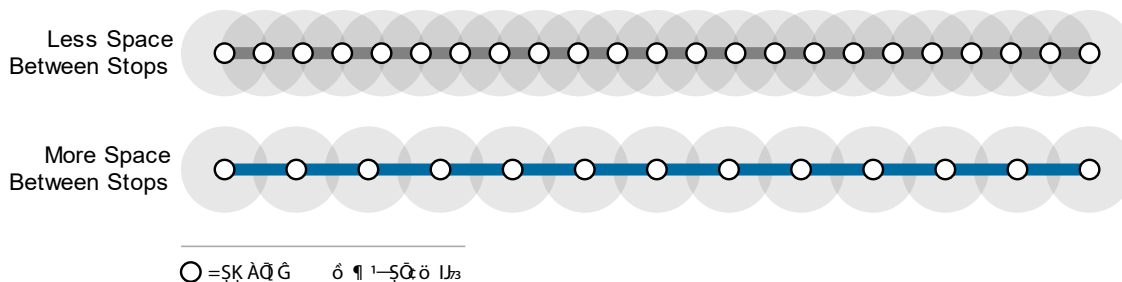
	Frequent Route	Local Route	Community Route	Microtransit	All-Day Regional Route	Peak-Only Route
Peak	120%	120%	100%	100%	100%	100%
Off-Peak	100%	100%	100%	100%	100%	100%

**Note:** Maximums are averages over one-hour periods; individual trips may exceed averages.

## Bus Stop Spacing

Spacing bus stops is an essential part of effective transit service. Closely spaced stops provide convenient access because riders are more likely to have a shorter walk to the nearest bus stop. However, closely spaced bus stops make bus service slow, as each additional stop requires the bus to decelerate, come to a complete stop, load, and unload riders, and then accelerate and re-merge into traffic. Since most riders want service that balances convenience and speed, the number and location of stops is a key component of determining that balance.

Bus stop spacing should also reflect service types. In general, services that emphasize speed and productivity (e.g., frequent routes) should have fewer stops that are spaced further apart, while services that emphasize accessibility (e.g., community routes) have stops spaced more closely together.



Standards for minimum stop spacing (or maximum stops per mile) are shown in Figure 8 |. Where multiple routes operate in the same corridor, the standard for the highest level of service operation applies. Exceptions to these standards should only be made in locations where walking conditions are particularly dangerous, significant topographical challenges impede pedestrian access, or factors compromise safe bus operations and dwelling. This includes level of walkability, the absence of pedestrian accommodations, and the presence of a dendritic street network throughout much of the region.

Figure 7 | Industry Standard Bus Stop Spacing Standards

	Frequent Route	Local Route	Community Route	All-Day Regional Route	Peak-Only Route
<b>Minimum Stop Spacing in Feet</b>					
<i>Moderate to High Density</i>	1,300	1,300	1,300	2,600	—
<i>Low Density</i>	1,300	1,300	1,300	2,600	—
<b>Maximum Number of Bus Stops per Mile</b>					
<i>Moderate to High Density</i>	4	4	4	2	—

Notes: Moderate to high density defined as greater than or equal to 4,000 persons per square mile; low density defined as less than 4,000 persons per square mile

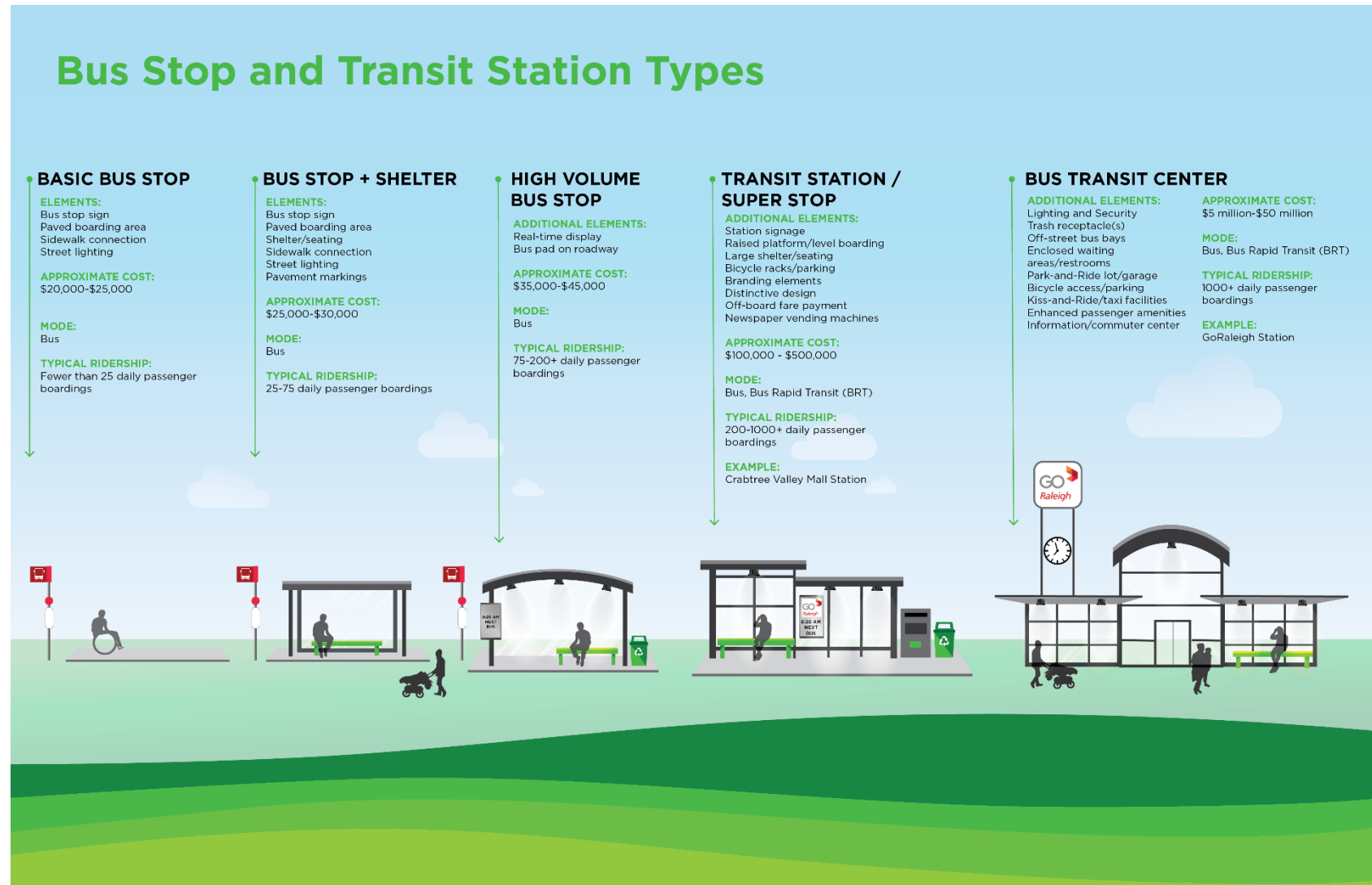
## Bus Stop Amenities

Bus stops should include passenger amenities that are appropriate for the level of passenger activity occurring at each stop. This standard serves several purposes: it ensures amenities are distributed with equity, as required by Title VI, as well as ensuring transit providers are efficiently investing capital resources in locations where it is most appropriate. Since passenger amenities enhance multiple routes, these standards are not specific to the type of service, only the total number of boardings, as described.

Where practicable, all new or improved bus stops and passenger waiting areas must conform to the ADA requirements as laid out in the Department of Transportation ADA standards for Transportation Facilities (2006). These standards specify a variety of requirements for platform surface, widths, and connectivity to surrounding sidewalk infrastructure and shelter facilities. As funds are available, existing bus stops and passenger waiting areas should be updated to meet ADA requirements.

Additionally, all stops should include clear signage. Additional amenities such as benches should be provided, as appropriate, depending on the level of passenger activity. Figure 9 provides a description of recommended amenities by type of stop.

Figure 8 | Bus Stop and Transit Station Types



## 4 Performance Measures

### Introduction

The Wake Transit Plan measures a combination of network-level and route specific performance measures. Network-level performance measures will measure progress towards overall goals and guide investment at a strategic level. An examples of a network-level performance measures in the Wake Transit Plan is the percentage of Wake County residents and jobs within  $\frac{3}{4}$  of a mile of all-day transit. Ensuring progress towards this goal is incorporated into the project prioritization process and determining where to develop new bus routes.

Route-level performance measures, on the other hand, are designed to ensure the productivity of individual bus routes matches the level of investment. The process of tracking and evaluating individual bus routes helps both the Wake Transit Plan and individual transit operators to identify which bus routes meet their performance targets, as well as routes that may be over performing the expectations for the classification and potentially warrant additional investment. Likewise, bus routes that are under-performing relative to their standards may require adjustments or reduced investment. In this way, the performance standards guide investment in individual bus routes and encourage transit operators to adjust service levels to match expectations.

Performance measures consist of a limited set of measures that capture the critical aspects of service productivity, efficiency, and effectiveness; at the same time, these performance measures can be easily reproduced and communicated. Performance measures are set for each of the six service classification types, recognizing that the productivity of individual bus route will be shaped by the underlying market and operating characteristics.

The performance measures included in this report were developed by:

- 1) Considering the existing performance measures and productivity levels of similar services as measured in the 2021 Route Performance Assessment.
- 2) Reviewing performance measures and productivity levels used by peer agencies, including both peers of the current network as well as peers applicable to the evolving transit network (see Appendix B).

### Updates to Performance Measures

In 2018, the Wake Transit Plan Service Guidelines and Performance Measures included four route-level metrics, one of which was designed to track service quality (on-time performance) and three related to service productivity (riders per hour or trip, cost per rider and farebox recovery rate). The 2018 guidelines and measures also set expectations for measuring customer satisfaction through a rider survey conducted regularly (see Chapter 6).

The 2023 Wake Bus Plan evaluated individual bus routes according to the metrics set out in the Wake Transit Plan Service Guidelines and Performance Measures. The analysis was based on

data for the month of April for the six-year period between 2016 and 2021. While the impact of the pandemic on transit ridership and bus route performance was clear, the evaluation process routes revealed opportunities and challenges with the approach developed in 2018, namely:

- In some cases, standards require adjusting because they were too stringent or too lenient. Examples include operating cost per rider and riders per trip.
- Farebox recovery ratio became meaningless when transit agencies eliminated fares during the pandemic. It also did not offer additional meaningful insights into route productivity beyond operating cost per rider.
- While on-time performance is an important measure of service quality, it might not be the most appropriate metric for the Wake Transit Plan.
- A renewed emphasis and desire to capture the value or impact of service, especially for the lowest income residents, people of color and other historically disadvantaged populations.

## Wake Transit Plan Performance Measures

As part of updating the Service Guidelines and Performance Measures in 2023, the Wake Bus Plan Working Group recommended adjusting the 2018 measures (or metrics) to focus on service quality, service effectiveness, service effectiveness and customer satisfaction.



### Service Quality

The Wake Transit Plan uses on-time performance to capture service quality. It measures how closely a transit service adheres to its published schedule, indicating the percentage of time a route is arriving on time, early or late. It is an important customer facing measure because it impacts service reliability.

- **On-time performance** – compares scheduled and actual bus departure and arrival times at fixed time points.



### Service Effectiveness

Service effectiveness measures provide insights into how many riders benefit from using Wake Transit Plan funded service compared to how much that service costs to operate and maintain. These measures are designed to ensure the Wake Transit Plan is a good steward of taxpayer funds. Service effectiveness is measured in two ways – productivity and cost effectiveness.

#### Productivity

The productivity of a bus route is measured according to:

- **Riders per revenue hour** – the number of boardings divided by the total number of hours the vehicles on a route are in service.

- **Riders per revenue trip** – the number of boardings divided by the number of trips a route makes during the day. Peer agencies use this metric as a more appropriate way to measure routes that run fewer trips each day over longer distances.

The standard sets a minimum for the average number of passenger boardings that a route should generate for each service hour (Figure 14). The standards vary by service type and by day of the week and time of day.

Figure 9 | Minimum Productivity Levels

	Frequent Route	Local Route	Community Route	Microtransit	All-Day Regional Route	Peak-Only Route
Weekdays – All Day	25/hour	15/hour	8/hour	2/hour	10/trip	10/trip
Weekdays – Early Morning and Late Night	15/hour	8/hour	8/hour	2/hour	6/trip	-
Saturday	20/hour	10/hour	8/hour	2/hour	8/trip	-
Sunday	15/hour	8/hour	8/hour	2/hour	6/trip	-

**Note:** “Early Morning and Late Night” refers to service before and after the minimum span of service. All day refers to the complete span of service, including early morning and late night service. “-” indicates that the standard does not apply.

### Cost Effectiveness

Measuring a route’s operating cost per rider shows how many people are using the bus route compared to how much it costs to run.

- **Operating Cost per Rider** – the amount spent on operating a bus route (fuel, vehicle maintenance and repairs, and operator wages and benefits) divided by the number of riders carried on the bus route.

Operating cost per rider varies by route type (see Figure 15).

Figure 10 | Operating Cost per Boarding

	Frequent Route	Local Route	Community Route	Microtransit	All-Day Regional Route	Peak-Only Route
Cost per boarding	\$5.00	\$10.00	\$10.00	\$30.00	\$10.00	\$10.00



### Service Impact

Productivity and cost effectiveness alone cannot capture the full impact and importance of transit service to individual neighborhoods and the region overall. A route that has low productivity, for example, may serve residents in neighborhoods with historic disinvestment and/or higher



concentrations of individuals and families with low incomes. The value – or impact – of these bus routes may not be reflected purely in cost per rider or rider per hour (or trip).

Rather than a standard, the Service Impact measure qualifies bus routes for a relaxed standard, given the added impact of serving low-income and historically disadvantaged communities.

- CAMPO's 2050 Metropolitan Transportation Plan developed a methodology to identify "communities of concern" for environmental justice analysis using six American Community Survey metrics: race (non-white), ethnicity (Hispanic or Latino origin), poverty (below 150% of the poverty line), elderly population (70+), vehicle availability (zero-vehicle households), and English proficiency (people who do not speak English or speak English "less than very well"). A block group meets the indicator threshold for each metric if the percentage of the targeted population is in the 75<sup>th</sup> percentile of all CAMPO block groups.<sup>1</sup>
- Bus routes would be eligible for the service impact bonus if at least 50% of the stops are located in or within one-quarter mile of block groups that meet at least four equity thresholds defined in CAMPO's Environmental Justice communities of concern.
- Bus routes that qualify for the service impact benefit would be required to meet the 80% standard for riders per hour / riders per trip and 120% of the standard for cost per rider. This is the same adjustment allowed for bus services operating between FY17 and FY21.

## Phasing Performance Standards

Service effectiveness performance measures are designed to evaluate routes in year 2027 of the Wake Transit Plan. Individual route performance is expected to improve as the overall network of transit service expands and improves. The standards set out in this document reflect the service effectiveness expected from a mature and complete transit network. Bus services associated with the Wake Transit Bus Plan will be phased in over time as are the expectations associated with individual routes. This approach ensures the performance targets will be appropriate for the life of the Wake Transit Plan. *Phasing does not apply to measures of service quality or service impact.*

The measure of productivity (riders per revenue hour and riders per trip) will be phased in over time, with individual routes and services evaluated according to the following schedule:

- Fiscal Years 2017-2021 – 80% of target
- Fiscal Years 2022-2026 – 90% of target
- Fiscal Year 2027 and beyond – 100% of target

The measure of cost effectiveness (operating cost per passenger boarding) is expected to decrease as service improves and ridership increases. For that reason, the phased schedule is the inverse and will be evaluated according to the following schedule:

- Fiscal Years 2017-2021 – 120% of target
- Fiscal Years 2022-2026 – 110% of target
- Fiscal Year 2027 and beyond – 100% of target

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<sup>1</sup> <https://www.campo-nc.us/transportation-plan/2050-metropolitan-transportation-plan-mtp>

## Applying the Performance Standards

The TPAC understands that transit providers are solely responsible for operating their services. As such, **transit providers have discretion to recommend and implement changes to their routes as needed.** Transit providers are encouraged to integrate the Service Guidelines and Performance Measures as they review and evaluate their transit services. This internal review process, as proposed for the Wake Transit Bus Plan, should consider transit operations as well as the impact of exogenous variables that may impact route productivity, such as gas prices.

However, the TPAC designed these performance standards and measures to strike a balance between setting realistic and achievable goals with a desire to encourage ongoing improvement. As such, the TPAC recommends that transit providers compare route performance relative to the Wake Transit Bus Plan standards. Routes that consistently over-perform relative to the Wake Transit Plan may warrant additional investment; and conversely routes that consistently under-perform relative to their standard may warrant a reduced investment. Recognizing that not every bus route will meet all performance standards, all the time, over-performing routes are defined as services that surpass at least three performance measures for three or more consecutive quarters. Under-performing routes are defined as routes that fall below the minimum standards for three or more performance measures for a period of three or more consecutive quarters.

Local transit providers will develop a report, submitted to the TPAC quarterly, that shows performance on individual performance measures at a route level. This report will also include information on the number of consecutive quarters the route has over- or under-performed relative to the standards. The TPAC will not be taking action on the routes on a quarterly basis, but transit providers will make the information available on a quarterly basis.

The TPAC recommends a tiered system for addressing over- and under- performing routes. This process is designed to be clear, consistent, and fair while ensuring the most cost-effective investments are prioritized.

1. New routes or routes undergoing significant changes (defined as a 20% change in revenue miles or hours) will be classified as new and exempt from performance measures services for a period of 18 months to build ridership and the market for transit services. This grace period is intended to reflect the major changes in transit service development in Wake County. The time period is longer than the one currently adopted by GoTriangle and GoRaleigh.
2. Local transit providers will review route productivity annually (in conjunction with the annual work plan process). **Routes identified as under- or over-performing will be considered as part of the local transit provider's existing route review process.** This process will be conducted in advance of the annual work plan development process and may consider corrective actions such as minor changes to include service design, strengthening connections, coordination with other routes; and/or marketing or information systems. Any actions resulting from this are at the discretion of the transit providers.
3. **Any significant changes to the funding of individual routes will be recommended as part of the update to the Wake Transit Bus Plan,** a process that is envisioned to occur at least once every four years. As part of this process, routes that have over- or under-performed relative to at least three of their respective standards for the past three or more consecutive quarters will be subjected to more strenuous review. This process will include reviewing:

- The specific performance measures where over- or under-performance has been recorded, including duration and the magnitude of the gap.
- Exogenous variables out of the transit providers' control may have contributed to over- or under-performance.
- Efforts under-taken by the transit provider to address over- or under-performance.

Routes that consistently over-perform set targets and have not received additional investment **may** be considered for additional resources. Additional resources may be used to advance the route classification to a higher tier or service (i.e., graduate service from a local route to a frequent route).

Likewise, routes that have exhausted their route development period and have not improved with annual adjustments **may** be recommended for a reduction or elimination of funding. For example, a reduction in funding may be used to move a route down a classification tier (i.e., from a community route to a demand response service).

## 5 Measuring Customer Satisfaction

Customer satisfaction is a critical element of the Wake Transit Plan as the vision adopted by the voters includes clear guidelines for enhancing customer service. The goal with these guidelines is a transit system that prioritizes accessibility, comfort, security, reliability, cleanliness, courtesy, and communication. Customer satisfaction measures also allow TPAC member agencies to understand if complaints are incidental to a particular individual or systemic to the overall network. Regular, periodic customer satisfaction surveys also allow Wake Transit Governing Boards to track satisfaction in the overall transit network as it evolves.

### Customer Satisfaction Survey

Each of the transit providers in Wake County will administer an annual customer satisfaction survey to gauge customer satisfaction (see Figure 18). The annual survey should include four key elements:

1. **Create a baseline survey:** The fiscal year 2019 survey will be the first comprehensive survey among all providers in Wake County. This survey will provide the baseline to compare future surveys against as transit improvements are implemented.
2. **Survey by provider and region:** The core of the survey instrument should include a set of identical questions for each transit provider. Uniform questions will allow the survey to provide comparable data among providers and assess regional satisfaction, while providing useful data to individual providers.
3. **Survey annually:** To utilize the survey as a performance measure, surveys should be conducted annually to monitor changes in customer satisfaction.
4. **Ensure statistical confidence:** The survey should obtain a 95% level of confidence for each provider.

Survey results should be reported annually to the TPAC, along with the network-level performance measures. Success or challenges identified in the survey process can be incorporated into the annual work plan review process to make minor adjustments as needed. Recommendations for major changes that result from the customer satisfaction survey process should be included in the major review process schedule.

Figure 11 | Onboard Customer Satisfaction Survey (20238 GoCary)

## PASSENGER SURVEY — Please tell us about how you use GoCary

El cuestionario en español se encuentra en el otro lado

1. In a **typical week** on how many days do you currently use GoCary? (Circle only one)

0 (None – Not a regular GoCary rider) 1 2 3 4 5 6 7

2. Before the pandemic which began in March 2020, on how many days a week did you typically use GoCary? 0 (Did not use GoCary then) 1 2 3 4 5 6 7

3. During the pandemic in 2020 and 2021, on how many days a week did you typically use GoCary? 0 (Did not use GoCary then) 1 2 3 4 5 6 7

4. What is the ONE main purpose for which you **most often** use the GoCary bus? Is it to go to or from1 ☐ Work 2 ☐ School/college 3 ☐ Shopping  
4 ☐ Medical/dental 5 ☐ Recreation/event 6 ☐ Other \_\_\_\_\_5. Please check **all** Triangle Region bus systems you use in a **typical week**1 ☐ GoRaleigh 2 ☐ GoTriangle 3 ☐ GoDurham 4 ☐ GoCary 5 ☐ Chapel Hill Transit  
6 ☐ Duke Transit 7 ☐ Wolfline 8 ☐ GoApex 9 ☐ Morrisville Smart Shuttle  
10 ☐ None of these6. Please mark **all** of the following that apply to you. Are you...1 ☐ Employed full time 2 ☐ Employed part time 3 ☐ Unemployed  
4 ☐ Homemaker 5 ☐ Student/Retired 7 ☐ Volunteer position7. If you are employed, are you currently working remotely or does your work require you to be onsite? 1 ☐ Remote only 2 ☐ Remote some days; onsite other days 3 ☐ Onsite only

8. Which GoCary routes do you use regularly? (Circle the ones that apply)

0 1 2 3 4 5 6 7 8 ACX

9. How old are you? \_\_\_\_\_ Years old

10. Do you identify as... 1 ☐ Male 2 ☐ Female 3 ☐ Non-binary 4 ☐ Prefer not to answer

11. Do you consider yourself to be... (Please check all that apply to you)

1 ☐ African American/Black 2 ☐ Asian 3 ☐ Caucasian/White  
4 ☐ Hispanic 5 ☐ Native American Indian 6 ☐ Other: \_\_\_\_\_

12. What language do you most often speak at home? (Check only one)

1 ☐ English 2 ☐ Spanish 3 ☐ Other: \_\_\_\_\_

13. What is your total annual household income? (Check only one)

1 ☐ Less than \$10,000 2 ☐ \$10,000 to \$14,999 3 ☐ \$15,000 to \$19,999  
4 ☐ \$20,000 to \$24,999 5 ☐ \$25,000 to \$34,999 6 ☐ \$35,000 to \$49,999  
7 ☐ \$50,000 to \$74,999 8 ☐ \$75,000 to \$100,000 9 ☐ More than \$100,000

14. How many cars or other vehicles are available for your use? 0 None 1 2 3 4 or more

15. Do you use a transit app on your cell phone? 1 ☐ Yes 2 ☐ No 3 ☐ No cell phone

If you use a transit app, which one? \_\_\_\_\_

In the past 30 days, how would you rate GoCary on the following services?

	Excellent	Very Good	Good	Neutral	Poor	Very Poor	Extremely poor	Does not apply
16. Buses running on-time	7	6	5	4	3	2	1	<input type="checkbox"/>
17. Frequency of service on weekdays	7	6	5	4	3	2	1	<input type="checkbox"/>
18. Frequency of service on Saturday	7	6	5	4	3	2	1	<input type="checkbox"/>
19. Frequency of service on Sunday	7	6	5	4	3	2	1	<input type="checkbox"/>
20. Hours the buses operate weekdays	7	6	5	4	3	2	1	<input type="checkbox"/>
21. Hours the buses operate Saturday	7	6	5	4	3	2	1	<input type="checkbox"/>
22. Hours the buses operate Sunday	7	6	5	4	3	2	1	<input type="checkbox"/>
23. Total time it takes for your usual trip	7	6	5	4	3	2	1	<input type="checkbox"/>
24. Service to all locations you want to go	7	6	5	4	3	2	1	<input type="checkbox"/>
25. Ease of transfer among GoCary routes	7	6	5	4	3	2	1	<input type="checkbox"/>
26. Ease of transferring between GoCary and other area bus transit systems	7	6	5	4	3	2	1	<input type="checkbox"/>
27. Cleanliness of the bus interiors	7	6	5	4	3	2	1	<input type="checkbox"/>
28. Cleanliness of the bus shelters and transit centers	7	6	5	4	3	2	1	<input type="checkbox"/>
29. Your sense of personal safety from other passengers on the buses	7	6	5	4	3	2	1	<input type="checkbox"/>
30. Courtesy & helpfulness of bus operators	7	6	5	4	3	2	1	<input type="checkbox"/>
31. Usefulness of information from 485-RIDE telephone operators	7	6	5	4	3	2	1	<input type="checkbox"/>
32. Usefulness of printed information such as schedule or brochures	7	6	5	4	3	2	1	<input type="checkbox"/>
33. Quality of <i>WIFI</i> service	7	6	5	4	3	2	1	<input type="checkbox"/>
34. The overall quality of GoCary service	7	6	5	4	3	2	1	

35. Of the services in questions 16 to 33 above, please list the three most important to improve or if service is already very good or excellent, to maintain?

Most important \_\_\_\_\_ 2nd most \_\_\_\_\_ 3rd most \_\_\_\_\_

Comments: \_\_\_\_\_

 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# Appendix A Existing Service Policies of Wake County Transit Providers

Four independent transit agencies operate public transportation services in Wake County. Each operator follows prescribed guidelines and performance measures to govern the provision of transit services (Figure 16).

Figure 12 | Wake County Transit Provider Policy Guidelines

Transit Provider	Governing Service Guidelines and Performance Measures
GoRaleigh	<ul style="list-style-type: none"> <li>GoRaleigh Service Change Initiation Policy</li> <li>GoRaleigh Rider Notification Policy</li> <li>GoRaleigh Shelter and Bench Policy</li> <li>GoRaleigh Title VI Program</li> </ul>
GoTriangle	<ul style="list-style-type: none"> <li>GoTriangle Regional Bus Service Standards</li> <li>GoTriangle Title VI Program</li> </ul>
GoCary	<ul style="list-style-type: none"> <li>Town of Cary Fixed Route Transit Service Standards</li> <li>Town of Cary Title VI Program</li> </ul>
WCTS	<ul style="list-style-type: none"> <li>Wake Coordinated Transportation Service Operations Guide</li> </ul>

## GoRaleigh Policies

Several GoRaleigh policies are related to transit service changes and the provision of transit amenities. GoRaleigh adopted its Service Change Initiation Policy in 2002. The policy states that no changes shall be made to a new route for at least six months after service initiation, unless safety, operational, or productivity issues warrant review by the provider.

GoRaleigh's Rider Notification Policy defines changes in transit service and outlines the required procedure for handling major service changes. According to GoRaleigh's Shelter and Bench Policy, shelters and benches are warranted at bus stops where there are at least 25 and 10 boardings a day, respectively. The policy states that special facilities should be provided, if necessary, at locations such as hospitals, clinics, senior centers, or recreation facilities serving seniors or persons with disabilities.

In addition to these written policies, GoRaleigh tracks:

- Predictive policy: Review routes with farebox revenue less than 50% of the systemwide average
- On-time performance: Defined as zero minutes early and five minutes late. Routes performing at 74.9% or less require review.

GoRaleigh also maintains standards based on Title VI requirements. These standards guide Title VI compliance, ensuring that minority and low-income individuals receive equitable transit service. The GoRaleigh Title VI Program defines the following standards:

- Load: Routes experiencing passenger load ratios between 1.01 to greater than 1.50 at any point should be reviewed
- Headway: Headways shall vary between peak periods and off-peak periods where demand dictates in order to minimize operating expenses and provide the most efficient service during weekday peak demand periods.
- On-time performance: 85% of trips should be completed no later than five minutes after the scheduled time point.
- Service availability: Evaluate the availability of transit service within Raleigh's minority Census Block Groups
- Passenger amenities: Provide bus shelters for stops with 25 daily boardings or more and benches for stops with 10 boardings or more.
- Vehicle assignments: Randomly assign vehicles to routes on a daily basis to ensure that buses are distributed equitably.

## GoTriangle Policies

GoTriangle's service guidelines are contained within the 2004 GoTriangle Regional Bus Service Standards. This document provides detailed expectations for GoTriangle services and establishes several service performance indicators, including:

- Unlinked Passenger trips per Vehicle Revenue Hour
- Cost Recovery Ratio
- Operating Cost per Unlinked Passenger Trip
- Subsidy per Passenger
- Unlinked Passenger Trips per Vehicle Revenue Mile

GoTriangle classifies routes as Peak Period, Daytime, Evening, or Weekend; routes are also classified as New (in operation for less than six months) or regular (in operation for six months or more) services. For each service standard, GoTriangle sets performance expectations based on the average of all routes in the category. Accordingly, once an average has been calculated, each route can be classified as low-performing (less than 75% of average), average (from 75% to 125% of average), or high-performing (greater than 125% of average).

According to the Regional Bus Service Standards, GoTriangle uses the results of the performance evaluation to address both low-performing routes and high-performing routes. Low-performing routes are defined as routes that score "low" on three to five indicators; depending on the indicators, GoTriangle will consider alignment modifications or schedule changes to improve performance. Passenger amenity improvements are often recommended for high-performing GoTriangle routes.

The Regional Bus Service Standards also guide Title VI compliance. Although Title VI evaluations are processed separately from service standards, GoTriangle evaluates additional indicators to compare predominantly minority Census tracts with predominantly non-minority Census tracts, to ensure they are distributing and allocating services, amenities, and other resources equitably. Indicators considered under GoTriangle's Title VI evaluation include:

- Impact on minority communities and minority-owned businesses during and after construction.



- Impacts that may be felt in minority communities, including increased traffic and the amount of available parking.
- Transit vehicle load factors between minority and non-minority Census tracts.
- Vehicle headways in minority and non-minority Census tracts.
- Distribution of amenities (benches, shelters, etc.) in minority and non-minority Census tracts.
- Transit access (distribution of transit services, number of people within a one-half mile walking distance to the system) in minority and non-minority Census tracts.

## GoCary Policies

GoCary developed Fixed Route Transit Service Standards in 2014, in part to ensure that the Town of Cary complies with nondiscrimination laws and regulations, including Title VI. The goal of the service standards is to establish policies necessary to ensure that GoCary service does not create disparate impacts on minority populations nor pose disproportionate burdens on low-income populations. Beyond this overarching goal, the document also outlines several standards:

- Vehicle loads: Vehicle loads should not exceed seating capacity on 30% or more of the trips provided on a given route, or exceed a load factor of 1.30.
- Vehicles will be assigned based on ridership demand.
- Service frequency: Thirty minute frequency on all routes during peak periods and 60-minute frequency on all fixed loop routes and off-peak period service
- On-time performance: Average system-wide on-time performance of 95%
- Service availability: Provide bus service to at least 50% of Cary residents living within three-quarters of a mile of a bus route
- Distribution of amenities: Provide a shelter at bus stops with over 20 boardings per day

## WCTS Policies

WCTS's Operations Guide (2015) outlines how the system's coordinated public and human service transportation operations are designed, operated, and delivered. The requirements and standards included in the Operations Guide are specific to coordinated service provision.

WCTS's primary service indicator is on-time performance. The Operations Guide states that the contractor is responsible for maintaining a minimum standard of "on-time vehicle trips" of 95% on both a daily trip basis and over the course of the contract period. The operations guide also sets several requirements regarding scheduling and dispatch, including:

- Daily scheduling sets a target that establishes that 99% of all trips (individual riders) do not spend more than one hour "in-vehicle" riding time.
- On-time performance measures the actual pick-up time with the scheduled pick-up time, as well as arrival prior to appointment time. A trip is considered "on-time" if the vehicle arrives for the rider within  $\pm 30$  minutes of the scheduled time in addition to arriving at appointment no later than appointment time. A minimum of 95% of all trips within Raleigh should be picked up within 60 minutes. Outside of Raleigh, a minimum of 95% of all trips should be picked up within 90 minutes.

## Service Guidelines and Performance Measures

### Wake Transit Plan – Wake Transit Bus Plan

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- The contractor should schedule and dispatch services that average at least 1.5 trips per hour monthly.

## Appendix B    Wake Bus Plan

### Classification of Routes

All Wake Transit Plan funded fixed route bus routes have been categorized according to the recommended and updated service guidelines (see Figure 13). Categorized routes include bus routes in the 2023 Wake Bus Plan and funded through Fiscal Year 2025.

Figure 13 Wake Transit Plan Funded Routes by Category (2023)

	GoRaleigh	GoCary	GoTriangle
<b>Frequent Route</b>	<ul style="list-style-type: none"> <li>▪ 1 Capital</li> <li>▪ 5 Biltmore Hills (FY24)</li> <li>▪ 6 Glenwood (FY24)</li> <li>▪ 7 South Saunders</li> <li>▪ 9 Hillsborough (FY24)</li> <li>▪ 11 Avent Ferry (FY25)</li> <li>▪ 15 WakeMed (replaced FY25)</li> <li>▪ 19 Apollo Heights</li> </ul>		
<b>Local Route</b>	<ul style="list-style-type: none"> <li>▪ 2 Falls of Neuse</li> <li>▪ 3 Glascock</li> <li>▪ 4 Rex Hospital</li> <li>▪ 8 Six Forks</li> <li>▪ 10 Longview</li> <li>▪ 12 Method</li> <li>▪ 16 Oberlin</li> <li>▪ 18 Poole</li> <li>▪ 21 Caraleigh</li> <li>▪ 27L Blue Ridge-Trinity</li> <li>▪ 36 Creedmoor</li> </ul>		
<b>Community Route</b>	<ul style="list-style-type: none"> <li>▪ 11L Southwest</li> <li>▪ 15L Trawick Connector</li> <li>▪ 17 Rock Quarry</li> <li>▪ 18L Poole-Barwell</li> <li>▪ 20 Garner</li> <li>▪ 25L Triangle Town Link</li> <li>▪ Wake Forest Loop</li> </ul>	<ul style="list-style-type: none"> <li>▪ 1 Crossroads</li> <li>▪ 3 Harrison Ave</li> <li>▪ 4 High House Road</li> <li>▪ 5 Kildaire Farm Road</li> <li>▪ 6 Buck Jones Road</li> <li>▪ 8 Cary Parkway</li> <li>▪ 7 Weston</li> <li>▪ 11 East Cary-Fairgrounds</li> <li>▪ 12 Apex-Cary</li> </ul>	
<b>All-Day Regional Route</b>	<ul style="list-style-type: none"> <li>▪ 33 Knightdale</li> <li>▪ 40X Wake Tech Express</li> <li>▪ 70X Glenwood North</li> </ul>		<ul style="list-style-type: none"> <li>▪ 100X Raleigh-RTC-Durham</li> <li>▪ 300 Cary-Raleigh</li> <li>▪ 305 Holly Springs-Apex-Raleigh</li> <li>▪ 310 Cary-RTC</li> </ul>
<b>Peak-Only Route</b>	<ul style="list-style-type: none"> <li>▪ 55X Poole Road Express</li> <li>▪ FRX Fuquay-Varina-Raleigh Express</li> <li>▪ WRX Wake Forest-Raleigh Express</li> </ul>		<ul style="list-style-type: none"> <li>▪ CRX Chapel Hill-Raleigh Express</li> <li>▪ DVX Duke-VA Express</li> <li>▪ ZWX Zebulon-Wendell-Raleigh Express</li> </ul>

## Appendix C Peer Review

Peer transit systems were identified through the National Transit Database (NTD) to determine appropriate performance measures for the Wake Transit Bus Plan. This process identified 11 peers, including four North Carolina agencies (Charlotte, Durham, Greensboro, and Winston-Salem); and eight national peers (Charleston, SC; Fort Wright, KY; Indianapolis, IN; Little Rock, AR; Madison, WI; Nashville, TN; Phoenix, AZ; and Richmond, VA). As a reference, the document also includes standards used by national leaders in transit service development and aspirational peers for Wake County. These agencies include the Regional Transit District in Denver; Tri-Met in Portland, Oregon; and Miami-Dade Transit in Miami; and Sound Transit in Seattle.

The information obtained in this peer review:

- Identifies best practices used in the setting and development of performance measures by transit agencies.
- Explores the existing productivity levels of transit providers operating service within Wake County
- Considers the performance standards achieved by similarly sized and positioned peer transit agencies, as well as three aspirational peers.

### Best Practices

This review of transit performance measures identified best practices that ensure performance measures are used in a constructive and appropriate way and work to encourage ongoing improvement and development. The most relevant of these best practices include:

- Setting performance standards based on route type.
- Adjusting performance expectations to reflect new and existing services.
- Calculating performance based on specific standards, not averages, which by design are continually shifting and result in an unstable baseline and target that can never be achieved.
- Collecting data on route performance quarterly, but evaluating routes annually

### Peer Systems and Underlying Operating Characteristics

The peer review includes operating characteristics (service area, service area population, annual operating costs, and peak vehicles) to help interpret relative performance (Figure 14 |). Data on both the operating characteristics and performance measures were compiled using the National Transit Database (NTD) (2021 reporting data). Figure 15 compares GoTriangle, GoRaleigh, and GoCary to the selected peers on several measures of service performance and efficiency, while Figure 15 provides the same information for WCTS.

As part of setting performance measures, this document balances what is realistic in Wake County today (2023) with the future expected investment in the transit network. The frequent and regional bus service operated by agencies in Denver, Portland, Miami, and Seattle are monitored under standards comparable to the Wake Service Guidelines and Performance Measures (see Figure 17).

Figure 14 | Wake County Transit Providers and Peer Systems – Fixed Route Service Statistics (2021)

City	Service Provider	Service Area Size (sq. mi.)	Service Area Population (2010)	Annual Operating Costs (in millions)	Fixed-Route Vehicles in Peak Service
<b>Transit Agencies Operating in Wake County</b>					
Triangle Region, NC <sup>2</sup>	GoTriangle	1,665	1,924,805	\$22.5	61
Raleigh, NC	GoRaleigh	125	474,069	\$31.4	75
Cary, NC	GoCary	59	173,587	\$3.9	11
<b>Peer Agencies</b>					
Charleston, SC	Charleston Area Regional Transportation Authority	138	351,988	\$16.8	52
Charlotte, NC	CATS	675	1,302,619	\$104.1	159
Durham, NC	Durham Area Transit Authority	93	283,506	\$24.8	43
Fort Wright, KY	TANK	267	278,653	\$19.0	97
Greensboro, NC	Greensboro Transit Authority	127	269,666	\$16.1	41
Indianapolis, IN	IndyGo	396	928,281	\$83.9	127
Little Rock, AR	Rock Region Metro	64	126,103	\$15.4	34
Madison, WI	Metro Transit	126	348,359	\$47.4	139
Nashville, TN	Metropolitan Transit Authority	504	694,144	\$76.5	117
Phoenix, AZ	Valley Metro	520	2,034,618	\$179.7	421
Richmond, VA	GRTC	185	492,198	\$44.9	122
Winston-Salem, NC	Winston-Salem Transit Authority	134	252,434	\$15.1	31
<b>Peer Average</b>		<b>269</b>	<b>613,547</b>	<b>\$53.6</b>	<b>115</b>

Source: National Transit Database (2021), U.S. Census and local provider data

<sup>2</sup> Includes service outside of Wake County

Figure 15 | Wake County Transit Providers and Peer Systems – Fixed Route Operating Statistics (2021)

City	Service Provider	Passenger Boardings per Revenue Hour	Passenger Boardings per Revenue Mile	Operating Cost per Passenger Boarding	Cost per Revenue Hour	Farebox Recovery (%)
Transit Agencies Operating in Wake County						
Triangle Region, NC <sup>3</sup>	GoTriangle	8.8	0.4	\$19.24	\$168.87	10.3%
Raleigh, NC	GoRaleigh	10.8	0.9	\$9.20	\$99.10	14.2%
Cary, NC	GoCary	4.3	0.3	\$20.87	\$89.90	9.5%
Peer Agencies						
Charleston, SC	Charleston Area Regional Transportation Authority	9.8	0.8	\$9.19	\$90.09	19.05%
Charlotte, NC	CATS	8.5	0.6	\$17.62	\$149.33	6.34%
Durham, NC	Durham Area Transit Authority	20.7	1.6	\$5.62	\$116.63	0.00%
Fort Wright, KY	TANK	7	0.5	\$14.28	\$100.69	9.16%
Greensboro, NC	Greensboro Transit Authority	11.3	0.9	\$8.95	\$101.04	7.47%
Indianapolis, IN	IndyGo	7.5	0.6	\$20.14	\$150.40	4.55%
Little Rock, AR	Rock Region Metro	9.9	0.7	\$12.71	\$126.26	5.45%
Madison, WI	Metro Transit	16.2	1.3	\$8.80	\$142.30	17.56%
Nashville, TN	Metropolitan Transit Authority	10.7	0.9	\$18.43	\$197.06	4.89%
Phoenix, AZ	Valley Metro	14.3	1.3	\$7.32	\$104.46	1.22%
Richmond, VA	GRTC	11.3	0.9	\$8.82	\$99.45	5.07%
Winston-Salem, NC	Winston-Salem Transit Authority	9.8	0.8	\$9.19	\$90.09	19.05%
Peer Average		22.1	1.7	\$4.38	\$93.62	20.4%

Source: National Transit Database (2021) and local provider data

<sup>3</sup> Includes service outside of Wake County



Figure 16 | Wake County Transit Providers and Peer Systems – Demand-Response and ADA Paratransit Statistics (2021)

City	Service Provider	Passenger Boardings per Revenue Hour	Passenger Boardings per Revenue Mile	Operating Cost per Passenger Boarding	Cost per Revenue Hour	Farebox Recovery (%)
Transit Agencies Operating in Wake County						
Wake County, NC	WCTS	1.3	0.1	\$44.52	\$57.44	48.1%
Triangle Region, NC <sup>4</sup>	GoTriangle	2.1	0.1	\$166.87	\$358.67	0.1%
Raleigh, NC	GoRaleigh	1.9	0.2	\$18.00	\$34.58	0.5%
Cary, NC	GoCary	1.1	0.1	\$127.74	\$138.11	1.8%
Peer Agencies						
Charleston, SC	Charleston Area Regional Transportation Authority	1.8	0.1	\$42.44	\$74.30	3.00%
Charlotte, NC	CATS	1.2	0.1	\$97.18	\$120.09	3.27%
Durham, NC	Durham Area Transit Authority	2	0.1	\$61.85	\$102.89	0.00%
Fort Wright, KY	TANK	1.4	0.1	\$55.30	\$76.10	8.46%
Greensboro, NC	Greensboro Transit Authority	2	0.1	\$33.60	\$67.80	1.60%
Indianapolis, IN	IndyGo	1.9	0.1	\$61.10	\$118.92	5.65%
Little Rock, AR	Rock Region Metro	2.3	0.1	\$28.75	\$65.43	5.81%
Madison, WI	Metro Transit	1.4	0.1	\$38.85	\$54.04	22.45%
Nashville, TN	Metropolitan Transit Authority	1.7	0.1	\$85.51	\$144.12	3.43%
Phoenix, AZ	Valley Metro	1.2	0.1	\$69.72	\$82.13	0.09%
Richmond, VA	GRTC	1.7	0.1	\$30.63	\$51.61	0.00%
Winston-Salem, NC	Winston-Salem Transit Authority	2.5	0.2	\$27.32	\$68.06	9.21%
Peer Average		1.8	0.1	\$52.69	\$85.46	0.05%

Source: National Transit Database (2021) and local provider data

<sup>4</sup> Includes service outside of Wake County

Figure 17 | Performance Standards Reported by Aspirational Peers

Frequent Route Performance Standards				
City	Service Provider	Passenger Boardings per Revenue Hour	Operating Cost per Passenger Boarding	Farebox Recovery (%)
Denver, CO	RTD	25	\$6.28	30%
Portland, OR	Tri-Met	15	--	--
Miami, FL	Miami-Dade County	30	--	20%
Seattle, WA	Sound Transit	N/A	N/A	N/A
Wake County, NC	Wake Transit Bus Plan (Proposed)	25	\$6.00	20%
Core Regional Route Performance Standards				
City	Service Provider	Passenger Boardings per Revenue Hour	Operating Cost per Passenger Boarding	Farebox Recovery (%)
Denver, CO	RTD	--	--	--
Portland, OR	Tri-Met	15	--	--
Miami, FL	Miami-Dade County	30 <sup>5</sup>	--	--
Seattle, WA	Sound Transit	25 (all day), 15 (limited service)	--	--
Wake County, NC	Wake Transit Bus Plan (Proposed)	20 <sup>6</sup>	\$6	20%
Demand-Response Performance Standards				
City	Service Provider	Passenger Boardings per Revenue Hour	Operating Cost per Passenger Boarding	Farebox Recovery (%)
Denver, CO	RTD	1.5	--	--
Portland, OR	Tri-Met	--	--	--
Miami, FL	Miami-Dade County	--	--	--
Seattle, WA	Sound Transit	N/A	N/A	N/A

<sup>5</sup> Passengers per trip<sup>6</sup> Passengers per trip

**Service Guidelines and Performance Measures**

**Wake Transit Plan – Wake Transit Bus Plan**

<b>Wake County, NC</b>	<b>Wake Transit Bus Plan (Proposed)</b>	1.5	\$30	5%
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Sources: TriMet Service Guidelines Framework (2014), RTD Transit Service Policies and Standards (2016), Miami-Dade Transit Service Standards (2009)