


KCATA COMPREHENSIVE SERVICE ANALYSIS

DRAFT Service Guidelines

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1. INTRODUCTION

The Kansas City Area Transportation Authority (KCATA) strives to provide quality transit service in a cost-effective manner that is consistent and equitable. KCATA must make a number of competing decisions on where demand is greatest, on which types of service would be most appropriate, and where limited resources can and should be used.
To do this, KCATA has developed this set of service guidelines that will be used to:

- Design service.
- Determine appropriate service levels.
- Establish minimum levels of service performance.
- Measure service performance.

These service guidelines have been developed as part of the KCATA Comprehensive Service Analysis (CSA) and apply to public transit service provided by KCATA. They have been used to develop the CSA service change recommendations and will be used on an ongoing basis to evaluate, adjust and improve service as demand and conditions change.
In most cases, the service guidelines define minimum thresholds that must be met, and most services would exceed the minimum thresholds. However, the guidelines are also designed to—within limits—provide flexibility to respond to varied customer needs throughout the KCATA service area.

Finally, it should be noted that adherence to these service guidelines is dependent upon resource availability, and in particular, the amount of funding provided by KCATA's local partners. In the event of constrained resources, KCATA will meet these guidelines as closely as possible, and will work to achieve consistency as resources permit.

2. KCATA SERVICES

The Kansas City Area Transportation Authority provides a family of services that are designed to meet a wide array of travel needs. These services include MAX bus rapid transit, urban and suburban local service, express routes, and Metro*Flex* demand-response service.
These service guidelines are based on a hierarchy of service types that includes:

- Key corridor routes
- Urban local routes
- Suburban local routes
- Commuter routes
- Lifeline services

The specific routes included in each category are shown in Appendix A.

KEY CORRIDOR SERVICES

The key corridor network consists of bus routes that serve high volume corridors with at least 50 trips per weekday and seven day-a-week service. Key corridor routes include MAX routes and other high volume ridership routes that form the "backbone" of the KCATA system.

MAX Bus Rapid Transit (BRT) Services: Metro Area Express (MAX) routes provide high-capacity, high-frequency BRT service. There are currently two MAX routes: Main Street MAX and Troost MAX.

High Volume Local Routes: Local routes that carry over 1,000 passengers per weekday that serve major activity centers and/or provide key connections with other routes, operate from early morning until late night, and operate seven days per week.

URBAN LOCAL SERVICES

Urban local routes are those that operate either entirely or primarily in densely developed areas, which is where the demand for transit is highest. These areas include:

- Kansas City, Mo.'s, core area (generally bounded by the Missouri River to the north, Swope Parkway and Van Brunt Boulevard/Hardesty Avenue to the east, 75th Street to the south, and the Missouri/Kansas state line to the west)
- Downtown Kansas City, Ks.
- Denser areas of the Northland, including North Kansas City, Mo.

SUBURBAN LOCAL SERVICES

Suburban local routes are local routes that operate either entirely or primarily outside of the densely developed urban areas, where the demand for transit is lower. Most of these routes operate in the Northland, east of Swope Parkway and Van Brunt Boulevard, in South Kansas City, Mo., as well as in suburban communities such as Independence, Mo., and western Kansas City, Ks.

COMMUTER ROUTES

Express routes are designed primarily to provide fast commuter service to and from downtown Kansas City, Mo. These routes generally operate on weekdays only, and many operate only during peak-periods. However, depending upon demand, some express routes operate for longer hours. Commuter routes typically serve at least one park-and-ride.

LIFELINE SERVICES

Lifeline services are provided in limited areas were there are demonstrably high levels of special need. For example, lifeline routes could be deployed to areas with high proportions of elderly residents, low-income residents, or households without automobiles. These routes may not meet the standards set for the local service network, but are maintained to provide a limited amount of service to meet critical needs. Lifeline services include KCATA's Metro*Flex* circulator routes that serve lower density areas where overall demand is too low to support fixed-route bus service. Some low-frequency, fixed-route services could also qualify as lifeline services.

3. SERVICE DESIGN GUIDELINES

KCATA strives to serve as many Kansas City metropolitan area residents, workers and visitors as it can with its available resources. KCATA seeks to balance its types of transit services to best match the varied travel demands, trip purposes and transportation patterns of riders and these sometimes competing demands. Service elements that will attract one type of rider to transit can deter other riders, and KCATA must balance these competing demands.

KCATA provides different service types to appeal to both transit-dependent and choice riders. KCATA services are intended to meet the basic transportation needs of residents in developed areas who cannot drive, and to provide compelling transportation options to those who can drive. For both types of riders—and those in between—there are specific service design principles that will improve service for nearly all riders.

SERVICE SHOULD BE SIMPLE

For people to use transit, service should be designed so that current and potential riders can understand and use the transportation options available to them. Most of the guidelines in this chapter are aimed at making service intuitive, logical and easy to understand.

ROUTES SHOULD OPERATE ALONG A DIRECT PATH

Routes should not deviate from the most direct alignment unless there is a compelling reason to do so. The fewer directional changes a route makes, the easier it is to understand. Conversely, circuitous alignments are disorienting and difficult to remember.

ROUTE DEVIATIONS SHOULD BE MINIMIZED

As described above, service should be relatively direct. The use of route deviations off of the most direct route should be minimized.

However, there are instances when the deviation of service off of the most direct route is appropriate; for example to provide service to major shopping centers, employment sites, schools, etc. In these cases, the benefits of operating the route off of the main route must be weighed against the inconvenience caused to passengers already on board.

Route deviations should be implemented only if:

1. Overall route productivity (in terms of passengers per revenue vehicle hour) would be equal to or better than without the deviation.
2. The number of new passengers that would be served is equal to or greater than 25% of the number of passengers who would be inconvenienced.
3. The deviation would not interfere with the provision of regular service frequencies and/or the provision of coordinated service with other routes operating in the same corridor.

In most cases, where route deviations are provided, they should be provided on an all day basis. 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 TRANSIT ROUTES SHOULD OPERATE ALONG ARTERIALS

Key Corridor routes should operate on major roadways and should avoid deviations off of these routes 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.

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 location of trip origin. All routes should operate along the same alignment in both directions, except 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 directions parallel each other as closely as possible.

ROUTES SHOULD SERVE WELL-DEFINED MARKETS

To make service easy to understand and to eliminate service duplication, service should be developed to serve clearly defined markets. Ideally, major corridors should be served by only one route of each route type. For example, one key corridor route and one commuter route, and not by multiple key corridor routes and multiple commuter routes. However, 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 to different destinations, service should be coordinated to maximize its utility and minimize redundancy. To avoid bunching of buses and to balance loads, major routes of the same route type that serve the same corridor should be scheduled to operate at the same service frequencies and should alternate trips at even intervals.

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 sequences.

For example, routes that provide four trips an hour should depart from their terminals every 15 minutes. Limited exceptions can be made in cases where demand spikes during a short period in order to eliminate or reduce crowding on individual trips.

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.

STOPS SHOULD BE SPACED APPROPRIATELY

Transit stops are the customers' access and egress points for transit services and should be conveniently located. However, transit stops are also the major reason that transit service is slower than automobile trips. Since most riders want service that balances convenience and speed, the number and location of stops is a key component of determining that balance.

KCATA provides different types of transit services that are tailored toward serving different types of trips and needs. Services that emphasize speed should have fewer stops, while service that emphasizes accessibility should have more frequent stops. Stop spacing guidelines, in terms of minimum stop spacing and the maximum number of stops per mile, are shown in Table 1. Exceptions to these guidelines should only be made in locations where walking conditions are particularly dangerous, significant topographical challenges impede pedestrian access, and factors compromise safe bus operations and dwelling.

Table 1: Recommended Stop Spacing

	Key Corridor		Urban	Suburban		
	MAX	Other	Local	Local	Commuter	Lifeline
Minimum Stop Spacing (feet)						
Moderate to High Density Areas	1,100	900	660	660	900	900
Low Density Areas	1,300	1,300	900	1,100	1,100	1,100
Maximum Stops per Mile						
Moderate to High Density Areas	5	6	8	8	6	6
Low Density Areas	4	4	6	5	5	5

Notes: (1) moderate to high density = greater than or equal to 4,000 persons per square mile; low density = less than 4,000 persons per square mile; (2) in areas where MAX operates in local service mode, Urban Local standards apply.

Bus stops with higher boarding activity levels should be equipped with appropriate passenger amenities as financially feasible. Bus stops located at locations that generate significant boarding activity and at intersections where routes make transfer connections should be prioritized to have passenger amenities.

SERVICE DESIGN SHOULD MAXIMIZE SERVICE

Service design can significantly impact schedule efficiency. Service should be designed to maximize in-service time and minimize out-of-service time.

4. SERVICE LEVEL GUIDELINES

Service level guidelines define when service should be provided and how often it should be provided. Three guidelines are used:

1. Minimum Span of Service
2. Minimum Service Frequencies
3. Maximum Passenger Loadings

These guidelines, in combination with the productivity guidelines (presented in Chapter 5), are used to determine appropriate service levels for each route. At a minimum, service should be provided based on the minimum span of service and minimum service frequency guidelines. Beyond that, additional service should be added to meet passenger loading guidelines, and to extend the span of service earlier in the morning and later at night if minimum productivity guidelines can be met.

On an ongoing basis, service should be added when ridership increases to levels that exceed maximum loading guidelines. Conversely, service should also be reduced when ridership falls significantly below the passenger loading guidelines.

MINIMUM SPAN OF SERVICE

The minimum span of service guidelines define the minimum period of time that different types of service should operate, in terms of the latest that service should begin and the earliest that it should end. Higher ridership services will have long spans of service, while lower ridership services will have shorter spans of service. Minimum span of service guidelines are presented in Table 3.

Based on demand, service can start earlier and end later, but subject to the minimum performance guidelines presented in Chapter 5. Note also that for some services and/or days, the span of service guidelines does not apply. In these cases, service will still often be provided, but based on other guidelines. For example, for commuter routes, the minimum service frequency guidelines (presented in the next section) specify that a minimum of three trips should be provided during both the AM and PM peak periods. In cases where urban local service is provided on weekends, that service would be provided based on the productivity standard presented in Chapter 5. In other words, service should be provided from as early and until as late as minimum productivity levels can be achieved.

Table 3: Span of Service Guidelines

	Key Corridor		Urban	Suburban	Commuter		
	MAX	Other	Local	Local	AM Peak	PM Peak	Lifeline
Weekdays							
Begin	5:00 am	5:00 am	6:00 am	6:00 am	--	--	9:00 am
End	12:00 am	12:00 am	7:00 pm	6:00 pm	--	--	3:00 pm
Saturdays							
Begin	5:30 am	5:30 am	--	--	--	--	--
End	11:30 pm	11:30 pm	--	--	--	--	--
Sundays							
Begin	5:30 am	5:30 am	--	--	--	--	--
End	11:30 pm	11:30 pm	--	--	--	--	--

Notes: The beginning span of service refers to the departure of the first inbound trip, and the ending span of service refers to the departure time of the last peak direction trip. "—" indicates that the guideline does not apply.

MINIMUM SERVICE FREQUENCIES

The minimum service frequency guidelines define the minimum service frequencies at which each type of service should operate. Based on demand, many services would operate more frequently, and in these cases, the service frequencies would be based on ridership and loading levels (as described in the next section). Minimum service frequency guidelines are presented in Table 4. Note also that when a corridor is served by multiple routes, effective service frequencies in the corridor would be more frequent than the frequencies for individual routes.

Table 4: Minimum Service Frequency Guidelines (Minutes)

	Key Corridor		Urban	Suburban		
	MAX	Other	Local	Local	Commuter	Lifeline
Weekdays						
Early Morning	30	30	60	60	--	120
AM Peak	10	15	30	60	3 Trips	120
Midday	20	30	60	60	--	120
PM Peak	10	15	30	60	3 Trips	120
Evening/Night	30	60	60	--	--	120
Saturdays						
All Day	30	30	60	60	--	120
Sundays						
All Day	30	60	60	60	--	120

Note: "—" indicates that the guideline does not apply. Also, the guidelines apply to services that are provided, and do not imply that all services will be provided at all times.

VEHICLE LOADING

KCATA strives to provide a seat to most passengers. During peak periods, it is expected that some passengers may have to stand, but the number of standing passengers will be kept to reasonable levels. Also, services will be designed so that when passengers do have to stand, they will not have to stand for long periods of time. On routes that operate for long distances on highways, and on all off-peak services, service will be scheduled to provide nearly all passengers with a seat.

Two different techniques are used to keep passenger loads within acceptable levels. The first is to match vehicle types with ridership levels, and to use larger vehicles on higher ridership routes. The second method is to provide more frequent service, with service frequencies set to keep passenger loads within the limits presented in Table 5.

These guidelines are presented in terms of maximum passenger loads as a percentage of seated capacity of the vehicle used to provide service (see Table 6), and average loads over any one hour period should be less than these levels. Where passenger loads exceed these levels, KCATA will deploy larger vehicles and/or increase service frequencies as financially feasible.

Table 5: Maximum Passenger Loading (as a Percentage of Seating Capacity)

Key Corridor		Urban	Suburban		
MAX	Other	Local	Local	Commuter	Lifeline
135%	125%	125%	125%	100%	125%

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

Table 6: Maximum Passenger Loads by Vehicle Type

	Seats (Typical)	Maximum Load
MAX	36-37	50
40' Transit Bus ("Large Bus")	40	50
30' Transit Bus ("Small Bus")	23	29
MetroFlex Vehicle	12	15

5. PRODUCTIVITY

KCATA must use its resources effectively and all routes should achieve a minimum level of productivity. These productivity guidelines use "Passengers per Vehicle Hour," a measure of the average number of passengers on each bus per hour of operation.

PRODUCTIVITY

With limited exceptions, all routes should attract a minimum number of passengers for each hour that buses are in operation (vehicle hours). These minimum productivity levels are presented in Table 7.

Table 7: Minimum Productivity Levels (Passengers per Vehicle Hour)

	Key Corridor		Urban	Suburban		
	MAX	Other	Local	Local	Commuter	Lifeline
Weekdays						
Early Morning	12	8	8	6	--	4
Late Night	12	8	8	6	--	4
All Day	30	24	15	12	12	4
Saturdays						
Early Morning	12	8	8	6	--	--
Late Night	12	8	8	6	--	--
All Day	27	20	15	12	--	--
Sundays						
Early Morning	12	8	8	6	--	--
Late Night	12	8	8	6	--	--
All Day	24	15	12	8	--	--

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.

In cases where routes do not meet minimum productivity guidelines, changes should be made to improve route productivity. These changes can include a variety of measures, including reconfiguring the route alignment to attract more passengers, eliminating particularly unproductive segments, and reducing service levels, as well as other changes. If no changes can be identified that improve productivity, steps may be taken to discontinue the route unless it serves a demonstrable critical need that is not served by other routes or services (including paratransit service).

In cases where service expansion is considered, ridership and productivity estimates should be developed that indicate that there is a reasonable certainty that the new service will meet the productivity guideline within 12 months of implementation.

APPENDIX A. ROUTES BY SERVICE CATEGORY – JUNE 2011

KEY CORRIDOR
#12-12th Street
#24-Independence Avenue
#25-Troost
#26-Troost MAX
#31-31st Street
#39-39th Street
#51-Broadway
#58-Main Street MAX
#71-Prospect
#101-Minnesota/State Avenue
#142-North Oak

URBAN LOCAL
#27-27th Street
#30-Northeast
#35-35th Street
#47-Roanoke
#53-Armour/Swope Park
#54-Armour/Paseo
#57-South Oak
#104-Argentine
#106-Quindaro
#107-7th Street/Parallel
#109-9th Street
#110-Woodland/Brooklyn
#121-Cleveland/Antioch
#123-23rd Street
#126-East 5th Street
#155-55th Street
#163-63rd Street
#175-75th Street

SUBURBAN LOCAL
#28-Blue Ridge
#129-I-29 Express
#133-Vivion/Antioch
#156-Red Bridge
#173-Casino Cruiser
#183-Green Independence
#229-Tiffany Springs MetroFlex
#284-Purple Independence
#285-Blue Independence
#291-Yellow Independence
#292-Orange Independence
#293-Red Independence

COMMUTER
#24X-Independence Express
#28X-Blue Ridge Express
#37-Gladstone
#37XX-N. Broadway Express
#38X-Meadowbrook Express
#38-Meadowbrook
#51X-Ward Parkway Express
#56X-Red Bridge Express
#55-Rockhill
#69X-Liberty Express
#102-Central
#132-Gracemor
#133X-Vivion/Antioch Express
#135-Winnwood
#152-Lee's Summit Express
#170-Blue Springs Express
#471- 71 Highway Express

LIFELINE
#136-Boardwalk/Antioch Connector
#137-Metro North/Antioch Connector
#237-Gladstone MetroFlex
#243-Antioch/Barry Road Connector
#244-NKC MetroFlex
#251-TMC Connector
#247-Westside MetroFlex
#252-Lee's Summit MetroFlex
#253-Raytown MetroFlex
#286-Silver Independence
#296-Bannister/Hillcrest MetroFlex
#298-South Kansas City MetroFlex