3 | Transit Service Guidelines

3 | Transit Service Guidelines

YRT/Viva's Transit Service Guidelines are intended to ensure that services are efficient, safe, and reliable.

YRT/Viva's Transit Service Guidelines are applied to conventional and Viva services. The guidelines bring clarity and consistency to the process of implementing, adjusting, and improving transit services, and allow flexibility to respond to customer needs and community expectations in an accountable, equitable, and efficient manner.

3.1 | Performance Indicator Guidelines

YRT/Viva reviews the performance of each individual route, and also reviews the performance of the whole system. System performance takes into account, for example, the way in which each category of route plays an important role for a particular customer market and how each category contributes to the success of the overall system. At the system-wide level, system performance is measured using the following indicators:

- Net Cost per Passenger and Passenger Boardings per Vehicle Hour
- Route performance
- On-time performance
- Trips not accounted for (missed trips)
- Mean Distance Between Failures (MDBF)
- Accident rate
- Route coverage
- Service levels and span of service
- Vehicle capacity
- Revenue/Cost ratio (R/C ratio)

These indicators are used to assess the reliability and cost-effectiveness of the service network. The indicators must be considered together (not individually), and the goal is to achieve a balance between them.

Net Cost per Passenger and Passenger Boardings per Vehicle Hour

The performance of individual routes is assessed by evaluating the net cost per passenger (regional subsidy per route), and passenger boardings per vehicle hour. These two indicators identify how well a service is being utilized by customers. The evaluation of boardings (including transfers) assigns additional importance to routes that carry an above average number of transferring passengers as these routes play a vital role in the performance of an effective transit network.

Route Performance Assessment

YRT/Viva utilizes Computer Aided Dispatch/ Automatic Vehicle Location (CAD/AVL) technology as a tool to help measure route performance. Reports are generated on various statistics of operational data, including travel time, passenger boarding, alighting activity and trips not accounted for (missed trips).

On-Time Performance

YRT/Viva has established a "trip start on-time" performance goal of 95 per cent for Viva service and 90 per cent for conventional service. The performance goal for "arrival last at stop" is 90 per cent Viva services and 85 per cent for conventional service. To improve on-time performance for trip start times, YRT/Viva continues to update schedules to reflect actual travel times.

Service Planning, Operations, Customer Service, and contractor staff work to improve on-time performance by:

- Analyzing routes departing less than 90 per cent on-time for conventional service
- Analyzing routes arriving less than 85 per cent on-time for conventional service
- Analyzing routes departing less than 95 per cent on-time for Viva service
- Analyzing routes arriving less than 90 per cent on-time for Viva service
- Identifying corrective measures
- Identifying schedule changes
- Developing interim operational measures
- Recommending technology changes and upgrades
- Recommending Bus Operator training
- Developing contingency bus requirements

Historical on-time performance for conventional and Viva routes is summarized in **Table 8**.

Trips Not Accounted For

YRT/Viva has set a "trips not accounted for" target of one to one and half per cent of all scheduled trips. YRT/Viva has implemented a process to track trips not accounted for by category. The tracking process includes:

- Mechanical breakdowns
- Operators sick/late
- 20 plus minute delay due to traffic
- Accidents
- Police, Fire, EMS Emergencies
- Inclement weather

Performance indicators hold YRT/Viva operations and maintenance contractors directly accountable for the number of trips not accounted for. Performance based contract incentives/disincentives ensure contractors operate a reliable service.

Mean Distance Between Failures (MDBF)

By tracking MDBF, YRT/Viva and its contractors can improve fleet reliability and provide better service to customers. **Figure 3** provides an example of how YRT/Viva tracks MDBF for each contract.

Accident Rate

Accident rate analysis provides a year-to-year, and month-to-month comparison of each contractor allowing YRT/Viva to examine trends, as shown in **Figure 4.** YRT/Viva measures all accidents by their profile to develop behaviour specific training programs that contractors can use to decrease accidents.

Table 8: On-Time Performance

Service		Target (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014* (%)
Conventional	Start of trip	**90**	76	81	83	86	88	91
	Arrival last stop	**85**	43	39	59	57	59	67
Viva	Start of trip	**95**	86	83	89	89	91	94
	Arrival last stop	**90**	16	16	42	45	51	56

* 2014 2nd Quarter Performance

Figure 3: Mean Distance Between Failures

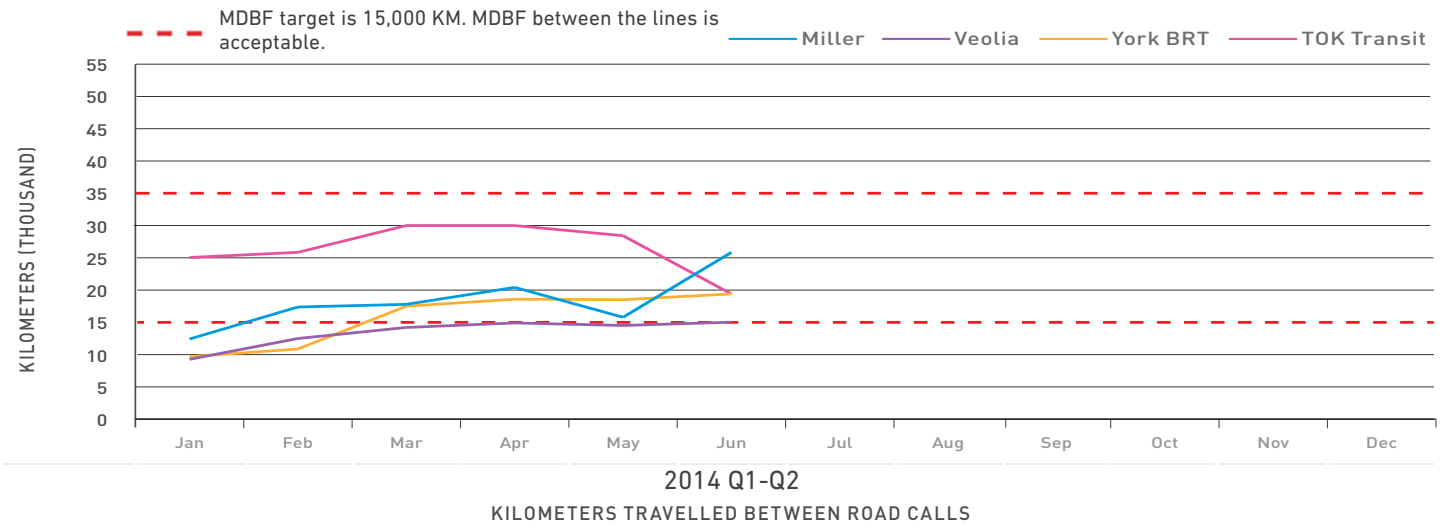
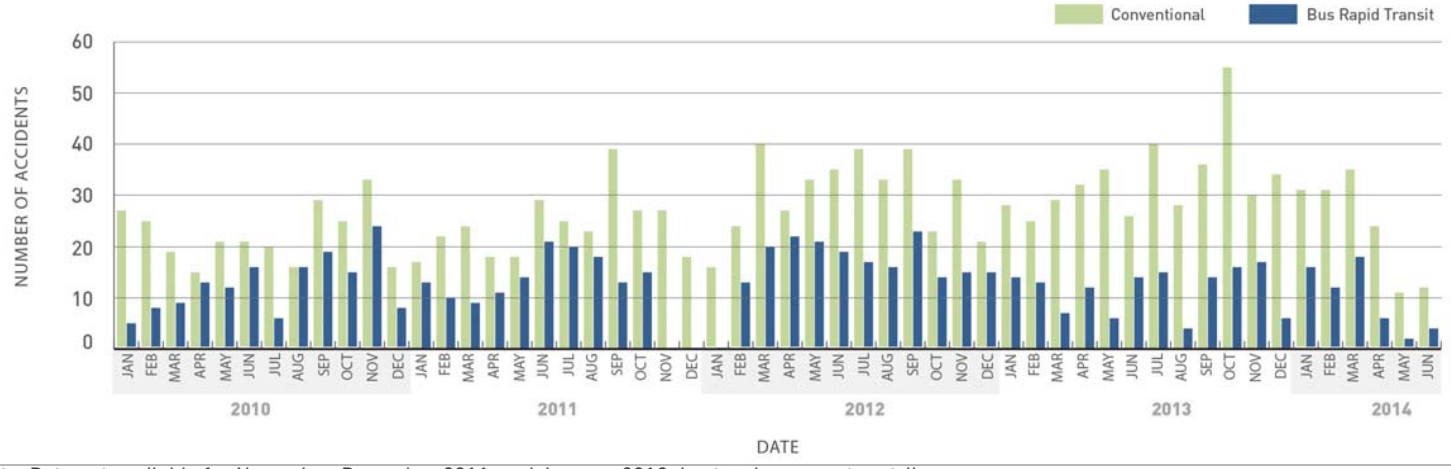


Figure 4: Accident Rate - Conventional vs. Viva



Note: Data not available for November, December 2011, and January 2012 due to a bus operator strike

Route Coverage

YRT/Viva will consider operating routes in urban areas that are beyond the maximum walking distance guidelines shown in **Table 9.** The objective of the guideline is to provide service to approximately 90 per cent of the urban area.

Service Levels and Span of Service

Minimum span of service and service levels are defined for Viva, Base, Local and Community Bus routes, but not for Express or GO Shuttle services.

Service frequencies for different times of day (service spans) are defined for Viva, Base, Local, and Community Bus routes, as shown in **Table 10**. Ridership levels are used to adjust service frequencies.

Service frequencies are not defined for Express or GO Shuttle services as these services target locations such as GO Stations and subway stations. Express services are scheduled on the basis of demand and vehicle capacity, and GO Shuttle services are scheduled to meet GO Train times.

Table 9: Walking Distance Guidelines

Service Period	Maximum Bus Stop Walking Distance
Monday to Saturday 6:00 a.m. to 7:00 p.m.	500 metres
All other periods*	1,000 metres

*Weekday and Saturday evenings, and all day Sunday/holiday

Table 10: Service Frequency Guidelines

Service Span	Viva Routes (in minutes)*	Base Routes (in minutes)	Local Routes (in minutes)	Community Bus Routes (in minutes)**
Weekdays				
6:00 a.m. to 9:00 a.m. 3:00 p.m. to 7:00 p.m.	15	30	60	120
9:00 a.m. to 3:00 p.m. 7:00 p.m. to 11:00 p.m.	15	45	80/90	120
Saturdays				
6:00 a.m. to 11:00 p.m.	15	45	80/90	120
Sundays/holidays				
9:00 a.m. to 11:00 p.m.	15	60	80/90	120

*Service frequencies are based on demand. The current range of frequencies for Viva is 3 to 22 minutes during rush hour.

**Where a Community Bus operates two branches and each branch operates a 120 minute frequency, the locations serviced by the Community Bus routes will have 60 minute frequency in opposite directions.

Vehicle Capacity

YRT/Viva designs its services to keep the number of passengers on its vehicles at a reasonable level and within the limits of safety. This could result in some passengers having to stand in buses at various times throughout the service day.

Vehicle capacity guidelines are calculated (on average) over one hour, in rush hours, and at the busiest point on a route.

If a service operates at a 15 minute frequency, four buses pass the busiest point in each direction in an hour. Although one or more of the four buses may be more crowded than the average, the average number of passengers for these four buses must fall within the service capacity guidelines.

Table 11 shows maximum vehicle capacity. If the average number of passengers exceeds the guideline, YRT/Viva adjusts the service to manage capacity.

Table 11: Vehicle Capacity Guidelines

Route Type	Vehicle Length	Seating Capacity	Average Maximum Vehicle Capacity
Viva, Base, and Local	60-foot bus (Viva)	52-54	72 passengers per vehicle
	40-foot bus	39, 43	55 passengers per vehicle
	40-foot bus (Viva)	36	48 passengers per vehicle
	30-foot bus	26	40 passengers per vehicle
Express	(High-speed or Highway)	43	100 per cent of seating capacity per vehicle
Shuttle		26, 39, 43	100 per cent of seating capacity per vehicle
Community Bus		26	100 per cent of seating capacity per vehicle

Note: Base, Local and most Express capacities are based on average maximum passengers per vehicle during non-rush hour and measured over a 60 minute period during rush hour. Seating capacities depend on vehicle year and/or model.

Target Performance

Target performance is established for average and minimum passengers per service hour. The target boardings per service hour are defined for each YRT/Viva route type, based on rush hour periods and non-rush hour periods. The performance targets are shown in **Table 12.**

Table 12: Performance Target by Service Type

Route Type	Weekday Rush Hour	All Other Periods*
Base		
	All routes averaging 30 passengers per service hour, with a minimum of 10 boardings per hour	All routes averaging 22 passengers per service hour, with a minimum of seven boardings per hour
Local		
	All routes averaging 25 passengers per service hour, with a minimum of eight boardings per hour	All routes averaging 22 passengers per service hour, with a minimum of seven boardings per hour
Express		
Fixed Route Express	All routes averaging 30 passengers per service hour, with a minimum of 10 boardings per hour	
Business Express	All routes averaging 35 passengers per service hour, with a minimum of 30 boardings per hour	
Shuttle		
	All routes averaging 25 passengers per service hour, with a minimum of 20 boardings per hour	
Community Bus		
Fixed Route	All routes averaging 15 passengers per service hour, with a minimum of five boardings per hour	All routes averaging 12 passengers per service hour, with a minimum of four boardings per hour
Dial-a-Ride (DAR)	All routes averaging 10 passengers per service hour, with a minimum of five boardings per hour	All routes averaging eight passengers per service hour, with a minimum of four boardings per hour

*Weekday non-rush hour, Weekday and Saturday evenings, and all day Sunday/holiday.

3.2 | Establishing New Transit Service

Determining whether Service is Warranted

Investigating whether or not a route should be provided (Base or Local routes, Express routes, or GO Shuttles) is determined by forecasted performance levels. Designating a base route will depend on the network coverage, and whether or not the new designation can meet the targets set for base routes.

The introduction of a High School Special is similar to that of a GO Shuttle. High School Special routes depend on whether or not the secondary school can be easily served by an existing service within the route network, and the limits of the route directness guideline for those routes.

Community Bus routes are considered for small urban communities or areas with a concentration of senior residents, medical buildings and shopping locations. A population of 15,000 residents is an appropriate guideline for considering service, and should be used to identify communities where these guidelines will apply. Community Bus routes will not be considered if Viva or conventional routes are operating within close proximity of a desired Community Bus route.

3.3 | Design Guidelines

YRT/Viva uses Design Guidelines to create efficient services and to ensure that each route meets the route's performance goals. If a particular route does not meet the guidelines, the route is carefully monitored to determine whether corrective action is required. The design guidelines cover:

- Route directness
- Route deviation
- Locating bus stops
- Locating vivastations
- Locating bus stations/terminals

Route Directness — How direct should a route be?

Base and Viva routes are designed to provide direct service, with minor deviations, if necessary, to serve major destinations.

Shuttle services and High School Specials may incorporate more indirect routings to increase the service area. Community Bus routes may be circuitous to serve more area residences and community destinations.

Route Deviations — When should a route deviate?

Combined with route directness, route deviation guidelines provide assistance in determining the route structure for services to schools, GO Stations, and major employment areas. The route deviation guidelines consider the benefit of varying from a direct route to serve a major area, versus the inconvenience to passengers already on-board.

Route deviations must attract enough new passengers to the route (rather than only reduce the walking distance for existing passengers) to make the change worthwhile. As additional travel time requires more service hours, changes should only be made if they improve the overall performance of the route.

If the deviation can be achieved with existing resources (typically less than a one or two minute increase in travelling time), the new ridership gained should be no less than 25 per cent of the passengers affected by the detour. However, to support the Viva and grid network, deviation of Viva or Base routes is generally not recommended.

Locating Bus Stops — Where should bus stops be located?

The minimum spacing criteria for bus stops are 200 metres in developed areas and, where demand exists, 500 metres in undeveloped areas. Bus stops should be placed at most intersections, passenger generators and transfer points, and certain major trip generators may require the spacing between stops to vary.

Development around major stops should be encouraged at greater density and should follow transit supportive design principles. Development should be built closer to the street, favour pedestrian connections, and provide customer friendly uses and other passenger amenities.

Bus stops at intersections should be located in the safest position, considering traffic and street conditions. Where possible, stops should be located close to signalized intersections.

At Viva transfer points, YRT/Viva stops on the intersecting routes should be located at the near side of the intersection, to facilitate transfers.

Transit stops and the adjacent area should be made accessible to people with disabilities, including wheelchairs and other mobility aids.

Sidewalks should be available along both sides of the street where transit operates.

All terminals and vivastations, and high ridership bus stops (more than 20 boardings per weekday) are priority points for transit shelters.

Locating Vivastations

The introduction of additional vivastations along established Viva routes will add travel time and the potential for delay. New vivastations should be added only when warranted by high anticipated demand, and location relative to the other vivastations on the route.

Spacing between vivastations should average at least one kilometre. The introduction of additional vivastations along established Viva routes will add travel time and the potential for delay.

In terms of spacing, an additional vivastation on an existing Viva route should only be considered if the additional vivastation:

> Is located at least 750 metres from the nearest adjacent vivastation on any Viva route serving the proposed additional station
> Will not reduce the average route-wide distance between vivastations on any route the additional vivastation serves to less than 1,000 metres

In terms of ridership, a new 'infill' vivastation on an existing route should attract more new riders than it discourages as a result of the additional travel time, and is expected to attract at least 300 new boardings per weekday (i.e. boardings must not include shifts from adjacent vivastations).

Recommendations for additional vivastations are subject to budget approval, and vivastation location criteria may be modified with the implementation of rapidways.

Locating Bus Stations/Terminals

Bus terminals and minor turnaround facilities will be located at transit nodes identified in the 2009 York Region Transportation Master Plan Update, at the end of a line, and at the point where local services connect at the convergence of two or more corridors.

Development around stations and terminals should incorporate York Region's Transit-Oriented Development (TOD) design principles. Transit-Oriented Development is an approach to planning and design that strengthens the relationship between how we grow and our ability to provide efficient and effective transit services. TOD guidelines include locating employment uses around transit hubs and discouraging low density, auto-oriented land use around transit terminals.

3.4 | Mobility Plus Transit Service Guidelines

Mobility Plus Service Guidelines are intended to make the specialized transit services convenient and easy to use for customers, and to ensure services are efficient, safe, and reliable.

The guidelines are applied to the specialized door-to door and the Family of Service programs. The guidelines are intended to bring clarity and consistency to the process of adjusting and improving Mobility Plus transit services, and allow flexibility to respond to customer needs and community expectations in an accountable, equitable, and efficient manner

Mobility Plus Performance Indicator Guidelines
Mobility Plus reviews the performance of each vehicle type and also reviews the performance of the whole system. System performance takes into account, for example, the role each vehicle type plays in the delivery of service to meet the varying customer needs, and how each vehicle type contributes to the success of the overall Mobility Plus system network. At the system-wide level, system performance is measured based on the following indicators:

- Net Cost per Passenger and Passenger Boarding per Vehicle Hour
- Route Performance
- On-time performance
- Accident rate
- Route coverage
- Service levels and span of service
- Vehicle capacity
- Performance targets

These indicators are used to assess the reliability and cost effectiveness of the Mobility Plus service. The indicators must be considered together, not individually, with the goal to achieve a balance between them while meeting all AODA legislative requirements.

Net Cost per Passenger and Passenger Boarding per Vehicle Hour
The performance of individual vehicles is assessed by evaluating the net cost per passenger and passenger per vehicle-hour. These indicators identify how well the service is being utilized by customers as shown in **Table 13**. The evaluation of boardings per vehicle (including transfers) gives additional importance to a vehicle type that may carry an above average number of Family of Service transferring passengers, which plays a vital role in the performance of the entire Mobility Plus and YRT/Viva transit network.

Table 13: Mobility Plus Performance Indicators

Performance Indicator	Value
Average Ridership (weekday daily)	1,182
Sedan Average Passenger per hour (all day)	1.85
Accessible Mini Van Passenger per hour (all day)	1.85
Sprinter Mini Bus Passenger per hour (all day)	2.30
Mobility Bus Passenger per hour (all day)	3.04
Community Bus Passenger per hour	5.90
Net Cost per Passenger – Sedan	$21.24
Net Cost per Passenger – Accessible Mini Van	$24.24
Net Cost per Passenger – Sprinter Mini Bus	$26.78
Net Cost per Passenger – Mobility Bus	$32.48
Net cost per Passenger – Community Bus	$12.98

January 2014 Contractor Costs Only

Route Performance Assessment

Mobility Plus utilizes Computer Aided Dispatch/Automatic Vehicle Location (CAD/AVL) technology as a tool to help measure vehicle and route performance. AVL Services, a reporting program of the RouteMatch scheduling system, is used to provide operational data including travel time, passenger boarding, alighting activity and trips not accounted for (missed trips).

On-Time Performance

Mobility Plus has established a trip start and trip end, on-time performance goal of 92 per cent for all contracted services. Vehicles are considered on-time when they depart or arrive no more than 10 minutes before or after the scheduled pick up and drop off time. To maintain and improve on-time performance for trip start times, Mobility Plus/contractors continue to update schedules to reflect actual travel times. Historical on-time performance for Mobility Plus services is summarized by contractor in **Table 14.**

Accident Rate

Accident rate analysis provides a year-to-year, and month-to-month comparison of each contractor allowing Mobility Plus to examine trends. Mobility Plus measures all accidents by their profile to develop behavior specific training programs that contractors can use to decrease accidents.

Route Coverage and Service Levels

Customers who qualify for Mobility Plus specialized door-to-door service can be picked up at their residence, regardless of where they reside in York Region. Mobility Plus provides transportation from the first accessible door at pick up to the first accessible door at final drop off. Transfers to other accessible vehicles and to other YRT/Viva service may occur.

Mobility Plus serves all nine municipalities in York Region. Registered Mobility Plus users can book trips to travel anywhere across the Region and connect to neighbouring specialized transit services in the City of Toronto and the Region of Peel and Durham. Under the AODA, Mobility Plus service hours must match the conventional YRT/Viva service hours, which are Monday to Sunday, including Statutory holidays, from 4:00 a.m. to 3:30 a.m.

Table 14: Mobility Plus On-Time Performance 2009 – 2014

Contractor	2009	2010	2011	2012	2013	2014*
Royal	88	92	92	88	90	91
Cares	93	90	92	89	92	87
MTS	92	93	93	93	92	88
Bus	93	94	87	96	93	86
Target	**92**	**92**	**92**	**92**	**92**	**92**

* 2014 Performance for January to April

Vehicle Capacity

Mobility Plus schedules services to match vehicle specifications based on the size of mobility aids, while maintaining the number of passengers on the vehicles at a reasonable level and within the limits of safety.

Vehicle capacity guidelines are calculated (on average) over one hour, in rush hours, and at the busiest point of a vehicles schedule.

Table 15 shows the maximum vehicle capacity for the Mobility Plus fleet.

Performance Target

Mobility Plus performance targets are established based on industry standards and adjusted for the York Region operating environment.

In a specialized transit service, a system is considered efficient based on passenger per hour targets for each vehicle type. Mobility Plus has adopted these performance targets as part of the overall service delivery model for each vehicle type as shown in **Table 16.**

Table 15: Mobility Plus Fleet and Vehicle Capacity

Fleet	Number of Peak Vehicles	Capacity (per vehicle) Ambulatory	Capacity (per vehicle) Wheelchair/Scooter
Eldorado Community Bus	6	21	2
Arboc LF Bus	6	4-11	1-5
Accessible Mini Van	24	3	1-2
Sedan	39	4	0
Sprinter Mini Bus	6	3-9	2-3
Total	**81**		

Table 16: Mobility Plus Performance Targets

Vehicle Type	Target
Mobility Bus	2.5 to 3.5 passengers per hour
Sprinter Mini Bus	2.1 to 2.5 passengers per hour
Accessible Mini Van	1.5 to 2.1 passengers per hour
Sedan	1.5 to 2.1 passengers per hour