



Prince George Transit System Transit Future Action Plan

Appendix 1 - Service Design Standards and Performance Guidelines

As part of the on-going management of the transit network, service design standards and performance guidelines have been developed as tools to facilitate service planning decisions and measure how the transit system is progressing towards achieving its goals.

- Service design standards define service levels, the service area and when new service should be introduced to an area.
- Performance guidelines measure service effectiveness and monitor how well the transit system is progressing to achieving the vision of the Transit Future Plan (TFP).

These measures are meant to ensure an acceptable level of service quality to the customer, and, along with the TFP, guide planning decisions and recommendations to council. Service standards and route performance guidelines should be re-examined and renewed periodically (every 5-10 years depending on community size and rate of development), since they evolve as the system develops and as the needs of the community change.

What they are and what they define:

Service design standards define minimum levels of transit service desired to meet community needs. Service standards are specific to a particular transit system and the communities it serves. Transit policies identified in the Prince George Official Community Plan (OCP) have been incorporated into the Prince George transit system service design standards to reflect community values. Service design standards usually define features such as:

- Service span (the hours and days of service when it operates);
- Frequency of routes or groups of routes;
- Walking distance to bus stops;
- Level of accessibility; and,
- How new service will be triggered for additional areas of service (subdivision density, population, etc.).

Why they matter:

The key benefit of service design standards are that they guide local governments and BC Transit staff in determining and managing community expectations regarding the level of transit service to be provided. They also inform decisions regarding system design such as whether to provide a new service or change existing service.

Network Design Principles

Transit service should be focused on major activity centres and residential areas within the urban area. Transit routes should be kept as direct and frequent as possible to be competitive with the automobile. Transit routes should connect residents to their local neighborhood centres and transit trips between neighborhood centres should be able to be made with no more than one transfer. Transit service should connect to other transportation systems to allow passengers to conveniently connect to other modes, including cycling and pedestrian networks, regional busing, rail passenger services and custom transit services. Transit service should be operated on the arterial and collector road network and have limited operations on the local road network. Future arterial and collectors roads should be designed to accommodate transit stops and transit priority measures. Transit service coverage and distance to major destinations. Transit routes and bus stops should be within:

- 400 metres walking distance of 90 per cent of the residences,
- 250 metres of all future medium and high-density residential developments, and
- 150 metres walking distance of all designated senior's residences and major institutional facilities.

Ease of Use Principles

To make the transit system easy to understand and use for all passengers, routes should be direct and straightforward, and service frequencies and schedules should be consistent on each route and during each time period, where possible. Customer information should be designed to be straightforward with simple route and schedule information. BC Transit will work with Prince George to develop a comprehensive branding package in the future, specific issues to be addressed include:

- Information and branding for the Rapid Transit Network (RTN) and the Frequent Transit Network (FTN), including naming convention, logo/identifier, visual identity and style guide for additional livery (vehicle colour schemes or logos), print and electronic channels.
- Identity and numbering for the Local Transit Network (LTN) and special services. Current livery will remain.
- Strategies for route identification (e.g. name/number that align with the layers of service).
- Persons with mobility and cognitive disabilities should be provided with a range of transit options, including handyDART service, taxi programs, and fully accessible conventional transit vehicles and bus-stop infrastructure.

Types of Transit Service

The TFP describes a hierarchy of transit services that will support implementation of the long-term transit strategy and satisfy various market segments, including the regular transit rider and potential users.

Type	Service Description
Rapid Transit	Rapid Transit routes are designed to move large volumes of passengers between major destinations and stop less often than frequent and local transit service.
Frequent Transit	Frequent routes that operate at a 15 minute frequency over a select span of service. Routes generally operate on arterial roads, serve corridors with mixed land use and provide connections between urban centres.
Local Transit	Local routes generally serve less densely populated areas with a focus on connections to local centres and to frequent transit routes.
Targeted Transit	Targeted routes are created to provide service to specific areas such as schools, universities, and/or peak commuter trips.
Custom Transit	Demand response service for people with disabilities who cannot use the regular conventional transit system some or all of the time.

Table 1: Types of transit service.

Span of Service

Span of service defines the operating hours for each service type. In general most routes operate from 7:00 a.m. to 10:00 p.m. on weekdays with reduced service on weekends. Span of service extension shall be considered when the first and last hour of service has productivity greater than the average productivity on the route.

Type	Period	Span
Rapid Transit	Weekday	6:00 a.m. to 11:00 p.m.
	Saturday	6:00 a.m. to 11:00 p.m.
	Sunday	6:00 a.m. to 11:00 p.m.
Frequent Transit	Weekday	6:00 a.m. to 11:00 p.m.
	Saturday	6:00 a.m. to 11:00 p.m.
	Sunday	6:00 a.m. to 11:00 p.m.
Local Transit	Weekday	7:00 a.m. to 10:00 p.m.
	Saturday	7:00 a.m. to 10:00 p.m.
	Sunday	7:00 a.m. to 10:00 p.m.
Target Transit	Weekday	Varies depending on service.
	Saturday	Varies depending on service.
	Sunday	Varies depending on service.
Custom Transit	Weekday	6:00 a.m. to 11:00 p.m.
	Saturday	6:00 a.m. to 11:00 p.m.
	Sunday	6:00 a.m. to 11:00 p.m.

Table 2: Prince George transit system service span.

Service Frequency

Service frequency defines the minimum frequency at which a route operates, subject to meeting the performance standards. Investments to increase service levels will be considered to strategically develop the network or when route performance indicates the route is performing 25% above the target for the routes class.

Type	Period	Regular Service (Peak Service)
Rapid Transit	Weekday	15 minutes (10 minutes)
	Saturday	15 minutes (15 minutes)
	Sunday	15 minutes (15 minutes)
Frequent Transit	Weekday	15 minutes (10 minutes)
	Saturday	20 minutes (15 minutes)
	Sunday	20 minutes (15 minutes)
Local Transit	Weekday	60 minutes (30 minutes)
	Saturday	60 minutes (30 minutes)
	Sunday	60 minutes (30 minutes)
Target Transit	Weekday	Varies depending on service.
	Saturday	Varies depending on service.
	Sunday	Varies depending on service.
Custom Transit	Weekday	N/A
	Saturday	N/A
	Sunday	N/A

Table 3: Prince George transit system service frequency.

Vehicle Type by Service Layer

Vehicle type is driven by passenger loads during the peak hour of the relevant operating period. On routes where bus capacity is exceeded, consideration should be given to operating buses with additional capacity or with increased service frequency. On routes where a small bus would accommodate passenger loads at peak times, consideration should be given to operating a smaller bus (light duty bus) and maintaining existing frequency. A typical approach is to allow standing passengers during peak periods (optimally for shorter runs) but to provide sufficient capacity for seated passengers during the off-peak hours. Table 4 describes the vehicle types associated with the Transit Future layers of service.

Service Layer	Vehicle Type
Rapid Transit	Heavy Duty or High Capacity
Frequent Transit	Heavy Duty or High Capacity
Local Transit	Heavy Duty, Medium Duty, or Light Duty
Targeted Transit	Heavy Duty, Medium Duty, or Light Duty
Custom Transit	Light Duty

Table 4: Vehicle type by service layer.

Transit Facilities

Design principles for transit facilities should conform to the BC Transit infrastructure and design guidelines, as well as the federal guidelines for transportation and transit infrastructure.

Transit Stops

Transit stops and facilities for waiting passengers should include a hard surface landing/waiting area and be universally accessible. They should also include on-street passenger facilities such as, benches, shelters, lighting, waste receptacles, and route/schedule information. Priority should be given for snow clearing at transit stops and the pedestrian connections to them.

Direct pedestrian and cycling connections should be provided to bus stops via sidewalks, pathways and crosswalks, with curb ramps and barrier-free access. Bus stops should be located on the far side of crosswalks, or at least 10 m in advance of a crosswalk. Buses may

stop in the traffic lane (with a bus bulge where on-street parking is provided), at curbside out of the traffic lane, or in a dedicated bus bay. Adequate sight distances should be achieved for motorists approaching the bus stop as well as transit passengers crossing the road from the bus stop. Passenger amenities at transit stops can enhance the quality of service for customers and can also have a significant impact on attracting new users. Table 5 describes what transit stop amenities should be associated with each type of service.

Facility	Amenities
Rapid Transit Stops & Transit Exchanges	<ul style="list-style-type: none"> • Premium transit shelters • Bike storage • Quality customer information (such as transit schedule and map information) • Universally accessible • Elevated boarding platform • Off-board fare payment • Real time schedule information • Customer wayfinding information • May include Park & Ride facilities
Frequent Transit Stops	<ul style="list-style-type: none"> • Universally accessible • Transit Shelter • Bench • Bike Storage • Quality customer information (such as transit schedule and map information) • May include Park & Ride facilities
Local Transit Stops	<ul style="list-style-type: none"> • Universally accessible • Bench • Transit Shelter • May include Park & Ride in rural areas
Targeted Transit Stops	<ul style="list-style-type: none"> • Universally accessible • Bench • Transit Shelter
Custom Transit	Not required.

Table 5: Transit Service Type and Associated Stop Amenities.

Stop Intervals

Transit stops should be spaced along a corridor at appropriate intervals, in urban areas this is typically between 300 m to 400 m. Transit stops that are spaced too close together lead to slower transit trips and higher transit stop maintenance costs. Stops that are too far apart limit passenger access to the system. Outside the urbanized area, bus stops should be limited to major destinations, points of interest, and residential concentrations. Spacing of stops should be limited on select types of service. See Table 6 for the appropriate standard for each service type.

Service Type	Stop Interval
Rapid Transit	Limited stops at key locations. Stops are typically spaced 800 m to 2 km apart
Frequent Transit	Frequent stops along a corridor, 300 m to 500 m apart
Local Transit	Frequent stops along a corridor, 250 m to 300 m apart
Targeted Transit	Varies depending on the service.
Custom Transit	Not applicable.

Table 6: Service type and appropriate stop intervals.

Transit Priority Measures

Transit priority measures should be provided on the RTN and FTN network to improve travel time and reliability as required. These measures include: signal timing optimization, transit signal priority, regulatory signage such as yield to buses, and geometric measure such as queue-jumper lanes and transit only lanes. See Table 7.

Service	Priority Measure	Description
Rapid Transit	Signal	Transit is given signal priority along the corridor at intersections
	Lane	Transit only lanes or bus queue-jumper lands at keys areas of congestion
Frequent Transit	Signal	Transit is given signal priority at key delay points
	Lane	Only if part of the RTN
Local Transit	Signal	Only if part of the RTN
	Lane	Only if part of the RTN
Targeted Transit	Signal	Only if part of the RTN
	Lane	Only if part of the RTN
Custom Transit	Signal	Not required
	Lane	Not required

Table 7: Transit service type and transit priority measures.

Transit Exchanges and Park and Rides

Transit exchanges are typically located within the activity centres of the community, such as downtown, village centres, and shopping malls, in order to reinforce the relationship with land use patterns. If properly planned and designed, transit exchanges can become effective multi-modal exchanges and pedestrian-oriented sites. Transit exchanges should provide weather protection, seating, transit route and schedule information, lighting, bicycle parking and other amenities as shown in the passenger amenities section below.

Park & Rides should be located in suburban and semi-rural areas to provide residents who live in areas with no transit service or poor transit service an access point to higher quality transit services. Below are the basic functional requirements for transit exchanges and Park & Ride facilities:

Site requirements

- Sites with no significant safety concerns, which provide for direct and safe pedestrian access, and which minimize the interaction between buses and general traffic on adjacent roads;
- Sites that can be accessed safely and efficiently, avoiding traffic congestion and queuing;

- Sites that provide high visibility to pedestrians, motorists and others, minimizing personal safety concerns for transit passengers using the terminals in evenings and at other off-peak times; and,
- The sites must be located to minimize additional routing and costs.

Physical requirements

- All platforms should accommodate standard 12 m buses, including double-decker buses in the future;
- All Rapid Transit stops and select exchange platforms should be designed for articulated buses.
- Buses must be able to arrive and depart from platforms independently.
- Passenger facilities should include:
 - Passenger amenities, including weather protection, seating, illumination, and bicycle storage;
 - Accessibility to all areas of the terminal for persons with disabilities; and,
 - Wayfinding signage and information.
- Transit terminals should also incorporate operator washrooms.
- In addition Park & Ride sites should include parking for automobiles, bicycles and bus stops for transit access.

Introducing New Service

The following guidelines have been identified to determine when it may be feasible to introduce transit service into new residential, industrial, commercial and recreational developments. The following conditions should be met:

- Minimum density of 10 residents per hectare or 10 jobs per hectare measured over a minimum developed area of 10 hectares (i.e. suburban development of single family homes); and
- Road and pedestrian access that provides for safe access and efficient operation of transit service.

Performance Guidelines

What they are and what they define:

Performance guidelines define numerical thresholds and targets for a particular system and its routes and services.

Why they matter:

Working in tandem with service design standards, performance guidelines are a tool that evaluate existing services, identify trends in performance and, based on this evidence, determine how service and supporting features (fares, marketing, facilities, etc.) should be changed to improve the effectiveness and efficiency of the system.

For a service to be efficient and productive, a balance should be achieved between oversupply and overcrowding. A number of measures can establish this equilibrium such as:

- Implement transit priority
- Change service span
- Alter frequency
- Change bus stop spacing

- Reduce/increase coverage
- Bus route changes
- Targeted marketing/Corridor branding
- Fleet type allocation

When system performance falls below or above the set guidelines, recommendations to Prince George will focus on those tools above that maximize efficiency.

Measures

Performance measures have been chosen that evaluate the effectiveness of service planning investments on a system and route level.

System level

The measures used for the system guidelines are:

Average rides per service hour

Measures the total volume of ridership as compared to the supply of transit service.

Cost per ride

Measures the average cost to provide service per passenger trip

Cost recovery

A measure of the financial performance of the transit system usually expressed in terms of total operating revenue/total operating expenses.

Rides per capita

Measures the ratio between transit trips and the population of the service area

Route level

The measures used for the route level guidelines are:

Average rides per service hour

Measures the total volume of ridership as compared to the supply of transit service.

Average rides per trip

Measures the total number of people that board a vehicle on a specific trip.

Route level performance guidelines have been classified into four categories (rapid transit, frequent transit, local transit and targeted transit) to acknowledge different performance expectations based on a route's objective.

Performance Targets

Table 8 and 9 outline the performance targets set for the system and route level. As well as monitoring existing performance against these guidelines, historical trends will also be monitored to determine if the system or routes are becoming more or less efficient over time. Significant variance (+/ - 25%) from the target will place a route on an action list for further investigation and will require more detailed analysis. Routes that fall below the 25% variance will be candidates for corrective action and routes that fall above the 25% variance will be candidates for service improvements. BC Transit will report on an annual basis how the system and routes are performing and this will help guide planning decisions

System Level

The purpose of monitoring system wide performance is to identify trends in system performance and compare the performance of the transit system with other peer transit systems. These measures are designed to monitor the pulse of the Prince George transit system as a whole and guide service planning. This can be particularly useful when identifying system wide impacts of major investments in the transit network such as, development of the rapid and frequent transit networks.

Measure	Target
Rides per service hour	30
Cost per ride	\$4.60
Cost Recovery	25.5%
Rides per capita	33.85

Table 8: System level performance guidelines.

Route Level

Analysis on a route-by-route basis gives a detailed indication of how individual components of the transit system are performing. A route-by-route analysis allows observations of the impact of service changes and investments made in the past and identifies future opportunities for strategic investment or reinvestment.

Service Type	Boardings per Trip	Boardings per Service Hour
Rapid Transit	25	30
Frequent Transit	25	30
Local Transit	12	25
2Targeted Transit	40	60

Table 9: Route level performance guidelines.