TORONTO TRANSIT COMMISSION
REPORT NO.

MEETING DATE: February 18, 2009

SUBJECT: 501 QUEEN STREETCAR ROUTE: STATUS UPDATE

ACTION ITEM

RECOMMENDATION

It is recommended that the Commission support the actions as described in this report and summarized as follows:

1. Staff to continue developing and implementing new route management strategies to determine their impact and sustainability prior to considering any split route scenarios;

2. Detailed CGM report references pertaining to the 501 Queen Streetcar Route status updates continue to be sent to Commissioner Bussin's attention;

3. Staff has completed an analysis of customer trip origin/destination points and will include a specific origin/destination analysis in the next 501 Queen customer survey;

4. Staff continues to work with the City of Toronto regarding a Transit supportive Traffic Management Plan; and

5. Winter weather conditions (extreme cold; frequent and extended snowfalls) have impeded our ability to determine the full benefit of some strategies tested to date.

BACKGROUND

At the October 2008 Commission meeting, Staff presented an update on the 501 Queen Streetcar route. This report provided background information regarding the Queen Route's performance and discussed a number of route management strategies, which had been tested through the summer of 2008 as well as a new route management concept implemented as a test in September.

In September 2008, staff implemented a new route management strategy on Queen during the mid-day (10am-4pm Monday to Friday) called 'Step Forward/End of Line Dispatch'. This strategy essentially disconnects the operator's schedule from the vehicle and provides a method to ensure operators are in their scheduled position each trip, without short turning streetcars. The short turns that are still required, are those to fill gaps in service caused by delay incidents. The application of this strategy during the month of September 2008 resulted in significant and measurable improvements in short turns, gapping and bunching as presented at the October 2008 Commission Meeting.

Staff also continued to investigate route splitting options and work with the City on traffic measures to improve route performance.

DISCUSSION:

Route Management

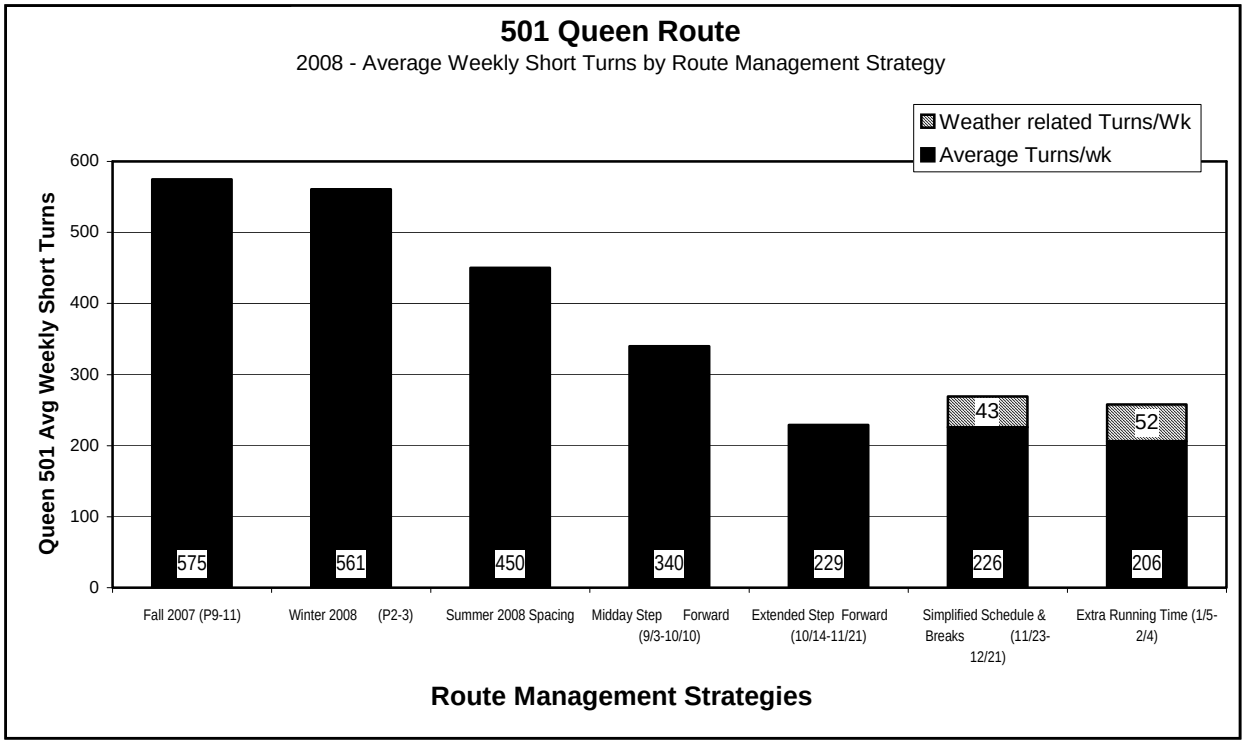
Since the October 23, 2008 Commission meeting, and based on the improvements in service quality on the 501 Queen Route achieved during the midday timeframe in September and early October, Staff expanded the timeframe of the 'Step Forward' strategy to include the afternoon peak period. 'Step Forward' was extended from its initial 6 hour timeframe, to a 10 hour timeframe, from approximately 10:00am to 8:00pm.

On November 24th, 2008 a new schedule was implemented on the Queen 501 route, which simplified route and crewing structure. Staff anticipated that this change would improve connectivity between runs and would result in further short turn reductions. There were no changes to running time or timing points, but the branches (Humber vs. Long Branch) were scheduled discretely and the methods used to schedule operator breaks were greatly simplified.

During the period from December 21st, through January 3rd, the 'Step Forward/End of Line Dispatch' process was not utilized because schedules, traffic patterns and ridership patterns change dynamically through this two-week period (three statutory holidays, two special schedule days - Christmas Eve and New Year's Eve, school closures and many business closures). While there were a few days with schedules that included the simplified route and crewing structure, most days did not include these changes.

The placement of an additional Supervisor at Connaught and at Neville from early September through mid December 2008 provided an opportunity to make detailed observations and analysis of the actual amount of running time taken for round trips. Based on an analysis of those observations, staff identified the need for additional running time. A new schedule was implemented on January 4th, 2009, which retained the extended hours of Step Forward, discrete branch operation and simplified breaks, but which added additional round trip running time. Since implementation of the additional running time, however, a number of issues including extended periods of extreme cold related vehicle breakdown and multiple snowfalls affecting reliable operation of the Queen route, have impacted our ability to measure the effectiveness of the schedule changes.

The following Chart measures average weekly short turns for the distinct Route Management strategies applied to the 501 Queen Route. The information graphically illustrates the effect of different strategies on the levels of short turning of our customers.



Weather extremes experienced from late November, 2008 through February, 2009 included significant accumulations of snow, extended periods of extreme cold and a number of wide temperature swings. These factors have resulted in elevated levels of vehicle failures including 'low air', 'No interior Heat', 'Frozen (Plugged) Sanders' as well as numerous incidents where poorly parked vehicles blocked transit service from passing. We have attempted to segregate the effect of these factors to normalize data in the last two periods in the chart above and will continue to measure performance to determine the true impact of the last two strategies implemented.

The following table provides a comparison of gaps during the Midday and pm Peak as a result of different route management strategies.

% Service operating in Large Gaps (Triple Headways)	Midday		Pm Peak	
	EB	WB	EB	WB
No Step Forward	5.4%	7.8%	4.7%	7.3%
Extended Step Forward	3.9%	5.2%	4.4%	6.2%
Extended Step Forward + Simplified Route and Crewing	3.3%	5.1%	3.5%	5.3%
% Improvement	39%	35%	26%	27%

With the application of Step Forward, Simplified Routing and Crewing, midday large gaps have been reduced by 35% to 40% in both directions. During the Pm Peak, application of these strategies has reduced large gaps by approximately 25%. At this time, we have not completed a full analysis of the impact of additional running time on Large Gaps during either midday or Pm Peak.

A survey of customers on the 501 Queen Route was conducted between October 16 and November 6, 2008. Customers were intercepted at various locations east of Kingston Rd and west of the Humber Loop. Survey respondents averaged 8.6 trips per week. Approximately half of the respondents had noticed recent changes to the 501 Queen Streetcar service. Approximately 11% of the respondents made either negative or neutral comments regarding their experience with recent Queen streetcar service. Observed improvements included fewer short turns, fewer gaps in service primarily in the east; improvements in even spacing on both east and west route segments and better schedule adherence on both route segments.

An analysis of customer complaints received by the Marketing Department from customers on the 501 Queen Route from Period 9 through 12 of 2007 vs. the same period in 2008 reveals the following:

- Delay complaints dropped from 27 to 14
- Short Turn complaints dropped from 6 to 1
- Vehicle Operation complaints dropped from 7 to 4

Communication and Information System Upgrades (CIS)

At year-end, virtually all of the streetcar fleet was retrofitted to use GPS location information to determine vehicle location. The GPS enhancements now in place, provide more accurate tracking of vehicles, and a scale map display indicating exact vehicle position including vehicle position off route. This feature has proved very useful in managing diversions, short turns and vehicles operating off-route.

A number of other improvements to CIS software are currently being investigated in order to achieve the desired route management improvements. These include the following:

CIS Enhancements:

- Headway Adherence Functionality:
    - Toggle between schedule adherence and headway adherence on CIS Console;
    - Option of changing trump (Onboard Vehicle Display) from schedule to headway;
- Real-Time analysis of current Point to Point Running Time;
- Real-Time route-schedule modifications to running time, headway, routing in order to manage blockages, diversions, emergencies and general delays more effectively;
- Full-Service Mobile CIS for on-street supervision.

Management Reports:

- Schedule and/or Headway adherence by Route, Vehicle, Operator, Stop;
- Layovers (Scheduled, Unscheduled);
- Short Turns by direction, location, timeframe, cause;
- Gapping/Bunching by direction, location, timeframe;
- Point to Point running time analysis over time and date ranges.

Staff has now confirmed business requirements for this new functionality. A number of these requirements may be satisfied with implementation and expansion of the new Next Vehicle Arrival System (NVAS) and some integration of that system with CIS operations. A further review is required and has commenced, which will confirm how much of the NVAS functionality can be used to achieve the required Route management improvements. In addition, this review will confirm the timeline for development of the remaining required software enhancements. This review and a further update, will be completed by mid 2009.

Split Route Analysis

A total of nine route or service change options for the 501 QUEEN route were discussed in a October 23, 2008 Commission Report.

None of these changes are recommended for implementation at this time. The route management changes described in this report should be continued and evaluated through to the summer of 2009. Streetcar track on Church Street, which would be used for most of the split route options, will be under construction in the spring and summer, and will not be available for use until mid-2009. A decision on splitting the route will be considered later in 2009, when the results of the route management changes, and the latest round of customer surveys, are available.

Origin/Destination Point Analysis

An origin/destination analysis was conducted using information derived from the 2006 Transportation Tomorrow Survey, a detailed five-year transportation origin-destination survey that is conducted across the greater Toronto area. The results of the analysis are expressed in table form and provided in Appendix 1.

Traffic Management Plan Update:

In the May, 2008 status report on the 501 Queen streetcar route, staff presented a list of possible traffic management measures which would improve the reliability and quality of service on the route. Staff provided these to Toronto Transportation Services for their review and analysis, because any changes to traffic by-laws and regulations are the responsibility of that area.

Transportation Services are very supportive of TTC initiatives to improve transit services throughout Toronto, and are actively involved in projects like transit signal priority and the *Transit City Light Rail Plan*. They have expressed strong support for the 501 Queen service quality initiative. At the same time, they are required to also consider the effects of traffic by-law changes on other users of the road system.

Transportation Services have completed a first-level review of the TTC's proposed changes to traffic by-laws on Queen Street. The material included in Appendix 2 is drawn from that review. Transportation Services and TTC staff are continuing to work together on the implementation of these proposals, and will report back with further details in subsequent update reports.

Future Actions

Staff will continue testing the 'Step Forward' strategy. Staff will retain the expanded timeframe, simplified crewing, discrete branches and additional running time. In spring, after our exposure to winter weather extremes has ended, performance of the Queen Route will be measured for a time period with a limited 'Step Forward' process and for a timeframe without 'Step Forward' to determine the combined effect of simplified crewing, discrete branches and additional running time against a control period.

Staff has identified a further concept, derivative of 'Step Forward' with some similarity to a modified version of the Step back process used in the Subway, which may be less labour intensive, which could be performed at any location on the route and which may be more transferable to other routes than the 'Step Forward' concept. Testing of this concept will require significant modifications to our current method of crewing schedules, constructing waybills and the way our operators manage their documentation, vehicle-to-vehicle transfers and relief's. Testing of this derivative strategy could take place in May/June.

Staff will continue to analyse and compare performance of the 501 Queen Route against past performance to quantify the effects of these changes.

A second customer survey will be conducted in spring, 2009 to determine what improvements or changes may have occurred from a customer perspective. This survey will include specific components to confirm the trip origin and destination data provided in Appendix 1.

Staff will provide further updates regarding this initiative at the July 9, 2009 Commission meeting.

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Appendix 1 – Origin/destination information

The table below provides a matrix that outlines the best-available information about the origins and destinations of customers who board streetcars on the 501 QUEEN route, on weekdays. This information is derived from the 2006 *Transportation Tomorrow Survey*, a detailed transportation origin-destination survey that is conducted every five years across the greater Toronto area.

For the purposes of this report, travel information for the existing 501 QUEEN is separated into five geographical sections. The numbers shown are the percentages of trips that board 501 QUEEN streetcars in the sections shown in the rows, and leave 501 QUEEN streetcars in the sections shown in the columns. Both morning peak period (in *italics*) and all-day percentages are shown. As an example, 72 per cent of the customers in the morning peak period who board at stops between Humber and Bathurst leave the streetcar at stops between Bathurst and Church. The numbers shown in the rightmost column are the total number of boardings made in the origin part of the route, in both directions.

Origin-Destination matrix: 501 QUEEN								
			Destination					Total boarding at origin
			Long Branch-Humber	Humber-Bathurst	Bathurst-Church	Church-Kingston Rd	Kingston Rd-Neville Park	
Origin	Long Branch-Humber	*Morning peak*	*52%*	*15%*	*29%*	*5%*	*0%*	*1340*
		All day	63%	12%	21%	3%	0%	5500
	Humber-Bathurst	*Morning peak*	*4%*	*15%*	*72%*	*8%*	*1%*	*2020*
		All day	8%	28%	50%	13%	1%	8750
	Bathurst-Church	*Morning peak*	*0%*	*21%*	*31%*	*48%*	*0%*	*940*
		All day	5%	26%	18%	36%	15%	15350
	Church-Kingston Rd	*Morning peak*	*1%*	*3%*	*62%*	*28%*	*6%*	*1750*
		All day	1%	11%	54%	23%	10%	10140
	Kingston Rd-Neville Park	*Morning peak*	*0%*	*0%*	*77%*	*17%*	*6%*	*1180*
		All day	0%	2%	60%	25%	13%	3730
	Total boarding at origin	*Morning peak*						*7230*
		All day						43460

Appendix 2 – Traffic Management Plan Update

Prohibit Parking on both sides of Queen Street East/West during the peak periods

Parking is prohibited at all times on several sections of Queen Street and either parking or stopping is prohibited during rush hour periods on both sides or on the peak flow side of the street on all sections of Queen Street. Parking is allowed in the off-peak periods and at anytime on weekends on most sections of Queen Street.

Prohibiting parking (or stopping) on both sides of Queen Street during the rush hour periods Monday to Friday, west of Bathurst Street and east of Jarvis Street (as requested by the TTC) is feasible, would potentially enhance transit operations, and from an operational perspective should be recommended. It is also consistent with the Sustainable Transportation Initiatives.

On sections of Queen Street East/West with local shopping communities such as "The Beaches", "Parkdale", "Leslieville", and "Queen West" (probably sections of Lake Shore Boulevard in Etobicoke where the 501 streetcar also runs), business proprietors and BIA's may oppose the parking prohibition.

Further research should be done pertaining to the impact of prohibiting parking on local businesses before a final recommendation is developed.

Expand the operational hours of the peak-period parking prohibitions

The current parking/stopping prohibitions on sections of Queen Street in the downtown core extend, from 6:30 a.m. to 9:30 a.m. and from 3:30 p.m. to 6:30 p.m., Monday to Friday. The parking/stopping prohibitions on Queen Street East/West outside the core apply, from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m., Monday to Friday. These regulations are relatively standard on arterial roads in the central area of the City.

Extending peak-hour parking prohibitions on transit routes also is identified as a Sustainable Transportation Initiatives – Short-term Proposal. With flexible working hours and changing characteristics as traffic progresses inward towards and outward away from the downtown core, it makes sense to consider prohibiting parking for longer and/or potentially different rush hour periods. Extending the peak-period parking prohibitions to operate for all or part of the period from 6:00 a.m. to 10:00 a.m., Monday to Friday for the inbound flow and from 3:00 p.m. to 7:00 p.m., Monday to Friday for the outbound flow, depending on which section of the 501 Queen streetcar route is considered and its proximity to the downtown core, is feasible and recommended by Traffic Operations.

Transportation Services is currently undertaking a broad review of this Sustainable Transportation initiative, and this research will be used as input in developing a recommendation on this matter.

Prohibit stopping at all times on both sides of Queen Street, from University Avenue to Victoria Street

Generally this appears feasible. Further review of the impact on possible curbside delivery requirements east of Yonge Street is required before committing to this proposal.

Prohibit stopping at all times opposite T-type intersections (Fuller, Beaconsfield, Massey, Euclid, Cameron, Beverley, and Seaton)

The proposal is intended to provide a slip-lane to allow motorists to pass vehicles waiting to make left-turns at these intersections, reduce queuing and therefore reduce delays to streetcars.

The exact number of parking spaces which would be lost at each location must be determined, together with the effect of these losses on the mixed commercial/residential neighbourhoods along Queen Street. Consultation with the Ward Councillor is required.

Eliminate (16) parking spaces on the north side of Queen Street West, between University Avenue and Spadina Avenue

Queen Street West, between University Avenue and Spadina Avenue is a high demand area for parking and is a thriving retail stretch with many diverse retail shops, restaurants, and taverns.

Although there are several off-street parking lots along Queen Street West in this area, the loss of on-street parking will have an impact on the neighbourhood. This should be reviewed prior to implementation.

Prohibit left-turns from 7:00 a.m. to 10:00 p.m. daily at all signalized intersections between Bathurst Street and Parliament Street

Eastbound and westbound left-turns are prohibited from 7:00 a.m. to 6:00 p.m., Monday to Friday, or at anytime at all major signalized intersections, except Church Street and Sherbourne Street, on the section of Queen Street, from Bathurst Street to Parliament Street. These turn prohibitions enhance transit operations during the peak operational period of the day, Monday to Friday. If amendments are made in the near future to extend the rush hour parking/stopping regulations to cover the “shoulder” areas, extending the turn prohibitions to apply from 6:30 a.m. to 6:30 p.m., Monday to Friday would be appropriate.

Prohibit left-turns from 7:00 a.m. to 10:00 a.m. and from 3:00 p.m. to 7:00 p.m. at locations along Queen Street East/West where turn prohibitions are currently 7-9 a.m/4-6 p.m.

Extending the operational periods of the left-turn prohibitions to correspond with any extended rush hour parking/stopping prohibitions is appropriate. However, applying these turn regulations also on weekends would need to be evaluated further to determine the impact on traffic circulation and over all benefit to streetcar operations.

Prohibit right-turns from 7:00 a.m. to 10:00 a.m. and from 3:00 p.m. to 7:00 p.m. at all signalized intersections between Spadina Avenue and Victoria Street

Right-turns are only prohibited on Queen Street at Yonge Street at this time to address delay caused by high pedestrian volume and minimize potential vehicle/pedestrian conflicts. This could be considered at other high pedestrian locations such as Bay Street and University Avenue during rush hour periods or during business hours of the day (7:00 a.m. to 7:00 p.m.). Further review is required.

Prohibit eastbound left-turns from Queen Street West into the City Hall parking garage

This proposal has also been raised and reviewed in the context of the Nathan Philips Square Revitalization Plan. Further discussion with Toronto Parking Authority is advisable to ensure that the entrance ramp to the garage from the south side of Queen Street West will remain accessible at all times.

Implement signal priority at several intersections that currently do not have priority (Jarvis Street, York Street, Glendale Avenue, Colborne Lodge, Windermere Avenue, Ellis Avenue and two locations on Lake Shore Boulevard, west of the Humber loop)

Provide a higher level of priority for transit at Broadview Avenue, Bathurst Street, Dufferin Street, and Lansdowne Avenue

Enhancing signal operations to enhance public transit operations is a priority of Transportation Services.
TTC should present their specific proposals, including signal algorithms and timings, and Transportation Services will then develop recommendations for each intersection.