

MEETING DATE: JUNE 22, 2005

SUBJECT: Future Streetcar Fleet Requirements And Plans

RECOMMENDATIONS

It is recommended that the Commission:

1. Approve the rebuilding of 100 Canadian Light Rail Vehicle (CLRV) streetcars, at an estimated total cost of \$130 million, to ensure that the TTC's near-term streetcar service requirements are met, noting that, under even the most-optimistic scenario, new streetcars could not be acquired and put into service until 2011/2012;
2. Approve proceeding immediately with the process of procuring new streetcars for the TTC, including approval of the hiring of five additional staff who would be dedicated to this project, so that the introduction of new streetcars in Toronto can be done as quickly as possible;
3. Approve a contingency plan of rebuilding the remaining 96 CLRV streetcars, at an estimated cost of \$134 million, which would be implemented only if new streetcars cannot be procured in time to meet the TTC's streetcar requirements;
4. Note that, in order to make TTC streetcar service accessible to people with mobility difficulties, the most-practical approach is to accelerate the procurement and introduction of new streetcars which would be low-floor and fully-accessible;
5. Note that current projections indicate that the TTC's streetcar fleet requirements will grow from the current 238 to a projected 350-to-480 by 2026 depending on the extent to which the *Building a Transit City* program is implemented with streetcars; and
6. Forward this report to the City of Toronto, the Ontario Ministry of Transportation, Transport Canada, and Infrastructure Canada.

FUNDING

Sufficient funds for the rebuilding of CLRV streetcars are included in Project 4.15 Streetcar Overhaul, under Life Extension of Canadian Light Rail Vehicles, as set out on pages 1037 to 1040, category State of Good Repair/Safety, in the TTC 2005-2009 Capital Program as approved by the City of Toronto Council on February 23, 2005. However, project financing approval is required from City Council to enable contract commitments to proceed for the full rebuild of 100 cars.

No funds are included in the approved TTC 2005-2009 Capital Program budget, for the purchase of new streetcars or the related activities including the required additional staffing. The cost of hiring additional staff to accelerate the design and procurement process for new streetcars will result in unbudgeted capital costs of approximately \$150,000 in 2005, and an annual cost of approximately \$400,000 commencing in 2006. Funding for these unbudgeted 2005 expenditures can be accommodated within Project 4.15 - Life Extension of CLRV project. These requirements, as well as the proposed procurement of new CLRV

streetcars, will be included in the TTC's 2006 budgets which will be presented to the Commission for approval in November, 2005.

BACKGROUND

Streetcars have been an important and continuous part of Toronto's public transit and urban scene for more than a century. Horse-drawn streetcars began operation in Toronto in 1861 and were replaced by electrically-powered streetcars in the 1890s. Until the opening of Toronto's first three subway lines in the 1950s and 1960s, streetcars carried the majority of transit customers in Toronto. While the streetcar network was reduced in size between 1947 and 1976, largely as a result of the replacement of streetcar routes by subway service, streetcars today still provide the majority of surface transit service in the downtown core. Four of the TTC's five busiest surface routes are streetcar routes. Approximately 260,000 customer-trips are made on streetcar routes each day.

As was common throughout the transit industry in North America and Western Europe after the Second World War, plans in Toronto called for the elimination of streetcars and their replacement by new subways, buses, or electric trolley buses. These plans were decisively reversed in 1972, largely as a result of citizen support for continued streetcar service. As a result, older streetcars were rebuilt, new streetcars were purchased, other infrastructure upgrades were made, and between 1990 and 2000, three significant additions were made to the streetcar route network. Major investment in renewed track and overhead wiring continues today as part of the TTC's State of Good Repair budget.

Much of the development of the older parts of Toronto was strongly influenced by the presence of frequent, reliable transit service provided by streetcar routes. Residential and commercial neighbourhoods that are today on well-used subway lines – Bloor West, North Toronto, or The Danforth, for example – were developed because of the streetcar service that was introduced to these areas in the first few decades of the 20th century. Other vibrant neighbourhoods that remain on busy, highly-travelled streetcar lines – Little Italy on College Street, St Clair Avenue, The Beach – continue to be popular and successful places to live and shop. For significant new neighbourhoods planned to be developed in future years, such as the East Bayfront and the West Don Lands, it is expected that only new streetcar routes can provide the necessary high-quality, high-capacity, and reliable public transport that will be necessary to support the growth of these new communities.

In addition to being an important part of Toronto's heritage, streetcars offer a number of important customer service, community, and environmental benefits. They provide a notably smooth, quiet, and comfortable ride. Experience with the three new streetcar services introduced in the 1990s shows that ridership increases when bus services are replaced by new streetcar service. Municipal investment in streetcars demonstrates the city's long-term commitment to an area which, in turn, instils confidence and brings about higher levels of private investment and development. Streetcars are environmentally-friendly, producing approximately 93% fewer emissions than buses, on a per passenger-kilometre basis, even after taking into account the off-site generation of electricity required for the streetcars.

Streetcars continue to play a very important role in the TTC's transit network. While only 11 of the TTC's 149 surface routes are operated with streetcars, these routes carry 17% of all passengers travelling on the TTC's surface network, or about 43 million passengers annually.

Toronto's new Official Plan highlights the need to focus new development on existing high-capacity transit service including the streetcar routes. The Plan introduces new policies to provide priority to streetcar service in order to make it more attractive and competitive.

The purpose of this report is to discuss the TTC's current and future streetcar fleet requirements, and the measures which must be taken in order to meet those requirements.

DISCUSSION

Current and Future Streetcar Requirements

The TTC currently operates 197 streetcars (158 CLRVs and 39 ALRVs) on its 11 streetcar routes. The number of streetcars required for scheduled service for each route during peak periods is shown in Table 1, attached.

There are a number of factors, some of which are quite recent initiatives, which will cause the number of streetcars required for service on the TTC system to increase in the future. These are:

- Additional ridership due to population and employment growth: Toronto's new Official Plan calls for an increase in population and employment of up to 750,000 people over the next 20 years. The Plan also calls for measures which will encourage more people to travel by transit, rather than by automobile. This growth in population, and policies aimed at changing people's travel behaviour, are expected to increase travel demand on streetcars.
- Ridership Growth Strategy (RGS): This plan, endorsed by the Commission in March, 2003, calls for, among other things, improvements to peak-period service on major arterial routes in Toronto. These improvements will require more streetcars to be put into service.
- Combating deteriorating traffic conditions: The majority of the TTC's streetcar routes currently operate in mixed-traffic, sharing the roadway with private automobiles, trucks, and other users of the road. The TTC's experience has been that, as traffic volumes grow and traffic operating speeds decline, more streetcars are required in service simply to offset this slowing-down of transit operating speeds. This trend will require an increase in the TTC's streetcar fleet.
- Development of Toronto's Waterfront: One of Toronto's major planning initiatives is the opening-up and redevelopment of its waterfront for a wide range of residential, employment, and recreational uses. In approving land-use plans for the waterfront, City Council also approved a "Transit First" policy which requires that high-capacity transit service be in place before development proceeds in the waterfront. This major initiative and policy position will likely require an increase in the TTC's streetcar fleet.
- Building a Transit City (BTC): In support of Toronto's new Official Plan, City Planning, City Transportation, and the TTC have been working together to develop a new transportation strategy for the City of Toronto which would introduce high-quality, high-capacity transit services, in dedicated rights-of-way, on a network of major arterial roads and utility corridors, in order to significantly enhance transit service across the entire city (see Exhibit 1, attached). Work is ongoing regarding the choice of streetcars or buses for the various corridors which constitute this network, but it is certain that implementation of the BTC network will require an increase in the TTC's streetcar fleet.

All of these factors, combined, will require a significant increase in the size of the TTC's streetcar fleet. Tables 2 and 3, attached, show that, depending on the assumptions made regarding which BTC corridors are implemented with streetcars as opposed to buses, the number of streetcars which the TTC would need for peak-period service would increase from 238 in 2006 to between 350 and 480 by 2026. Exhibit 2, attached, illustrates the projected growth in streetcar fleet requirements. Even assuming that the TTC's existing streetcar fleet is kept in operation, the demand for streetcars could begin to exceed the number of streetcars available for service by the year 2010.

Status of the Current Streetcar Fleet

The majority of the TTC's current streetcar fleet are CLRV streetcars. This group of streetcars will begin to reach the end of their 30-year service life in 2007. Even before the CLRVs will have reached their 30-year life expectancy, they will have experienced several significant mechanical and electrical problems which reduce their reliability and availability for service. If these streetcars are to be kept in operation beyond their 30-year service life, many of their components will have to be completely rebuilt or replaced. If this work is not initiated by 2007, then these streetcars will begin to fail at an increasing rate, resulting in fewer and fewer streetcars being available for scheduled service, and those which are available being less reliable and more prone to breakdown. Exhibit 3, attached, shows the projected reduction in streetcar availability unless action is taken to extend the service lives of this group of streetcars.

Means of Meeting the Increasing Demand for Streetcars

As described earlier in this report, and illustrated in Exhibit 2, attached, it is expected that the demand for streetcars will increase significantly over the next 20 years. There are two means by which this increasing demand can be met.

1. Buy new streetcars for Toronto: There are a number of manufacturers of streetcars in the market today. New streetcars would offer several advantages including:

- new and more-reliable technologies and propulsion systems
- fully-accessible low-floor design
- greater energy efficiency
- passenger amenities such as air conditioning
- potential of greater capacity per vehicle

Toronto's streetcar system has several attributes which are relatively unique in streetcar operations. These include:

- an atypical rail gauge
- steeper grades than would be found in most other cities (e.g. Bathurst Street, Kingston Road, upper Gerrard Street, Harbourfront and St.Clair West portals)
- tight turning radii
- single-ended operation which requires turn-around loops at the ends of routes.

This means that, when the TTC buys new streetcars, it will have to specify performance characteristics which are less-commonly found in the industry. It will likely not be possible for the TTC to buy an "off-the-shelf" product.

The steps required to buy and put new streetcars into service in Toronto are many, including: product research, development of specifications, industry review of tenders, TTC evaluation of tenders, award of tenders, design, engineering, and production of prototype, testing and evaluation of a prototype, refinement of design, and start-up of production. Therefore, while the TTC will have to, and should invest in new streetcars to expand its streetcar fleet, this process is very complicated and will realistically require upwards of seven years from the start of the process to the entry of new streetcars into service. On this basis, the earliest date by which new streetcars could be in operation in Toronto would be in 2011/2012.

Referring to Exhibit 4, even if the TTC immediately begins the process of procuring new streetcars for Toronto, new streetcars could probably not be delivered in time to meet the projected increasing demand for streetcars in the system.

2. Extend the Life of the Current CLRV Streetcars: Given the lead time required to procure new streetcars, it will not be possible to meet the near-term and medium-term demand for streetcars unless steps are taken today to ensure that the current fleet of streetcars can continue to operate safely and reliability beyond 2007, which marks the end of the 30-year life expectancy of the oldest of these vehicles. In order to ensure that there are sufficient streetcars to maintain current service and to meet the projected growth in requirements until new streetcars can be put into service, the TTC must start to rebuild its current fleet of streetcars through a formal Life Extension Program (LEP). Considerable work has been done to determine the scope of rebuilding which such a program would entail. The Life Extension Program would be expected to allow the current fleet of streetcars to continue to operate for an additional 10-15 years by overhauling, rebuilding, or replacing a number of significant components of these streetcars including mechanical components, vehicle structure, electrical systems, motive systems and trucks, seating, and heating/air conditioning/ventilation systems.

In order to make this program as efficient as possible through economies of scale, it would be necessary to establish a minimum “critical mass” for rebuilding. That minimum number is 100 streetcars. As shown in Exhibit 5, the rebuilding of CLRV streetcars will minimise the possible future shortages of streetcars in advance of new streetcars being acquired between 2012 and 2021.

The implementation of a Life Extension Program for the CLRV streetcar fleet is, itself, a complicated undertaking which requires lead time for re-design of the streetcars’ major systems, for the awarding of contracts, and for pre-production set-up (see Exhibit 6, attached). Therefore, in order to ensure that the TTC has a reliable operational streetcar fleet to meet its requirements until new streetcars can be put into service, the Commission should approve the implementation of the proposed Life Extension Program for 100 CLRV streetcars. Additionally, because of the unknowns involved in the future streetcar fleet requirements and the speed with which new streetcars can be put into service, the Commission should also approve a contingency plan of rebuilding the remaining 96 CLRV streetcars. This contingency plan would be put into effect only if the procurement of new streetcars cannot be achieved fast enough to meet projected fleet requirements.

Making Streetcar Service Accessible

One of the major outstanding issues regarding streetcar service in Toronto is their lack of accessibility for people with mobility difficulties. While the TTC is retrofitting subway stations with elevators and other accessibility features in order to make these stations navigable by people with mobility or other sensory disabilities, and while the TTC is replacing its bus fleet with new fully-accessible, low-floor buses, the TTC’s streetcar fleet remains not accessible.

TTC staff have done extensive research into the means of making the current streetcar fleet accessible. These measures have included construction of high-level platforms comparable to what is found at GO train platforms, changing the grade of streetcar tracks at streetcar loading platforms to equalize the streetcar floor level with the platform, the use of low-floor accessible trailers attached to streetcars, and the retrofitting of the current streetcars with lifts. Each of these investigated options would require considerable explanation which is not the focus of this report but, in summary, after exhaustive research on the means of making the current fleet accessible, staff have concluded that this is not a practical objective and that this should not be pursued further. This conclusion has been reviewed and concurred by an independent consultant, Booz Allen Hamilton.

The TTC’s efforts regarding the provision of accessible streetcar service should now focus on accelerating the process of procuring fully-accessible low-floor streetcars which would benefit all customers. Staff believe that this approach is the most pragmatic and realistic one which the TTC can take in order to achieve full accessibility of the streetcar network.

JUSTIFICATION

The TTC's fleet requirements are projected to increase significantly over the next 20 years, as a result of several city-building and service initiatives. In order to meet this growing requirement for streetcars, the Commission should approve both the rebuilding of the current CLRV streetcar fleet in order to ensure continued safe and reliable operation of these streetcars for an additional 10-15 years, and the immediate commencement of the process of procuring new fully-accessible low-floor streetcars for Toronto. These two initiatives, together, will ensure that Toronto's near-term and long-term streetcar fleet requirements are met and that the objective of providing fully-accessible service on the TTC's streetcar network will be advanced.

June 22, 2005
11-55-80

Attachment: Tables 1, 2, and 3
Exhibits 1, 2, 3, 4, 5, and 6

TABLE 1**Peak-Period In-Service Streetcar Requirements September 2005 (without construction)**

	<u>Morning Peak</u>	<u>Afternoon Peak</u>	
511 Bathurst	9	9	
506 Carlton	34	29	
502 Downtowner	7	6	
505 Dundas	19	20	
509 Harbourfront	3	4	
504 King	45	32	(7 Morning Peak are ALRV)
503 Kingston Rd	6	5	
508 Lake Shore	3	4	
501 Queen	29	31	(all ALRV)
510 Spadina	18	21	
512 St Clair	22	19	
535 Standby	<u>0</u>	<u>1</u>	
Total	<u>195</u>	<u>181</u>	

TABLE 2

**PROJECTED STREETCAR REQUIREMENTS WITH RGS AND "MOSTLY BUS" BTC
(June 2005)**

<u>Forecast for Scheduled Service - Streetcars</u>	2006	2011	2016	2021	2026
<i>Assumed annual ridership (M)</i> ¹	436	469	493	518	543
Base					
ALRV	36				
CLRV	159				
Sub-total					
Additional streetcars due to congestion/running time ²	3	5	5	5	5
Additional streetcars for population growth ²	1	4	3	3	3
Ridership Growth Strategy - improved peak service	3	3			
Subtotal including RGS	202	215	223	231	239
Additional Waterfront Requirements					
- West Don		5	2		
- East Bayfront		3	4		
- Bremner Boulevard		3	2		
- Port Lands			6	10	5
Additional "Building a Transit City"³					
- Waterfront West, CNE to Park Lawn			5		
- Kingston Road, Victoria Park to Lawrence				12	
Total, Waterfront and BTC	0	11	30	52	57
"Low Estimate" Scheduled Streetcar Requirements	202	226	253	283	296
<u>Total Including Maintenance Spares⁴</u>	238	265	297	333	348

Notes:

- 1) Ridership forecasts reflect proforma budget numbers - May 2005
- 2) Based on the pattern of actual streetcar additions between 1996 and 2001.
- 3) Timing of introduction of service illustrative of what is feasible - priorities not finalised
- 4) Assumes 17% needed for maintenance spares

TABLE 3

**PROJECTED STREETCAR REQUIREMENTS WITH RGS AND "MOSTLY STREETCAR" BTC
(June 2005)**

<u>Forecast for Scheduled Service - Streetcars</u>	2006	2011	2016	2021	2026
<i>Assumed annual ridership (M)¹</i>	436	469	493	518	543
Base					
ALRV	36				
CLRV	159				
Sub-total					
Additional streetcars due to congestion/running time ²	3	5	5	5	5
Additional streetcars for population growth ²	1	4	3	3	3
Ridership Growth Strategy - improved peak service	3	3			
Subtotal including RGS	202	215	223	231	236
Additional Waterfront Requirements					
- West Don		5	2		
- East Bayfront		3	4		
- Bremner Boulevard		3	2		
- Port Lands			6	10	
Additional "Building a Transit City"³					
- Waterfront West, CNE to Park Lawn			5		
- Don Mills, Pape Stn to Steeles			25		
- Eglinton East, Don Mills to Kingston Road			15		
- Kingston Road, Victoria Park to Lawrence				12	
- Finch Hydro Corridor, Markham Road to Yonge			20		
- Finch Hydro Corridor, Yonge to Black Creek				20	
- Finch Hydro Corridor, Black Creek to Renforth					
- Eglinton West, Black Creek to Renforth					
Total, Waterfront and BTC	0	11	90	132	136
"High Estimate" Scheduled Streetcar Requirements	202	226	313	363	402
<u>Total Including Maintenance Spares⁴</u>	238	265	368	427	438

Notes:

- 1) Ridership forecasts reflect proforma budget numbers - May 2005
- 2) Based on the pattern of actual streetcar additions between 1996 and 2001.
- 3) Timing of introduction of service illustrative of what is feasible - priorities not finalised

4) Assumes 17% needed for maintenance spares

