For Action



Results of the King Street Transit Pilot

Date: April 11, 2019To: TTC BoardFrom: Chief Customer Officer

Summary

The King Street Transit Pilot began on November 12, 2017 providing greater priority for the TTC's King streetcar customers between Bathurst Street and Jarvis Street over the past year and a half.

From a transit perspective, the pilot project is a success:

- **Faster and more predictable transit travel times:** On average, streetcars now travel faster during all periods of the day and times are more predictable, making the service more attractive. Approximately 30,000 minutes of travel time are saved by King streetcar customers daily.
- More people taking transit along the King Street corridor: With more predictable travel, more people are taking King streetcars than ever, with daily weekday ridership growing by 16% from 72,000 to 84,000 boardings per day. Capacity grew on King Street through the pilot project to meet unprecedented increases in demand.
- **Greater customer satisfaction with King streetcar service:** Prior to the pilot, overall customer satisfaction with King streetcar service was low on key measures such as travel time, comfort, and wait time. Through the pilot period, customer satisfaction on all these measures has significantly improved.
- Improved efficiency and reliability of streetcar operations: Streetcar service on King Street is now more productive, with 25% more customers per hour of service operated. Overall reliability has improved with reduced variability in the busiest portion of the route.

TTC and City staff recommend that the pilot project be made permanent as the *King Street Transit Priority Corridor* with immediate enhancements to the pilot design, such as improvements to streetcar stops and improved signage at intersections. Furthermore, the TTC tentatively plans on rehabilitating streetcar track on King Street between Dufferin Street and Parliament Street in stages through 2023; providing an opportunity for the City and TTC to implement permanent changes to the street to further enhance transit, public realm, and local access.

As part of the 5-Year Service Plan and 10-year Outlook, the TTC will recommend future transit pilot projects on bus and streetcar corridors.

This report summarizes the performance of the King Street Transit Pilot from a transit perspective. It complements the attached joint City-TTC report, entitled "The Future of King Street: Results of the Transit Pilot", to be considered at Executive Committee on April 9, 2019 and City Council on April 16, 2019. Recommendations in that report for Committee and Council approval were developed jointly between TTC and City staff.

Recommendations

It is recommended that the TTC Board:

- 1. Endorse the findings of the joint City-TTC report, attached, entitled "The Future of King Street: Results of the Transit Pilot", to be considered at Executive Committee on April 9, 2019 and City Council on April 16, 2019.
- 2. Request that City Council approve the recommendation in the "The Future of King Street: Results of the Transit Pilot" that King Street continue to operate as a Transit Priority Corridor between Bathurst Street and Jarvis Street.
- 3. Request that the City further monitor and assess the late-night performance of the King Street Transit Priority Corridor to inform the consideration of changes to improve transit operations.
- 4. Note that TTC staff, in collaboration with the City, will initiate discussions on longer-term improvements to the King Street Transit Priority Corridor to be aligned with track reconstruction planned for 2023.

Financial Summary

The recommendation to permanently operate King Street as a transit priority corridor between Bathurst Street and Jarvis Street is not expected to result in any financial impact to the TTC, however it is anticipated to result in both operating and capital budget impacts for other City programs and agencies.

Capital Budget Impacts

Capital funding needed for permanent improvements to the King Street Transit Priority Corridor for TTC stops and public realm spaces is estimated at \$1.5 million. These costs will be funded within the City's Transportation Services 2019 Capital Budget through a combination of capital project reallocations and a draw from the City's Public Realm Reserve Fund.

The recommendation of this report do not result in any increased costs impacting the TTC's 2019 Capital Budget. Longer-term TTC capital improvements to the King Street Transit Priority Corridor will be reviewed in concert with planned surface track reconstruction in 2023 for consideration by the Board as part of future year budget processes.

Operating Budget Impacts

The City's Transportation Services anticipates an operating cost of \$0.750 million to operate the project for the remainder of 2019. These costs are associated with traffic system maintenance, maintenance of public realm spaces and seasonal maintenance and operations and will be accommodated within the 2019 Operating Budget for Transportation Services.

Transportation Services also expects a small loss of user fee revenue (\$16,800) associated with continuing to waive application fees for outdoor cafes and public installations on a curb lane for 30 curb lane public space areas.

As part of the King Street Pilot project, the Toronto Parking Authority removed 180 onstreet parking spaces on King Street, offset by the addition of 100 new on-street spaces on side streets. This change results in an estimated net increase of \$0.9 million in Toronto Parking Authority revenue.

The recommendation of this report do not result in any increased costs impacting the TTC's 2019 Operating Budget for service provided on the King Street Transit Priority Corridor.

King Street Pilot – Project Cancellation

Should the King Street Transit Priority Corridor not be approved the capital cost to reinstate King Street to its pre-pilot roadway configuration is estimated at \$0.5 million. This cost will need to be funded within the City's Transportation Services 2019 Capital Budget through capital project reallocations.

There would also be an additional operating cost for the TTC for the 504 King streetcar service of \$0.132 million assuming the loss of travel time improvements and adjusted for service reductions due to reduced demand. This cost is not included in the TTC 2019 Operating Budget.

The Chief Financial Officer has reviewed this report and agrees with the financial summary information.

Equity/Accessibility Matters

Streetcar service in the King Street corridor is provided by accessible streetcars. TTC and City of Toronto staff worked closely with members of the Advisory Committee on Accessible Transit (ACAT) prior to the launch of the pilot project to ensure that accessibility was a key consideration in the design of relocated transit stops and that access for paratransit customers would be maintained throughout.

As part of the pilot project, the following measures were implemented to maintain and enhance accessible transit:

• Ramps constructed from sidewalk to street level at relocated far-side streetcar stops for customers using mobility devices to access low-floor streetcars

- Tactile attention indicator tiles to designate larger customer waiting areas at each street level stop and improve safety for customers with vision loss
- New accessible loading areas were designated in the curb lane throughout the pilot zone, which can be used by TTC Wheel-Trans services
- TTC Wheel-Trans vehicles are permitted to travel freely through the pilot area

Potential future improvements, such as constructing bump outs at each transit stop as recommended in the next steps section below, would further enhance accessible service along the King Street corridor.

Decision History

At the July 11, 2016 TTC Board Meeting, City Planning and the TTC presented an introduction to the King Street Pilot Study (then called the King Street Visioning Study): https://www.ttc.ca/About the TTC/Commission reports and information/Commission meetings/2016/July 11/Agenda/index.jsp

The TTC Board endorsed the King Street Transit Pilot project at its meeting on June 15, 2017:

http://www.ttc.ca/About the TTC/Commission reports and information/Commission meetings/2017/June 15/Agenda/index.jsp

City Council approved the King Street Transit Pilot for a one-year period at its meeting on July 4, 2017:

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.EX26.1

At the October 16, 2017 TTC Board Meeting, the TTC Board endorsed the framework for monitoring and evaluation for the King Street Pilot: http://www.ttc.ca/About the TTC/Commission reports and information/Commission meetings/2017/October 16/index.jsp

At the December 4, 2018 City Council meeting, City Council approved an extension of the pilot period to July 31, 2019, to allow for analysis and reporting on the pilot project: http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.CC1.5

Issue Background

The King Street Transit Pilot began on November 12, 2017 to improve transit service on one of TTC's busiest surface transit routes, the King streetcar. The implementation followed the King Street Visioning Study and a comprehensive community and stakeholder engagement that informed the pilot's design and key priorities.

The pilot design, as illustrated below in Figure 1, discouraged through private automobile traffic on King Street between Bathurst Street and Jarvis Street. Generally, all traffic is required to turn right off of King Street at each major intersection, with the exception of streetcars, buses, TTC-operated Wheel-Trans vehicles, and bicvcles. A further exemption for taxis is provided between 10:00 p.m. and 5:00 a.m.

To improve safety at streetcar stops and to accommodate dedicated right-turn lanes, streetcar stops within the pilot zone were relocated to the far side of the intersection at most locations. The curb lane at the stops were repurposed to provide dedicated space for waiting customers and to allow for direct boarding from the street.

The result of these changes was significantly reduced automobile volumes that provided less congested and more predictable travel for streetcars and TTC customers.



Figure 1: Typical Street Block in King Street Transit Pilot Zone

Transit Evaluation Framework

The framework to assess the King Street Transit Pilot was outlined in the October 16, 2017 TTC Board report entitled, "King Street Pilot: Monitoring and Evaluation". From a transit perspective, the success of the pilot is defined by improvements to transit performance informed primarily by three metrics: reliability, ridership and travel times.

The City's report, attached, and available online

(<u>http://app.toronto.ca/tmmis/viewAgendaltemHistory.do?item=2019.EX4.2</u>) expands the evaluation to include the travel experience for other modes, the economic impacts on businesses, and the success of the public realm program.

Comments

The success of the King Street Transit Pilot can be summarized into four key points:

- Predictable and faster transit journeys
- Improved efficiency and reliability of streetcar operations
- More people taking transit in the King Street corridor
- Greater customer satisfaction with King streetcar service

Detailed performance assessment for each of these points can be found in Appendix 4 of the attached joint City-TTC report.

Success #1: Transit journeys on King Street are faster and more predictable.

Average transit journey times through the pilot area have improved during all periods of the day, with a 1 to 2 minute travel time improvement in the morning peak period and a 3 to 4 minute travel time improvement in the afternoon peak period. Worst case travel times in the afternoon peak improved by 15 to 20%, or between 4 to 5 minutes. On average, King streetcar customers are saving approximately 30,000 minutes of travel time per day.

Moreover, the most significant improvement to transit on King Street is that streetcar journeys are not only faster, but more predictable. This means that customers can board a streetcar with more confidence that they will arrive to their destination by a certain time. As Figure 2 shows, variability in travel time in the afternoon commute was reduced dramatically upon the start of the pilot period. Travel times today during the busiest hour rarely exceed 20 minutes, whereas prior to the pilot, travel times were regularly above 25 minutes.



Figure 2: Daily Pilot Area Travel Time – Afternoon Busiest Hour/Direction

Success #2: Streetcar operations are more efficient and reliable.

In general, the King Street Transit Pilot has resulted in more reliable, productive and efficient operation of streetcar service in the corridor. This results primarily from reduced travel time variability. Data shows that bunching of streetcars is less frequent during the busiest times of the day. Wait time data also indicates that the proportion of streetcars arriving within 4 minutes during peak periods was maintained around 80% through the pilot period.

The King Street Transit Pilot also improved on-time performance of the service relative to other mixed-traffic streetcar routes as a result of reduced travel time variability and increased route supervision.

Finally, from a route productivity perspective, the ridership gains relative to the cost of operating the service resulted in a more cost-effective service. A common measure for cost-efficiency and productivity of transit service is the number of customers per hour of service operated. Increased ridership during the pilot has increased route productivity by 25% to approximately 125 boardings per hour of service.

Figure 3: Route Productivity

| | King Streetcar Corridor | | | Other Routes (for comparison) | | |
|-------------------------------|-------------------------|---------------|-----------------|-------------------------------|-----------|-----------------------------|
| | Pre-Pilot | March 2018 | October 2018 | 510 Spadina | 501 Queen | 29 Dufferin 929 Dufferin |
| Daily Ridership | 72,000 | 81,000 | 84,000 | 40,000 | 55,100 | 42,300 |
| Scheduled Revenue Hours | 710 | 780 | 670 | 270 | 820 | 530 |
| Boardings per Revenue Hour | 101 | 104 | 125 | 148 | 67 | 80 |

Success #3: More people are taking transit in the King Street corridor.

Ridership on streetcars on King Street immediately increased upon the implementation of the pilot project in mid-November 2017. Increases were observed at all times of the day, including in off-peak periods and on weekends.

Figure 4 shows the weekday route-wide ridership totals for the 504 King and 514 Cherry streetcar routes. Overall, weekday ridership has increased by nearly 17% between September 2017 and October 2018 to approximately 84,000 customers per day. Figure 5 shows that ridership increases are consistently observed at most times of the day, particularly in the midday, where ridership has increased between 10% and 25%. Early evening and weekend ridership fluctuates depending on time of year due to special events occurring in the downtown and weather.

Figure 4: Streetcar Ridership in King Street Corridor

| | Pre-Pilot | November 2017 | March 2018 | June 2018 | October 2018 |
|--------------------|-----------|------------------|---------------|--------------|-----------------|
| Daily Ridership | 72,000 | 84,000 | 81,000 | 80,000 | 84,000 |
| Saturday Ridership | 52,700 | 61,500 | 52,600 | 56,300 | No data |
| Sunday Ridership | 44,800 | 52,200 | 44,700 | 47,900 | No data |

NOTE: Daily ridership prior to October 2018 includes boardings for 504 King and 514 Cherry streetcar routes



Figure 5: Weekday Ridership by Time Period

Streetcars are busier than ever on King Street during peak commuting times

The peak point, peak hour demand for the surveyed periods is provided in Figure 6 for the morning and afternoon peak hours. In October 2018, morning peak hour demand increased by over 30% while the afternoon peak hour demand increased by 45% from the September 2017 baseline. Improved and more reliable service delivery, particularly in the afternoon rush hour, likely contributed to greater demands.

TTC responded by increasing capacity on the route with full deployment of low-floor streetcars

Figure 7 illustrates the monthly average and range of streetcar capacity delivered at the peak point in the morning and afternoon peak periods. Since the start of the pilot, delivered capacity has increased from approximately 2,000 customers per hour in the morning peak period to approximately 2,900 customers per hour. In the afternoon peak period, it has increased from approximately 1,600 customers per hour to approximately 2,400 customers per hour. Despite this increase, overcrowding is still observed at the busiest times. Further measures to increase capacity will be explored, including adding more streetcars or reintroducing supplemental bus service at the busiest times.

Figure 6: Peak Demand

Morning Peak Demand

Observed eastbound at Spadina Ave., 8:00 to 9:00 a.m.

Afternoon Peak Demand

Observed westbound at Spadina Ave., 5:00 to 6:00 p.m.



Note: Observed peak demand is the number of customers observed in the busiest direction, at the busiest location, in the busiest hour.



Figure 7: Peak Capacity Operated

Note: Capacity delivered calculated based on vehicle capacity as defined by TTC Service Standards. Peak period standards for bus (51), CLRV streetcar (74), ALRV streetcar (108), and low-floor streetcar (130)

Success #4: Greater customer satisfaction with King streetcar service.

The King Street Transit Pilot has improved perceptions of customer satisfaction with transit service in the King Street corridor. The TTC conducts a quarterly Customer Satisfaction Survey (CSS) that provides an insight on perceptions of TTC service and operations. Since the start of the King Street Transit Pilot, satisfaction has increased significantly on two key measures that can be attributed to the pilot: overall satisfaction and trip duration. In 2018, perceptions of trip duration, a key driver of overall customer satisfaction, averaged 88%, which is the highest of all streetcar routes.

Key Conclusions

1. King Street Transit Pilot successfully improved transit in the corridor and should be made permanent

The King Street Transit Pilot has resulted in positive results for the three key aspects of performance measurement: travel time, reliability, and ridership. The benefits, relative to the investment in the project, are unprecedented for the TTC.

2. Pilot approach provided flexibility for adjustments and learnings to inform a permanent design and a model for future transit projects

The pilot involved an unprecedented program of data collection and analysis for a transportation project in Toronto. This was required in order to assess the impacts of the project not only for transit, but for other modes of transportation and the community. The data analysis allowed for more responsive adjustments to the pilot project, such as service changes to accommodate increased ridership.

The pilot program also allowed for changes to operations of traffic signals and adjustments to elements such as streetcar stop configuration and curbside uses. For example, at the start of the pilot project, transit signal priority was disabled to observe overall traffic implications of the proposed pilot design. Upon better understanding of the impact on surrounding traffic patterns, transit signal priority was re-enabled in July 2018.

3. Pilot project demonstrated the cooperation between TTC and City essential for success of future transit projects

From early planning stages through design and implementation, the TTC worked closely with City Planning and Transportation Services staff to make the King Street Transit Pilot a reality. The alignment of common goals for mobility, land use, and placemaking created a stronger coalition to advance the project than if the respective priorities were presented individually. The King Street Transit Pilot has provided a framework on which future projects can proceed.

Next Steps

Recommendations for immediate changes

If the King Street Transit Pilot is made permanent, there are immediate-term improvements that can be made to the current design to enhance transit operations and the customer experience in the pilot area. TTC and City staff will work together to implement some of these immediate changes, including:

- Improved customer experience at TTC stops: the current stop designs lack weather protection and physical separation from the roadway. TTC staff will work with the City to identify interim stop design improvements where space and context allows, such as shelters, modular raised stop platforms, and real-time information displays
- Adjustments to TTC stops at busy locations: the TTC is assessing stop operations at busy locations such as University Avenue to extend stops to allow more than one streetcar to serve the stop at a time to reduce dwell times and delays
- Investigating opportunities to optimize operations at both ends of the pilot.
- **Augmented Transit Signal Priority:** The City and TTC will explore additional transit signal priority at intersections where currently signal priority is not provided
- **Improved and illuminated signage:** the City and TTC will work to improve signage within the pilot area to better inform motorists of traffic restrictions

TTC will also continue to make service and schedule adjustments to improve service reliability and capacity on the King Street corridor. The City will work with Toronto Police Services to maintain an effective level of enforcement in the pilot zone.

Recommendations for a permanent design

The TTC plans to reconstruct streetcar tracks on King Street between Close Avenue and Berkeley Street in stages in 2023. This presents an opportunity to implement physical changes to King Street to improve transit and public realm within the pilot area, or beyond. The approval of the King Street Pilot will allow for the City and TTC to begin the engagement of local residents, businesses, visitors, and transit users to make a permanent design that reflects the lessons learned during the pilot.

Some considerations to be part of a permanent design include:

- **Physical roadway alterations:** including bump-outs for transit stops, widened sidewalks and public realm, and accommodation for cycling
- Streetcar track network enhancements: improving the intersection of York Street and King Street by adding an additional east-to-north movement that allows for more routing options for diversions or adjustments. Layby tracks within the pilot area may also provide an opportunity to provide greater service resiliency with standby vehicles.

Recommendations for other transit pilot projects

The TTC is undertaking a 5-Year Service Plan and 10-Year Outlook. As part of this study, the TTC will identify other pilot projects for transit priority to be implemented in the near and medium-term.

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Signature

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Attachments

Attachment 1 – City of Toronto Council Report Attachment 2 – Transit Performance Summary