Line 1 – Delivering Additional Capacity
2019 – 2031

April 11, 2019
Presentation Overview

1. Ridership Growth
2. ATC Re-Baselining
3. Line 1 Capacity Requirements
4. State of Good Repair Capital Projects
5. Subway Closures
6. Key Recommendations
Ridership Growth
### Ridership Growth: Demand and Capacity

| Demand is driven by | • Land use  
|                     | • Population  
|                     | • Employment  
| Demand is/will be affected by | • Connecting transit services- subway, bus, streetcar  
|                      | • Rapid transit expansion  
| Capacity is driven by | • Size of trains  
|                      | • Frequency of trains  
|                      | • Dwell time at stations  
|                      | • Station design  
|                      | • Operating policies  

**Demand and Capacity** on the subway are measured in persons per hour per direction (pphpd)
• 28,000+ pphpd
• 25.5 trips per hour
• 1100+ people per train
Challenges: Ridership Growth will Continue

Ridership has been increasing on Line 1 for more than a decade

Southbound AM peak demand continues to grow

2018 – 28,300 PPHPD

to

2031 – 36,000 PPHPD

A 30% Increase
Challenges: Bottleneck at Bloor-Yonge

Historical Crowding on Line 1 Yonge – AM Peak Hour

Less than 85% full
Sufficient capacity to serve demand

Between 85% and 100% full
Approaching capacity, crowded vehicles that slow down service and may not accommodate localized surges in demand

100% full
Capacity exceeded, trains bypass waiting passengers frequently
ATC Re-baselining and Transit Systems Engineering Review
Subway Signal System: Modernizing the TTC
History

2006 • Project initiation and preliminary scope development

2015 • Scope Change, transition to one contractor
      • Change phasing, advance ATC for TYSSE

2017 • ATC’s priority was TYSSE December 2017 opening
      • Advance ATC in Wilson Yard from original schedule

2018 • ATC Project identifies schedule slippage
      • CEO directs an internal and external review of project
      • Transit Systems Engineering (TSE) engaged
TSE Key Findings & Recommendations

- TTC is installing a State-of-the-Art signal system
- Successful Phase 1 and 2 implementations
- Revised Budget and Schedule are reasonable, need contingency
- Conduct a quantitative risk assessment of the project
- Adopt an integrated program approach to address all potential capacity limiting elements
- TTC agrees and accepts TSE’s findings & recommendations
Accomplishments

• TYSSE opened with ATC Dec 2017

• Two ATC routes from Wilson Subway Yard, including new north route, improving dispatch into morning service

• ATC installed and operating Vaughan Metropolitan Centre to Dupont, Dec 2018 (40% of Line 1)

• ATC on track to open from Dupont to St. Patrick, May 2019

• Original 1954 signal system (Union-Eglinton) retired by 2021
Benefits of ATC

• 80% Reduction in Signal Delays (Dupont to Wilson)
  • Q1 2018 – 61 minutes of delays
  • Q1 2019 – 12 minutes of delays

• 9% Improvement in Travel Time (St George to Vaughan)
  • Q1 2018 – 42:21 average travel time
  • Q1 2019 – 37:42 average travel time

• 16.5% Improvement in Trains-per-Hour SB Bloor in AM Peak (8am to 9am)
  • Q1 2018 – 21.2 average trains-per-hour
  • Q1 2019 – 24.7 average trains-per-hour
## Impact to 2015 Schedule

<table>
<thead>
<tr>
<th>Phase</th>
<th>Revenue Area</th>
<th>ATC Commissioning Dates</th>
<th>Trending</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>2015 Schedule</td>
<td>2019 Schedule</td>
</tr>
<tr>
<td>1</td>
<td>Wilson to Dupont</td>
<td>December 2017</td>
<td>October 2017</td>
</tr>
<tr>
<td>2</td>
<td>Sheppard West to VMC</td>
<td>December 2017</td>
<td>December 2017</td>
</tr>
<tr>
<td>2A-2C</td>
<td>Wilson Yard to Main Line</td>
<td><strong>December 2019</strong></td>
<td>August 2018</td>
</tr>
<tr>
<td>3A</td>
<td>Dupont to St. Patrick</td>
<td>December 2018</td>
<td>May 2019</td>
</tr>
<tr>
<td>3B</td>
<td>St. Patrick to Queen</td>
<td>December 2018</td>
<td>February 2020</td>
</tr>
<tr>
<td>3C</td>
<td>Queen to Rosedale</td>
<td>December 2018</td>
<td>November 2020</td>
</tr>
<tr>
<td>4</td>
<td>Rosedale to Eglinton</td>
<td>March 2019</td>
<td>November 2021</td>
</tr>
<tr>
<td>5</td>
<td>Eglinton to Finch</td>
<td>June 2019</td>
<td><strong>September 2022</strong></td>
</tr>
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</table>
## Impact to 2015 Budget

<table>
<thead>
<tr>
<th>Item</th>
<th>Financial Impact</th>
</tr>
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<tbody>
<tr>
<td>Schedule delay</td>
<td>$77 Million</td>
</tr>
<tr>
<td>- Maintain specialized staffing for longer duration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Includes $13M for consultant contract amendment</td>
</tr>
<tr>
<td>Additional Closures</td>
<td>$14 Million</td>
</tr>
<tr>
<td>- Alternative bus service and support staff</td>
<td></td>
</tr>
<tr>
<td>Enabling ATP on workcars</td>
<td>$7 Million</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$98 Million</strong></td>
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- January 24, 2019 TTC Board approved a budget increase $98M
- March 7, 2019 City Council approved the budget increase
- Future budget impacts, if any will be included in the 2020 to 2029 Capital Budget submission.
Line 1 Capacity Requirements
Program Objective:

Identify Line 1 capacity constraints and develop strategy to increase capacity for 2021, 2023, 2028, and 2031
Implementation Strategy includes 19 Elements

Operational Strategies
- Terminal Station Turn Back
- Manage Station Dwell Times
- Additional Staffing
- Fleeting
- Managing Higher Frequency Service

Line 1 Infrastructure Improvements
- Automatic Train Control
- Traction Power
- Station Capacity
- Fire Ventilation Requirements
- Platform Edge Doors

New or Expanded Facilities
- Bloor Yonge Station
- Additional Train Storage
- Car House Maintenance Capacity
- Transit Control Centre Capacity

State of Good Repair
- Asbestos Abatement
- Tunnel Liners
- Track Geometry / Maintenance
- Maintenance Window

Vehicle Procurement
- Additional Trains

19 Elements
Board Key Milestones

Line 1 Capacity Program
• Today – endorse the Preliminary Strategy
• Q3 2020 – Approve Initial Business Case and Stage Gate 1

Individual Projects
• Q1 2020 – Approve the subway fleet procurement Initial Business Case and Stage Gate 1
• Q1 2020 – Approve the Bloor-Yonge Station Capacity Initial Business Case and Stage Gate 2
State of Good Repair Capital Projects and 2019 Subway Closure Schedule
Subway/SRT Track Rehabilitation

Broken wooden tie

Wooden coverboard
Substructure and Drainage Rehabilitation
Complete trainstop layout: trip arm (left), trainstop circuit controller (small box by the trip arm) and trainstop (large casting on the right)
Wayside Signal Decommissioning

Old signaling system: trainstop layout, including trip arm / signal head / instrument case – all in acceptable condition
Poor condition GRS Model 5 switch machine

Rebuilt GRS Model 5 switch machine
Electrically Operated Isolating Switches and Switchstands
# 2019 Subway Closures

<table>
<thead>
<tr>
<th></th>
<th>Line 1</th>
<th>Line 2</th>
<th>Line 3</th>
<th>Total</th>
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<tbody>
<tr>
<td>Full Weekend Closures</td>
<td>27</td>
<td>3</td>
<td>1</td>
<td>32</td>
</tr>
<tr>
<td>Single Day Closures</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>6</td>
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<tr>
<td>Late Sunday Openings</td>
<td>2</td>
<td>8</td>
<td>0</td>
<td>10</td>
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<tr>
<td>Early Weeknight Closures</td>
<td>22</td>
<td>7</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td><strong>Total Closures by Line</strong></td>
<td><strong>53</strong></td>
<td><strong>20</strong></td>
<td><strong>3</strong></td>
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Key Recommendations

• Authorize an amendment to the Parsons contract for continued specialized engineering consultant services for ATC

• Endorse
  • re-baselining of ATC
  • a program approach for State of Good Repair Projects
  • a preliminary implementation strategy for Line 1 Capacity Requirements
  • the 2019 subway closures plan

• Direct staff to report back to the Board
  • at Stage-Gate 1 of the preliminary implementation strategy for Line 1 Capacity Requirements
  • through the Major Projects section of the quarterly Financial Update on ATC and the State of Good Repair Program