



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	<ul style="list-style-type: none">• Land use• Population• Employment
Demand is/will be affected by	<ul style="list-style-type: none">• Connecting transit services- subway, bus, streetcar• Rapid transit expansion
Capacity is driven by	<ul style="list-style-type: none">• Size of trains• Frequency of trains• Dwell time at stations• Station design• Operating policies

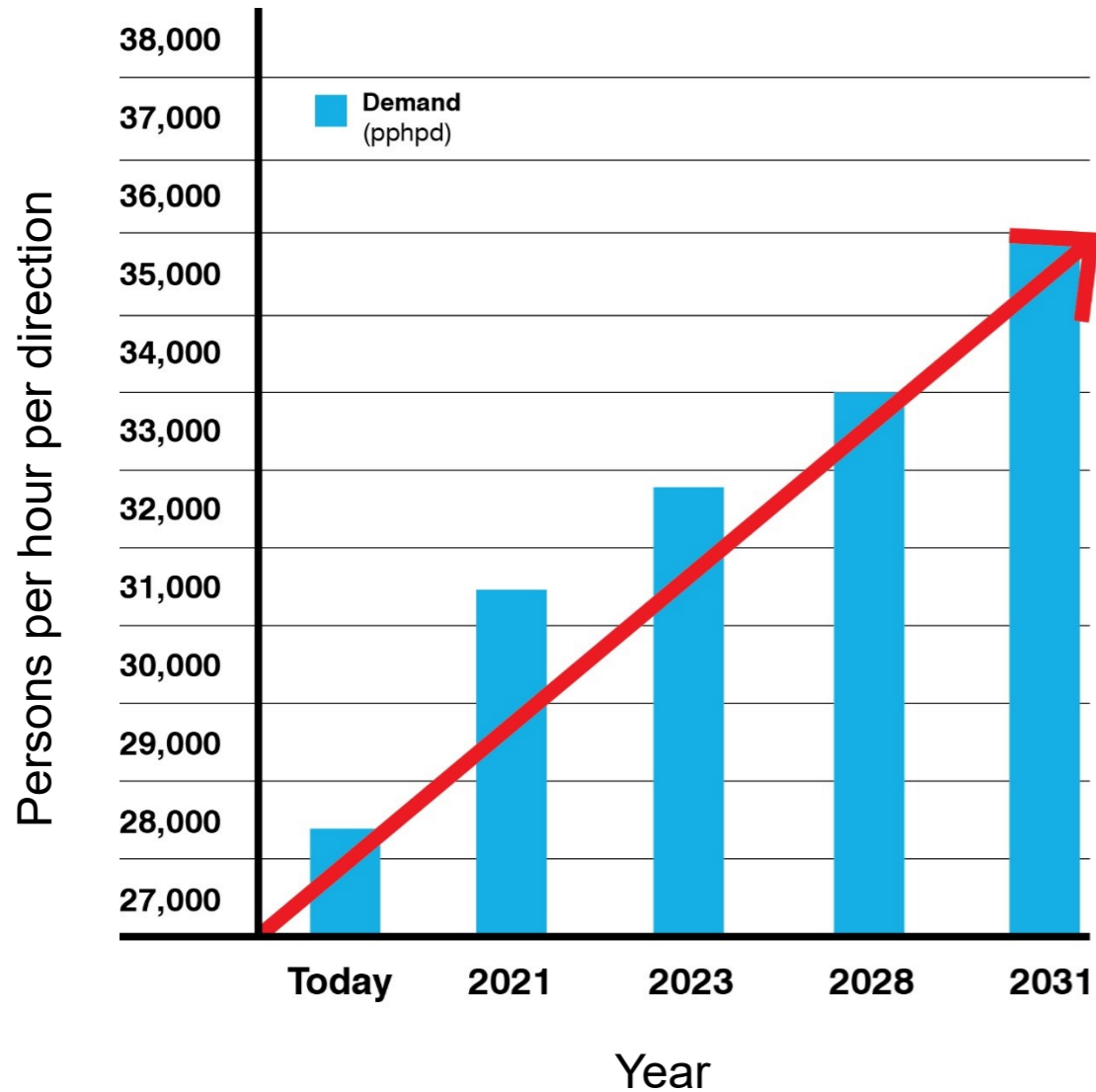
Demand and Capacity on the subway are measured in persons per hour per direction (pphpd)



- **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**

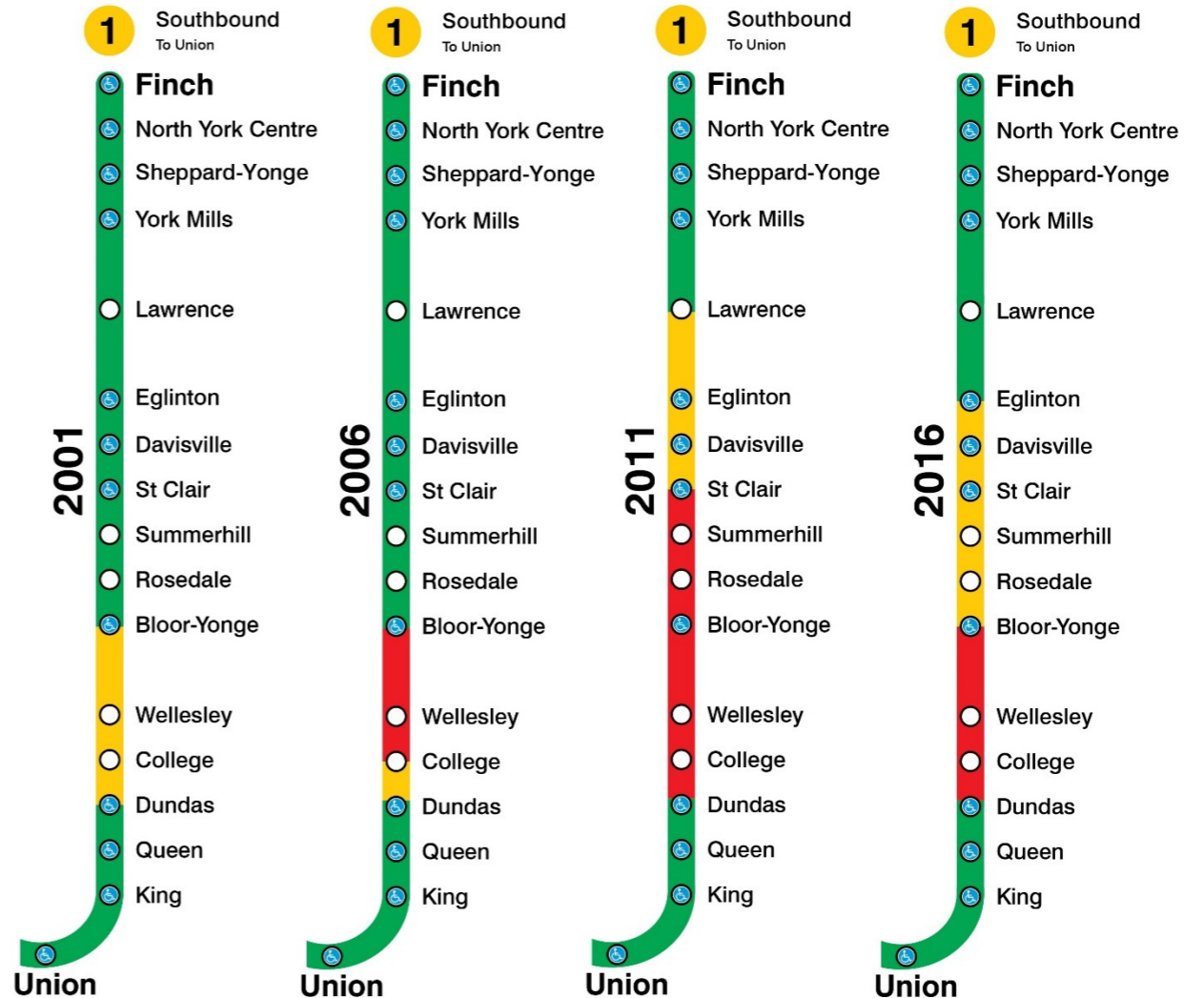
A 30% Increase



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

Phase	Revenue Area	ATC Commissioning Dates		Trending
		2015 Schedule	2019 Schedule	
1	Wilson to Dupont	December 2017	October 2017	Complete
2	Sheppard West to VMC	December 2017	December 2017	Complete
2A-2C	Wilson Yard to Main Line	December 2019	August 2018	Complete
3A	Dupont to St. Patrick	December 2018	May 2019	On Schedule
3B	St. Patrick to Queen	December 2018	February 2020	
3C	Queen to Rosedale	December 2018	November 2020	
4	Rosedale to Eglinton	March 2019	November 2021	
5	Eglinton to Finch	June 2019	September 2022	



Impact to 2015 Budget

Item	Financial Impact
Schedule delay - Maintain specialized staffing for longer duration	\$77 Million *Includes \$13M for consultant contract amendment
Additional Closures - Alternative bus service and support staff	\$14 Million
Enabling ATP on workcars	\$7 Million
Total	\$98 Million

- 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

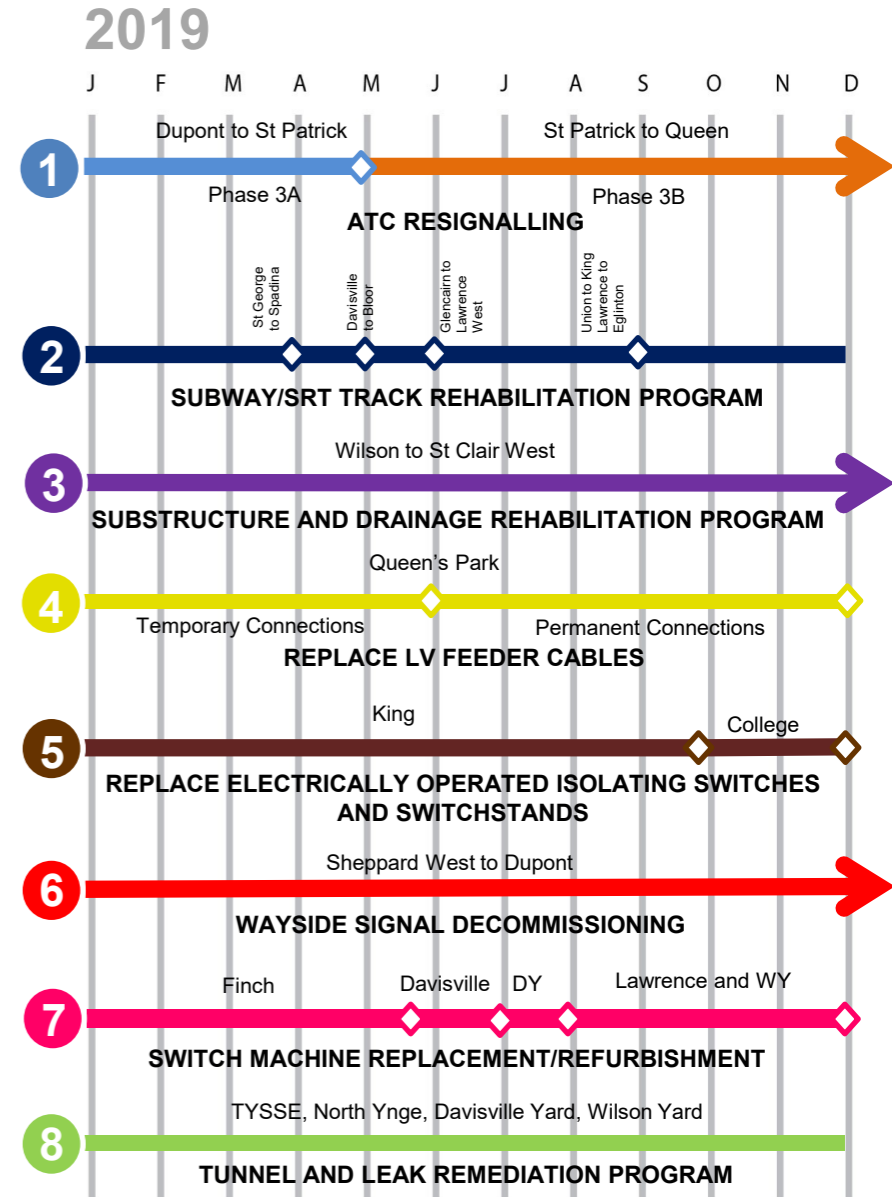
- Q1 2020 – Approve the subway fleet procurement Initial Business Case and Stage Gate 1
- Q1 2020 – Approve the Bloor-Yonge Station Capacity Initial Business Case and Stage Gate 2





State of Good Repair Capital Projects and 2019 Subway Closure Schedule

Subway Capital Project Alignment – 2019



ATC Resignalling



Subway/SRT Track Rehabilitation



Worn Frog



Worn switch point

Subway/SRT Track Rehabilitation



Broken wooden tie

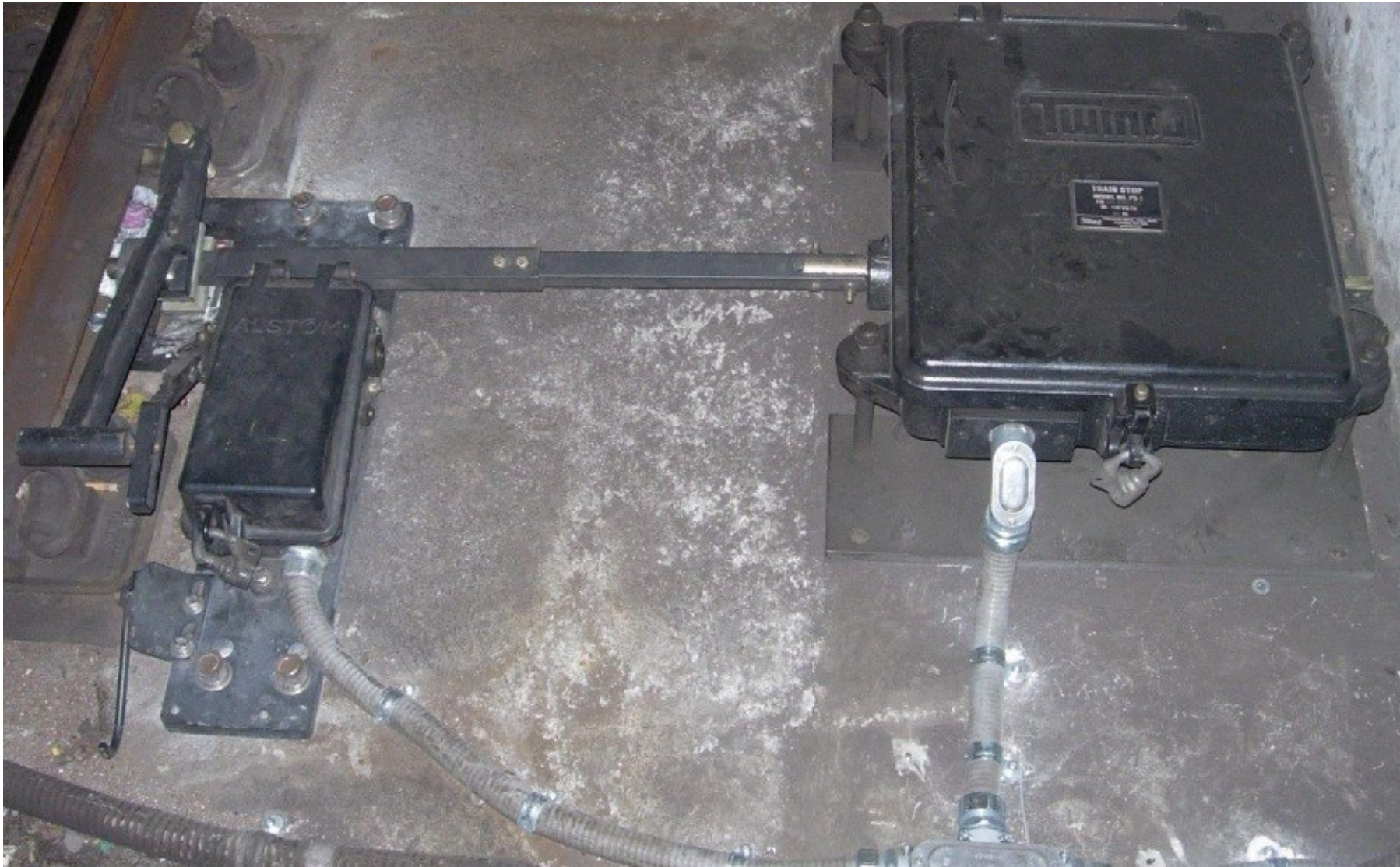


Wooden coverboard

Substructure and Drainage Rehabilitation



Wayside Signal Decommissioning



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

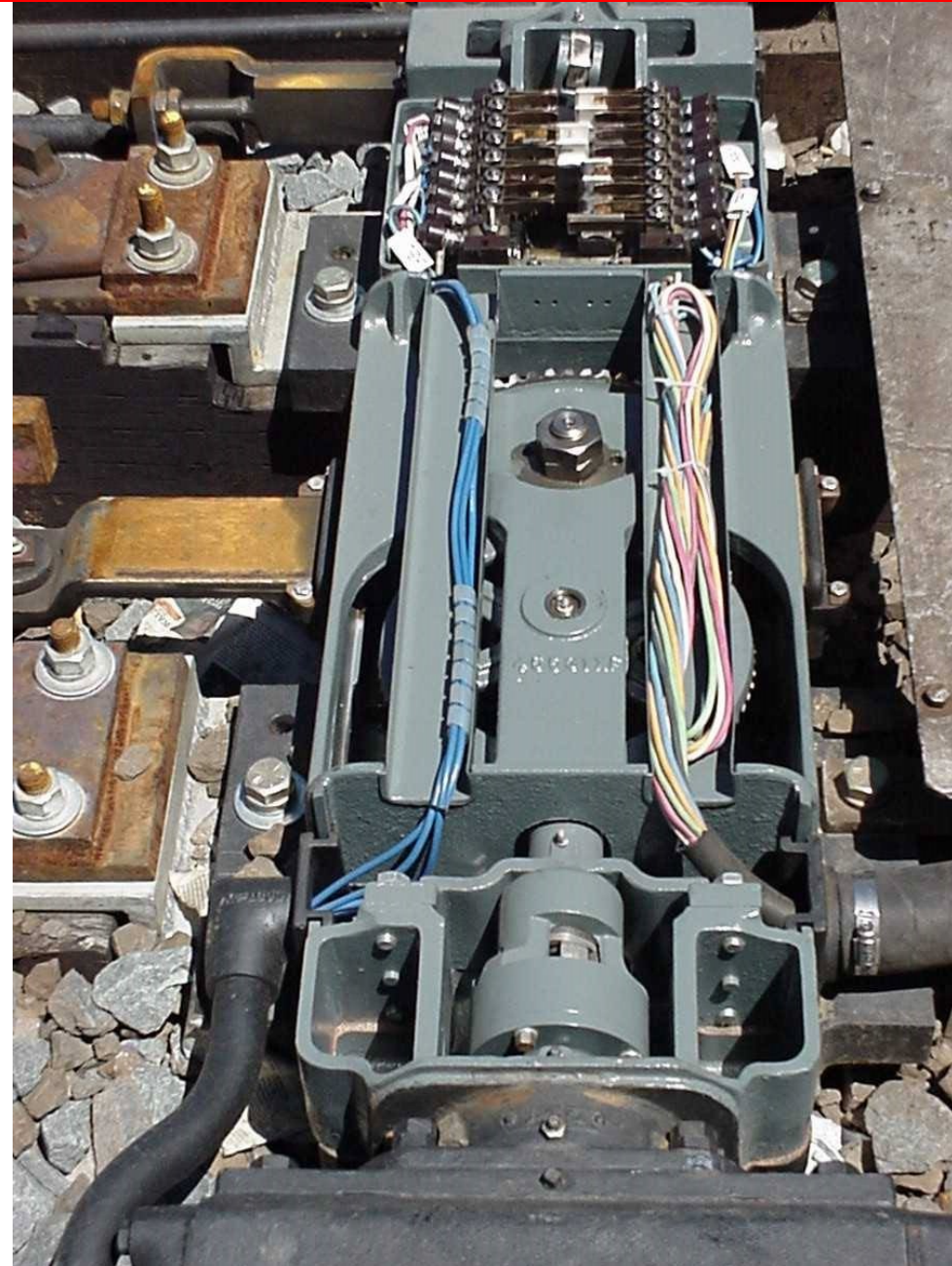


Old signaling system: trainstop layout, including trip arm / signal head / instrument case – all in acceptable condition

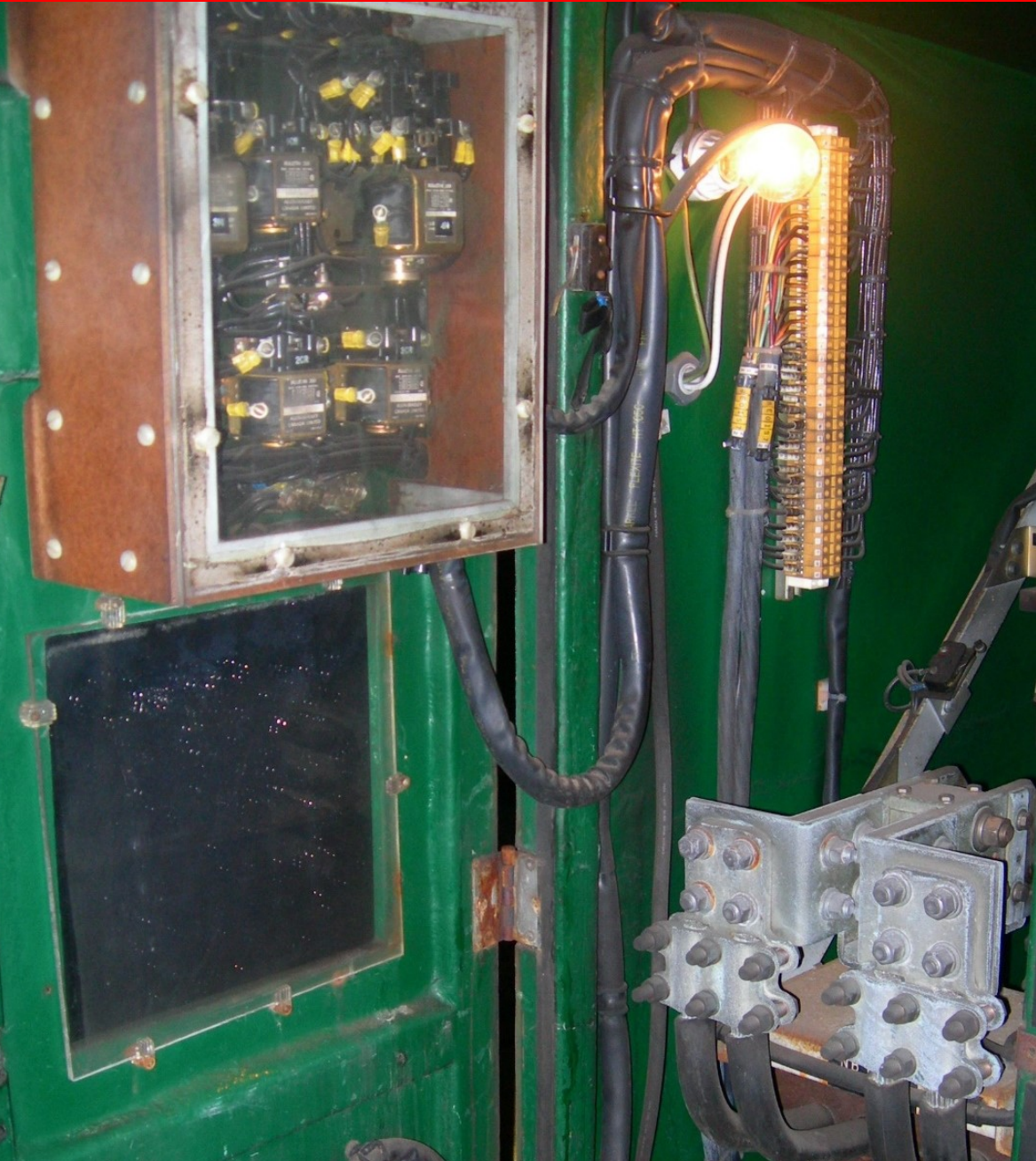
Switch Machine Replacement



Poor condition GRS Model 5 switch machine



Electrically Operated Isolating Switches and Switchstands



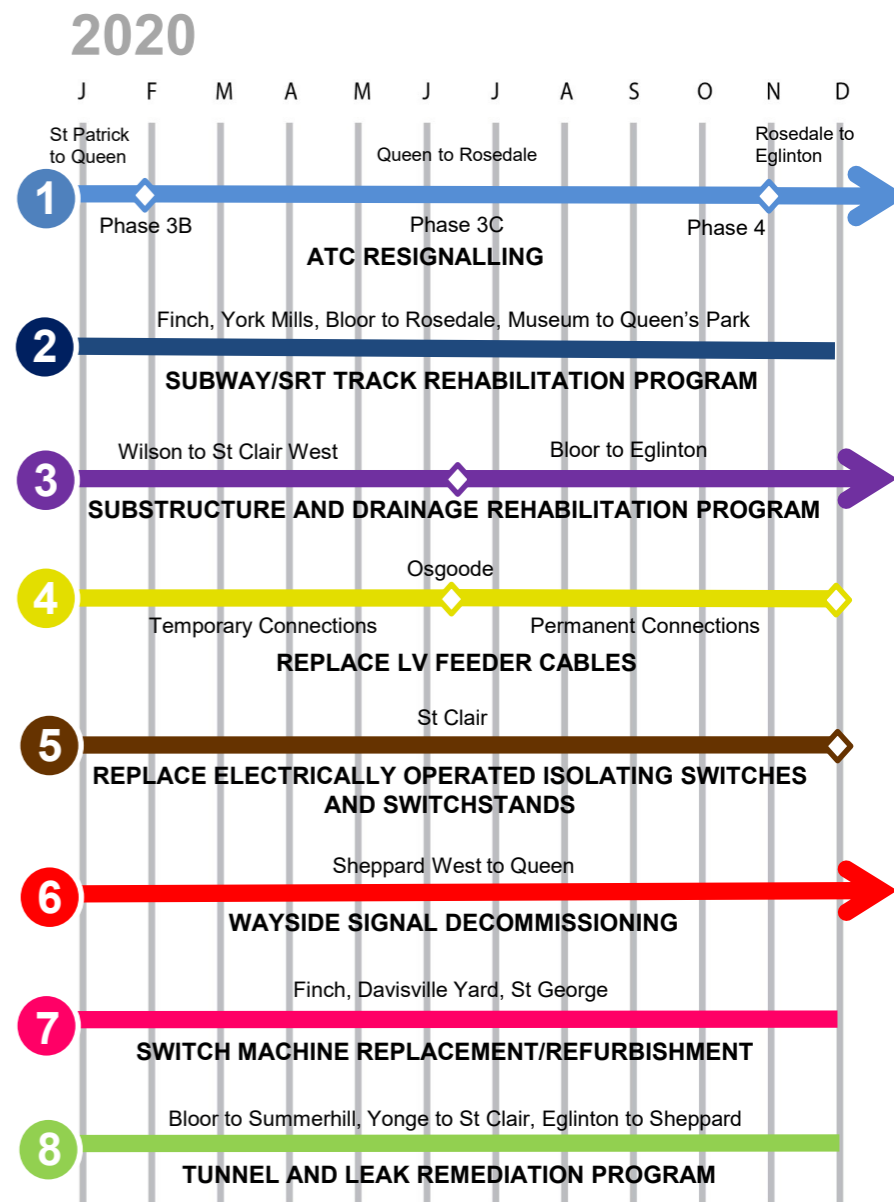
LV Feeder Cables



Tunnel and Leak Remediation



Subway Capital Project Alignment – 2020



2019 Subway Closures

	Line 1	Line 2	Line 3	Total
Full Weekend Closures	27	3	1	32
Single Day Closures	2	2	2	6
Late Sunday Openings	2	8	0	10
Early Weeknight Closures	22	7	0	29
Total Closures by Line	53	20	3	



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



