

Stage 2 Light Rail Transit Project

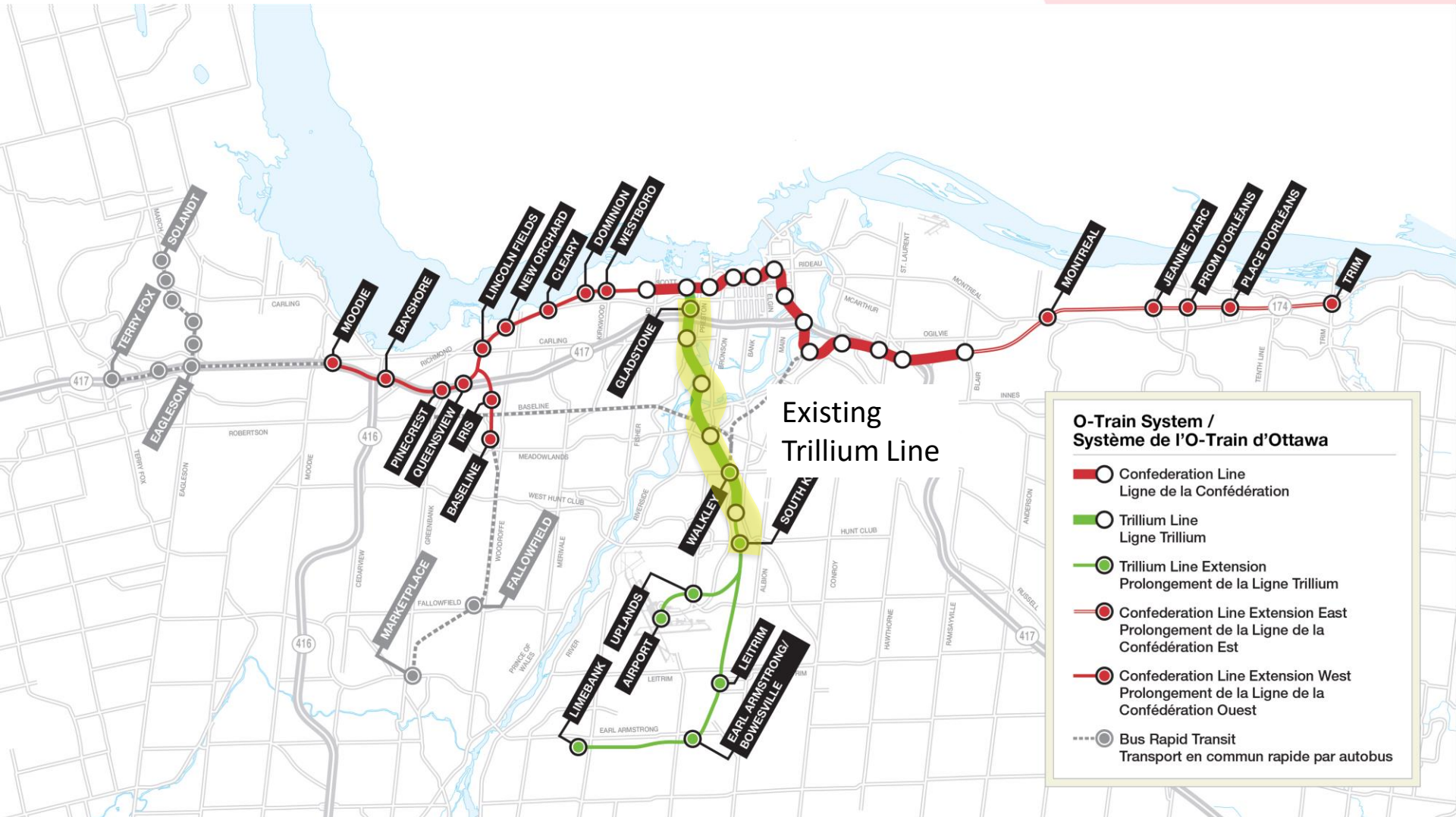
Technical Briefing
February 22, 2019



BACKGROUND



Stage 2 LRT Evolution



Stage 2 LRT Evolution



30 km

KM of new rail



44 km

KM of new rail



New Stations



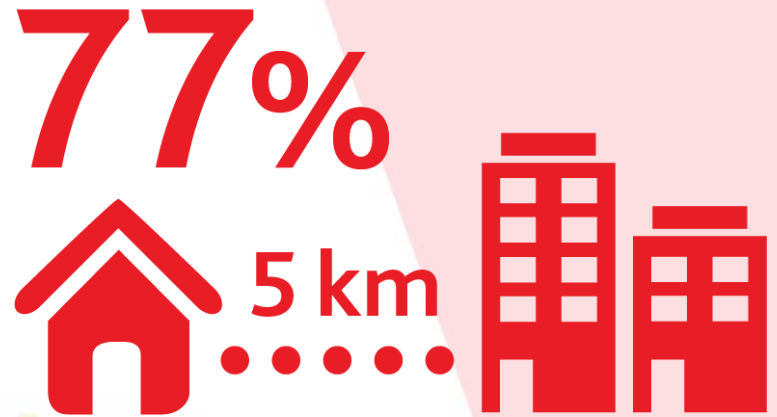
New Stations



Stage 2 LRT Evolution



Ottawa residents
within 5km of new rail



Ottawa residents
within 5km of new rail



Approved Procurement Model

Confederation Line East and West Extensions

Design-Build-Finance (DBf)

- Confederation Line East Extension
- Confederation Line West Extension

RTG MOU (\$492M)

- 38 Vehicles
- Belfast Yard MSF expansion
- Civil, vehicle maintenance and lifecycle



Trillium Line Extensions

Design-Build-Finance-Maintain (DBFM)

- Trillium Line Extension, including Airport Link
- Upgrade existing Trillium Line
- Maintain existing and expanded Trillium Line

RTG MOU

Additional Vehicles

- RTG will provide and maintain 38 additional Alstom Citadis vehicles to ensure the expanded Confederation Line operates as a single, uniform service
- Vehicles assembly completion: 2021



Belfast Yard MSF Expansion

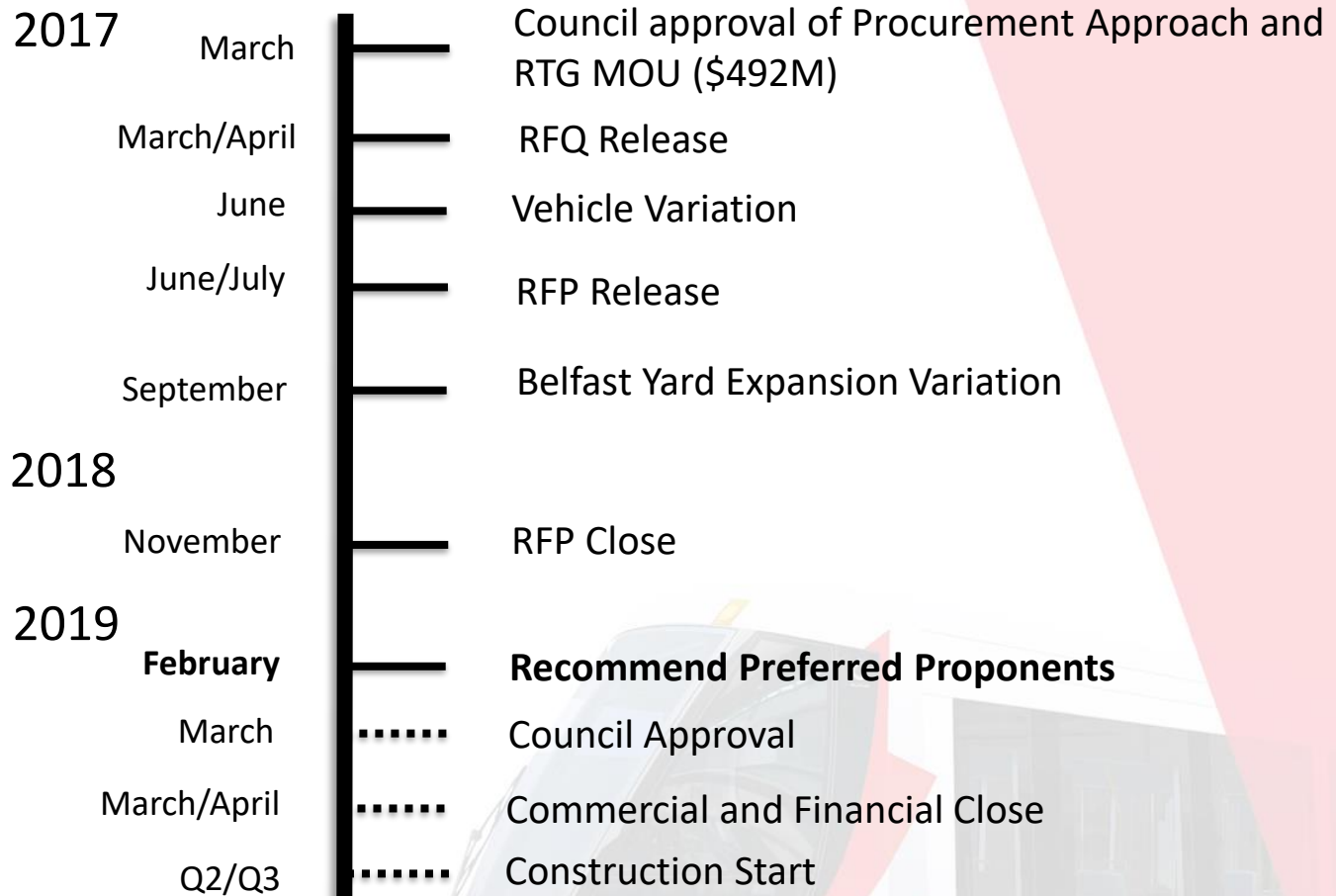
- RTG is expanding the Belfast Yard MSF to accommodate the additional Stage 2 vehicles
- Construction completion: 2019



Applied Lessons Learned

- **Notification penalties** – missed project completion notifications will result in penalties, missed dates where project availability notification has been provided will also result in penalties
- **Cost management** - incorporated Stage 1 contingency costs as part of Stage 2's base scope
- **Payment mechanism** – adjusted to monthly payments to give greater flexibility to the contractor to manage the schedule
- **Bundled Projects** – incorporated City infrastructure projects during procurement to benefit from full risk transfer and cost and schedule certainty of the P3 contract
- **Mobility Matters** - expanded mobility matters to include pedestrians and cyclists

Procurement Timeline



Procurement Results



Preferred Proponent Confederation Line Extension



Kiewit



Preferred Proponent Confederation Line Extension



Waterloo Stage 1 LRT



South-Europe-Atlantic High Speed Rail



Lusail LRT

Preferred Proponent Trillium Line Extension

*Transit***NEXT**



SNC • LAVALIN



Preferred Proponent Trillium Line Extension



Canada Line



Evergreen Rapid Transit Line



Calgary West LRT



EAST ♦ WEST
CONNECTORS
CONNECTEURS
EST ♦ OUEST

Submission Details

Confederation Line Extension



Design Submission Westboro Station



Design Submission Westboro Station



Design Submission Westboro Station



Design Submission Dominion Station



Design Submission Dominion Station



Design Submission Cleary Station



Design Submission Cleary Station



Design Submission New Orchard Station



Design Submission New Orchard Station



Design Submission New Orchard Station



Design Submission Lincoln Fields Station



Design Submission Lincoln Fields Station



Design Submission Queensview Station



Design Submission Queensview Station



Design Submission Pinecrest Station



Design Submission Pinecrest Station



Design Submission Bayshore Station



Design Submission Bayshore Station



Design Submission Bayshore Station



Design Submission Moodie Station



Design Submission Moodie Station

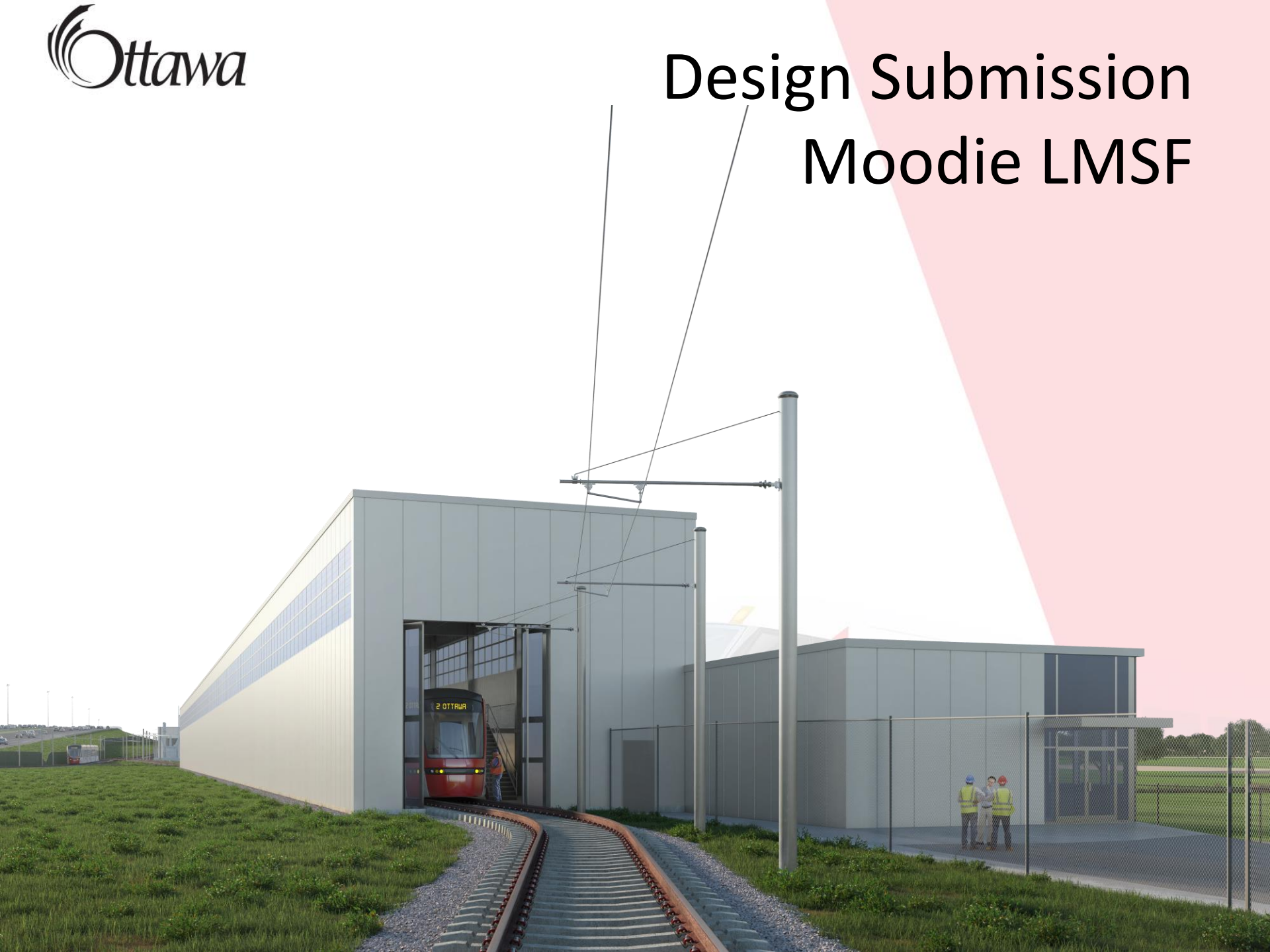


Design Submission

Moodie LMSF



Design Submission Moodie LMSF



Design Submission Iris Station



Design Submission Iris Station



Design Submission Baseline Station



Design Submission Baseline Station



Design Submission Montreal Station



Design Submission Montreal Station



Design Submission Montreal Station



Design Submission Jeanne d'Arc Station



Design Submission Jeanne d'Arc Station



Design Submission Orléans Blvd Station



Design Submission Orléans Blvd Station



Design Submission Place d'Orléans Station



Design Submission Place d'Orléans Station



Design Submission Trim Station



Design Submission Trim Station



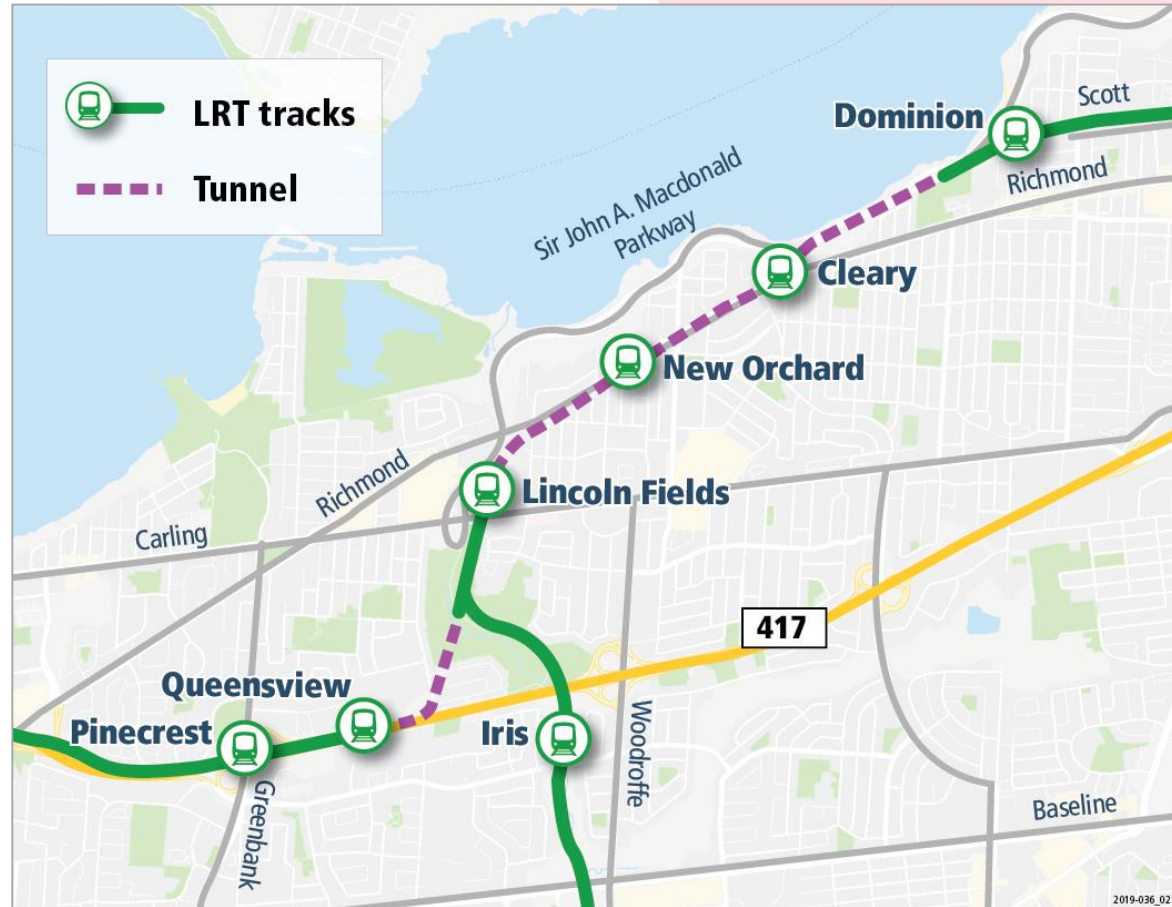
Construction Submission

- Construction Schedule: Confederation Line West Extension



Construction Submission

- Tunnel construction methodology: cut and cover



Construction Submission

- Construction Schedule: Confederation Line East Extension



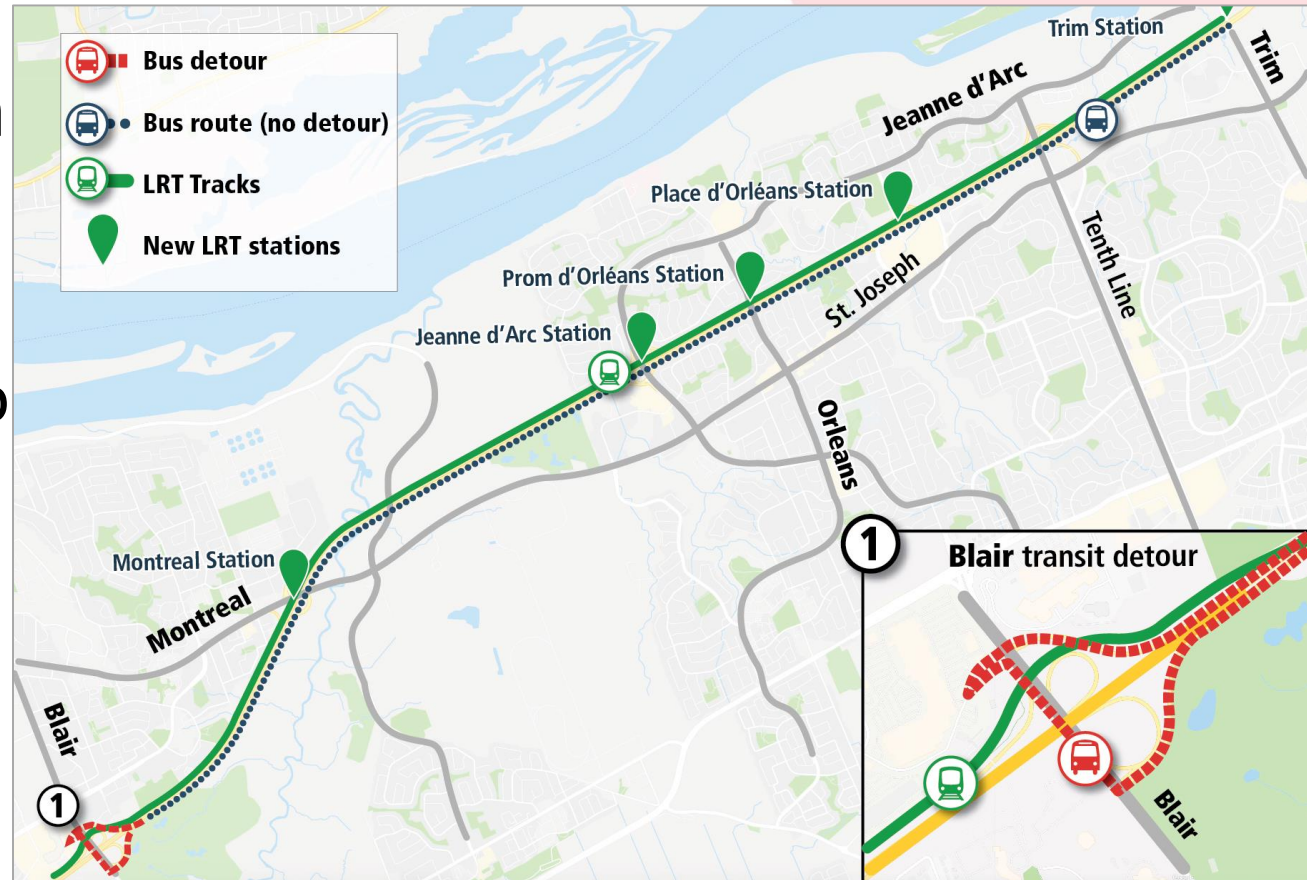
Mobility Submission

- Bus Detours:
Confederation
Line West
Extension
– 2022 to 2025



Mobility Submission

- Bus Detour:
Confederation
Line East
Extension
– 2021/2022 to
2024



Bundled Projects

- Bundled projects included in the Confederation Line Extension scope total \$107 million and include works such as:
 - Bridge works (Montreal, Golden Rod, Moodie, Jeanne d'Arc, Algonquin)
 - Greens Creek culvert replacement
 - Watermain, storm and sanitary sewer upgrades
 - Rock and sound walls
 - Trim Park and Ride Expansion
 - Woodroffe Stormwater Management Pond
 - Baseline Station Surface Improvements
 - OR 174 concrete removal (eastbound lanes)
 - Upgrades to intelligent transportation systems
 - Active mobility enhancements outside of LRT scope, including Moodie Bridge

*Transit***NEXT**

Submission Details Trillium Line Extension



Design Submission Bayview Station



Design Submission Bayview Station



Design Submission Gladstone Station



Design Submission Gladstone Station



Design Submission Walkley Station



Design Submission Walkley Station



Design Submission South Keys Station



Design Submission South Keys Station



Design Submission Leitrim Station



Design Submission Leitrim Station



Design Submission Leitrim Station



Design Submission Bowesville Station



Design Submission Bowesville Station



Design Submission Limebank Station



Design Submission Limebank Station



Design Submission Uplands Station



Design Submission Uplands Station



Design Submission Airport Station



Design Submission Airport Station



Design Submission Walkley MSF

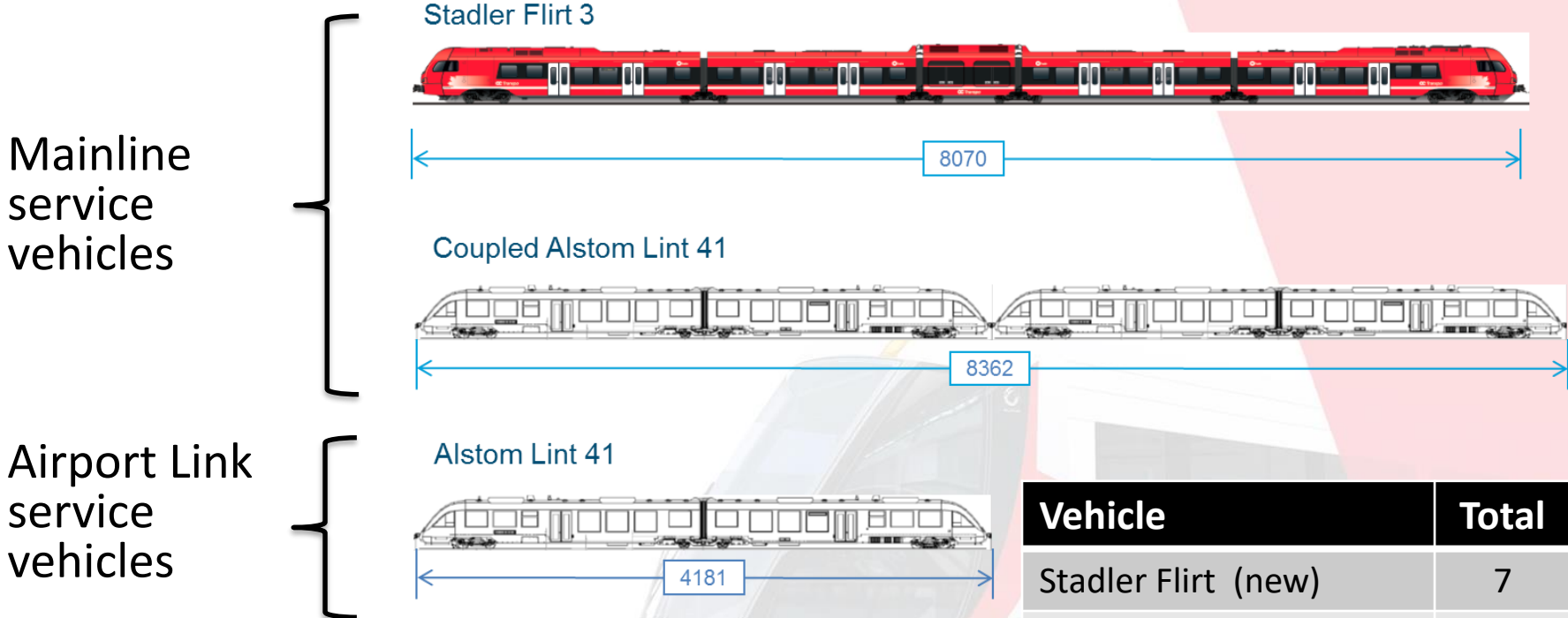


Existing Trillium Stations

- Existing Trillium Stations will be upgraded with:
 - Platform extensions to accommodate 2-car consists
 - New platform furniture
 - Improved signage, lighting and communications systems
 - Modernization of existing elevator and additional of a new elevator at Carling Station to provide redundancy

Vehicle Submission

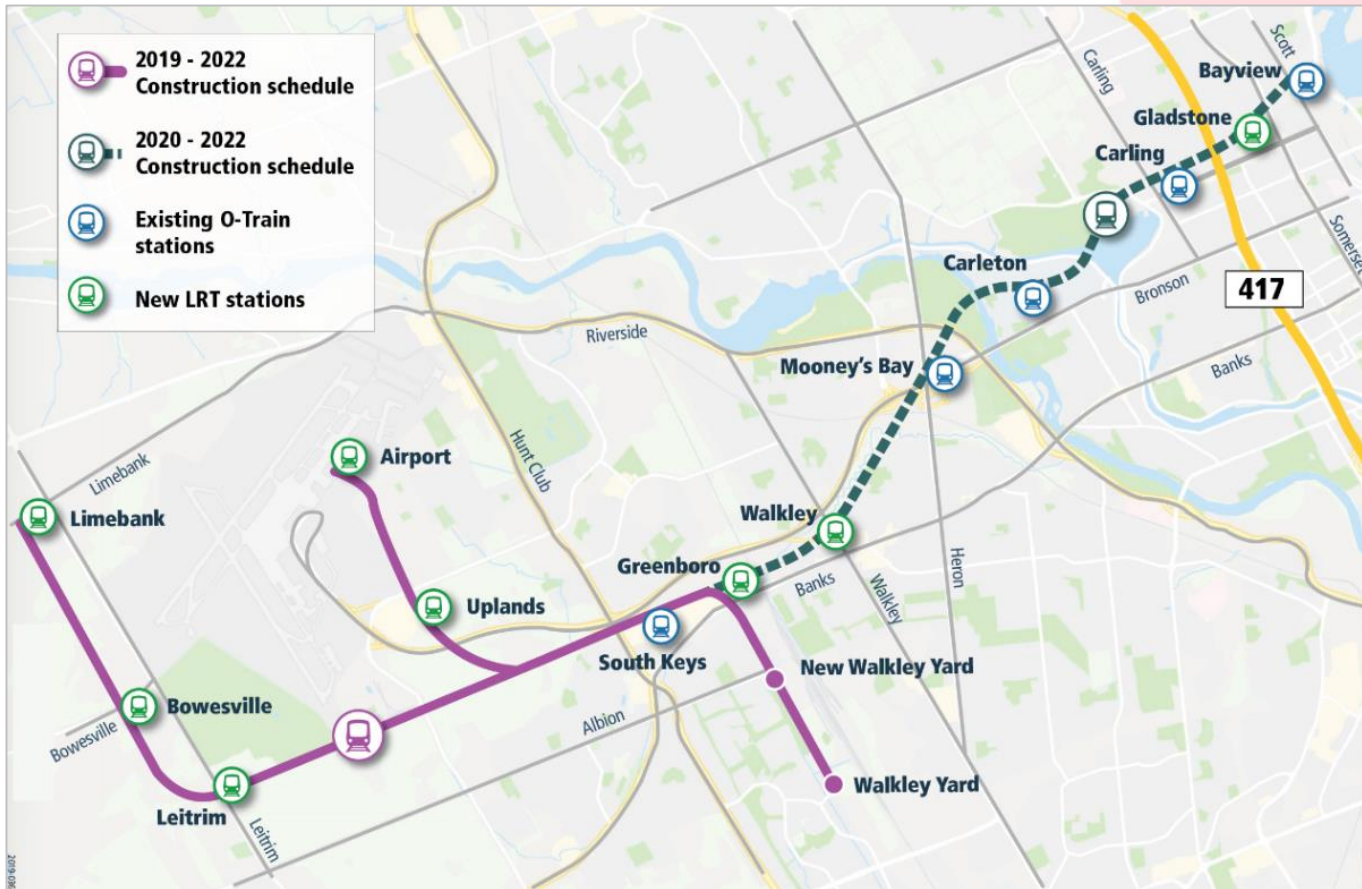
- The expanded Trillium Line will include a mixed fleet network:



Vehicle	Total
Stadler Flirt (new)	7
Alstom Lint (existing)	6

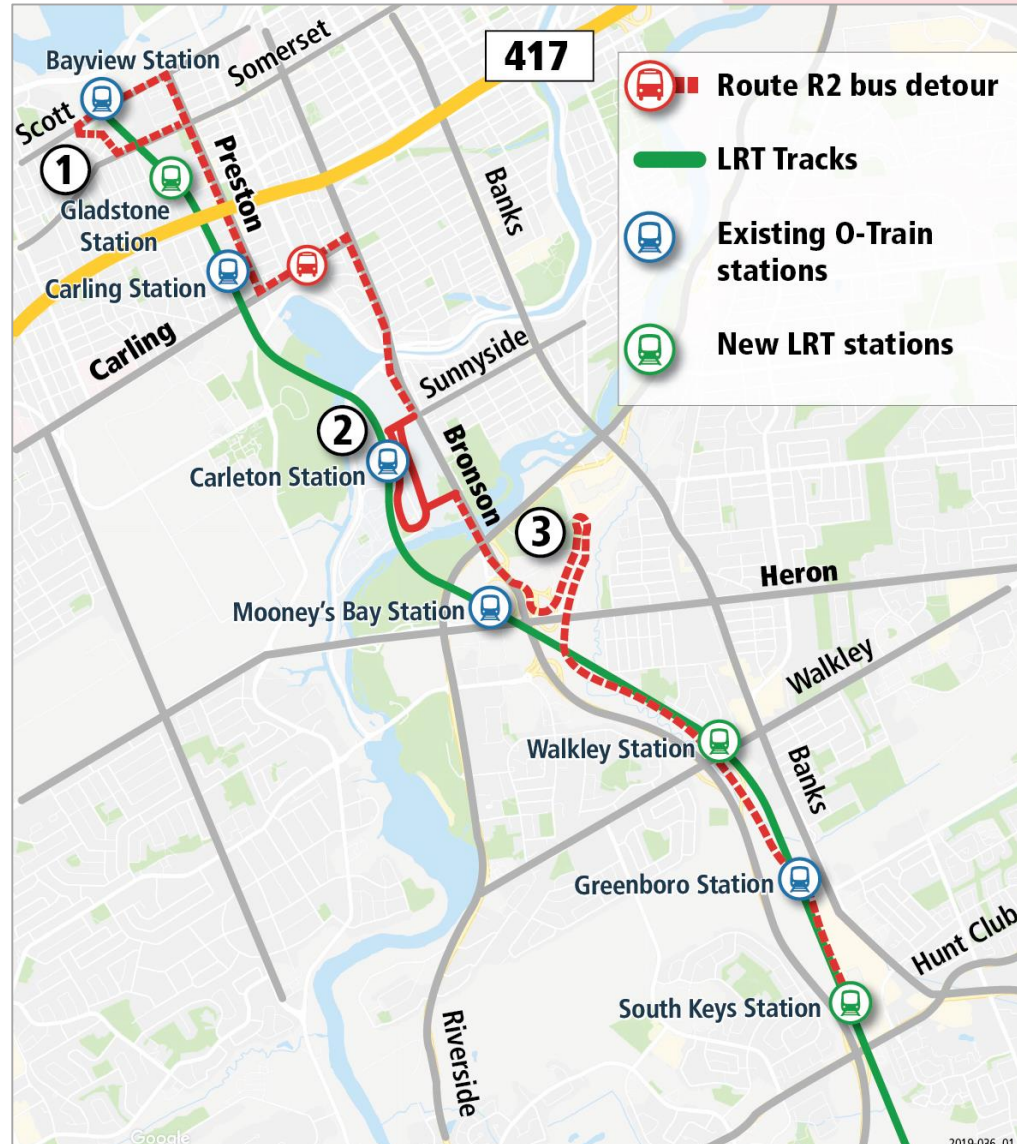
Construction Submission

Construction Schedule: Trillium Line Extension



Mobility Submission

Trillium Line
Detour via
Route R2 Bus:
2020 - 2022



Bundled Projects

- Bundled projects included in the Trillium Line Extension scope total \$67 million and include works such as :
 - Tunnels (Dow's Lake and Carleton)
 - New pedestrian bridges (Rideau River, Trinity)
 - Ellwood Diamond grade separation
 - Existing Trillium Line station and signal upgrades
 - Alstom vehicle overhaul

System Maintenance

Maintained by
Rideau Transit
Maintenance
(until 2048)

Confederation Line (Tunney's Pasture to Blair)

Confederation Line East and West Extensions

All Confederation Line Alstom Vehicles

Maintained by
TransitNEXT
Maintenance
(until 2048)

Existing Trillium Line (Bayview to Greenboro)

Trillium Line Extensions

All Trillium Line Vehicles (Alstom and Stadler)

Project Agreements

- Stage 2 includes two Project Agreements, one for Trillium Line Extensions (DBFM), and one for Confederation Line Extensions (DBf)
- Each project agreement:
 - Dictates performance specifications;
 - Determines roles and responsibilities with respect to utilities, geotechnical, permits and approvals;
 - Defines system integration;
 - Defines interface agreement; and
 - Determines payment regime.

Bid Pricing & Schedule



Stage 2 Scope Evolution

- Scope additions to the Trillium Line Extension
 - New Maintenance and Storage Facility (MSF)
 - Upgrades to existing system and takeover of existing alignment assets
 - Seven Stadler vehicles
 - 3.4 km extension to Limebank
 - Bundled projects, including Ellwood Diamond grade separation
- Scope additions to Confederation Line Extensions
 - Bayshore to Moodie extension
 - Moodie Light MSF
 - Bundled projects
 - Additional Washrooms
 - Additional escalators and elevators



Market Cost Drivers

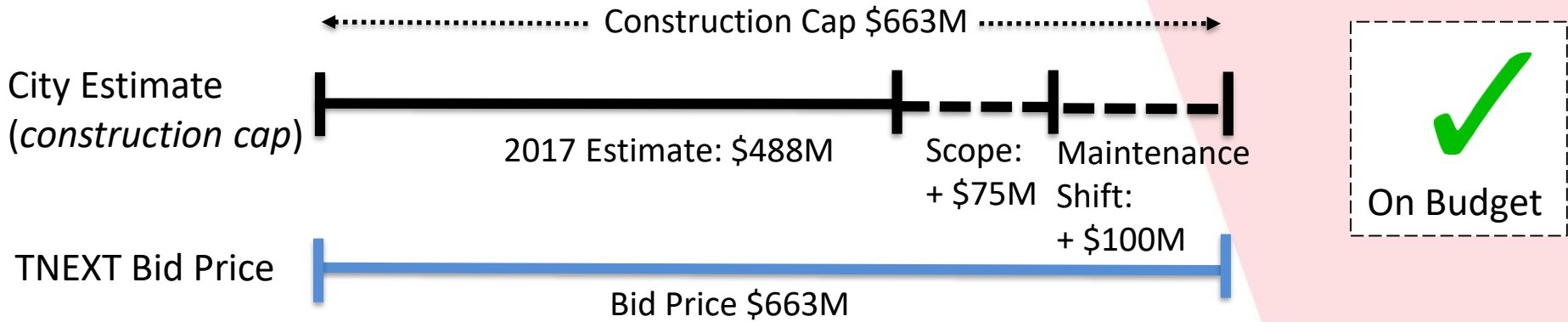
Capital costs for large scale transit projects have been observed in recent projects across Canada, including:

- Increased cost of labour and services;
- Increased cost of materials; and
- Increased cost of risk contingency and schedule

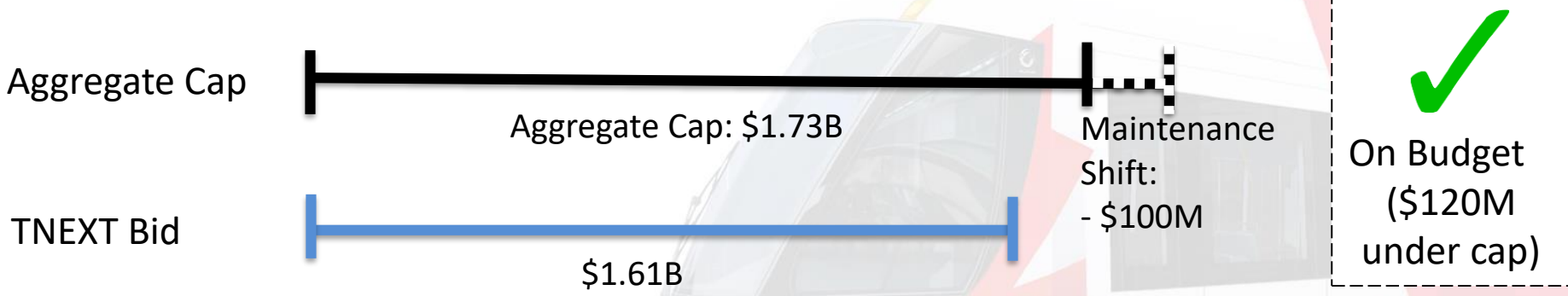


Trillium Line Procurement Results

Construction Cost



Aggregate Cost (maintenance + capital)



MOU Pricing

- The MOU achieved real savings for the City by extracting efficiencies from RTG:

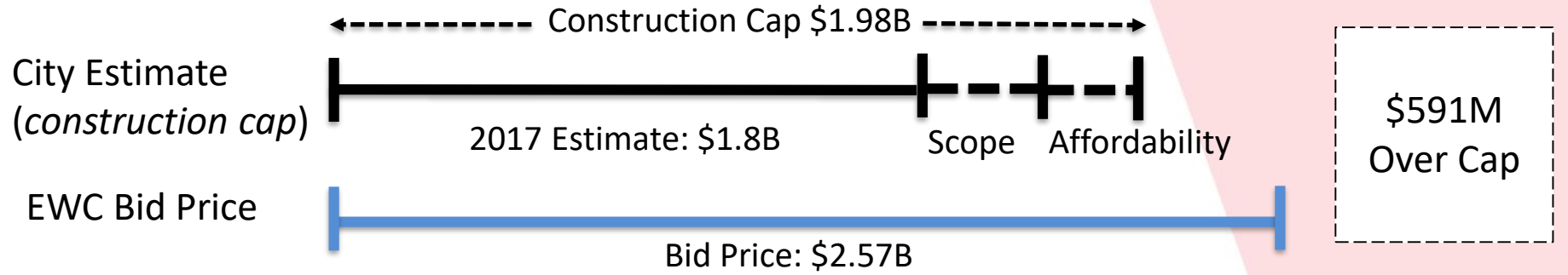
RTG MOU Scope	Savings from the Bid Price to the final Negotiated price
Per vehicle	\$1M reduction
Per km vehicle maintenance	7% reduction
Per km infrastructure maintenance	27% reduction

- Stage 2 MOU pricing, as compared to Stage 1 Confederation Line 2012 maintenance pricing:

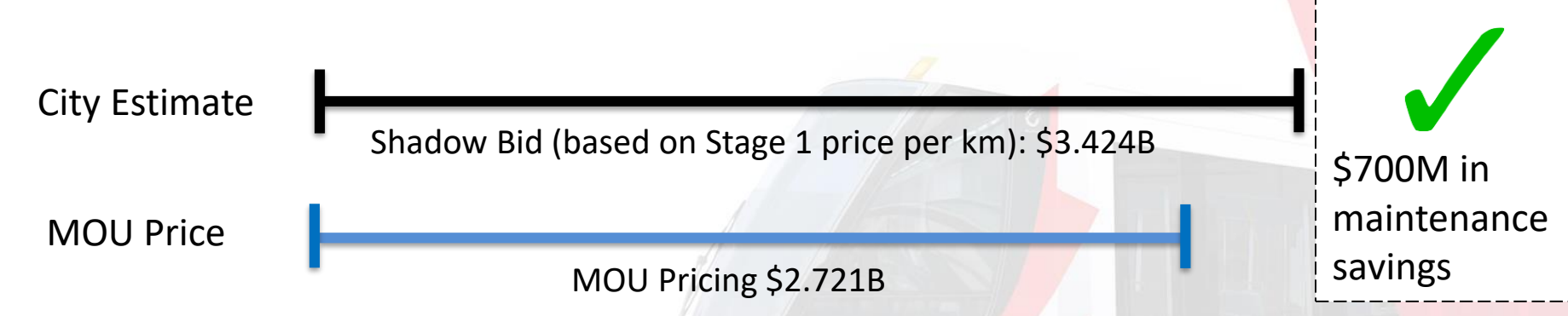
	Variable Cost	Fixed Cost	Total
Stage 1 Pricing	\$1,143M	\$2,281M	\$3,424M
Stage 2 MOU Pricing	\$1,059M	\$1,662M	\$2,721M
Total Savings to 2048	-	-	\$703M

Confederation Line Procurement Results

Construction Cost



Maintenance Cost



Stage 2 Scope Increases

- Additional scope with funding
- Additional scope brought on as enhancements with no funding
- Additional capital scope brought on to reduce Trillium Line maintenance costs



Scope Increases: Additions of Project Elements with Funding

- Bundled Projects
 - Total increase: \$74M
 - 2017 Estimate: \$100M
 - Final Estimate: \$174M
- Extension to Limebank
 - 3.4km extension and one additional Stadler vehicle: \$80M

Total scope increases with funding: \$154M

Scope Increases: Project Enhancements with No Funding

- A number of project enhancements have been added to project scope, totalling \$311M, including:
 - Extension to Moodie, Moodie Station, Moodie LMSF
 - Place d'Orleans Station Bridge and Champlain entrance
 - Additional Washrooms (Lincoln Fields, Place d'Orleans)
 - Additional escalators (11)
 - South Keys north tunnel
 - Detour facilities (including 417 ramp work)
 - Gladstone Plaza expansion
 - Double tracking south of Leitrim to Limebank
 - Fully independent alignment for Airport Link
 - Double engines for Stadler Vehicles
 - OR 174 Stormwater improvements

Scope Increases: Shift from Trillium Maintenance to Capital

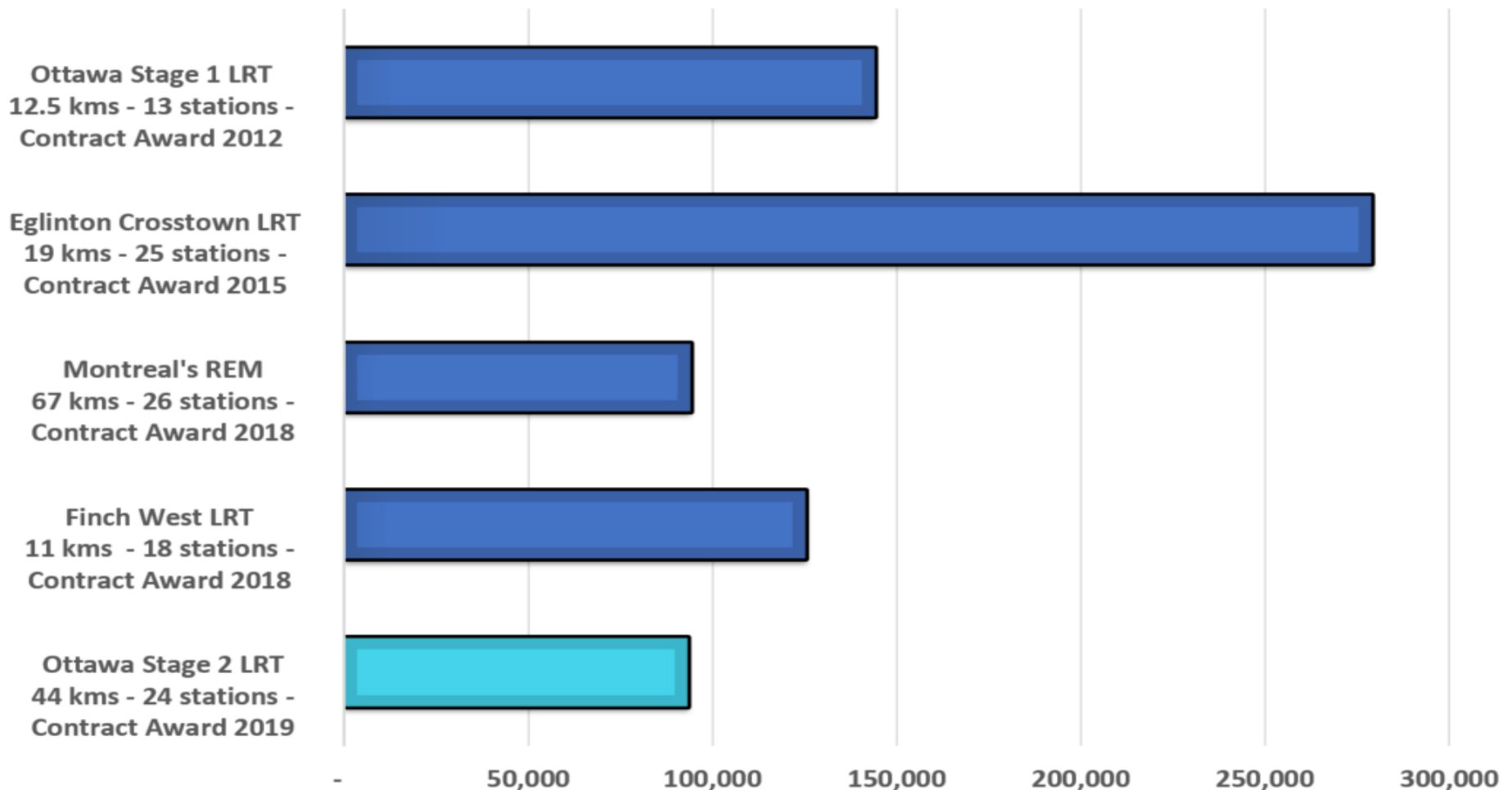
- TNEXT opted to perform a more robust overhaul and upgrade of the existing Trillium Line than had been previously contemplated
- To do this, they had to stay under the aggregate budget for both capital and maintenance.
- By investing an additional \$236M upfront, TNEXT's bid came in under the City's aggregate budget by \$120M

Stage 2 Scope and Market Pressures

	(\$M)
March 2017 Capital Project Costs (HWY 417 works removed)	3,415
Scope Changes	
<ul style="list-style-type: none"> Funded Projects Unfunded Enhancements Trillium Front-end Capital investments 	701
Market Pressures Impacting Price	591
Cost compression	(50)
Total Stage 2 Capital Project Costs	4,657

Value for Money

Canadian LRT Projects, Cost per km, estimate
(\$CAD 000s)



Funding



Stage 2 Budget Funding

	Cash \$M	Debt \$M	Other (Tax, Rate, PTIF) \$M	Total \$M
Federal and Provincial Grants	2,366			2,366
Other Revenue	35			35
Gas Taxes	382	562		944
Development Charges	194	771		965
Transit taxes		293		288
Non-Transit Funding (Bundled Projects)			59	59
Total	2,977	1,626	59	4,657

Long Range Financial Plan (LRFP) Transit Update



Updates to the 2017 LRFP

- Changes in Revenue
 - Transit Tax increased to 3%
 - Maintain fare increases at 2.5%
 - Assessment growth increased to 1.5%
 - Reduction in fare revenue due to fare erosion
 - Assume 100% senior level government funding for Stage 3
- Changes in Operating Costs
 - Increases to fuel costs, station energy costs, Faregate costs
 - Reductions in the maintenance price for the Trillium Extension

Updates to the 2017 LRFP

- Changes in Capital Costs
 - Increased scope of Stage 2 plus market conditions increase the overall cost by \$1.2 Billion
- Based on these assumptions the Transit LRFP is affordable
- Debt servicing within Provincial limit



Schedule



Schedule Submission

Activity	Timeline
Construction Start (Confederation and Trillium Lines)	2019
Trillium Line Construction Completion	2022
Confederation Line East Construction Completion	2024
Confederation Line West Construction Completion	2025



O-Train Evolution



stations



stations



stations



stations

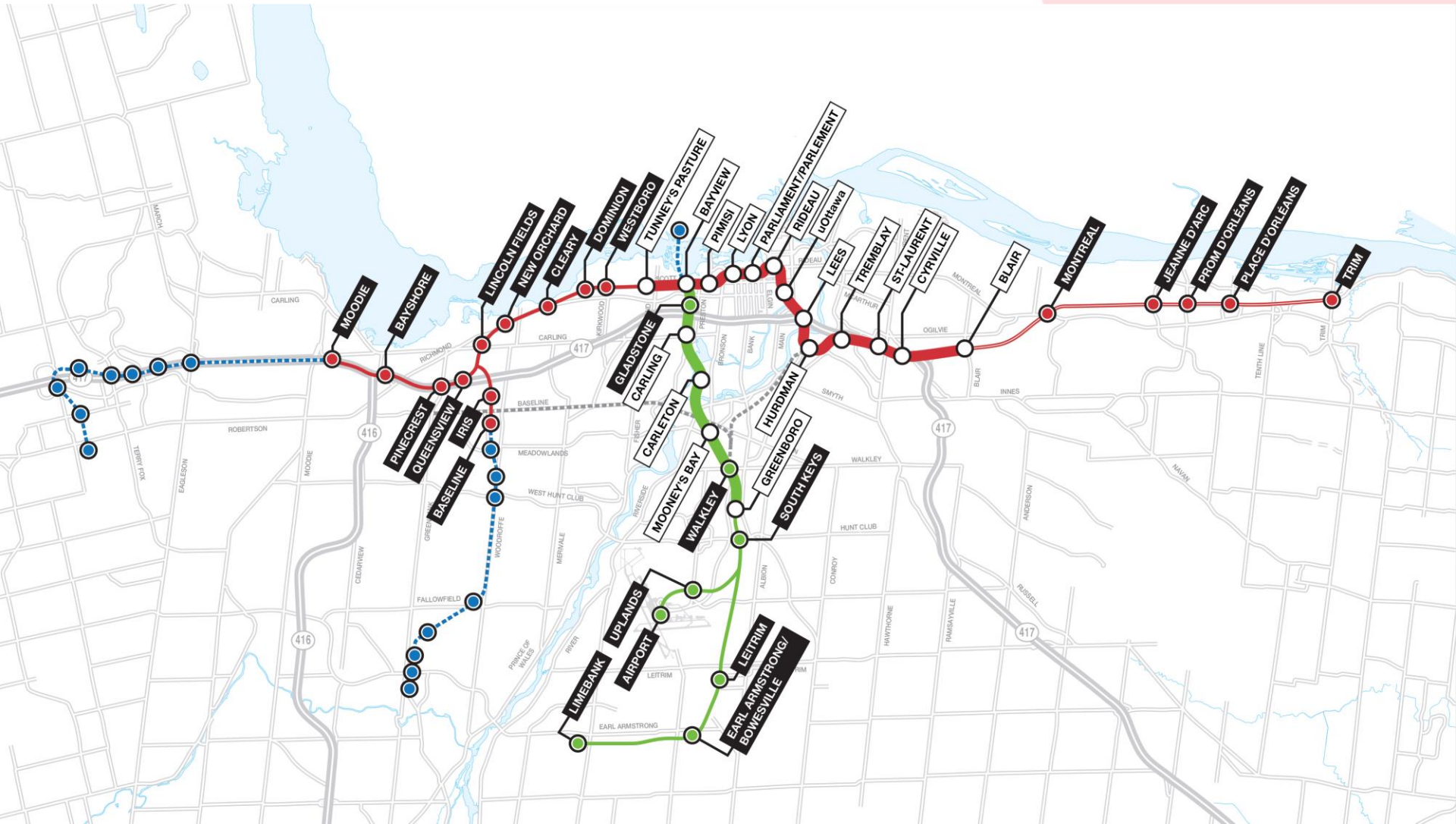
2001

2019

2025

Stage 3





O-Train Network

- When Stage 2 is complete, the City's overall O-Train network will include:
 - 64 km of fully grade separated rail
 - 41 stations
 - 85 vehicles
 - 3 maintenance and storage facilities



Next Steps



Next Steps

Activity	Timeline
Staff report will rise to Committee	February 27
Staff report will rise to Council	March 6
Financial and Commercial Close	March/April
Construction commences	2019



Questions?

