

Subject: Stage 2 Light Rail Transit Project

File Number: ACS 2024-TSD-RCP-0001

Report to Light Rail Sub-Committee on 29 February 2024

Submitted on February 20, 2024 by Renée Amilcar, General Manager, Transit Services Department

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Ward: Citywide

Objet : Phase 2 du projet de train léger sur rail

Numéro de dossier : ACS 2024 -TSD-RCP-0001

Rapport présenté au Sous-comité du train léger

Rapport soumis le 29 février 2024

Soumis le 2024-02-20 par Renée Amilcar, Directrice générale, Services de transport en commun

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Quartier : À l'échelle de la ville

REPORT RECOMMENDATION(S)

That the Light Rail Sub-Committee receive this report for information.

RECOMMANDATION(S) DU RAPPORT

Que le Sous-comité du train léger prenne connaissance du présent rapport à titre d'information.

BACKGROUND

On March 6, 2019, Council approved the Contract Award of Ottawa's Stage 2 Light Rail Transit Projects and Related Matters report ([ACS2019-TSD-OTP-0001](#)).

TransitNEXT was awarded the contract to design, build, finance, and maintain the Trillium Line extension, including the Airport Link. The Trillium Line will operate from Bayview Station to Limebank Station (Line 2) and include the Airport Link (Line 4).

East/West Connectors (EWC) was awarded the contract to design, build, and finance the Confederation Line extensions. The project will extend Line 1 from Blair Station to Trim Station in the east and from Tunney's Pasture Station to Moodie Station (Line 1), and to Baseline Station (Line 3).

As part of the 2022-2026 Council Governance Review report, Council approved the following Motion 2022 - 03/06, moved by Councillor Desroches and seconded by Mayor Sutcliffe:

THEREFORE BE IT RESOLVED that City Council establish a Light Rail Sub-Committee of Council to provide oversight over non-operational matters related to the Confederation Line 1 and the construction of Confederation Stage 2 and Trillium Lines.

Based on this motion, Transit Services provides a regular Stage 2 Light Rail Transit Project presentation to Light Rail Sub-Committee (LRSC). The following report provides an update on training for the Trillium Line, overall testing program and durations, changes to the Transit Operations Control Centre (headend), the Stage 2 Rail Activation Management Program (RAMP) Scorecard Analysis, project schedule and delivery risks, followed by an overview of the Stage 2 O-Train East-West construction updates.

DISCUSSION

This report, and the presentation prepared for the February 29, 2024, Light Rail Sub-Committee (LRSC) meeting, delivers an update on progress of the Trillium Line Extension Project (Line 2 and Line 4), as well as the O-Train Confederation Line East and West extensions (Line 1 and Line 3).

The City of Ottawa has taken significant steps to apply lessons learned from the Stage 1 project and ensure their integration into the planning, procurement, and delivery of the Stage 2 project. Moreover, many of the recommendations stemming from the Ottawa Light Rail Transit (OLRT) Public Inquiry have been embedded in the Stage 2 program and are being implemented as part of the works. The Inquiry recommendations and the

City's response to complete the work is outlined in the Action Plan Status Update – Response to OLRT Public Inquiry Recommendations ([ACS2023-TSD-TS-0016](#)).

The City of Ottawa continues to prioritize the implementation of lessons learned as the Stage 2 project progresses. City staff consistently apply the knowledge gained from previous work to improve operations and the development of the Stage 2 project.

Trillium Line Extension Construction

On the Trillium Line (Line 2 and 4), final construction activity, as well as final testing and commissioning, is well underway. The Signaling and Train Control System (S&TCS) testing is nearing completion with the final headway regulation test outstanding. The testing of up to nine trains with seven trains on the mainline and two trains on the airport line started in mid-November. Depending on available operators, system functionality, and deficiency rectification works, five to nine trains are regularly running on the system. Additional testing is underway as part of demonstrating the integrated functionality of the system and to verify correct operation of various functions of the train control system.

Starting in January of this year, test trains have operated on the mainline and airport spur between 7 a.m. to 11 p.m., Monday to Friday. Moving forward, the plan is to increase the number of operating hours of the trains to match the planned service levels and to demonstrate reliability of the fleet and the systems. This period of additional running time, including through the current winter season, is critical to surfacing and correcting issues before the line opens for service.

Concurrently, the closeout of deficiencies on all Trillium Line stations is progressing, including elevator adjustments and inspections, final installation of aluminum composite panels at the stations, final glazing installation, and final communications device commissioning. Ottawa Fire Service (OFS) continues with life safety/fire alarm demonstration and deficiency closeout for all stations. Building Code Services (BCS) are working through final inspections.

Civil works at Limebank Station bus loop, and Leitrim and Bowesville stations Park & Ride continued, including concrete pours and asphaltting. Permanent fence installation along sections of the guideway continued as operational signage installation along the guideway progressed. Bridge work continues at the University Road pedestrian bridge with the installation of light fixtures and bridge approach work remaining.

Training

Training for the Stage 2 Trillium Line continues for the Diesel Rail Operator Instructors, Diesel Rail Operators and Diesel Rail Controllers. Emergency Responders, including Ottawa Police Service, Ottawa Fire Services, Ottawa Paramedics and OC Transpo Special Constable Unit have completed their training, familiarization tours and tabletop exercises and full-scale exercise.

Diesel Rail Operator

The Diesel Rail Operator (DRO) cohorts are presently either completing classroom training or on-the-job training (OJT). OC Transpo requires approximately 54 fully trained DROs to support the Trillium Line when revenue service begins. As of the end of Q4 2023, the DRO Cohorts have progressed as follows:

- DRO Cohort #1 (9 DROs) certification is complete.
- DRO Cohort #2 (16 DROs) has completed classroom training and have commenced OJT training. Final certification is expected to occur by Q1 2024.
- DRO Cohort #3 (7 DROs) have completed the classroom training and are awaiting OJT training. Final OJT certification is expected to occur in Q2 2024.
- DRO Cohort #4 (24 DROs) is progressing through their classroom training program. Final OJT certification is expected to occur in Q2 2024.

Diesel Rail Controllers

To date, 12 Diesel Rail Controllers (DRC) have completed classroom training and are currently progressing through OJT. TransitNEXT has certified 2 DRCs, pending validation by OC Transpo. The final OJT certification for all 12 DRCs is expected in Q2 2024. OC Transpo is currently reviewing opportunities to provide ongoing additional support for DRCs during the start of revenue service.

Emergency Responders

Emergency Responders (ER) (including Ottawa Police Service, Ottawa Fire Services, Ottawa Paramedics and OC Transpo Special Constable Unit) have progressed through classroom and practical training exercises to prepare for service. The training program included tours of stations, the guideway, the vehicles (both Stadler and Alstom), the Dow's Lake Tunnel and tunnel ventilation system, and Albion Yard (formally the Walkley MSF) to familiarize them with the areas and to enable effective emergency response to all locations.

As of the end of 2023, the ERs have completed the five tabletop exercises addressing various emergency scenarios, and a final full-scale exercise that took place on October 31, 2023, at the Ottawa International Airport.

Overall Testing Program

The overall testing program initially started with activities that could be categorized as vehicle testing and non-vehicle system testing. At this stage of the test program, both vehicle and systems are being tested as part of the system wide testing.

Vehicle Testing

The testing for the Stadler vehicles included commissioning and testing activities in Switzerland prior to the vehicles being delivered to Ottawa. These activities included most static type tests with some dynamic tests.

Each vehicle went through commissioning tests upon arrival in Ottawa ensuring basic functionality. Alongside these tests were a concert of type tests to ensure performance requirements were met. This test program is substantially complete, with two tests remaining open. The conclusion of the vehicle qualification program is anticipated to be completed within Q1 2024.

Systems Testing

The TransitNEXT Testing and Commissioning (T&C) Plan for the Trillium Line Extension Project is designed to support the systems integration activities and processes necessary to achieve the requirements of the Project Agreement (PA). A number of tests remain to be completed including final headway testing, testing of the passenger information displays at the stations, and other final integration tests.

Transit Operations Control Centre

The City is responsible for a number of systems in the Transit Operations Control Centre (TOCC) to support Trillium Line operations. The City has specified, procured, and installed the systems and equipment required at Belfast Maintenance and Storage Facility (MSF), as well as at the Transit Operations Control Centre to allow for operation of the line. The City is responsible for all communication systems required for the Line 2 and Line 4 in the TOCC while TransitNEXT is responsible for the signaling, high speed data radio, and tunnel ventilation interfaces in the TOCC.

In order to advance testing of the TOCC and field equipment, the City built a temporary test lab that is equipped with all the servers and consoles for Line 2 and Line 4. This test

lab allowed local setup of equipment and configuration well in advance of when it is required for formal integration with TransitNEXT.

The testing is now in the formal integration phase with TransitNEXT and system integration testing is progressing on the project. In addition, the various workstations in the TOCC and BCC are now being used to support operations training.

Trillium Line Rail Activation Management Program (RAMP) Scorecard Analysis

The Rail Activation Management Program (RAMP) structure and reporting mechanisms ensure a comprehensive tracking and support for all activities and milestones leading up to the public launch of Line 2 and Line 4. Further information can be found in the report presented to Light Rail Sub-Committee on June 19, 2023 – Rail Operational Readiness – Trillium Line ([ACS2023-TSD-RCP-0012](#)).

Regularly scheduled RAMP meetings assemble key stakeholders, including RAMP leads, consultants, Stage 2 contractors, subject-matter experts (SMEs), and support staff. These meetings serve as a platform to exchange updates, coordinate upcoming activities, identify emerging issues, and assign responsibilities for resolution. Identification of critical activities are essential for a successful public launch. These activities take into consideration services that may have high-impact disruptions, form the basis of the RAMP Scorecard.

A progress summary of critical activities for the RAMP Scorecard include:

1) System Installation, Integration, Testing and Commissioning

Work continues final signal and train control testing, communication systems (cameras, building management systems, etc.) testing, and final integration between the Transit Operations Control Centre and the field devices. This work is expected to be nearly complete by the end of March.

2) Operations and Maintenance Readiness

Overall, progress is satisfactory across multiple areas, including regulatory approvals, operating plans and procedures, safety and security certification, emergency preparedness, pre-launch coordination, live testing, Trial Run planning, and bus service readiness. Key items that are being monitored closely are as follows:

- a. Regulatory Approvals: Building Code Services Occupancy Permits and Technical Standards and Safety Authority (TSSA) approvals for elevators are progressing. Final occupancy at five stations is pending final commissioning of

the Transit Operations Control Centre while other stations are undergoing final deficiency closeout work. Elevator inspections are progressing.

- b. Training Program, Staffing and Recruitment, and Maintenance Readiness: Work is progressing in these areas though some signal issues and staffing issues are affecting progress. Impacts on the training program are being assessed and the teams are working closely together to find ways to maximize training hours. The team is also closely monitoring train and system performance as part of building confidence in the reliability of the system.
- c. Maintenance Management Performance Reporting System (MMPRS): In order to support reporting of train and service availability, the maintainer is required to provide a performance reporting system. This system is still incomplete.

3) Customer-Facing Projects

There is remaining work with the payphone installation (available for emergency and distress calls) installation and the readiness of some customer-facing systems that are being tracked closely.

Project Schedule and Delivery Risks Update

The start of systemwide testing (Bayview Station through to Limebank Station, and South Keys Station through to Airport Station) began in summer 2023. Testing of the communications system, as well as signal and train control system has progressed. Following the successful testing of the dynamic commissioning of the signal and train control system is nearing completion with the headway regulation test being outstanding. Once the completion of training and various other system readiness prerequisites occurs, Trial Running will commence.

The City will then review and assess an opening date along with the required regulatory approvals. The final date selected will be heavily influenced by the safety, reliability, and general performance of the system. The project remains a construction site and there are remaining risks that can affect completion timelines. Project delivery risk factors that could further delay project works include:

a. Safety and Security Management

A significant safety incident during the remaining construction period, due to the complexity of the operation increasing during testing and commissioning of trains, would result in a significant delay. The rollout of TransitNEXT's Construction Safety

Management Plan (CSMP) accompanied with City presence on-site will be used to help prevent the occurrence of a major safety incident.

Furthermore, systemwide testing is used as a final demonstration that the design, construction, and commissioning have been successful; however, this process has the potential to identify critical safety issues in which case additional project time would be required to resolve the issue. To help mitigate this risk and assess the possibility as early as possible in the project, there has been a progressive ramp-up of testing activities from an individual component level to system integration testing level along with interface control documents to identify and manage the interfaces.

b. Systemwide Testing / Performance

In addition to safety issues that could emerge during testing, the testing process may identify additional technical, reliability, and/or performance issues that require additional time to resolve. Specifically, the process could identify issues with reliability of a specific vehicle system or infrastructure element that requires time to correct.

c. Training Completion

Training of Diesel Rail Operators and Diesel Rail Controllers is a critical final step in bringing the system into service.

d. Regulatory Requirements

Critical to the opening of Trillium Line (Line 2) and Airport Link (Line 4) are the rail regulatory approvals from Transport Canada and Canadian Transportation Agency, approvals from Building Code Services and Ottawa Fire Services, and secondary approvals for elevators from the TSSA.

e. Construction Completion

Importantly, the City continues to track progress of the works against the overall project schedule. Notwithstanding completion of final commissioning, training, and achievement of regulatory approvals, final completion of construction is required to enable these follow-on activities. Key remaining works include the following:

- Closeout and commissioning of final electrical, mechanical, fire safety systems, and communication system deficiencies in order to achieve station occupancy.
- Remaining civil works including Leitrim Park and Ride asphaltting for extended parking area, Limebank Station / Main Street Road and traffic lights, final traffic intersection work to Hunt Club Road, and the multi-use pathways including

pedestrian crossings between Hunt Club and Earl Armstrong. Additional items including landscaping are outstanding in some areas.

As part of building on the collaborative approach to project delivery, the City is working with TransitNEXT to identify potential items that are not required for Substantial Completion. Items such as final landscaping, final roadway works, and some multiuse pathway work could potentially be deferred.

f. Third-Party Development / Construction Interface

Third-party construction works near the Trillium Line have the potential to cause impacts to the project and in the future, to operations of the line. Coordination of construction interface points with these projects is critical to maintain the safety of the respective construction sites and the Trillium Line operation.

For example, the proposed New Campus Development (NCD) sites for the Ottawa Hospital are bisected by City-owned railway property. The hospital parking garage is being constructed over part of Line 2. Similarly, there are active and planned construction projects that abut the Trillium Line being led by Ottawa Community Housing, Carleton University, and at Somerset that have the potential to affect Trillium Line operations on a temporary basis. Close coordination between the various parties is required to ensure safe operation.

Confederation Line East Extension

In the east segment, the majority of the guideway barrier wall between the rail guideway and the highway is completed with some exceptions for station/guideway entrances. The Overhead Catenary System (OCS) cable installation between Blair Station and approaching Jeanne d'Arc Station is completed with cable installation east of Jeanne d'Arc towards Trim Station beginning.

Racks and cabinet installation in the communications room with cable pulling in the east stations is ongoing. Communication device configuration work to continue.

Traction Power Substations (TPSS) buildings were delivered and installed at all stations in the east. Energization of the TPSS for Montreal and Jeanne d'Arc stations to take place early in 2024.

All trackwork in the east has been completed with the continuation of deficiency correction work. Finishing works at Montreal and Jeanne d'Arc stations continue. Mechanical and electrical work is ongoing at Convent Glen, Place d'Orléans, and Trim stations.

Confederation Line West Extension

For Confederation Line West, construction of stations, guideway and the cut and cover tunnel continue. A series of detours continue to be necessary to enable various construction activities.

Concrete work for the section of the Parkway tunnel along the Kichi Zibi Parkway was complete at the end of 2023. Work is ongoing within the tunnel, including dry fire line installation and preparations for plinth construction.

All stations are under construction, with principally structural work ongoing at Westboro, Kichi Sibi, Sherbourne and New Orchard stations. Stations further along continue working on interior finishes and testing and commissioning.

Interior finishing and testing and commissioning work is ongoing in Lincoln Fields, Iris, Algonquin and Pinecrest stations. Emergency egress tunnel at Bayshore Station is nearing completion, backfill is ongoing. Testing and commissioning for occupancy is ongoing at the LMSF and near Moodie Station. Glazing and concrete work is ongoing at Queensview Station with escalator and elevator installation continuing at Moodie Station.

Stage 1 and Stage 2 Contingency Funds

The Stage 1 Confederation Line contingency fund is \$115 million. To date, \$101.19 million from the total fund has been spent. Remaining funds are primarily related to property requirements and remaining commercial matters.

The original Stage 2 contingency fund of approximately \$152 million was increased by \$25 million (approved by Council July 6, 2022) and an additional \$110 million (approved by Council November 22, 2023) due to unforeseen costs and improvements to the project. Approximately \$207 million of the Stage 2 contingency fund has been committed to date. As per the last funding report, a residual budget pressure is forecasted for City and other costs however that pressure will be addressed at a future date.

Stage 1 and Stage 2 Capital Budgets

In keeping with Council's approved 2017 Stage 2 Report ([ACS2017-TSD-OTP-0001](#)), 2019 Stage 2 Report ([ACS2019-TSD-OTP-0001](#)), 2022 Stage 2 Report ([ACS2022-FSD-FIN-009](#)) and 2023 Stage 2 Report ([ACS2023-TSD-RCP-0017](#)), approximately \$3.486 billion has been spent as of December 31, 2023 and relates to the RTG MOU for Belfast Yard and vehicle assembly mobilization (\$442 million), Confederation Line extension mobilization and construction period payments (\$1.864 billion), Trillium Line extension construction period payments and financial close for the Revenue Vehicle

Supply Contract (\$632 million), and contingency (\$106 million).

The remaining \$442 million was spent on planning, procurement, project delivery and City retained scope.

December 31, 2023				
Project Description	Authority	Actual Expenditures	Funds Reserved/Committed	Unspent/Uncommitted
Stage 1				
Confederation Line Program	2,130,000,000	2,130,000,000	-	-
Contingency	115,000,000	101,192,705	13,807,295	-
Total Stage 1	2,245,000,000	2,231,192,705	13,807,295	-
Stage 2				
Confederation Line Extensions DBF Contract	2,680,832,113	1,864,085,060	816,747,053	-
Trillium Line Extension DBFM Contract	850,966,493	631,626,745	80,817,758	-
Deferred Equity (Maintenance Term)	-	-	138,521,990	-
RTG Stage 2 MOU (includes 38 Alstom vehicles)	516,184,423	442,130,219	74,024,460	29,745
City Costs (includes planning, procurement, property acquisitions, City retained scope, and delivery oversight)	574,629,108	442,287,182	38,418,831	93,923,095
Contingency	287,640,000	105,844,557	101,538,956	80,256,487
Total Stage 2	4,910,252,137	3,485,973,762	1,250,069,048	174,209,327

FINANCIAL IMPLICATIONS

Delays could have implications on the project's budget. Staff will report to Committee and Council on any adjustments to the contingency budget as and when required.

LEGAL IMPLICATIONS

There are no legal impediments to receiving this report for information.

ACCESSIBILITY IMPACTS

All components of the Stage 2 LRT project adhere to the *Accessibility for Ontarians with Disabilities Act (AODA)*.

Any policy or procedural development, as well as customer communications and public engagement identified in the report's recommendations will include the application of the City's Equity and Inclusion Lens.

Staff will continue to engage persons with disabilities and accessibility stakeholders to ensure that their perspectives are considered and incorporated, and to promote inclusion. Staff will also ensure that any applicable accessibility legislation, standards and

guidelines are adhered to during the execution of the projects and initiatives identified in this report.

ASSET MANAGEMENT IMPLICATIONS

The City of Ottawa' Comprehensive Asset Management program uses widely accepted asset management practices and long-range financial planning, in compliance with provincial asset management regulations, to manage the City's infrastructure portfolio worth over \$70 billion to provide for the safe delivery of reliable and affordable services to the community.

Asset management is an internationally recognized and implemented practice that supports informed, transparent decision making, giving Council a framework to provide direction on the appropriate balance of service delivery, cost, and risk, through a process of optimizing the lifecycle management of the City's assets which support the services it delivers.

The implementation of the Comprehensive Asset Management program enables the City to effectively manage existing and new infrastructure to maximize benefits, reduce risk, and provide safe and reliable levels of service to community users. The report identifies potential improvements to the Business Case and Project Management Policy and Project Management Framework. These are guiding documents to the Comprehensive Asset Management program, and as such, any changes to these core documents will be reviewed and reflected in the program.

RURAL IMPLICATIONS

The City's transportation network, including light rail transit, is designed to provide options for all residents. Once completed, Stage 2 LRT will span from Trim Rd. to Moodie Dr. and south all the way to Riverside South. Rural residents will have access to Park and Ride lots at various stations which will allow them to easily use public transit. For Line 2 specifically, there will be Park and Ride lots at Bowesville Station, Leitrim Station, and Greenboro Station.

TERM OF COUNCIL PRIORITIES

The 2023-2026 Term of Council Priorities include:

- A city that is more connected with reliable, safe and accessible mobility options.
- A city that it is green and resilient.

DISPOSITION

Transit Services will provide regular updates on Trillium Line testing and trial running. As detailed in the report, TSD will provide a quarterly report and presentation to Light Rail Sub-Committee, which will provide a construction update of Trillium Line and Confederation Line.