Altus Group

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INDEPENDENT CERTIFIER'S REPORT ON SUBSTANTIAL COMPLETION

for

THE CONFEDERATION LINE (OTTAWA LIGHT RAIL PROJECT)

Ottawa, Ontario

Prepared for Project Agreement Parties:

CITY OF OTTAWA

and

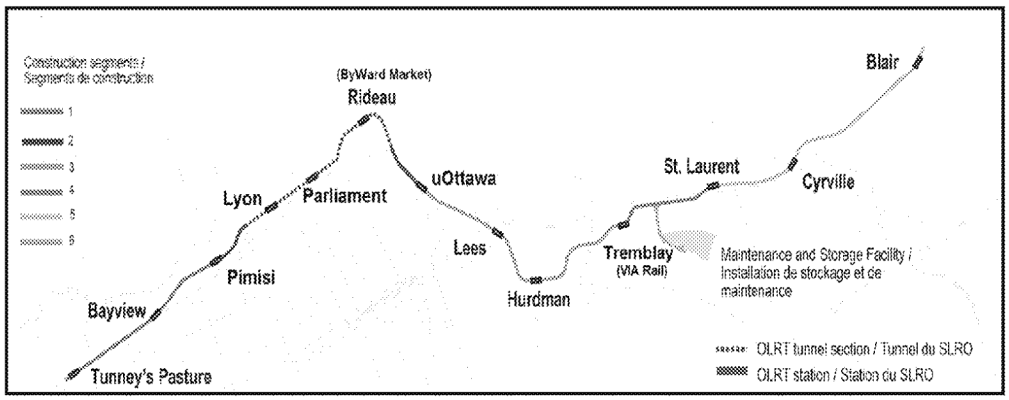
RIDEAU TRANSIT GROUP (RTG) GENERAL PARTNERSHIP

Prepared by:

Altus Group Limited

Issued:

May 13, 2019



Altus Project 100224

Altus Group

March 13, 2019 Altus Ref: 100224

City of Ottawa
DCM, Planning, Transit & the Environment
110 Laurier Avenue West
Ottawa, ON, K1P 1J1

Attn: Michael Morgan (City Representative)

Rideau Transit Group Partnership
Confederation Line
1545 Carling Avenue, Suite 406
Ottawa, ON K1Z 8P9

Attn: Peter Lauch (Project Co Representative)

Dear Sirs,

Re: The Confederation Line Project (Ottawa Light Rail Transit Project
Independent Certifier's Report on Substantial Completion

The Independent Certifier ("IC") has reviewed the status of the project, the requirements for achievement of Substantial Completion pursuant to the Project Agreement, and the opinions of both Project Co and the City.

Project Co issued the Substantial Completion Notice (dated April 26, 2019) on April 29, 2019 confirming their position that the requirements for Substantial Completion have been satisfied pursuant to the Project Agreement.

According to Section 26.2 (b) (ii) of the Project Agreement, the Substantial Completion Notice shall be issued upon the satisfaction of all requirements for Substantial Completion and which Notice shall describe, in reasonable detail, the satisfaction of the requirements for Substantial Completion, together with Project Co's opinion as to whether the conditions for issuance of the Substantial Completion Certificate have been satisfied. **Appendix A** of this Report includes Project Co's Substantial Completion Notice; however, we have not included all the supporting documentation that was provided with the Substantial Completion Notice due to the large nature of the enclosures. The supporting documentation provided is availablele on eBuilder.

A meeting was held with the IC and Project Co on April 30, 2018 to review and discuss Project Co's Substantial Completion Notice ("SC Notice") including all supporting documentation provided with the SC Notice. The IC understands that a meeting took place between the City and Project Co on April 29, 2019 to review and discuss the same. In addition to performing the IC's Certification Services pursuant to the IC Agreement since Financial Close, the IC has participated in the PA Compliance working group meetings established in June 2018 to review the Substantial Completion requirements and ensure the PA Parties are aligned on the evidence/supporting documentation that would be provided by Project Co with their SC Notice. The IC has conducted monthly site visits, issued monthly reports, witnessed various testing and commissioning activities, attended deficiency walks and has certified all Milestones achieved

at this time. The last site visit the IC conducted was on May 1, 2019 to assess the progress as part of our review in determining whether the conditions for the issuance of the Substantial Completion Certificate have been satisfied. Please see **Appendix C** of this Report for the corresponding photo report.

Pursuant to Section 26.2 (c) of the Project Agreement, on May 6, 2019, the City provided their opinion as to whether the conditions for issuance of the Substantial Completion Certificate have been satisfied and, if applicable, any reasons as to why they consider that the Substantial Completion Certificate should not be issued. After reviewing Project Co's SC Notice, the City's opinion is that the conditions for the issuance of the Substantial Completion Certificate have not been satisfied for a number of reasons, which they detail in their opinion letter and enclosure Appendix A. Please refer to Appendix B for a copy of the City's opinion and enclosure Appendix A.

Pursuant to Section 24.4 (d) of the Project Agreement, the Independent Certifier has considered the opinions and positions of both Project Co and the City, and has determined that the conditions for the issuance of the Substantial Completion Certificate have **not** been satisfied at the time of the issuance of the Substantial Completion Notice and at the date of this report.

The IC would like to highlight the key definitions for Substantial Completion contained in this Project Agreement. Pursuant to Schedule 1, Section 1.619, of the PA, Substantial Completion is defined as follows:

> *"**Substantial Completion**" means the Substantial Completion of the Fixed Component and Substantial Completion of the Vehicle Component*

Pursuant to Schedule 1, Section 1.623, of the PA,

> *"**Substantial Completion of the Fixed Component**" means the point at which the Fixed Component shall be completed to the same extent as a "contract" being "substantially performed" in accordance with the CLA; a certificate of substantial performance of the Design and Construction Works in respect of the Fixed Component (other than the construction-period operations and maintenance services described in the Output Specifications) is published pursuant to Section 32(1) of the CLA; and all requirements of Substantial Completion described in Schedule 14 – Commissioning, have been satisfied in respect of the Fixed Component.*

Pursuant to Schedule 1, Section 1.625, of the PA,

> *"**Substantial Completion of the Vehicle Component**" means:*
>
> *(a) that all of the "Vehicles" required by this Project Agreement have been delivered at the location designated by the City in accordance with this Project Agreement and have been completed to the same extent as the Fixed Component, as referred to in the definition of Substantial Completion of the Fixed Component, but for clarity, there shall be no requirement for the publication of a certificate of substantial performance; and*
>
> *(b) Project Co shall have caused compliance with "SAT 3" level of testing as described in the Integrated Test Plan outlined in Schedule 15 – Output Specifications.*

(c) *Project Co shall have demonstrated compliance with the test and commissioning requirements as provided for in Part 4 of Schedule 15 2 – Output Specifications– Design and Construction Requirements and Schedule 14 – Commissioning.*

1.696 "Vehicles" means all light rail transit vehicles used to carry Passengers on the System including all Vehicle Equipment contained therein, and all spare Vehicles as required in accordance with the Vehicle Design and Construction Requirements and Operation Requirements and Specifications; and "Vehicle" has a corresponding meaning.

As defined in the Project Agreement, both the definition of ***Substantial Completion of the Fixed Component*** and ***Substantial Completion of the Vehicle Component***, require the Fixed Component and the Vehicle Component shall be completed to the same extent as a "contract" *being "substantially performed" in accordance with the CLA (we note that the certificate of substantial performance (Form 9) for the Fixed Component is required to be published pursuant to Section 32(1) of the CLA).*

Pursuant to the CLA, a contract is substantially performed
(a) when the improvement to be made under that contract or a substantial part thereof is ***ready for use or is being used for the purposes intended****; and*
(b) when the improvement to be made under that contract is capable of completion or, where there is a known defect, correction, at a cost of not more than,
(i) 3 per cent of the first $1,000,000 of the contract price,
(ii) 2 per cent of the next $1,000,000 of the contract price, and
(iii) 1 per cent of the balance of the contract price. R.S.O. 1990, c. C.30, s. 2 (1); 2017, c. 24, s. 4 (1, 2).

The IC notes that in addition to completing the Fixed Component and Vehicle Component to the same extent as a "contract" being "substantially performed" pursuant to the CLA, there are further requirements for Substantial Completion pursuant to the Project Agreement that have to be satisfied.

The IC notes that outstanding defects, deficiencies and items of outstanding work can remain to be completed at Substantial Completion provided they fall under the definition of Minor Deficiencies in the Project Agreement. For clarity and pursuant to Schedule 1, Section 1.400 of the PA, Minor Deficiencies is defined as follows:

*"**Minor Deficiencies**" means any defects, deficiencies and items of outstanding work (including in relation to seasonal work) arising from or related to the work required to achieve Final Completion or Milestone Acceptance in the case of any Milestone, and which would not materially impair:*

(a) the public's or the City's use and enjoyment of the System;
(b) the performance of the Governmental Activities;
(c) the performance of the Maintenance Services by Project Co; or
(d) safety or traffic flow on the System in any relevant respect.

The following matters are required to be performed by Project Co to satisfy the conditions for the issuance of the **Substantial Completion Certificate**, are included, but not limited to, the matters listed below and these items cannot be considered Minor Deficiencies as defined in the Project Agreement:

1) The issuance of a Certificate of Substantial Performance (Form 9 from the CLA) of the Design and Construction Works in respect of the Fixed Component is required to be issued. The Form 9 that was provided with the SC Notice, indicated a substantial performance date of April 26, 2019, however the Certificate was not been signed by the Project Co Rep and the Payment Certifier, as indicated, and the Certificate does not note a date for signing. The Form 9 submitted with the Substantial Completion Notice is incomplete.
2) The Certificate of Substantial Performance is required to be published pursuant to Section 32(1) of the CLA in the DCN.
3) Certification/Approval from Ottawa Fire Services (OFS) to be received and letter of confirmation to be provided by Ottawa Fire Services relating to Fixed Facilities (Station, Tunnel, Guideway, etc).
4) Issuance of full (non-conditional) Occupancy Permits.
    a) Currently several Occupancy Permits issued by the Building Officials contain restrictions or conditions that need to be closed prior to permitting general occupancy. This is a requirement for Substantial Completion and cannot be considered a Minor Deficiency if it restricts Occupancy of the facility and the permits indicate several restrictions. Project Co has provided an update on May 2, 2019, however, confirmation that the conditions/restrictions from the Building Officials is outstanding.
    b) The IC understands from both the City and Project Co, that they have agreed that the hoarding and fencing (externally) preventing access from the general public to the Stations will remain until the end of Trial Running for safety and security concerns. Confirmation from the PA Parties that they are aligned with this agreement is requested.
    c) The Rideau Station Occupancy Permit was outstanding at the time of the issuance of the SC Notice, but has since been provided (conditional occupancy) on May 2, 2019. The Occupancy Permits for Tunney's BOB and Place de Ville retail spaces are currently outstanding; however Project Co has confirmed that these permits have been agreed to be carried as Minor Deficiencies. Confirmation from the City is required.
5) Issuance of TSSA licences for the Elevators and Escalators at the Stations. At the time of issuance of the SC Notice, these licences were not all available. Project Co provided an update on May 8, 2019, and currently 35 TSSA licences have been issued out of 59 Elevators (5 Elevators have pending inspections) and 19 TSSA licences have been issued out of 43 Escalators. We note that Project Co have provided Inspection Reports for the Elevators and Escalators that do not have licences (except the 5 pending inspections notes above) and the issuance of the licences is imminent.
6) Integration Conformance Letter – TVS – (Electrical and Mechanical). This conformance letter notes several marked (*) SAT/SIT tests as having been conducted but the results are unknown and under process for submission. The EOR notes that all the testing documentation must demonstrate and satisfy the it is in "general conformance to establish the pass criteria". The IC sought clarification on these comments and has not yet received a response. As an example, one of the SIT's noted, TVS SIT – Segment 2 Tunnel, is dated March 20, 2019 and marked "incomplete" (see further item (7(vi) in this report comments relating to the results of this SIT test). The ICL letter was signed on March 22, 2019, and the results were known at that time as "incomplete". The EOR should review the SAT/SIT test

results that were not known at the time of issuance of the ICL letter and reconfirm that the results have established the pass criteria.

7) All requirements for testing and commissioning requirements to be completed and compliant ("Pass" status with Minor Deficiencies remaining) as provided for in Part 4 of Schedule 15 2 – Output Specifications– Design and Construction Requirements and Schedule 14 – Commissioning.
   a) Examples of incomplete tests (not an inclusive list)
      i) System Operating Demonstration – marked "incomplete" on 4/12/19 and indicates 3 failures within report, and EOR has not signed off.
      ii) Demonstrate End to End Operation Time – marked a "pass" on 4/3/19, however lists 7 deviations from the test procedure, and EOR has not signed off.
      iii) OCS/Pantograph Interaction (Slow) Zone 1 and (Slow) Zone 2 do not indicate a "Pass" or "Fail" criteria. Report indicates in some cases that a retest is necessary. EOR has not signed off.
      iv) HOL Neutral Bond Testing (Baseline) TPSS4 and TPSS 5 are marked to be re-tested by EOR.
      v) SCADA/TPSS, Local SIT – TPSS 6 – marked "incomplete" on 10/28/18 due to door contact deficiency and requires replacement of the door contact, and EOR has not signed off.
      vi) Tunnel Ventilation System – Segment 2 Tunnels – marked "incomplete". Test Case 9 (On-board pressure transient testing to be completed during Trial Running) and Test Case 8 (Acoustic testing did not meet PA Criteria, however request for variation has been submitted to change the PA Criteria. Confirmation this has been agreed is required)
   b) Examples of failed tests (not an inclusive list)
      i) Maintenance of Way Vehicles/Guideway Clearance SIT – marked "Fail" on 12/3/18
      ii) OCS/Pantograph Interaction (Normal) Zone 2 - marked "Fail" on 11/23/18.
      iii) Guideway Operational Signage Zone 1,2,3 and 4 – all marked as "Fail" on 21/02/19 with noted deficiencies required to be closed.
      iv) SCADA/Station & Systems, Local SIT Blair – marked "Pass" but "Fail" in report as Switch Heater (TSH-26) failed and cannot operate.
      v) SCADA/Station & Systems, Local SIT uOttawa, Rideau – marked "Pass" but "Fail" in report as various hardware issued prevented testing.
      vi) SCADA/Station & Systems, Local SIT Tunney's, Parliament, Lees – marked "Pass" but "Fail" in report due to door issues.
   c) Confirmation of an agreed change to the PA criteria to the TVS Mechanical SIT and Smoke Test at St Laurent, Lyon Station, Parliament Station, Rideau Station. When originally conducted this SIT was listed as a "Fail" and was missing the EOR signature. It has since been updated to a Pass and the EOR has signed off in May 2019, however confirmation should be provided that the noise criteria has been agreed to be changed from the PA criteria set out in NC 70 and to the criteria set out in NFPA 130 as requested by Project Co, through RFI OLR-OTT-16-0-RFI-0583. This does not appear to be agreed at the time of issuance of the current SIT report.
   d) All SAT/SIT Reports to be signed by the approving Professional Engineer of Record. The IC understands this is also a requirement for the OFS certification/signoff.
   e) Pursuant to Schedule 14, all Commissioning documentation shall be provided by Project Co to the City in accordance with the requirements of Schedule 10 – Review Procedure. Confirmation this has occurred, and City review indicates "Reviewed" or "Reviewed as Noted" status.
   f) All SIT/SAT Reports must be issued confirming each test has been marked "Pass" to validate the ESAC and Safety Case arguments (see item (12) below for further information).

8) The restrictions listed on the System Security Certificates of Conformance for the stations, issued on May 6, 2019, should be closed or confirmed as agreed Minor Deficiencies
9) The Thales Safety Certificates that were provided by Project Co on Friday May 10, 2019, certifying that the LRVs are up to date with the Thales software updates (to version 5.02) and suitable for use with the SCADA system. Project Co has advised, during the Trial Running Meeting of May 7, 2019, that a Thales software update (version 5.04) was to be released on Friday May 10, 2019. Project Co intended to carry out the software update and testing May 11 and May 12, 2019 and the process would finish with a report and updated Thales Safety Certificate. The updated Thales Safety Certificates and test report should be made available once the software upgrade is complete and tested.
10) The LRV Alstom Safety Certificate for all 34 vehicles should be provided confirming that the LRV can operate at AW3, which confirms that the trains can carry passengers. This is essential to meet the requirements of Substantial Completion, that all 34 vehicles have been completed to the same extent as the Fixed Component and therefore "ready for use or is being used for the purposes intended" pursuant to the requirements of Substantial Performance as defined in the CLA. The IC understands that Project Co's position is that Alstom will not or cannot issue the Safety Certification at AW3 until after the successful completion of the 12-day Trial Running period. Alstom's position or reasoning to not issue the AW3 Safety Certification needs further discussion, clarification and agreement between the Parties. All testing and commissioning should be completed for the achievement of Substantial Completion, prior to the start of the 12 Day Trial Running period. Currently the Vehicles are restricted for the minimum necessary for conducting driver training, and or commissioning of other LRT or systems by OLRTC. The IC understands that Project Co's position is that the 12 Day Trial Running period could commence with AW0 Safety Certification from Alstom, however the AW0 certification does not satisfy the conditions for Substantial Completion.
11) Several issues remain outstanding and require resolution to demonstrate vehicle reliability prior to the achievement of Substantial Completion relating to the Vehicle Component, including as examples:
    a) Brake defects/failures (vehicles under inspection or repair) relating to the hydraulic pressure units. The IC understand that this was a fleet wide issue and all HPU's were replaced in early 2019 however issues remain with some of the vehicles
    b) Door sensitivity issues, including non-compliant performance and door closure issues due to misalignment, Vapor supplied part defects. Project Co has confirmed to the IC that it was a fleet wide issue and currently 23 of the 34 vehicles have been rectified. Testing to confirm compliance should be completed and documented.
12) The Engineering Safety Assurance Case (ESAC) was submitted for review on April 24, 2019 (according to City) and April 18, 2019 (according to Project Co with corrections on April 24, 2019). The ESAC is a Schedule 10 Review submission and the timing of the submission did not allow for the Schedule 10 Review process to be carried out pursuant to the Project Agreement, prior to Project Co's SC Notice. The ESAC should be reviewed and marked "Reviewed" or "Reviewed as Noted" to confirm compliance. The City did list several concerns relating the ESAC, including the Safety Case and Safety Standards, and highlighted their opinion that the System is not yet ready to carry passengers and therefore not ready for public use as required by Substantial Completion requirements. The IC doesn't have a role in carrying out a Schedule 10 review of this submission, however, the IC notes there are several caveats preventing validity of the ESAC and Case for Safety arguments, which remain outstanding at this time, as follows:

a) All conditions on the Occupancy Permits be satisfied. As per item (4) above, conditions remain on the Occupancy Permits
b) All conditions detailed on the OFS Certificates must be satisfied. The IC is not aware that the OFS Certificates have been issued
c) All outstanding SIT/SAT Reports must be issued confirming that each test has passed. As per above, the completion and subsequent "pass" of the SIT/SAT reports and tests is not yet satisfied. The IC has sought clarification from Project Co on this caveat, however, it is still not clear which SIT/SAT Reports must be confirmed "Pass" for this caveat to be removed and if indeed those SIT/SAT Reports are available and marked "Pass".
d) The IC recommends that the PA Parties meet to review the Schedule 10 Review comments from the City towards finalizing the Engineering Safety Case Assessment for the purposes of Substantial Completion.

13) The emergency telephones connectivity and functionality with the Transit Operation Control Centre (TOCC) is required. Project Co has advised that the issue of the PBX firewall configuration has been resolved on May 10, 2019 and functionality will be audited and validated to the City.
14) The fire telephones currently have not passed field acceptance, and this is required by OFS. Project Co has advised that poor voice quality concerns and the YCC/BCC disconnection issues have been rectified, however the handsets were to be exchanged on May 10, 2019 and then validation testing will be performed.
15) The draft Minor Deficiency List was provided with the SC Notice and was further updated at a request from the IC and recirculated on May 6, 2019. The IC notes that although the process of escalating the classification of the deficiencies (to be closed Pre-SC notice or to be closed Pre-RSA or to be considered a minor deficiency at SC) had begun with the Senior Executive level, the escalation process was not completed at the time that the SC Notice was issued. The IC has discussed with both PA Parties that there are numerous deficiencies identified with different classifications by both PA Parties and there remains deficiencies that are to be closed Pre-SC Notice. All deficiencies, defects, elements of incomplete work are required to fall under the definition of a Minor Deficiency as defined in the PA in order to meet the conditions for the issuance of the Substantial Completion Certificate.

The IC notes that we have made reasonable efforts to detail above the matters that are required to be performed by Project Co to satisfy the conditions for issuance of the Substantial Completion Certificate. However, due to the nature and number of conditions that were not met at the time of issuance of the Substantial Completion Notice and the large volume of documentation that has been submitted post SC-Notice, the above list is not exhaustive.

The IC notes that during the City's 5-day review period and the subsequent IC's 5-day review period, a large amount of supporting documentation, reports, certifications, permits, etc. has been provided by Project Co as they continue to rectify issues and satisfy requirements relating to Substantial Completion. In addition, Project Co has issued a response to the City Opinion on May 9, 2019, providing a detailed update on the issues highlighted by the City in their Opinion Letter. The IC has made reasonable efforts to review and consider supporting documentation received from Project Co after the issuance of their SC Notice, however, further documentation/confirmation/validation will be required (as detailed in this report) to meet the conditions for the issuance of the Substantial Completion Certificate.

The IC highlights that a tremendous amount of progress by Project Co has been made since the SC Notice was issued. The IC advises that the PA Parties and IC meet to discuss to the City Opinion, Project Co's response to the City Opinion, and this IC Report to ensure all Parties (IC/City/Project Co) are aligned with the (i) requirements for Substantial Completion that remain outstanding and the (ii) requirements that only need to be satisfied before the Revenue Service Availability Notice. In carrying out this review process, it appears the PA Parties are not aligned on these requirements. In addition, the IC highly recommends that meetings continue between the PA Parties and the IC to review the anticipated progress towards the satisfaction of Substantial Completion prior to the issuance of the next Substantial Completion Notice.

Next Steps:

Pursuant to Section 26.2 (e) of the PA, Project Co shall, within 5 Business Days after receipt of this report, provide the Independent Certifier and the City Representative with:

> *(i) a detailed list indicating the rectification actions proposed for all matters raised in such report;*
> *(ii) the schedule for completion of all such rectification actions; and*
> *(iii) any additional Project Co Commissioning that needs to be undertaken as a result of the rectification actions, and Project Co shall perform all such additional rectification actions and Project Co Commissioning in a timely manner. Upon completion thereof, Project Co may give a further Substantial Completion Notice and Sections 26.2 (c) to (e), inclusive, shall be repeated until the Substantial Completion Certificate has been issued.*

The issuance of items (i) to (iii) pursuant to Section 26.2 (e) is required to be provided by Project Co by May 21, 2019. Upon completion of all rectification items and matters required to be performed, Project Co may give a further Substantial Completion Notice. The IC notes that a full Substantial Completion Notice will be required to be submitted by Project Co at this time, and not an update to the Substantial Completion Notice issued on April 29, 2019.

We look forward to the successful completion of all the requirements for Substantial Completion by Project Co and the resulting issuance of the Substantial Completion Certificate by the Independent Certifier.

Yours truly,
ALTUS GROUP LIMITED

Per: Monica Sechiari. P. Eng
Associate Director, IC Services

cc. Lorne Gray – City of Ottawa
Paul Hughes – Altus Group Limited

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This report and the findings enclosed are based on the documentation supplied to us by the PA Parties and its representatives. Should any subsequent information arise which materially affects the project, we will report as soon as it becomes available. Furthermore, Altus Group has made reasonable investigation to review the project documentation; however, should any information be withheld from us, we cannot be responsible to ensure that it is included in this report.

1 LIST OF APPENDICES

Appendix A: Project Co's Substantial Completion Notice – April 29, 2019
Appendix B: City Opinion – May 6, 2019
Appendix C: Photographs – May 1, 2019 Site Visit

APPENDIX A – Project Co's Substantial Completion Notice – April 29, 2019

26 April 2019

City of Ottawa
O-Train Construction
110 Laurier Avenue West,
Ottawa, ON, K1P 1J1
Mail Code: 23-10

Our Reference:	RTG-OTT-00-0-LET-0747
OLRT Reference:	OLR-RTG-00-0-LET-1257
Project Agreement Reference:	Section 26.2(b)(ii)

Attention: Michael Morgan
Director, O-Train Construction Office

Subject: Substantial Completion Notice

Dear Mr. Morgan:

Pursuant to Section 26.2(b)(ii) of the Project Agreement, this letter serves as written notice to the City that the requirements for Substantial Completion have been satisfied.

This notice is the result of the conclusions drawn from the Project Agreement Compliance Working Group which commenced in June 2018, and is the carefully considered opinion of OLRT-C's Project Director.

Following the effort of OLRT-C's department managers, involving all relevant disciplines, RTG is of the opinion that the requirements for Substantial Completion have been satisfied, as certified by the signature below.

Should you have any questions or concerns, or require additional information, please do not hesitate to contact us.

Kind regards,

Peter Lauch, P. Eng.
CEO
Rideau Transit Group General Partnership

cc.: Gary Craig, Claudio Colaiacovo, Richard Holder, Lorne Gray – OTC
Monica Sechiari, Kyle Campbell – ALTUS
Rupert Holloway, Cesar Palencia, Matthew Slade, Gonzalo Gomeza, Derek Love, Florica Nye, Walid Gamoudi, François Poirier, Chris Woodmass – OLRT-C
Dwayne Mercer – RTG

OLRT Constructors
1600 Carling Avenue,
Suite 300.
Ottawa, Ontario
K1Z 1G3

Rideau Transit Group
1545 Carling Avenue, Suite 406
Ottawa, Ontario
K1Z 8P9

26 April, 2019

Our Ref.	**OLR-RTG-00-0-LET-1257**
City Ref.	

Attention: Peter Lauch
Chief Executive Officer

Subject: Project Compliance for Substantial Completion letter

Dear Mr. Lauch,

Pursuant to Section 26.2 (b) of the CC, this letter serves as written notice to RTG that the requirements for Substantial Completion have been satisfied.

This notice is the result of the conclusions drawn from the Project Agreement Compliance Working Group which started in June 2018, and is the carefully considered opinion of the OLRT-C Project Director.

Following the effort of OLRT-C's department managers, involving all relevant disciplines, OLRT-C is of the opinion that the requirements for Substantial Completion have been satisfied, as certified by the signature below.

Sincerely,

Rupert Holloway
Project Director
RH/TS

Cc: Cesar Palencia, Matthew Slade, Walid Gamoudi, Florica Nye
François Poirier, Chris Woodmass, Derek Love, Gonzalo Gomeza

APPENDIX B – City Opinion – May 6, 2019

May 6, 2019

Mr. Peter Lauch, CEO
Rideau Transit Group GP
1545 Carling Avenue
Suite 406
Ottawa, ON K1Z 8P9

Your reference: RTG-OTT-00-0-LET-0747

Our reference: OTT-RTG-RLET- 0494

Dear Mr. Lauch,

RE: Substantial Completion Notice – City Opinion

Further to your letter, as referenced above, received on April 26, 2019 at 5:40 pm (the "**Substantial Completion Notice**"), we acknowledge that RTG has asserted that the requirements for Substantial Completion have been satisfied.[1]

Further to our letter dated April 30, 2019, bearing reference OTT-RTG-RLET-0492, given that the Substantial Completion Notice was received after the close of business on April 26, 2019 and that supporting documents were provided over the next three days, the City's review period commenced on Tuesday, April 30, 2019 and is based on the status of the Design and Construction Works as of close of business on Monday, April 29, 2019. Our position as articulated in this opinion does not reflect any documentation or change in the status of the Work since that date.

The City has carefully reviewed the status of completion of the Project as of the close of business on Monday, April 29, 2019 and it is the City's opinion that the conditions for issuance of the Substantial Completion Certificate have **not** been satisfied as of that date. In this letter and its Appendix, the City sets out the reasons as to why it considers that the Substantial Completion Certificate should not be issued.

In the Substantial Completion Notice, Project Co alleges that the notice is the result of the conclusions drawn from the Project Agreement Compliance Working Group. This is incorrect. This Working Group did not conclude that Substantial Completion had been achieved as of April 29, 2019.

[1] Capitalized terms not otherwise defined herein shall have the meaning given to them in the Project Agreement dated February 12, 2013 (the "PA").

City of Ottawa
O-Train Construction
Transportation Services Department
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

Ville d'Ottawa
Construction de l'O-Train,
Direction générale des transports,
110, avenue Laurier ouest
Ottawa, ON
K1P1J1

While the City appreciates that it is the "carefully considered opinion" of the OLRT-C's Project Director that the requirements for Substantial Completion have been satisfied, the City disagrees. There are significant outstanding issues that remain unresolved, as described in this letter and referenced in the list attached as Appendix A which must be resolved in order for the City to conclude that RTG has complied with the requirements for issuance of the Substantial Completion Certificate as articulated in the Project Agreement.

1. Substantial Completion

As you know, the achievement of Substantial Completion requires Substantial Completion of the Fixed Component **and** Substantial Completion of the Vehicle Component.

Both Substantial Completion of the Fixed Component and Substantial Completion of the Vehicle Component require, as one element of the test that must be satisfied, that the components shall be completed to the same extent as a "contract" being "substantially performed" in accordance with the *Construction Lien Act* (now the *Construction Act*).

As part of the definition of substantial performance, the *Construction Act* requires that the improvement to be made under the contract or substantial part thereof is "ready for use or is being used for the purposes intended." As well, there is a mathematical calculation that must be satisfied.[2]

In addition to satisfying all of the requirements of the *Construction Act* for substantial performance, in order to achieve Substantial Completion, **all** of the requirements of Substantial Completion set out in the Project Agreement must also be satisfied.

At the time of Substantial Completion, only Minor Deficiencies should remain outstanding pursuant to the Project Agreement. Minor Deficiencies are defined in the Project Agreement as follows:

> 1.399 **"Minor Deficiencies"** means any defects, deficiencies and items of outstanding work (including in relation to seasonal work) arising from or related to the work required to achieve Final Completion or Milestone Acceptance in the case of any Milestone, and which would not **materially impair**:
>
> (a) **the public's or the City's use and enjoyment of the System**;

[2] *Construction Lien Act*, RSO 1990, c C.30, Section 2.

City of Ottawa
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(b) the performance of the Governmental Activities;

(c) **the performance of the Maintenance Services by Project Co**; or

(d) **safety** or traffic flow **on the System in any relevant respect**. [Emphasis added]

In the circumstances, as of April 29, 2019, the improvement is not ready for use for the purpose for which it was intended (and therefore the requirements of s.2 of the *Construction Act* are not satisfied) and there are significant defects, deficiencies and items of outstanding work which materially impair the public's and/or the City's use and enjoyment of the System, the performance of the Maintenance Services by Project Co, and Safety on the System. These issues are described below in general and significant examples are listed in the attached Appendix A. In relation to the defects, deficiencies, and items of outstanding work described below and in Appendix A, the City has examined the cumulative effect of the issues identified in concluding that the System cannot be used for its intended purpose. The City appreciates the effort that has been expended by RTG on the System, but the Notice of Substantial Completion was issued prematurely.

2. Safety

According to the Project Agreement, any defect, deficiency, or item of outstanding work which materially impairs safety on the System will be a bar to the achievement of Substantial Completion. An assessment of whether Project Co has satisfied the Safety Requirements is therefore critical to an evaluation of whether or not the improvement is ready for use for the purposes for which it was intended and a determination as to whether or not (i) the public's and/or the City's use and enjoyment of the system are materially impaired and importantly, (ii) whether the **safety** on the System is materially impaired in relevant respects.

There are significant items of outstanding work which must be completed before the System meets the Safety Requirements. The City's review of the Engineering Safety Assurance Case provided by RTG to meet the Safety Requirements as defined in the Project Agreement, including the Safety Case and the Safety Standards, specifically IEC15288 and EN50126, has identified missing documents and several restrictions that apply. For example, the LRV Safety Case and LRV certification for passengers has not been provided by Alstom. The System is not yet ready to carry passengers (i.e. public use) according to the documents submitted by RTG (see the Case for Safety (OLR-05-0-0000-REP-0017 – rev1)).

The Engineering Safety Assurance Case was only submitted by RTG on Wednesday, April 24, 2019 and is incomplete. The Engineering Safety Case Assessment is a

City of Ottawa
O-Train Construction
Transportation Services Department
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

Ville d'Ottawa
Construction de l'O-Train,
Direction générale des transports,
110, avenue Laurier ouest
Ottawa, ON
K1P1J1

Schedule 10 Submittal under the Project Agreement and as such the City is entitled to the prescribed time for a proper review period. The City was simply not afforded adequate time to undertake its review of this document prior to the submission of the Substantial Completion Notice on April 29, 2019. Evaluation of safety will not be rushed or done in partial measure. A proper acceptance process will be followed as set out in the Project Agreement prior to any positive opinion with respect to Substantial Completion being rendered by the City. The City is working diligently to review Project Co's submissions and to date, fifteen of twenty-five key Engineering Safety Assurance Case documents have been reviewed, the contents of which the City has no objection and the remaining documents are under review. However and in any event, System Acceptance Testing ("SAT") and System Integration Testing ("SIT") is still not complete which means that the Engineering Safety Case will need to be re-submitted (see (OLR-05-0-0000-REP-0051)).

Therefore, RTG has not demonstrated that the Safety Requirements have been met for Substantial Completion.

3. Vehicles

As RTG is aware, the Vehicles have been delayed in their delivery for many months and there are major, defects, deficiencies, and items of outstanding work. The City appreciates that RTG has been addressing these problems with the Vehicles by attempting to work with its supplier, Alstom and that there have been challenges but it is Project Co that is responsible to achieve Substantial Completion, including Substantial Completion of the Vehicle Component. None of the delays associated with the Vehicles are the responsibility of the City; this is squarely a Project Co responsibility. The City requires **all** Vehicles to be ready for use as at Substantial Completion, which is a requirement of the Project Agreement.

In order to achieve Substantial Completion of the Vehicle Component, the Project Agreement requires that each of the following requirements be satisfied:

- That "**all** of the 'Vehicles' required by this Project Agreement have been delivered the location designated by the City in accordance with this Project Agreement and have been completed to the same extent of the Fixed Component..." [emphasis added];

- "Project Co shall have caused compliance with "SAT 3" level of testing as described in the Integrated Test Plan outlined in Schedule 15 – Output Specifications"; and

- "Project Co shall have demonstrated compliance with the test and commissioning requirements as provided for in **Part 4 of Schedule 15 2-Output Specifications**

City of Ottawa
O-Train Construction
Transportation Services Department
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

Ville d'Ottawa
Construction de l'O-Train,
Direction générale des transports,
110, avenue Laurier ouest
Ottawa, ON
K1P1J1

– **Design and Construction Requirements and Schedule 14 – Commissioning."** [Emphasis added]

As of April 29, 2019, there were 25 Vehicles that had defects and deficiencies that would prevent the Vehicles from being used. The defects and deficiencies are extensive and ongoing and result in a lack of access to the complete fleet. The Vehicles have not been shown to be reliable. As of April 29, 2019, the City has observed that there had never been 15 two-car consists running on the track. This falls significantly short of capacity needed for passenger service.

The defects identified in relation to the Vehicles as of April 29, 2019 include:

- **Brakes**: Brakes on several vehicles were defective and under inspection or repair at the Maintenance and Storage Facility. The Operator reported Incorrect Operating State ("IOS") faults during mainline operations resulting in these Vehicles being taken out of service for over 24 hours. The preliminary assessment from RTG indicates that the brake IOS faults may result from an issue with the hydraulic pressure units but it is unknown if this problem is fleet wide. All parties agree that this is a critical issue that would prevent the Vehicles from being used for service.

- **Doors**: Nine (9)Vehicles had more than one defective door and therefore would have been unavailable for passenger service. The door defects included fleet-wide sensitive edges (Schedule 15-2, Part 4, Article 3.20 (f) (ii)) not performing correctly and door closures not working due to door misalignment. In relation to the sensitive edge issue, items such as a purse strap caught in the door would not be detected and it is possible that a person could be dragged by the Vehicle if a strap was caught. All parties have agreed that this is a critical issue that would prevent the Vehicle from being used for service.

- **Communications:** Numerous IOS messages indicate defects with the Network Video Recorders, internal displays, and other faults with the onboard communication systems. In some instances, the number of error messages that appear on the driver display units indicate that the Vehicle is unfit for service. All parties have agreed that this is a critical issue that would prevent the Vehicle from being used for service.

- **Line Contactor**: The component that provides the electrical connection between the Overhead Catenary System and the traction converter is defective and has been replaced three times fleet-wide but the City has not seen any root cause analysis and the problem is not resolved.

In addition to the above significant defects and deficiencies in the Vehicles, the following are key items of outstanding work in relation to the Vehicles:

- Integration of the onboard Communication-Based Train Control system with the onboard passenger information system for automatic route selection and the onboard platform edge camera display selections (Schedule 15-2, Part 4, Article 3.27 (c) (xiii)) is incomplete. RTG's proposed mitigation, which involves manual route assignments (missions) selection with the ability to view platform edge cameras, is not working on all Vehicles. This is a critical Safety issue for passenger service and prevents the Vehicles from being ready for use. By way of example:

    - This means that when a driver departs a station he or she is unable to see whether the platform edge is clear of passengers; and

    - There are insufficient missions currently programmed to accommodate all potential routes which will result in inaccurate information being provided through the public address and passenger information system;

    As of April 29, 2019 there is no formal indication from RTG as to when or how these problems will be solved.

- Vehicles being used for testing and training as of April 29, 2019 are generally non-compliant with Vehicle minimum operating standards. In order to assess the Vehicles, the City looks to Schedule 15-3, Attachment 5, which provides a standard to demonstrate readiness for intended use. RTG has not demonstrated that the Vehicles satisfy the Vehicle Maintenance Service Requirements. Therefore, the use and enjoyment of the Vehicles would be materially impaired as would the performance of the Maintenance Services (which is also an element of the definition of Minor Deficiencies, as set out above).

RTG has failed to demonstrate compliance with the testing and commissioning requirements as provided for in Schedule 15-2, Part 4 and Schedule 14 – Commissioning. For example, RTG is not ready to conduct Trial Running because the testing of the integrated System is incomplete and the results have shown unsatisfactory performance such that the System is not "essentially ready" for Revenue Service Commencement as required by Schedule 14 - Commissioning. As a result, the System is not ready for use. This issue is particularly important to the Substantial Completion of the Vehicle Component but is also relevant to the completion of the Fixed Component for the reasons discussed below in relation to the CBTC.

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O-Train Construction
Transportation Services Department
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

Ville d'Ottawa
Construction de l'O-Train,
Direction générale des transports,
110, avenue Laurier ouest
Ottawa, ON
K1P1J1

4. Transit Operation Control Centre/System Control and Data Acquisition

There are significant items of outstanding work in relation to the Transit Operation Control Centre/System Control and Data Acquisition including:

- **Emergency telephones**: The emergency telephones are not calling through to the Transit Operation Control Centre and have not completed testing and commissioning as required under Schedule 15-2, Part 4, Article 6.2 (h). A subset of these telephones are used in critical areas including designated waiting areas and elevators in order to provide a means for communications by passengers to the Transit Operation Control Centre in the event of an emergency.

- **Fire telephones:** The fire telephones are not calling through to the Transit Operation Control Centre and the party line function does not work. The fire telephones have not been fully tested and commissioned as required by NFPA 130 (2010) Chapter 10 (4.2). These telephones are to be used by Ottawa Fire Services during an event and are therefore required for emergency communications.

- **Guideway Intrusion Detection System:** The guideway intrusion detection system integration with the Communications-Based Train Control is not activated and has not been fully tested and commissioned in accordance with Schedule 14, 1.9 (a) (xvi). This system is identified in the Integrated Hazard Log and is intended to mitigate unauthorized access to the track under IHL 018, IHL 019, IHL024 and IHL 338.

- **Intrusion Access Control:** The card readers are not fully installed and integration with the CCTV system is not complete as required under Schedule 15-2, Part 4, Article 6.3 (f). The card readers have not been fully tested and commissioned and installation works are ongoing as of April 29, 2019.

- **Passenger Announcements/Passenger Information Systems:** Completion of these systems as required per Schedule 15-2, Part 4, Article 6.3 (c) and (d) is outstanding. Specifically, the pre-recorded messages are not loaded into the System to make it useable and the Passenger Information Display System has not been fully tested and commissioned.

- **Closed Circuit Television (CCTV):** Completion of these systems, as required per Schedule 15-2, Part 4, Article 6.3 (e), is outstanding. There are numerous issues with the CCTV system including images blocked by station elements, blind-spots and cameras off-line (42 cameras). In addition, there are system-wide compression issues resulting in unacceptable image quality and the system has not been fully tested and commissioned.

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O-Train Construction
Transportation Services Department
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

Ville d'Ottawa
Construction de l'O-Train,
Direction générale des transports,
110, avenue Laurier ouest
Ottawa, ON
K1P1J1

- **Passenger Counting**: Real-time passenger counting reporting is required to the Transit Operation Control Centre as per Schedule 15-2, Part 4, Article 3.27 (xiv). As of April 29, 2019 there is no formal indication from RTG as to when this incomplete work will be undertaken and when the testing will occur.

- **Open Data**: The Advanced Traveller Information System is not functional. Schedule 15-2, Part 4, Article 6.2 (b) (iii) requires a server that shall allow external approved parties to retrieve operational performance and travel data (Open Data) for third party applications. Despite repeated requests to RTG for confirmation of data interface and structure information, timelines for implementation, and timelines for testing, this Work is still incomplete.

- **Alarm Management**: Schedule 15-2, Part 4, Article 6.2 (a) requires that the "TSCC shall include all of the systems and subsystems necessary to provide the command, control and monitoring necessary for the delivery of the OLRT services in a **safe and efficient manner**." [emphasis added] To date, RTG has failed to demonstrate an effective configuration of the SCADA alarms that will enable the City provide command and control in a safe and efficient manner. As an example of the incomplete commissioning of the SCADA system, the following is a summary of SCADA alarms on April 29, 2019:

    - 1768 Alarms (Priority 0 = 1212, Priority 1=199; Priority 2 = 355; Priority 3=2)
    - TVS Alarms = 57 Alarms (P0 and P1)
    - Guideway Intrusion Detection System = 164 intrusion alarms
    - Negative Ground Device = 289 P2 trips, mainly on TPSS 1,5 and 6.

RTG has failed to demonstrated compliance with the testing and commissioning requirements as provided for in Schedule 15-2, Part 4 and Schedule 14 – Commissioning. At present, the OC Transpo controllers (Electric Rail Controllers) do not have full access to all of the railway systems which means that the System is not "essentially ready" for Trial Running.

5. Communications Based Train Control ("CBTC")

The Project Agreement requires that an integrated System has been tested and ready by the time of Substantial Completion. As of April 29, 2019, the testing of the integrated System with the final software configuration is outstanding. The installation of the final software is planned for the start of Trial Running, but RTG has not provided time for preparation of a final timetable and service schedules. The following technical defects materially impair the City's ability to use the system as expected:

City of Ottawa
O-Train Construction
Transportation Services Department
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

Ville d'Ottawa
Construction de l'O-Train,
Direction générale des transports,
110, avenue Laurier ouest
Ottawa, ON
K1P1J1

- During the month of April 2019, there have been six (6) complete failures of zone controllers. The zone controller functionality does not meet the obligation for redundant zone controllers required in Schedule 15-4, Part 4, Article 5.3. Schedule 15-2, Part 4, Article 5.11 (a) which requires that overall reliability of the CBTC Train Control System shall be such that with the provided redundancy, availability is 99.99% or greater. Further, the CBTC Onboard Equipment is to meet an overall requirement of 480,000 km mean distance between chargeable failures.

- Over the course of a 10-day period at the start of April 2019, there were at least ten (10) switch failures that resulted in limited use of the System. It is impossible to sustain Project Agreement service levels with this rate of ongoing failures. A review of the field equipment revealed a variety of issues including floating switch plates, unsupported switch machines, and deficient maintenance activity. As of April 29, 2019, the City has not seen a root cause analysis of the issue.

- Completion of the yard control, per Schedule 15-2, Part 6, Article 7.3, requires a Yard Control Centre to control all yard track switch movements and to monitor vehicles within the yard and up to the yard lead demarcation point for turn over to mainline operations. The expansion of the yard has led to some CBTC implementation restrictions; however, a full yard management plan has yet to be provided by RTG and, in some cases, the current operating practices have not been demonstrated to take advantage of switch control functionality in the Thales system that is already working.

In addition, RTG has not demonstrated that it has complied with the testing or commissioning requirements as Schedule 15-2, Part 4 – Testing and Commissioning. The testing program is incomplete, and RTG has failed a number of tests according its own results, as listed in the attached Appendix A. Multiple tests have failed and issues need to be resolved (e.g. correct locations of transponders, platform stopping, point alignment, performance travelling etc.).

6. Stations

In response to the Substantial Completion Notice, the City performed a walk-through of the Stations. A number of outstanding issues exist that materially impair the public and the City's use and enjoyment of the Stations including the following (by way of example only):

- Elevator licences had not been provided as of April 29, 2019. Therefore, zero (0) of fifty-nine (59) elevators installed in the Stations were available for the City or the public's use at that time. The City has not seen the TSSA inspection reports which would identify any deficiencies, defects, and items of outstanding work. The

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O-Train Construction
Transportation Services Department
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

Ville d'Ottawa
Construction de l'O-Train,
Direction générale des transports,
110, avenue Laurier ouest
Ottawa, ON
K1P1J1

functionality of the telephones in the elevators has not been fully tested and commissioned between the field and the Transit Operation Control Centre.

- Escalator licences had not been provided by RTG as of April 29, 2019. TSSA did provide directly to the City, twelve (12) of forty-three (43) escalator licences. Upon receipt, the City gave these original licences to OLRT-C. During a site visit on May 1, 2019, only four (4) escalators were observed to be working.

- Approval of fire safety plans by Ottawa Fire Services (OFS) for all thirteen (13) stations have not been provided.

- Fire telephones are incomplete, and require additional testing and reports and Ottawa Fire Service approval.

- Emergency telephones across all stations are not able to call in to the Transit Operation Control Centre. This functionality is a critical feature in delivering a safe, secure transit systems for the City's customers. To date RTG has not been able to demonstrate that these telephones function as required, including being able to connect from the field to the Transit Operation Control Centre.

- RTG has not demonstrated that it has complied with the testing or commissioning requirements as Schedule 15-2, Part 4 – Testing and Commissioning as evidenced by the fact that the Commissioning Manuals provided by RTG show that the Mechanical and Electrical testing is not complete.

While occupancy permits have been issued for the Stations, there are conditions associated with these permits which must be satisfied before the Stations will be ready for use by the public.

7. Winter Performance

In respect of winter performance, there are ongoing problems with the snow removal equipment/maintenance vehicles and switch heater equipment which require corrective action. RTG has failed to demonstrate compliance with the performance requirements for these items set out in Schedule 15-2 Part 4, Article 5.3(g) (ii), (iii) and (iv).

Schedule 15-2 Part 4, Article 1.3 (a) requires a fleet of support Non-Revenue Vehicles to support maintenance of the System. Schedule 15-2 Part 4, Article 4.2 (a) requires confirmation of the scope and extent of non-revenue vehicles revenue to support operations and maintenance and Schedule 14, Article 1.8 (a) (iii) requires commissioning of these same non-revenue vehicles. To date, the City has not received confirmation of successful integrated testing of the fleet of non-revenue vehicles nor has it received

confirmation or demonstration of an adequate level of equipment to support winter operations.

8. Tunnel Ventilation System Issues

The Ottawa Fire Service has stated that they will not approve compliance with the NFPA 130 requirements of the Project (which is a Project Agreement requirement) for the following reasons:

- Ottawa Fire Services requires that all System Acceptance Test (SAT) and System Integration Test (SIT) reports be signed by a reviewing professional and signed and sealed by an approving professional engineer. Currently, these reports do not contain the adequate signatures. Good Industry Practice requires that these seals and signatures be obtained.

- The Conformance Letters are to be signed and sealed by a professional engineer based on the evidence of the revised SAT/SIT.

9. Conclusion

For the reasons described in this letter and given the outstanding items listed in Appendix A, it is the City's opinion that the Substantial Completion Certificate should **not** be issued.

The Substantial Completion Notice of RTG should only have been issued "upon the satisfaction of all requirements for Substantial Completion." It is the City's opinion that RTG issued the Substantial Completion Notice prematurely knowing that the improvement was not ready for use and that significant defects, deficiencies, and items of outstanding work existed that would materially impair the public and/or the City's use and enjoyment of the System, the performance of the Maintenance Services by Project Co, and Safety on the System.

The City will continue to cooperate with RTG as it attempts to achieve Substantial Completion. However, the City cannot accept a System as Substantially Complete when that System is not ready for use and safe for the public.

City of Ottawa
O-Train Construction
Transportation Services Department
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

Ville d'Ottawa
Construction de l'O-Train,
Direction générale des transports,
110, avenue Laurier ouest
Ottawa, ON
K1P1J1

Yours Truly,

Michael Morgan

cc Gary Craig, Richard Holder, Claudio Colaiacovo, Lorne Gray, OTC
Rupert Holloway, Cesar Palencia, Mathew Slade, OLRT-C
Monica Sechiari, Altus Group

Enc. Appendix A

City of Ottawa
O-Train Construction
Transportation Services Department
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

Ville d'Ottawa
Construction de l'O-Train,
Direction générale des transports,
110, avenue Laurier ouest
Ottawa, ON
K1P1J1

Appendix A

Item				
1	Safety	ESAC	OLR-05-0-0000-REP-0054_2 Technical Compliance Report.pdf	15-2 Part 4 Article 9 – No evidence of EMC tests conducted by sub-suppliers apart from Thales and Alstom.
2	Safety	ESAC	OLR-05-0-0000-REP-0014 Rev 0	Interface Hazard Analysis Report - document is not final
3	Safety	ESAC	OLR-05-0-0000-REP-0056 Rev 0	System RAM Analysis Report - document is not final
4	Safety	ESAC	OLR-05-0-0000-REP-0053 Rev 0	Safety Requirements Matrix - System - document is not final
5	Safety	ESAC	ESAC Reference	Station Safety Case has not been submitted
6	Safety	ESAC	OLR-05-0-0000-REG-0004	Project Integrated Hazard Log - document is not final
7	Safety	ESAC	ESAC reference	HAZOP Analysis and HRP Report - has not been submitted
8	Safety	ESAC	REJ-05-0-0000- REP-0311 -	System Level Safety Case - document is not final
9	Safety	deficiency list	Testing Integration Review Outstanding	The ESAC is expected to include a review of the completeness of all the test results.
10	Safety	deficiency list	OLR-05-0-0000-REP-0058_0 ORD pdf - Operating Restrictions	This document notes that as a signaling/TVS requirement, only 1 LRV is allowed in th MSF Connector Tunnel at one time
11	Safety	Compliance Matrix	Schedule 15-2 Part 1	After completion of Certification of Compliance with safety and security related Design criteria, Project Co shall prepare and submit Design Criteria Conformance Certificates of completed designs for acceptance by the City. The full total of 23 Security Certificates listed not provided at SC
12	Safety	Compliance Matrix	Schedule 15-2 Part 1	Project Co shall verify that all identified Fire/Life Safety and Security issues are resolved. Not all Safety and Security issues are resolved - 8 items remain outstanding.
13	Safety	Compliance Matrix	Schedule 15-2 Part 2	The Guideway shall be fenced or otherwise enclosed for security. See details in portion of NCR 837 addressing Guideway fencing deficiencies that are not resolved
14	Safety	Compliance Matrix	Schedule 15-2 Part 5	Each DWA shall have fixed CCTV security coverage. PTZ cameras shall not be used for DWA. NCRs 868 and 874 identified gaps in camera coverage of DWA.
15	Safety	Compliance Matrix	Schedule 15-2 Part 5	Signage shall be placed in visible locations, free from obstructions. Special care shall be taken to ensure that signs are not obstructed by other signs, Design elements or items such as security cameras. NCRs 868 and 874 identified areas of obstruction.
16	LRV	Deficiency List	All vehicles	RTG is currently working on fleet wide campaigns, defects and deficiencies. For instance, IOS reports are frequently recorded for brakes, doors and communications issues. Additionally, the line contactor is being replaced in every vehicle. The cumulative effect is that RTG has not demonstrated that it has a fleet of vehicles ready for service that have satisfied the requirements of the VMOS.
17	LRV	Deficiency List	Vehicle-OCS clearance envelope at the west end of the Tunney's test	This test has to be undertaken as there has been an incident of Vehicle/OCS contact at this location
18	LRV	Deficiency List	FDAS-CBTC SIT @ station, second vehicle finished dwell time	During FDAS-CBTC SIT, second vehicle on opposing track finished its programmed dwell time as a vehicle on fire approached it's platform.
19	LRV	Deficiency List	High Speed Data Radio (HSDR) Type Test Report	HSDR Type Test Procedure has received but the Test Report has not received yet
20	LRV	Deficiency List	APU Failure investigation	Root cause analysis report not provided for APU failures
21	TOCC / SCADA	Compliance Matrix	Schedule 15-2 Part 4, 2.3 (e) # 94398 in compliance matrix	Test Result for TPSS failure to validate normal and contingency operations with no degradation of performance is missing.
22	TOCC / SCADA	Compliance Matrix	OLR-90-0-0000-CMP-0001-AH # 108442 in compliance matrix	PA-Schedule 8 - Energy Matters Target Letter not provided to City
23	TOCC / SCADA	DCL	REJ-OLR-54-0-DCL-0233_0	The design conformation letter for OCS Mainline Design does not include the sub-contractors design shop drawings for Tunneys Pasture termination. Nor does it confirm structural integrity of the OCS system with respect to vertical and horizontal loading from for such items as wind, stagger and sag
24	TOCC / SCADA	DCI	Schedule 15-2 Part 4, article 2	DCLs and CCLs missing for each TPSS
25	TOCC / SCADA	DCL	Schedule 15-2 Part 4, article 9	CCL for EMI/EMC missing for system
26	TOCC / SCADA	CCL	REJ-OLR-53-1-CCL-0221_1 REJ-OLR-53-1-CCL-0222_1 REJ-OLR-53-3-CCL-0223_1 REJ-OLR-53-3-CCL-0224_1 REJ-OLR-53-4-CCL-0225_1 REJ-OLR-53-4-CCL-0226_1 REJ-OLR-53-5-CCL-0227_1 REJ-OLR-53-5-CCL-0228_1	The Construction Conformance letters for Communication Systems TPSS 1 to 9 are deficient due to restrictions and conditions for example - "EJV review of OLRTC SCADA deviations - It is noted that the wiring and terminations of the SCADA Marshalling Panels do not follow EJV design however conform to the design intent. It is further noted that no evidence has been made available from the vendor supporting Safety Integrity Level (SIL) 2 compliance as defined in IEC 61508 for the delivered solution. This letter is supported by and contingent on the successful completion of the Verification and Validation program carried out by OLRTC."
27	TOCC / SCADA		RES-16-1-TP03-SIT-1R1029	HOL Neutral Bond Testing (Baseline), TPSS3 has not been provided
28	TOCC / SCADA	CCL	REJ-OLR-53-1-CCL-0229 R1 to REJ-OLR-53-4-CCL-0242 R1 (14 letters)	Non-compliant design: No Safety Integrity level (SIL) 2 compliance verification in accordance with IEC 61508.
29	TOCC / SCADA	SIT/SAT	RES-16-8-0000-SAT-1R1030	OCS Electrical Connection Verification - Zone 1 Test Report is marked "Failed"
30	TOCC / SCADA	SIT/SAT	RES-16-8-0000-SAT-2R1031	OCS Electrical Connection Verification - Zone 2 Test Report is marked "Failed"
31	TOCC / SCADA	SIT/SAT	RES-16-8-0000-SAT-3R1032	OCS Electrical Connection Verification - Zone 3 Test Report is not marked "pass" & not approved by ERO also
32	TOCC / SCADA	SIT/SAT	RES-16-8-0000-SAT-4R1033	OCS Electrical Connection Verification - Zone 4 Test Report is not marked "pass" & not approved by ERO.
33	TOCC / SCADA	SIT/SAT	RES-16-8-0000-SAT-5R1029	OCS Electrical Connection Verification - Zone 5 (MSF) Test Report is not marked "pass" & not approved by ERO
34	TOCC / SCADA	SIT/SAT	RES-16-8-0000-SAT-1R1003	OCS Wayside Disconnect Switch, Zone 1 Test Report is not marked "pass" & not approved by ERO
35	TOCC / SCADA	SIT/SAT	RES-16-8-0000-SAT-2R1004	OCS Wayside Disconnect Switch, Zone 2 Test Report is not marked "pass" & not approved by ERO
36	TOCC / SCADA	SIT/SAT	RES-16-8-0000-SAT-5R1002	OCS Wayside Disconnect Switch, Zone 5 Test Report is not marked "pass" & not approved by ERO
37	TOCC / SCADA	SIT/SAT	RES-16-8-0000-SAT-5R1001	SAT Rail Sectioning Procedure Test Report MSF is approved by ERO but there are failures reported.

Appendix A

38	TOCC / SCADA	SIT/SAT	OLR-16-8-0000-SAT-4R4036	Vehicle Envelope Clearance Zone 4 Test Report is marked "pass" & approved by ERO but there are failures reported.
39	TOCC / SCADA	SIT/SAT	OLR-16-8-0000-SAT-5R4035	Vehicle Envelope Clearance Zone 5 Test Report is marked "pass" & approved by ERO but there are failures reported.
40	TOCC / SCADA	SIT/SAT	OLR-16-8-0000-SAT-3R4037	Vehicle Envelope Clearance Zone 3 Test Report is marked "Failed".
41	TOCC / SCADA	SIT/SAT	OLR-16-8-0000-SAT-1R4039	Vehicle Envelope Clearance Zone 1 Test Report is not marked "pass" & not approved by ERO.
42	TOCC / SCADA	SIT/SAT	OLR-16-8-0000-SAT-2R4038	Vehicle Envelope Clearance Zone 2 Test Report is not marked "pass" & not approved by ERO.
43	TOCC / SCADA	SIT/SAT	OLR-16-4-0000-SAT-5R1011	SAT Test Report Track Switch Heater System (GAS) Test Report is marked "pass" but without ERO approval.
44	TOCC / SCADA	SIT/SAT	Signage SIT	Zone 1 to 5 Operational Signage SITS have all failed
45	TOCC / SCADA	SIT/SAT	Commissioning Manual System Integration Tests	53 SITs where the report is missing from Commissionning Manuals. 131 SITs where there are no signature from ERO of which 23 are marked fail, incomplete, re-test, missing assessment or cover sheet (75 Communications systems, 22 Power Supply and Distribution, 21 TVS, 5 guideway and 8 system wide)
46	TOCC / SCADA	Deficiency List	GIDS incorrect sensor trigger causing EB on mainline. - major	GIDS are unreliable in the field with multiple nuisance triggers
47	TOCC / SCADA	Deficiency List	Complete PBX integration to enable emergency telephones to ring through to TOCC	Emergency telephones shall enable the user to communicate with the Transit Law personnel located in the TSCC by the push of a button when and if there is an emergency situation. Via PBX and PSTN. This is currently not possible
48	TOCC / SCADA	Deficiency List	LRV CCTV live viewing of cameras at Transit Law	This function is not enabled
49	TOCC / SCADA	Deficiency List	Key Management Plan	There is a requirement for a key management system to secure and manage keys
50	TOCC / SCADA	Deficiency List	TOCC/BCC System SIT: PA/PIDS Console	PA/PIDS console has been delivered to TOCC but not installed. Following installation, this console needs to be tested.
51	TOCC / SCADA	Deficiency List	Intrusion access control	integration with CCTV not complete
52	TOCC / SCADA	Compliance Matrix	15-2 Part 4, 2.4 (g)(i) D	NCR 727 is still outstanding for the generator connection point on the TPSS enclosures.
53	TOCC / SCADA	Compliance Matrix	Schedule 15-2 Part 4, 2.5 (e) (i) A. Compliance matrix #94489	The battery shall be capable of supplying TPSS demand to support control power for 8 hours and to support the failure mode analysis. NCR 862 is still outstanding.
54	CBTC	Compliance Matrix	15-2 Part 1, 2.3 Operational Headways a)	The System shall be designed to reliably support a sustained operational Headway of 2 minutes or less under typical operating conditions. This has not been demonstrated in the field by test.
55	CBTC	Compliance Matrix	15-2 Part 1, 2.3 Operational Headways b)	The System shall be designed to reliably support a sustained operational Headway of 15 minutes during a single Track outage. This has not been demonstrated in the field by test. Test must demonstrate both 15 minute headway, AND, the terminal to terminal trip times shall not be significantly increased. Not been demonstrated by simulation as performance analysis did not analyze failure modes.
56	CBTC	Compliance Matrix	15-2 Part 1, 2.3 Operational Headways b)	The System shall be designed to reliably support a sustained operational Headway of 15 minutes during a single Track outage; When track outage is due to a track switch that is reporting as out of position or "Disturbed", the Transit system is not able to continue operation under train control supervision to end destination platform.
57	CBTC	Compliance Matrix	15-2 Part 1, 2.6 a) (ii) Operating Scenario 2 (Year 2031): minimum of 18,040 PPHPD	The system test for this operation needs to be performed and passed. The compliance evidence offered is an inadequate simulation document. Test needs to demonstrate sufficient headway and travel time with available vehicles.
58	CBTC	Compliance Matrix	15-2 Part 1, 2.6 a) (ii) Operating Scenario 3 f) C)	"C. A minimum operational headway of the greater of 105 seconds or the minimum sustainable headway of the core system." This has not been demonstrated in the field by test.
59	CBTC	Compliance Matrix	15-2 Part 1, 2.7 Maximum Trip Times (ii) ATO mode	"The maximum terminal to terminal travel time during the peak period shall be as follows: (a) ATO mode: 23 minutes including Dwell Time. " Peak period is to operate with passenger loaded trains. (AW2/3) - Only tested with empty trains
60	CBTC	SIT/SAT	15-2 Part 4, 5.13 Testing (vii). (viii)	Operational testing of integrated system is not complete. Failed or incomplete for headway throughout, service capacity tests.
61	CBTC	SIT/SAT	15-2 Part 4, 5.13 Testing (vii). (viii)	253 CBTC Tests not passed successfully - many reports not included in commissioning manual.
62	CBTC	Other	15-2 Part 1, 10.3 RAMS, a) iii)	Reliability analysis required of switch system including switch control rack, relays, EPC, power distribution, cabling, machine, sensors, etc. No RAMS study provided, and impact of failures remains omitted from the system wide availability of the transit system.
63	CBTC	Other	15-2 Part 1, 10.3 RAMS, a) iii)	Zone controller systems have halted in the field during pre-trial testing with no known defined cause. Resolution of root cause and demonstration of sustainable reliable operation is needed.
64	CBTC	Other	15-2 Part 1, 10.3 RAMS, a) iii)	Track switches report "Disturbed" with a high frequency of occurrence. Several times in a week. Resolution and demonstration of reliable operation needed.
65	CBTC	Deficiency List	Thales TimeTable Compiler entry and exit trips.	Timetable Compiler - Entry routes direct LRV to stop at all out of service station during 'deadhead' run to first service platform. Exit routes direct LRV to stop at out of service platforms.
66	CBTC	Deficiency List	Wayside Signal lamps reporting invalid status, and holding VOBC Controlled trains.	Practise Running - several reports of wayside signals showing "invalid", this causes LRV to EB, then require a reset of the route to recover. Need to determine cause.
67	CBTC	Deficiency List	Delayed Departure from platform.	LRV departs platform late - delayed past depart schedule time (Dwell expiry) Automatic Door operation - Train door closure completed 2 seconds after depart time - delay departure by 3s, until system enables the depart button. Delay after Depart and DRS press. After the ERO presses the depart button "DRS" LRV delays for a further 3 seconds. 5-6 second delay in Auto doors. 3s with doors closed manualy early. Requirement is zero (depart at dwell expiry)

Appendix A

68	CBTC	Deficiency List	ATS - Manual Reservation Areas	Manual reservation areas cannot be established across zone controller borders
69	CBTC	Deficiency List	ATS - Anti-bunching	Anti-bunching non-functional at STL, CYR, TRE
70	CBTC	Deficiency List	ATS - Line Assignment 7	Trains on line assignment 7 will not use BLA-W when BLA-E is occupied causing a back log of trains
71	CBTC	Deficiency List	ATS - Alarm screen icons	Alarm screen icons have not been activated
72	TVS	ICL	REJ-OLR-52-0-ICL-0002	Integration Conformance Letter TVS (Mechanical & Electrical) - Multiple test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature. Several reports are incomplete, not submitted and are not passed incomplete.
73	TVS	ICL	OLR-53-0-0000-ICL-0003	Integrated Conformance Letter SCADA to TVS - All Systems Integration Reports report lacks a Reviewed by signature and an Approved by the Engineer of Record signature. Several CCL require updates as well
74	TVS	SIT/SAT	RES-16-5-SLSU-SAT-3R3021	TVS Mechanical SAT - St Laurent Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
75	TVS	SIT/SAT	RES-16-2-DWSU-SAT-2R3022	TVS Mechanical SAT - Lyon Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
76	TVS	SIT/SAT	RES-16-2-DWSU-SAT-2R3026	TVS Electrical SAT - Lyon Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
77	TVS	SIT/SAT	RES-16-2-DESU-SAT-2R3023	TVS Mechanical SAT - Parliament Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
78	TVS	SIT/SAT	RES-16-2-DESU-SAT-2R3027	TVS Electrical SAT - Parliament Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
79	TVS	SIT/SAT	RES-16-2-RISU-SAT-2R3024	TVS Mechanical SAT - Rideau Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
80	TVS	SIT/SAT	RES-16-2-RISU-SAT-2R3028	TVS Electrical SAT - Rideau Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature - The test report is incomplete
81	TVS	SIT/SAT	RES-16-2-WPTU-SAT-2R3041	TICP 1 SAT - West Portal - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature - There is no confirmation of test report status. Additional validation appears to have taken place after test date see page 9/14
82	TVS	SIT/SAT	RES-16-2-DWSU-SAT-2R3018	TICP 2 SAT - Lyon Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature - There is no confirmation of test report status - Deficiency listed - TICP was tested on temporary stand and door problems existed
83	TVS	SIT/SAT	RES-16-2-DESU-SAT-2R3019	TICP 3 SAT - Parliament Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
84	TVS	SIT/SAT	RES-16-2-RISU-SAT-2R3020	TICP 4 SAT - Rideau Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
85	TVS	SIT/SAT	RES-16-2-EPTU-SAT-2R3040	TICP 5 SAT - East Portal - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
86	TVS	SIT/SAT	RES-16-5-SLSU-SIT-3R30233	TVS PLC Local SIT - St Laurent Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
87	TVS	SIT/SAT	RES-16-2-DWSU-SIT-2R30230	TVS PLC Local SIT - Lyon - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
88	TVS	SIT/SAT	RES-16-2-DESU-SIT-2R30231	TVS PLC Local SIT - Parliament - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
89	TVS	SIT/SAT	RES-16-2-RISU-SIT-2R30232	TVS PLC Local SIT - Rideau - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
90	TVS	SIT/SAT	RES-16-5-SLSU-SIT-3R30226	TVS / SCADA Remote SIT - St Laurent Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
91	TVS	SIT/SAT	RES-16-2-DWSU-SIT-2R30227	TVS / SCADA Remote SIT - Lyon Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
92	TVS	SIT/SAT	RES-16-2-DESU-SIT-2R30229	TVS / SCADA Remote SIT - Parliament Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
93	TVS	SIT/SAT	RES-16-2-RISU-SIT-2R30228	TVS / SCADA Remote SIT - Rideau Station - The test report lacks a Reviewed by signature and an Approved by the Engineer of Record signature
94	TVS	SIT/SAT	RES-16-5-SLSU-SIT-3R3078	*TVS Mechanical SIT & Smoke Test - St Laurent Station Test Report Status Incomplete - Test Case 8 Piston Effect / Air Velocity Check Test,,Test Case 9 Pressure Wave, and Test Case 10 Pressure Transient are incomplete Test Case 4 – Acoustic Testing required revisions and alterations to the station emergency mode criteria.
95	TVS	SIT/SAT	RES-16-2-DWSU-SIT-2R3073	*TVS Mechanical SIT & Smoke Test - Lyon Station - Test report status - Incomplete - For Test Case 4 – ACOUSTIC TESTING; Measured sound levels at the West Portal Jet-Fans slightly exceed the NC 70 criteria under the PA.
96	TVS	SIT/SAT	RES-16-2-DESU-SIT-2R3074	*TVS Mechanical SIT & Smoke Test - Parliament Station - Test report status - Incomplete - For Test Case 3 – ACOUSTIC TESTING; The measured sound levels for SVZ case 2-2 while using the PA criteria do not pass using the propose NC70 criteria. A request for a Variation is pending.
97	TVS	SIT/SAT	RES-16-2-RISU-SIT-2R3075	*TVS Mechanical SIT & Smoke Test - Rideau Station -Test report status - Incomplete - For Test Case 4 – ACOUSTIC TESTING; Measured sound levels at the East Portal Jet-Fans slightly exceed the NC 70 criteria under the PA. A Request for a Variation is pending.
98	TVS	SIT/SAT	RES-16-4-0000-SIT-3R3225	*TVS Mechanical SIT & Smoke Test - MSF Access Track - Not Submitted
99	TVS	SIT/SAT	RES-16-8-0000-SIT-2R3079	TVS SIT - Segment 2 Tunnel - Incomplete - For Test Case 8 – ACOUSTIC TESTING; Measured sound levels at the Jet-Fans slightly exceed the NC 70criteria under the PA. A request for a Variation is pending. For Test Case 9, On-board pressure transient testing shall be completed during trial running session.
100	TVS	SIT/SAT	RES-16-0-0000-SIT-0R3224	*TVS SIT - End-to-End Tunnel - Not Submitted. This test validatess smoke detectors / TVS / TICP / CBTC integration for a coupled train.
101	TVS	Other	REJ-52-5-0000-REP-0218	Tunnel Ventilation Analysis - St. Laurent Station - Pre-Final CFD Report - Reports need to be finalized and sealed
102	TVS	CCL	REJ-OLR-42-5-CCL-0137 (fire protection)	St. Laurent Station - IFC Mechanical Design (HVAC and fire protection) - Letter notes waiting for spring stand pipe test, test was completed; letter should be revised

Appendix A

103	TVS	CCL	REJ-OLR-56-2-CCL-0164	PS&D - Segment 2 Tunnel Embedded Requirements - Letter notes deficiency: letter should be revised
104	TVS	CCL	REJ-OLR-52-2-CCL-0169	TVS - Mechanical - MSF Connector Track - IFC - Letter notes awaiting MSF Hot smoke test results , letter should be revised based on approved SIT
105	TVS	CCL	REJ-OLR-52-2-CCL-0168	TVS - Mechanical - St. Laurent Station - IFC Updates may be required by BCS final reports
106	TVS	CCL	REJ-OLR-56_0_CCL-0251	TVS Electrical Design (Lyon Parliament and Rideau) - Updates required by BCS final reports
107	TVS	CCL	REJ-OLR-56-5-CCL-0175	TVS Electrical St Laurent - IFC - Updates may be required by BCS final reports
108	TVS	Other	OLR-16-0-0000-MAN-0003_0	TVS Commissioning Manual - Commissioning Manual requires updating/resubmission with all required signatures i.e. FATs SITs SATs, Parliament Damper tests etc., missing submissions MSF+ End to End test and confirmed pass status on all tests
109	TVS	CCL	REJ-OLR-42-5-CCL-0138 (HV	St. Laurent Station - HVAC systems - Updates required by BCS final reports
110	TVS	CCL	REJ-OLR-42-2-CCL-0191 (HVAC)	Lyon Station - IFC Mechanical (HVAC) - Updates required by BCS final reports
111	TVS	CCL	REJ-OLR-42-2-CCL-0194 (HVAC)	Parliament Station - IFC Mechanical design (HVAC) - Updates required by BCS final reports
112	TVS	CCL	REJ-OLR-42-2-CCL-0197 (HVAC)	Rideau Station - IFC Mechanical design (HVAC) Updates required by BCS final reports
113	TVS	Other	REF-51-0-0000-REP-0178_2	ST UGS.412 Evacuation of Persons with Disabilities from Stations - FCD - report needs to be sealed
114	TVS	DCL	REJ-OLR-52-2-DCL-0259	TVS Mechanical Segment 2 - Clarification - Report is Stamped Jan 10/19 however PLC mode tables changes occurred later.
115	System	Compliance Matrix	OLR-90-0-0000-CMP-0002_33(0	Demonstration of product compliance is either not documented, not performed, pending or not completed for 340 items of the PA
116	Maintenance	SIT/SAT	Schedule 15-2 Part 4 Article 4 _ 4.1 General (g)	"Project Co shall ensure that civil infrastructure, both new and existing, shall accommodate the worst case loading scenario for all Non-Revenue Vehicles" [RES-16-8-0000-SIT-OR7175 indicates that the OCS maintenance vehicle and the ballast regulator exceed the vehicle dynamic envelope and therefore have interference issues with guideway and station infrastructure.
117	Maintenance	Compliance Matrix	Schedule 15-2 Part 4 Article 4 _ 4.2 Non-Revenue Vehicle Types and Maintenance Tasks (a)	"Project Co shall submit a list of non-revenue vehicles required for OLRT and their respective task descriptions to support revenue operations and maintenance of LRT infrastructure." The List is not complete
118	Maintenance	SIT/SAT	Schedule 14	SIT for portable generator is missing (Generator needs to be hooked up to each underground station and procedures customized where necessary)
119	TOCC / SCADA	Compliance Matrix	Schedule 15-2 Part 4, 2.3 (a) # 94398 in compliance matrix	Test Result for TPSS failure to validate normal and contingency operations with no degradation of performance is missing.
120	TOCC / SCADA	DCL	REJ-OLR-54-0-DCL-0233_0	The design confirmation letter for OCS Mainline Design does not include the sub-contractors design shop drawings for Tunneys Pasture termination. Nor does it confirm structural integrity of the OCS system with respect to vertical and horizontal loading from for such items as wind, stagger and sag
121	TOCC / SCADA	DCI	Schedule 15-2 Part 4, article 2	DCLs and CCLs missing for each TPSS
122	TOCC / SCADA	DCL	Schedule 15-2 Part 4, article 9	CCL for EMI/EMC missing for system
123	TOCC / SCADA	CCL	REJ-OLR-53-1-CCL-0221_1 REJ-OLR-53-1-CCL-0222_1 REJ-OLR-53-3-CCL-0223_1 REJ-OLR-53-3-CCL-0224_1 REJ-OLR-53-4-CCL-0225_1 REJ-OLR-53-4-CCL-0226_1 REJ-OLR-53-5-CCL-0227_1 REJ-OLR-53-5-CCL-0228_1	The Construction Conformance letters for Communication Systems TPSS 1 to 9 are deficient due to restrictions and conditions for example:- "EJV review of OLRTC SCADA deviations - It is noted that the wiring and terminations of the SCADA Marshalling Panels do not follow EJV design however conform to the design intent; It is further noted that no evidence has been made available from the vendor supporting Safety Integrity Level (SIL) 2 compliance as defined in IEC 61508 for the delivered solution. This letter is supported by and contingent on the successful completion of the Verification and Validation program carried out by OLRTC."
124	TOCC / SCADA	SIT/SAT	RES-16-1-TP03-SIT-1R1029	HOL Neutral Bond Testing (Baseline). TPSS3 has not been provided
125	TOCC / SCADA	CCL	REJ-OLR-53-1-CCL-0229 R1 to REJ-OLR-53-4-CCL-0242 R1 (14 letters)	Non-compliant design: No Safety Integrity level (SIL) 2 compliance verification in accordance with IEC 61508.
126	Stations	Compliance Matrix	Schedule 15-2 Part 5 article 1.16 (a) --> Design Principles - Accessibility Schedule 15-2 Part 5 article 2.4 (a) (i) --> Vertical Circulation - Elevators	Zero (0) of fifty-nine (59) elevators installed in the stations are available for our use. Elevator licences have not been provided, which the City understands is due to incomplete work, outstanding defects, and incomplete inspections.
127	Stations	Compliance Matrix	Schedule 15-2 Part 5 article 1.16 (a) --> Design Principles - Accessibility Schedule 15-2 Part 5 article 2.4 (a) (ii) --> Vertical Circulation - Escalators	Based on information received to date, twelve (12) of forty-three (43) escalators have been licensed. Further escalators may have been licensed, however, during a site visit on May 1, 2019, only four (4) escalators were observed to be working.
128	Stations	Compliance Matrix	Schedule 15-2 Part 5 article 1.2 (d) (i) --> Overview - Emergency Planning	Approval of fire safety plans by Ottawa Fire Services (OFS) for all thirteen (13) stations have not been provided
129	Stations	Compliance Matrix	Schedule 15-2 Part 4 article 6.3 (g) (i) --> Performance Requirements - Telephone and Intercom System	Emergency telephones (ETEL) across all stations are not working. This functionality is a critical feature in delivering a safe, secure transit system for our customers. To date we have been unable to use or test any of these phones from the field to the TOCC.
130	Stations	Compliance Matrix	Schedule 14 Article 1.9 (a) --- Commissioning - Guideway and Building Systems	Following our preliminary review of the documentation submitted at Substantial Completion, we note that a series of Commissioning Manuals provided show stations Mechanical and Electrical testing as not complete

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APPENDIX C – Site Visit Photos May 1, 2019

Altus Group

SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 1 **Date:** May 1st, 2019 Blair Station- Overview of Blair Station platform level.	
Photo No. 2 **Date:** May 1st, 2019 Blair Station- Upper concourse level and fare gates.	

Altus Group

SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 3 **Date:** May 1st, 2019 Cyrville Station- Concourse level and fare gates.	
Photo No. 4 **Date:** May 1st, 2019 Cyrville Station- Platform level and waiting area.	

Altus Group

SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 5 **Date:** May 1st, 2019 St. Laurent Station- Platform level	
Photo No. 6 **Date:** May 1st, 2019 St. Laurent Station- Overview of platform level from concourse level.	

Altus Group

SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 7

Date:
May 1st, 2019

Tremblay Station-

Overview of platform level from concourse level.

Photo No. 8

Date:
May 1st, 2019

Tremblay Station-

Concourse level.

Altus Group

SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 9

Date:
May 1st, 2019

Hurdman Station-

Platform level of Hurdman Station.

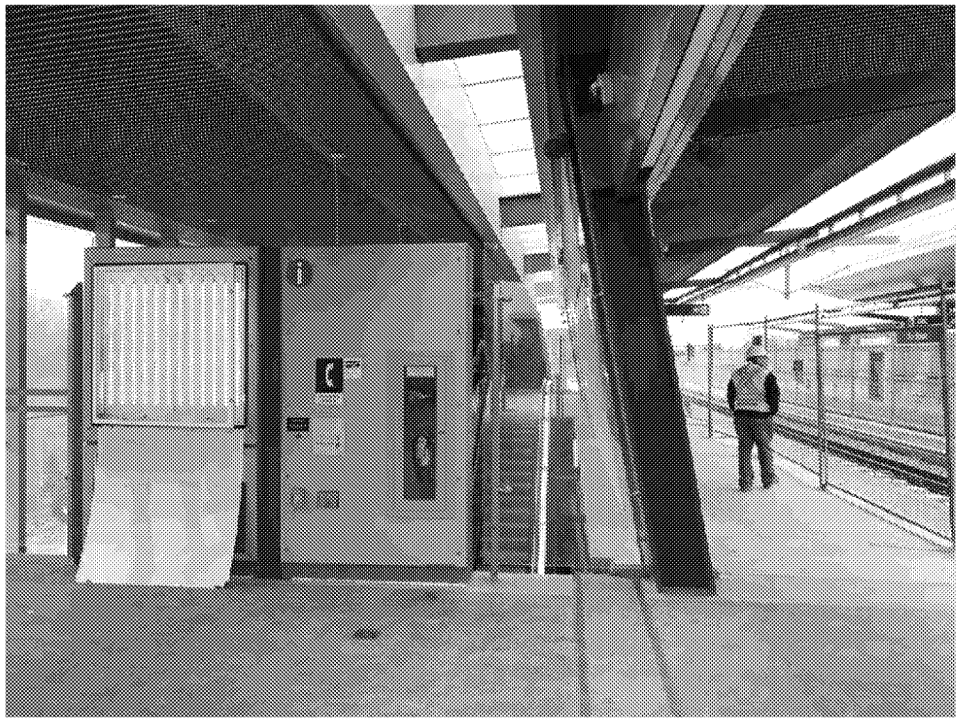

Photo No. 10

Date:
May 1st, 2019

Hurdman Station-

Concourse level of Hurdman Station.

Altus Group

SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 11

Date:
May 1st, 2019

Lees Station-

Concourse level of Lees Station.

Photo No. 12

Date:
May 1st, 2019

Lees Station-

Overview of Lees Station platform level.

AltusGroup

SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 13

Date:
May 1st, 2019

uOttawa Station-

Platform level of uOttawa Station.

Photo No. 14

Date:
May 1st, 2019

uOttawa Station-

The exterior multi-use path installed in the plaza to the North of uOttawa Station.

Altus Group

SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 15

Date:
May 1st, 2019

Rideau Station-

Overview of the platform level of Rideau Station.

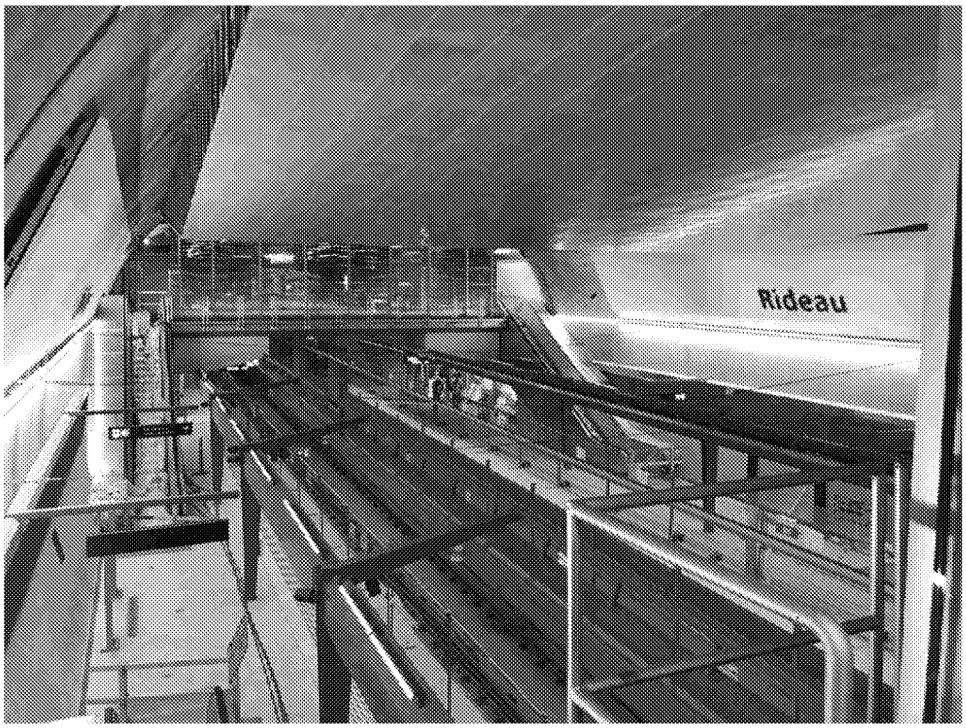

Photo No. 16

Date:
May 1st, 2019

Rideau Station-

Concourse level of Rideau Station

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SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 17

Date:
May 1st, 2019

Parliament Station-

Platform level of Parliament Station.

Photo No. 18

Date:
May 1st, 2019

Parliament Station-

Concourse level of Parliament Station.

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SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 19

Date:
May 1st, 2019

Lyon Station-

Concourse level of Lyon Station.

Photo No. 20

Date:
May 1st, 2019

Lyon Station-

Platform level of Lyon Station.

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SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 21

Date:
May 1st, 2019

Pimisi Station-

Platform level of Pimisi Station.

Photo No. 22

Date:
May 1st, 2019

Pimisi Station-

Entryway to concourse level of Pimisi Station.

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SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 23

Date:
May 1st, 2019

Bayview Station-

Platform level of Bayview Station.

Photo No. 24

Date:
May 1st, 2019

Bayview Station-

Concourse level of Bayview Station.

Altus Group

SITE PHOTOGRAPHS

Project Name:	**Site Location:**	**Project No:**
Ottawa Light Rail System	Ottawa	100224

Photo No. 25 **Date:** May 1st, 2019 Tunney's Pasture Station- Platform level of Tunney's Pasture Station.	
Photo No. 26 **Date:** May 1st, 2019 Tunney's Pasture Station- Concourse level of Tunnay's Pasture Station.