



From; Derek Wynne
SEMP Ltd
1 Kensington Gardens,
Lostock Hall,
Preston, PR5-5TW.

FAO; John Heffernan
Cc; Kari McGuire
Roger Schmidt
Eugene Creamer
Sean Derry

DW/LET/OLRT-C/014
31st January 2018

Dear John,

Re; OLRT-C Systems Engineering & Assurance Deliverables

SEMP Ltd have recently conducted a Systems Engineering Health Check of OLRT-C and subsequently facilitated the OLRT-C Engagement Workshop with Ottawa City and their Safety Assessor. Further to these activities OLRT-C are now in receipt of the Safety Audit Report produced by the Safety Auditor.

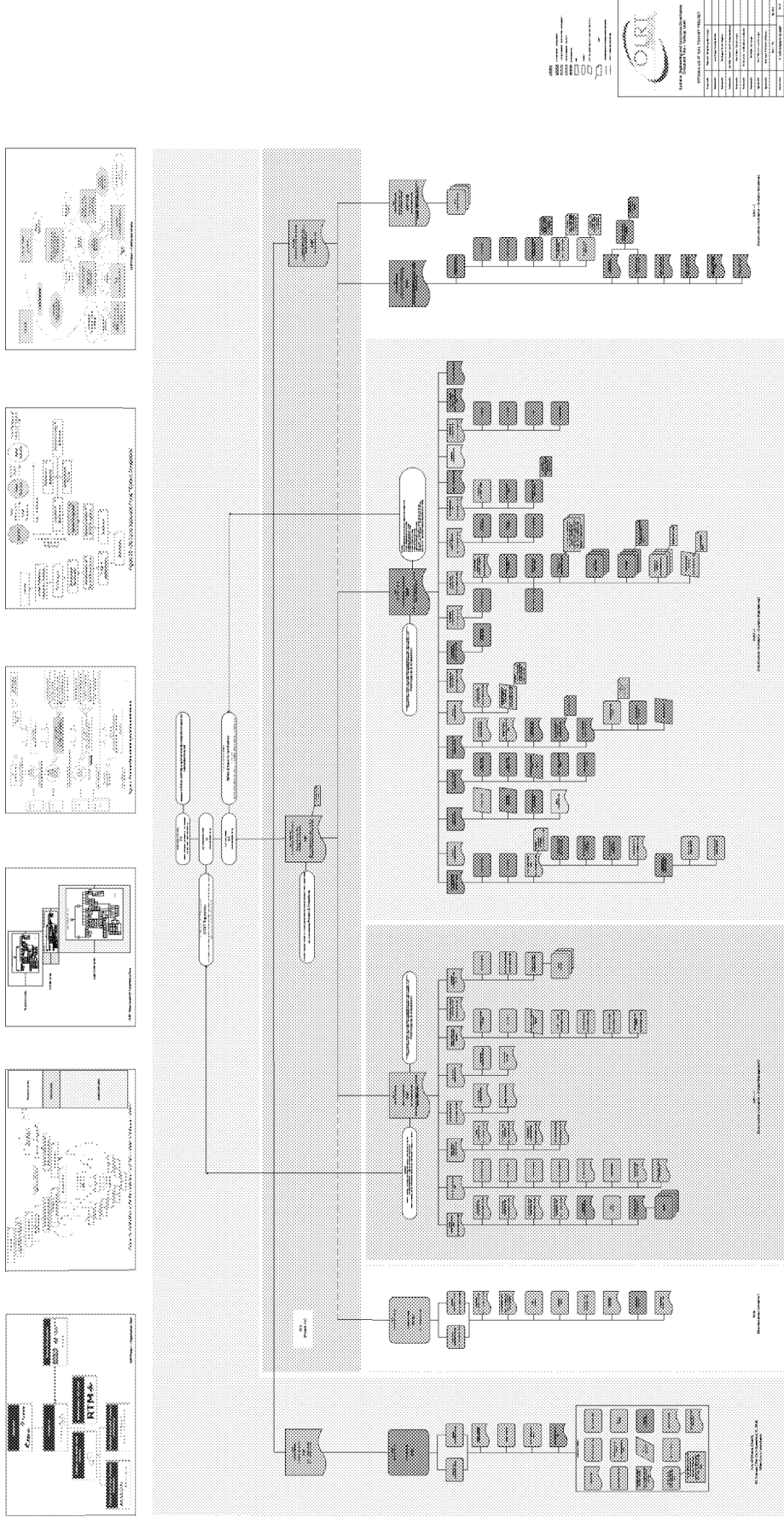
The Safety Audit Report presents various findings that are consistent with the Systems Engineering Health Check Report(s) already provided by SEMP; these are summarised below and are consistent with the discussions minuted during the OLRT-C Engagement Workshop.

- No evidence to demonstrate a rigorous and systematic approach to Safety
- Inadequate capturing and subsequent analysis / fulfilment of Safety Requirements specified in the Project Agreement
- No adherence to process requirements specified in the Project Agreement (such ISO 15288 / 50126)
- No RAM Analysis undertaken and therefore inadequate ability to verify the availability and functionality of Safety functions

The summarising discussion at the end of the OLRT-C Engagement Workshop considered the need for competent / experienced resources to prepare the various artefacts defined by the Governance Document Tree; subsequently OLRT-C and SEMP Ltd have engaged in a significant quantum of deliberation regarding how best to satisfy Ottawa City and their Safety Assessor concerns.

The diagram below is the OLRT-C Governance Document Tree. It is agreed by all parties that any deficient artefacts must be produced / re-produced in order (it may also be necessary to address deficiencies at both the Primary System and Sub-system levels although the specific details are yet to be determined and are therefore excluded from this quotation).

SYSTEMS ENGINEERING & ASSURANCE GOVERNANCE DOCUMENT TREE - *RAILWAY LEVEL



Existing / Not Required;

Within the OLRT-C Governance Document Tree the green and grey shaded artefacts are defined as;

GREEN

OLRT-C have determined these artefact exists and are of sufficient quality / correctness.

GREY

OLRT-C have determined these artefact have little relevance / value at this late juncture.

- | | |
|--|--|
| <ul style="list-style-type: none"> • Vehicle & MSF Operational Concept • Signalling Operational Concept • Training Simulator Management Plan • Other O & M Plans - Operators Safety Case • Other O & M Plans - Operator Safety Plan • Other O & M Plans - System Operations & Fault Recovery Plan • MTCEC Maintenance Concept RTM-18-0-0000-MPL-0001 • Vehicle & MSF Maintenance Concept RTM-18-0-0000-MPL-0005 • Signalling Maintenance Concept RTM-18-0-0000-MPL-0005 • FTEL/ HOL – FLS & Emergency Testing • Maintenance Safety Plan • Maintenance Readiness Plan • PMP Project Management Plan RTG-04-0-0000-MPL-0002 • Traffic Quality Management Plan OLR-04-0-0000-MPL-0032 • Design Quality Management Plan REJ-04-0-0000-MPL-0022 • Environmental Quality Management Plan OLR-04-0-0000-MPL-0010 • Preliminary Specification Plan • Procurement Strategy • Risk Identification • Resource Planning • Execution Approach • Pre-Construction Plan • Scope Definition • Construction Plan (Delivery Plan) • Building Commissioning & Validation Plan • Health, Safety & Environment Management Plan • Safety Management Plan OLR-15-0-0000-MPL-0001 • Environmental Management Plan OLR-70-0-0000-MPL-0001 • Design Execution Plan REJ-03-0-0000-MPL-0002 | <ul style="list-style-type: none"> • Design Project Management Plan • Energy Efficiency Plan • Construction Management Plan • Construction Management Procedures • Construction BIM Plan • Project Control Plan (Including Integrated Schedule) • Organizing & Schedule Strategies • Cost Control • Issues, Risks, Assumptions & Dependencies (IRAD) • Activities Schedule OLR-02-0-0000-SCE-0002 • Deliverables Schedule OLR-02-0-0000-SCE-0002 • Milestones Schedule OLR-02-0-0000-SCE-0002 • Procurement & Contract Administration Plan OLR-QMS-GP301-SP01 • Stakeholder Management Plan (RACI) • Owner's Occupancy • Close-Out Schedule Chart OLR-90-0-0000-DIA-0001 • Specific Procedures • Trial Running Test Plan OLR-16-0-0000-MPL-5001 • Site Instructions (Major Changes) • Field Directive Review (Minor Changes) • Software Management Plan • DOORS Management Plan • System Modelling Management Plan • Virtual System & Environment Integration Plan • Preliminary Design Reviews • Security Management Plan • Threat, Vulnerability & Security Analysis & Assessment Log OLR-05-0-0000-REP-0005 & ...RE G-0003 • Sustainability Management Plan REM-70-0-0000-MPL-0003 • Preliminary RAM Analysis Report • Document Management Plan • Threat, Vulnerability and Security Report - OLR-05-0-0000-REP-0005 |
|--|--|

It should be noted that all artefacts that fall into either of the Green / Grey categories provide an input into those artefacts that require producing or re-producing; as such there is a reliance and consequential dependency on their suitability.

Needs Producing / Re-producing;

Within the OLRT-C Governance Document Tree the pink and amber shaded artefacts are defined as;

PINK OLRT-C have determined these artefact do not exist and therefore need producing.

AMBER OLRT-C have determined these artefact exist but require to be re-produced.

It should be noted that all artefacts that fall into either of the above categories provide an input to other artefacts that require producing or re-producing; as such there is a reliance and consequential dependency on the suitability of artefacts being produced / re-produced in addition to the timeliness of their availability (in accordance with the integrated schedule).

OLRT-C / Others to produce

The following artefacts / activities **will not be** produced by SEMP Ltd hence delivery responsibility will remain with OLRT-C / Others; SEMP Ltd **will** mentor activities / review outputs as described later in this quotation.

- | | |
|---|--|
| <ul style="list-style-type: none"> • Define Primary Systems Level Governance Document Tree • Define Sub-systems Level Governance Document Tree • OPSC Operating Concept • Training Strategies • OLRT Training Needs Analysis • Operational Readiness Plan • Other O & M Plans - *Operator SOPs • Other O & M Plans - *Safety Management System • Other O & M Plans - Bylaws & Other Rules • Other O & M Plans - *Operator Work Instructions • Other O & M Plans - Security Management System OCT-X-000-00-PGM(0.5) draft • Other O & M Plans - Operator Training • Other O & M Plans - *Emergency Responders Procedures and Plans 2 doc: emergency mgnt plan and emergency response procedures • Other O & M Plans - Hazards Transferred to Operators • Other O & M Plans - Operators Safety Restriction • Other O & M Plans - *Rail Operating Rules Includes Operating rules, OLRT and Operator Rule Book • Signalling Maintenance Concept RTM-18-0-0000-MPL-0005 • Maintenance SOPPs RTM-18-0-00000 -MAN-0001 & List of other RTM procedures & M Manuals • Maintainer Training • Quality Management System Plan RTG-04-0-0000-QMS-0001 • Construction Quality Management Plan OLR-04-0-0000-MPL-0017 | <ul style="list-style-type: none"> • Program Integration Review (Railway Level) • Management & Acceptance of Field Change Condition • System Design Integration Management Plan • Technical Interface Management Plan • System Performance Requirements Management Plan • System Architecture Management Plan • Agreed Interface Definitions • Interface Register • Cyber Security Management Plan REJ-53-0-0000-REP-0300 • Human Factors Management Plan (including integration) • Human Factors Design Report • Sustainability Report • Fire Evacuation Strategy • Project Integrated Hazard Log OLR-05-0-0000-REG-0004 • EMC/EMI Control & Mgmt Plan OLR-74-0-0000-MPL-0002 • EMC/EMI Test Procedures • EMC/EMI Test Report • E & B Strategy/Report • Change Management Plan • Configuration Management Plan OLR-QMS-GP100-SP04 <ul style="list-style-type: none"> ○ As Required ○ As Designed ○ As Built ○ As Commissioned • Asset Management Plan • Performance Report • Preliminary Operational Readiness Report • Project Assurance Plan Above Ground Stations • Project Assurance Plan Under Ground Stations |
|---|--|

<ul style="list-style-type: none"> • QMS Procedures • Test & Commissioning Safety Plan OLR-15-0-0000-MPL-0004 • Construction Safety Plan OLR-04-0-0000-MPL-0019 • Integrated Close-out Schedule OLR-90-0-0000-SCE-0001 • System Integration Management Plan (including staging) • Migration Strategy • ICD Defined • Test & Commissioning Plan OLR- 16-0-0000-MPL-0001 • Test Readiness & Review (Sub-System Level) (Full System Level) • Functional Integration Review (System Level) 	<ul style="list-style-type: none"> • Project Assurance Plan Maintenance & Storage Facility • AAPP-WBS Authority Approval Process Plan (Work Breakdown Structure) OLR-05-0-0000-WBS-0001 • System Description or Definition • System Architecture • System Context Diagrams • Interface Hazard workshops • Primary System Design Definitions / Architectures • HAZOP Workshops (per key Systems Lifecycle Phase) • Primary Systems RAM Analysis • QRA Models and Reports
--	---

SEMP Ltd to Mentor / Review;

SEMP will contribute to the following activities / artefacts being produced by OLRT-C / Others by provision of Mentoring / Review (the type and quantum of support to be provided is detailed per activity / artefact);

<ul style="list-style-type: none"> • Define Primary Systems Level Governance Document Tree: Full Review :10 days • Define Sub-systems Level Governance Document Tree: Full Review :10 days • OPSC Operating Concept: Full Review :10 days • Training Strategies: Light Review :5 days • Other O & M Plans - Security Management System OCT-X-000-00-PGM(0.5) draft: Full Review :5 days • Other O & M Plans - *Emergency Responders Procedures and Plans 2 doc: emergency mgnt plan and emergency response procedures: Full Review :10 days • Other O & M Plans - Hazards Transferred to Operators: Full Review :10 days • Other O & M Plans - Operators Safety Restrictions: Full Review :5 days • Management & Acceptance of Field Change Condition: Full Review :5 days • System Design Integration Management Plan: Full Review :5 days • Technical Interface Management Plan: Full Review :5 days 	<ul style="list-style-type: none"> • System Performance Requirements Management Plan: Full Review :5 days • System Architecture Management Plan: Full Review :5 days • Agreed Interface Definitions: Full Review :20 days • Interface Register: Full Review :5 days • Cyber Security Management Plan REJ-53-0-0000-REP-0300: Full Review :5 days • Human Factors Management Plan (including integration): Advice / Mentoring :5 days • Human Factors Design Report: Advice / Mentoring :5 days • Project Integrated Hazard Log OLR-05-0-0000-REG-0004: Advice / Mentoring / Full Review :20 days • EMC/EMI Control & Mgmt Plan OLR-74-0-0000-MPL-0002: Advice / Mentoring :5 days • Configuration Management Plan OLR-QMS-GP100-SP04: Full Review :5 days <p><i>List as per MS Excel Spreadsheet supplied by email from Roger Schmidt 30th January 2018.</i></p>
---	--

Specific Consideration;

- SEMP Ltd will ensure sufficient SME resource capacity is available for provision of the Mentoring / Reviewing support in accordance with the Integrated Schedule.
- SEMP Ltd Review feedback will be provided by means of a formal Review Comments Sheet so that suitable Systems Assurance evidence can be observed by Ottawa City and their SA.
- Should any schedule / suitability concerns be noted by SEMP Ltd an early warning will be provided.

SEMP Ltd to Produce;

The following artefacts / activities **will be** produced / undertaken by SEMP Ltd;

<ul style="list-style-type: none"> • Maintenance Safety Case • Competency Management Plan • Risk Based Intrusion Audit Programme • Thales Intrusive Audit Report • Alstom Intrusive Audit Report • Project Agreement (Compliance Matrix) • Stakeholder Requirements - Railway • System Requirements & Specifications - Railway • Requirements Traceability Matrix - Railway • Requirements Acceptance Criteria - Railway • Verification & Validation Matrix - DOORS - Railway • Verification & Validation Report - Railway • Safety Requirements Matrix - Railway • System Integration Programme Plan OLR-50-0-0000-MPL-0003 • Interface Hazard Analysis Report • HAZOP Analysis Report • HRP Report • Railway Level Safety Case REJ-05-0-0000-REP-0311 • RAM Management Plan OLR-05-0-0000-MPL-007 	<ul style="list-style-type: none"> • System RAM Analysis Report Maintenance, Access and Spares Strategy • Maintainability/Failure Management demonstration Plan • Issues Assumptions Degradation & Concessions Management Plan • Engineering Safety & Assurance Case (ESAC) • RAM Report • OLRT Project Specific Safety Case • Railway Technical Case Report (Completeness Argument) • Railway Level Technical Case Goal Structured Notation (GSN) • Project Assurance Plan Primary Systems • L6- L9 Assurance Deliverables • Project Management / Integrated Schedule - Ongoing • Route Book Visualisation - Monthly refresh / weekly update • DOORS Licenses (10 licenses x 6 months) • EJV Intrusive Audit Report • Program Integration Review - Railway Level (Additional Engagement Workshop 1) • Additional Engagement Workshop 2
--	---

Specific Consideration;

- SEMP will effect a 'challenge' to the Integrated Schedule to reflect all artefacts (produced / re-produced by SEMP Ltd / OLRT-C / Others) being completed in readiness for delivery to Ottawa City and their Safety Assessor by RSAD 26th October 2018. Equally a Substantial Completion of Fixed Facility and Vehicle Completion of 14th August 2018 shall be planned for. The revised Integrated Schedule reflecting these date will be delivered within five (5) working days of receipt your Purchase Order.
- The Integrated Schedule and Route Book Visualisation will define Risks, Issues, Assumptions, and Dependencies of works by OLRT-C / Others which may impact SEMP Ltd activities.
- The Integrated Schedule and Route Book Visualisation will identify any early warnings / recommend solutions relating to artefacts / activities being produced / undertaken by OLRT-C / Others at Railway, System and Sub-System levels. Note; SEMP Ltd will ensure artefacts it is producing / re-producing are issued within the 'challenged' timescales, irrespective of successful delivery by OLRT-C / Others.
- SEMP Ltd will support the OLRT-C Systems Assurance function by facilitating 2x Engagement Workshops (Program Integration Review – Railway Level and one other Engagement Workshop) in order to support OLRT-C in obtaining acceptance by Ottawa City and their Safety Assessor.
- SEMP Ltd will Identify critical success factors and quick win opportunities on an on-going basis with Ottawa City and their Safety Assessor to ensure their confidence in the OLRT-C 'challenged' Integrated Schedule.

Commercial Considerations;

As per various discussions, and in accordance with the email from Sean Derry on 25th January 2018 (10.53 EST) coupled with the subsequent telecom with Roger Schmidt and Sean Derry on 30th January 2018 (15.57 EST), in order to meet the 'challenged' timescales SEMP Ltd must be engaged without delay; SEMP Ltd therefore require a Purchase Order in the amount of **£3,783,979.00 GBP** (approximately \$6,603,080CAD at today's spot rate of £1GBP = \$1.74501CAD) excluding any local taxes (such as the Income Tax Act (Canada)).

Payments shall be made monthly as follows;

February – Invoice date 2 nd March 2018	£398,313.58GBP (\$695,061.18CAD)
March – Invoice date 30 th March 2018	£398,313.58GBP (\$695,061.18CAD)
April – Invoice date 27 th April 2018	£398,313.58GBP (\$695,061.18CAD)
May – Invoice date 25 th May 2018	£398,313.58GBP (\$695,061.18CAD)
June – Invoice Date 29 th June 2018	£497,891.97GBP (\$868,826.47CAD)
July – Invoice Date 27 th July 2018	£398,313.58GBP (\$695,061.18CAD)
August – Invoice Date 31 st August 2018	£497,891.97GBP (\$868,826.47CAD)
September – Invoice Date 28 th September 2018	£398,313.58GBP (\$695,061.18CAD)
October – Invoice Date 26 th October 2018	£398,313.58GBP (\$695,061.18CAD)
TOTAL	£3,783,979GBP (\$6,603,080CAD)

This Purchase Order should provide; reference number, the above line items, 30 day payment terms and confirm invoicing arrangements.

Conditions;

- SEMP Ltd costs include resources, travel, tools etc. required for works within our above defined scope.
- SEMP Ltd shall prepare / issue artefacts utilising the best available source information at the beginning of each artefact production / re-production activity.
- Any dependencies identified by SEMP Ltd on the source information to be provided / produced by OLRT-C / Others that are not met shall not delay issue of artefacts within SEMP Ltd scope by the artefacts scheduled date; this schedule adherence might result in deficiencies if required source information to be provided / produced by OLRT-C / Others is not available in accordance with the Integrated Schedule dependency dates.
- This quotation excludes any reworks that may be required resulting from the inaccuracy / unsuitability of source information that is to be provided / produced by OLRT-C / Others.
- For any unknowns yet to be determined at Primary System / Sub-system levels and / or physical works such as Test & Commissioning, OLRT-C shall not impose any late delivery penalties should these result in the schedule not being adhered to.
- On an ongoing basis SEMP Ltd will look to identify opportunities for minimising the quantum / scope of artefacts, where this will not affect Systems Assurance needs or acceptance by Ottawa City and their SA, in order to identify opportunities for cost savings.

I trust the above meets with your expectations, please let me know if you require any further information and I will endeavour to respond by return to prevent delays.

Yours Sincerely

A handwritten signature in black ink, appearing to read 'Derek Wynne', with a stylized flourish at the end.

Derek Wynne

Director