

From: [Brown, Keith](#)
To: [Woodhead, Roger](#); [Fullerton, William](#)
Subject: RE: RTGEJV - CCN - 0087
Date: Monday, November 9, 2015 1:05:00 PM
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)

Bill,

I feel the need to explain Ottawa from my perspective; I considered 'defend' but decided against that verb as it lends to an emotional position which I am not trying to take.

The 'Ottawa Model' of delivering these projects, where 'Engineering' is de-coupled from Installation/Construction was new to us when we started bidding our work and developing budgets. The expectation, by us, was that we would have the role and scope we had always had, including delivery of specialist engineering and managing the 'Systems' process throughout the job.

Initially I put together a budget that included our normal design and support roles, plus the costs of specialist activities – System Assurance, Safety Engineer, RAM, EMC, Ergonomics etc. This had a budget cost of [REDACTED] and a sell price (at 2.7 multiplier) of around [REDACTED].

Over the course of the next 2 months the specialist activities were removed and the engineering re-worked to only deliver up to FDR/IFC, dropping the cost to [REDACTED] and a sell budget to [REDACTED]. By removal of other staff positions we further got it down to [REDACTED] cost and [REDACTED] sell.

All the time were be driving by a 'this is not an EPC job' and 'engineering should be 7% of capital cost' coming from both DB and our own DE management who were looking to get an agreement that met DB's expectations.

The 'this is not an EPOC job' translates to 'do what the PA requires and nothing more'; or 'if you are not required to do an interface matrix, don't do it.'

The push to 7%, which is unreasonable for a Systems Engineering budget on to fronts; the first is our capital budget is small in the first place, and second we traditionally get dragged into all manner of work that is not 'Systems design related'. The resultant reduction in budgets did not equate to a resultant reduction in scope

The results of this:

1. The normal 'Systems Deliverables' as Reece discusses were not delivered as they were not required by the PA.
2. There was no budget to do the non-Systems design work that we ended up doing. To not do this work, which included guiding the DB, guiding OC Transpo, etc., would have resulted in the project not being as far along as it is.

Some of this has been repeated on Eglinton; for instance, our budgets have been cut with no reduction in scope. But we have made some headway as well - we have more control over the end-to-end Systems work and we are in more control of the engineering. We are helped in no small part by the Client's engineering group requiring proper engineering deliveries (SEMP, SIMP, etc.) which were not required on Ottawa.

To summarise, I agree with the philosophy that Reece details and it is aligned to where we (Systems Engineering) would always go if given the budget and resource to deliver it. This can only occur in a supportive environment where what is best for the Systems Engineering of the Project and the end Transit System is determined by the people tasked with delivering it, and not be a Construction JV who are driving by a Civil Engineering \$\$ model.

Keith

Keith Brown

*Director, Automation Systems
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From: Woodhead, Roger
Sent: November 9, 2015 6:23 AM
To: Fullerton, William
Cc: Brown, Keith
Subject: RE: RTGEJV - CCN - 0087

I am attaching an email which Keith sent to Reece along the same lines.

On Ottawa we are only responsible for design and have no responsibility for the vehicle or train control which limits are involvement even more.

As far as design goes we have ensured that the civil infrastructure is interfaced with the vehicle, i.e. the dynamic envelope fits inside the structures and the bridges can take the weight of the vehicle. We have designed the power system so that the vehicle can operate and the comms system is interfaced with the vehicle and train control.

OLRTC lack the expertise in systems integration so I am sure they will blame us when things go wrong.

The fact that they have asked us to develop the test plans says a lot about their lack of expertise.

Roger Woodhead, *Ph.D., P.Eng*
Director Transit Systems
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From: Fullerton, William
Sent: November 9, 2015 3:55 AM
To: Woodhead, Roger
Subject: FW: RTGEJV - CCN - 0087

Roger, are we following the procedure that Reece lays out in the word document try create the "interface control matrix"

and ultimately the "interface control document"? Or do we have some other process?

From: Bailey, Reece
Sent: Friday, November 06, 2015 2:27 PM
To: Woodhead, Roger; Taslimi, Peter; Brown, Keith
Cc: Fullerton, William; Dominique Quesnel; Christine Bergsma; Williams, Bill
Subject: RE: RTGEJV - CCN - 0087

All there is a very strong chance we will have to develop the interface matrix. I have set out below what I propose as a starting point. I have the integration model built and ready (just about) for use and will share if we do the work. Please have a look let me know if I have this wrong or need to add anything. As I see things now, no work has been done on integration and it is needed ASAP. Below is just my thoughts and based on past projects, this is also AREMA compliant.

Also attached is how I would go about gathering and managing Interface from a Systems Engineering perspective. Hopefully the two do not contradict too much

By using the Interface Coordination and Integration Plan (ICIP), civil and systems integration is component oriented, thus the design/component engineers will not only identify and incorporate the appropriate design criteria but also communicate interface requirements between disciplines. In addition, civil and systems interface coordination and systems integration must be thorough and comprehensive in that it must also consider; construction methods and sequencing; testing and commissioning; revenue service testing; and revenue service. Civil and systems integration must be conducted in a logical and precise manner in order to completely and accurately identify and trace the upward and downward relationships between design aspects and components. Interface management includes a set of activities integrated into the systems engineering process where the benefits include:

- All facility and system interfaces are identified.
- Necessary interface requirements are clearly and completely defined.
- Interfacing systems are designed to the same requirements.
- Incompatibility issues are identified and resolved.
- Changes made in one area of the system are checked for compatibility with other associated areas.

This plan has five (5) main facets:

- (1) Although the Ottawa LRT (OLRT) project is around 80% design complete it is still important to determine **roles and responsibilities** as this is important to the final success of the project and is critical to completing the OLRT integration process. This includes the assignment of an integration manager with experience in this or a similar role we would propose Peter Taslimi for this role.
- (2) The lead design consultant would normally produce a **Project Integration Implementation Plan (PIIP)**. This PIIP would tailor the ICIP requirements to suit the scope and contracting methods of the project, establish schedules, define deliverables and establish a comprehensive change control process. As most of this work has been completed and is already in place we propose to use this existing work and processes and continue to develop in to one PIIP. The plan is revisited as the design progresses to update schedules, personnel, and include any change to the methods being used for the design process anyway under normal circumstances so we propose to do this at this point in the project. Revisions may also require Owner acceptance.
- (3) The ICIP contains specific technical requirements for a disciplined approach for ensuring and documenting that as the design progresses the proper inter-discipline communication is being performed. We will look at early design requirements to ensure they include the development of Point to Point Responsibility Block Diagrams; Equipment Circulation and Access Drawings; System Schematic Diagrams; Composite Drawings; and Interface Coordination and Systems Integration Checklists, and make sure they gained Owner acceptance. These early design submittals define the detailed design responsibilities and the physical requirements for the OLRT equipment to ensure the system is well understood by all disciplines prior to finalizing the contract drawings and specifications.

As the design of the OLRT is at a more mature level necessary equipment is understood, so the ICIP requires the more detailed functional interfaces be defined through Interface Block Diagrams and Interface Coordination and Systems Integration Checklists. We will use these requirements to ensure that all interfacing equipment is designed to the same requirements and the supervisory and control work can

be easily integrated and constructed. We will use the Interface Block Diagrams as they provide a graphical representation of the system boundary, the interfaces with other systems, and the input and outputs flowing between the systems. These diagrams, in conjunction with text descriptions, will provide an adequate functional definition of the system interfaces to ensure compliance with the OLRT PA.

- (4) ICIP required submittals as well as detailed interface coordination aspects are documented using Interface Control Documents (ICD). I am unsure of the extent these documents have been developed for the OLRT, so have assumed they will need to be produced. I will set out the number and type of ICD required for this project in the next section. ICDs are generated, tracked, and their final disposition recorded using the Systems Integration Database (a copy of this database has been supplied to David Whyte.
- (5) The System Integration Database is a spreadsheet tool that will be used by EJV (originally in DBJV scope) to collect, manage, collate, report, and archive ICD information. The database can be managed by either the EJV or the DBJV and contains the workflow logic that formalizes the review and acceptance of all interfaces.

Reece Bailey, *MRO*
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From: Woodhead, Roger
Sent: November 6, 2015 11:36 AM
To: Taslimi, Peter; Bailey, Reece
Cc: Fullerton, William; Dominique Quesnel; Christine Bergsma; Williams, Bill
Subject: RE: RTGEJV - CCN - 0087

That's great Peter. I suggest you respond to Roger directly with copies to all and tell Roger that you are the contact person for any future correspondence.

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From: Taslimi, Peter
Sent: November 6, 2015 8:34 AM
To: Woodhead, Roger; Bailey, Reece
Cc: Fullerton, William; Dominique Quesnel; Christine Bergsma; Williams, Bill
Subject: RE: RTGEJV - CCN - 0087

Roger: See suggestion below?

From: Woodhead, Roger
Sent: 06 November, 2015 11:27
To: Taslimi, Peter; Bailey, Reece
Cc: Fullerton, William; Dominique Quesnel; Christine Bergsma; Williams, Bill
Subject: RE: RTGEJV - CCN - 0087

I think they are asking question 3 because they believe that the OLRTC person will save them money, i.e. reduce the EJV hours. Can we say something about this - will it or won't it? Personally I don't believe they have anyone with the experience or time to help write these plans but perhaps they do.

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From: Taslimi, Peter
Sent: November 6, 2015 7:57 AM
To: Bailey, Reece; Woodhead, Roger
Cc: Fullerton, William; Dominique Quesnel; Christine Bergsma; Williams, Bill
Subject: FW: RTGEJV - CCN - 0087

Reece / Roger below is the draft response to Roger Schmidt Bill Williams and I have drafted. Please advise if you would like anything revised? Thanks, Peter

- 1) Can you include the attachment A that lists the 141 integration tests?
 - a. Yes provided in the attachment Appendix A release 01. Our CCN refers to 75-100 procedures to be created. The 141 mainly refers to interface points which would have to be covered in the procedures. Also see 2)a. ii. Below.

- 2) Our original request for this work was provided via the attached PowerPoint. Could you advise where your proposal deviates from the plan in the PowerPoint
 - a. There is a high degree of alignment. The following are the differences
 - i. no trial running tests per the CCN
 - ii. number of plans differs (64 estimated in plan, 75-100 estimated in CCN – This number will be refined as we progress through the project. We have conducted a preliminary gap analysis between the list in Appendix A and the list prepared by the T&C team of OLRTC and see a high degree of alignment with differences mainly arising from combining test cases vs. listing them separately
 - iii. hours differ (4000 estimated by OLRTC and 9000 estimated in CCN, however this number also includes updating of requirements management in DOORS to complete the V&V process
 - iv. resource quantities and strategy differs. We are proposing a virtual team with the list provided in the CCN and including a Lead engineer from Montreal visiting Ottawa weekly or as required, and subject matter experts in each area.

- 3) For example, the PowerPoint noted a dedicated OLRTC staff person in Ottawa to support assembly/ creation of the SIT plans. This CCN proposal does not mention or seem to rely on that OLRTC staff person – please confirm.
 - a. See bullet 2)a. iv. Above. **The CCN does not include the OLRTC staff person. This person could enhance communication between OLRTC and the test production team and the client, but will have limited impact on the production of test procedures.**

- 4) The CCN proposal also noted that SAT tests for Tunnel Vent and PS&D would be required but the CCN, on page 2, seems to indicate they are not provided – please confirm
 - b. SAT tests are assumed under OLRTC/Supplier responsibility in the CCN and as per the PPT presentation , CCN is for SIT level testing. Understanding from October 13th meeting With OLRTC is that PS&D and Tunnel Ventilation may require SAT / SSIT procedures by EJV prior to SIT level testing. These will be added to the final list and therefore are included.

- 5) Please confirm that Tunnel Vent and PS&D SSIT and SIT are included (PS&D procedure are needed first. We already have equipment related to PS&D installed and PICO'd by Siemen at MSF location.)
 - a. Yes – these will be included if required.

- 6) It is stated in CCN-0087 that “Signaling tests are not included”. Can you confirm that SCADA – CBTC interface SIT is part of the work and is included
 - a. CBTC to SCADA SIT level testing was put under train control which was to be excluded based on the October 13th meeting, but can be included in the final test list if required.

- 7) We assume you have in mind that all SIT procedures deliverables will have to follow Schedule 10 process with the City which means 1st delivery of documents for review and comment and a final round including these comments in the final release. Please confirm.
 - a. Strategy was to Issue first internally approved procedures (by EJV and DBJV) then submit to customer. Revisions / comments required by customer will be included.

Regards,

Roger

From: Christine Bergsma
Sent: October-29-15 3:15 PM
To: Roger Schmidt <Roger.Schmidt@ottawa-lrt.ca>
Cc: Selene Tsang <TsangS@mmm.ca>; Florica Nye <Florica.Nye@ottawa-lrt.ca>; Roger Woodhead <roger.woodhead@snclavalin.com>; Dominique Quesnel <guesnel@mmm.ca>; Kari McGuire <Kari.McGuire@ottawa-lrt.ca>; Jeffrey Seider <SeiderJ@mmm.ca>; John Heffernan <John.Heffernan@ottawa-lrt.ca>; Russell Gibson <Russell.Gibson@ottawa-lrt.ca>; Alex McKinnon <Alex.McKinnon@ottawa-lrt.ca>; Paloma Perez <Paloma.Perez@ottawa-lrt.ca>; Christine Bergsma <BergsmaC@mmm.ca>
Subject: RTGEJV - CCN - 0087

Hello Roger – please find attached RTGEJV CCN – 0087. Upon your approval please send change order.

Thank you
Christine

Christine Bergsma C.I.M., I.C.I.A.

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