Commission of Inquiry
into the Construction Works at and near
the Hung Hom Station Extension
under the Shatin to Central Link Project

Project Management Expert Report

Prepared for
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APPENDIX

1. INTRODUCTION

1.1 APPOINTMENT

1. I, Steve Huyghe, am the Chairman and Founder of CORE International Consulting ("CORE") headquartered in Atlanta, Georgia, USA, with regional locations in Asia.

2. I am a construction professional and was appointed by Messrs. Mayer Brown, on behalf of MTR Corporation Limited ("MTRCL"), to act as MTRCL's independent project management expert in the Hung Hom Commission of Inquiry. My CV is enclosed in Appendix A. In the Original Inquiry[1], I reviewed, assessed and provided independent project management expert testimony in relation to certain works[2] performed as part of the Shatin to Central Link Project, under Works Contract 1112, for the Track Slab, i.e., the EWL slab and Diaphragm Wall at the Hung Hom Station Extension ("Project").

3. The Chief Executive in Council decided to expand the Terms of Reference of the Commission of Inquiry ("Commission") on 19 February 2019, and the scope of my original instructions has now been augmented to include an evaluation of the pertinent facts and any recommended improvement measures relating to irregularities to the construction works at the North Approach Tunnels ("NAT"), the South Approach Tunnels ("SAT") and the Hung Hom Stabling Sidings ("HHS").

4. I understand from my instructions that the expanded Terms of Reference of the Commission (the "Extended Inquiry") are as follows:

"Regarding the MTR Corporation Limited ('MTRCL')'s Contract No. 1112 ('Contract') of the Shatin to Central Link Project:

(a) (1) in respect of the diaphragm wall and platform slab construction works at the Hung Hom Station Extension,

(i) to inquire into the facts and circumstances surrounding the steel reinforcement fixing works, including but not limited to those works at locations that have given rise to extensive public concern about their safety since May 2018;

(ii) to inquire into the facts and circumstances surrounding any other works which raise concerns about public safety; and

[1] Work that was the subject of the Commission of Inquiry that was established on 10 July 2018.
[2] Project Management procedures, rebar fixing regarding coupler installation/rebar installations at the top of the Diaphragm Wall/possible concrete leakage and honeycombing issues.

(iii) to ascertain whether the works in (1)(i) and (ii) above were executed in accordance with the Contract. If not, the reasons therefore and whether steps for rectification have been taken;

(2) in respect of the construction works at the North Approach Tunnels, the South Approach Tunnels and the Hung Hom Stabling Sidings,

(i) to inquire into the facts and circumstances surrounding any problem relating to the steel reinforcement fixing or concreting works, including but not limited to any lack of proper inspection, supervision or documentation of such works undertaken, any lack of proper testing of the materials used for such works and of proper documentation of such testing, and any deviation of such works undertaken from the designs, plans, or drawings accepted by the Highways Department or the Building Authority;

(ii) to inquire into the facts and circumstances surrounding any works or matters which raise concerns about public safety or substantial works quality; and

(iii) to ascertain whether the works and matters involved in (2)(i) and (ii) above were executed in accordance with the Contract. If not, the reasons therefore and whether steps for rectification have been taken;

(b) to review, in the light of (a) above,

(i) the adequacy of the relevant aspects of the MTRCL's project management and supervision system, quality assurance and quality control system, risk management system, site supervision and control system and processes, system on reporting to Government, system and processes for communication internally and with various stakeholders, and any other related systems, processes and practices, and the implementation thereof; and

(ii) the extent and adequacy of the monitoring and control mechanisms of the Government, and the implementation thereof; and

(c) *in the light of (b) above, to make recommendations on suitable measures with a view to promoting public safety and assurance on quality of works".*

5. Based upon the Directions given by the Commission on 21 August 2019:

> *"(2) Any party (including Leighton) seeking to rely on expert evidence on project management issues in response to Mr. Rowsell's expert report shall submit a responsive expert report to the Commission's solicitors by Friday, 13 September 2019*[3].
>
> *(3) The expert report to be adduced by any party pursuant to paragraph 2 must be responsive to Mr. Rowsell's report and shall be on project management issues strictly within the Expanded Terms of Reference."*

6. To comply with the Directions given by the Commission on 21 August 2019, the Extended Inquiry addresses project management ("PM") issues in paragraph (b) which only covers MTRCL's systems and procedures. Therefore, my understanding is that Mr. Rowsell's (the PM expert for the Commission) instructions specifically relate to paragraph (b) and not paragraph (a) of the Extended Inquiry, even though as I read and understand paragraphs (a)(1)(iii) and (a)(2)(iii) of the Extended Inquiry the language is much broader and includes all PM issues that must be considered to perform a complete evaluation. By the Direction referred to in the previous paragraph, the Commission has instructed Mr. George Wall, the PM expert for Leighton, and me to issue expert reports that are responsive to Mr. Rowsell's expert report ("Rowsell Report").

7. My expert report follows these instructions (paragraphs 4-6 above). However, I consider that where, as here, there are relevant contractual obligations in existence arising between Leighton and MTRCL, it would be remiss of me to ignore such obligations for the purpose of providing a comprehensive opinion on the PM issues arising out of the Extended Inquiry.

8. In the Original Inquiry a Joint Statement was produced by Mr. Rowsell and me that covered the relevant PM issues and was provided to the Commission dated 9 January 2019 ("First PME Joint Statement").

9. I also note that on 24 August 2019[4] the parties were informed that the Commission was keen for the PM experts to hold a joint 'without prejudice' meeting with a view to narrowing their differences and a joint memorandum being prepared in the event that any consensus could be reached on the PM issues. A meeting did take place on 3 September 2019 between Mr.

[3] This date was subsequently extended to 20 September 2019.
[4] Email from Lo & Lo dated 24 August 2019.

Rowsell, Mr. Wall and me, and it is anticipated that another Joint Statement will be prepared that follows the same format of the previous Joint Statement.

10. My opinions are based on the PM document bundles that I have been provided with by those instructing me, Messrs. Mayer Brown, together with my review of the factual witness statements and transcripts. No intentional attempt has been made by me to provide any independent, factual analysis or any subjective determinations.

11. I will focus on my response to the Rowsell Report in terms of the MTRCL PM procedures and the evaluation of the pertinent facts and any recommended improvement measures concerning the PM issues and related matters arising out of the construction works at the NAT, the SAT and the HHS.

1.2 STRUCTURE OF REPORT

12. To assist the Commission in reviewing this report, I have organised the structure of my report, as far as practical, to align with and be responsive to the Rowsell Report.

13. In responding to Mr. Rowsell's comments / observations and for ease of reference, I adopt where appropriate the same headings / sub-headings as set out in the Rowsell Report.

14. I understand my duty is to assist the Commission in relation to the PM issues. I will thus address issues that fall within my expertise and which are based upon the instructions given to me by Messrs. Mayer Brown.

15. As in the Original Inquiry, I do not address the issues pertaining to the Government included in Part 2 of the Rowsell Report.

2. RESPONSES TO PART 1 OF ROWSELL REPORT: ADEQUACY OF MTRCL'S PROJECT MANAGEMENT SYSTEM AND OTHER SYSTEMS

2.1 MTRCL'S OBLIGATIONS UNDER THE 2012 ENTRUSTMENT AGREEMENT

16. I agree with Mr. Rowsell's opinion as set out in paragraph 3 of the Rowsell Report [ER1 (Part 2)/1/5]. However, I would like to point out that MTRCL's obligations under the Entrustment Activities were to provide PM services against a backdrop where all the individual works contractors who were performing the construction works had obligations to carry out and complete such works in accordance with the terms of their respective contracts, including with reasonable skill, care, and in a professional manner.

17. I agree with Mr. Rowsell's observation in paragraph 7b of the Rowsell Report insofar as he states that the RISC forms provide a record of inspection but I would not go so far as to say that they constitute a 'formal certification' that work has been approved. Further, as to his observation that the *"as-constructed documents listed in EA Appendix K at include, at item 5 [G7/5698], inspection and testing certificates. This would appear, in my opinion, to include RISC forms …"*, I note that item 5 as referred to by Mr. Rowsell refers to *"design certificates, submissions to and certificates issued by any relevant authorities (e.g. FSD, WSD, EMSD), inspection and testing certificates, factor test records, software license agreements"* and it appears to me to be ultimately a legal matter upon which I am not qualified to express view. However, I do question whether a RISC form would fall within the category of documentation set out in item 5 which are described as *"as-constructed documents"*. From my perspective, the certificates as listed in item 5 of EA Appendix K are to be issued by registered professionals, authorities and/or those specialist vendors supplying the goods or systems, after the works are completed and have been thoroughly inspected/tested/checked. These certificates, from a PM perspective, are not based on individual construction elements such as a concrete pour at a slab.

18. Regarding the RISC forms, they are part of contemporaneous construction records which document a specific part of works that has been inspected by Leighton and MTRCL before the follow-on construction activities can proceed on site. The RISC forms are typically signed-off by site team personnel who do not necessarily need to be registered professionals. So RISC forms in this respect are different from the certificates as set out in item 5 of EA Appendix K.

19. Staying with the matter of RISC forms, I understand that the completed RISC forms are required to be retained on the ePMS based on PIMS/PN/02-4 Archiving of Project Records, Exhibit 7.3/1 Detail of Types of Project Records, Items 11.26 [BB9853] and 11.47.1 [BB9854]. However, with regards to being an as-built record, there are many other documents that serve such purpose such as site record photos, site diaries and as-built drawings which normally substantiate the construction works as installed. I also note in this respect that MTRCL's Kit Chan's evidence was that the RISC forms are normally not kept after a job is finished in accordance with the current practice in the industry, there were no specific requirements concerning the way in which RISC forms are handled after a job is finished and whether or not they are kept and for how long is left to the discretion of the site team [T14/9:6-12:2; T14/42:17-43:19].

2.2 MTRCL'S OBLIGATIONS UNDER THE PROJECT MANAGEMENT PLAN

20. Regarding Mr. Rowsell's comments and observations on the Project Management Plan (PMP) [paragraphs 10-17 of the Rowsell Report] [ER1 (Part 2)/1/9-10], I consider it would be helpful to refer to paragraph 11 of the First PME Joint Statement [ER1 (Part 1)/9/T-2] in the Original Inquiry where we set out a few areas to improve the PMP. I am of the opinion that those suggestions are applicable in terms of addressing Mr. Rowsell's latest comments and observations.

21. Paragraph 11 of the First PME Joint Statement [ER1 (Part 1)/9/T-2] states that:

"Whilst we are not fully agreed about the adequacy of the Project Management Plan, we do agree there is room for improvement, and additional modifications can and should be made. Our suggestions for improvement include:

a. Consideration should be given to preparing a cross-referencing system between the PMP and the PIMs to help identify the roles and responsibilities of the various staff members, including contractual roles and responsibilities.

b. Review and improve the detailed content of the PMP, to make them more comprehensive and relevant to the project by translating generic guidance into project specific requirements.

c. Consider the inclusion in the PMP of proposals for any project partnering arrangements and initiatives".

22. Regarding paragraphs 11 and 16 of the Rowsell Report, they are related to the statutory design submission process under the IoE/IoC. Paragraph 11 of the Rowsell Report describes correctly the subject matter of section 9.1 of the PMP and, in addition, accurately sets out the terms of part of paragraph 9.1.3. In this context, I note that Appendix 7 of the PMP also contains Flow Charts making provision for how *"Amendments Necessary to Suit Site Conditions"*, which I understand that both MTRCL and Leighton contend the design modifications/changes referred to by Mr. Rowsell in paragraph 16 of the Rowsell Report comprise. However, interpreting how Appendix 7 applies in practice from a legal perspective lies outside my expertise[5]. That said, the Competent Persons are responsible for complying with the statutory design submission process on behalf of MTRCL and my understanding from the IoE is that for major design changes which arise during the course of construction, such changes would need to go through the Buildings Department ("BD") consultation process. For minor design changes, they would be consolidated with other minor changes and dealt with before submitting the BA-14 to BD, based on Chris Chan's testimony [T11/135:11-136:1] and Kit Chan's testimony [T14/35:1-36:3]. However, the determination whether a design change is major or minor change is a matter of (often subjective) engineering judgement. This is a matter which is outside my PM expertise.

23. I agree that paragraph 14 of the Rowsell Report is correct as a matter of fact. Again, in paragraph 11 of the First PME Joint Statement, Mr. Rowsell and I already pointed out the areas of improvement and additional modifications concerning the PMP (see paragraphs 20-21 of my report above).

24. In paragraph 15b of the Rowsell Report [ER1 (Part 2)/1/11], Mr. Rowsell comments that the PMP lacks any reference to resource management or job specific training requirements. I agree with Mr. Rowsell's comment. It would be helpful to have a section in the PMP covering the topics of resource management and training requirements, as well as identifying who in MTRCL has the management responsibility in terms of overseeing and administering those areas.

25. Regarding paragraph 15c of the Rowsell Report and the observation that the PMP is lacking in terms of *"The role of leaders in establishing the appropriate culture and behaviours in relation to safe and compliant working procedures and establishing effective lines of communication"*, I agree that the lines of communication can be strengthened in the PMP.

[5] I understand that MTRCL's Closing Submissions deal with its contentions concerning the true meaning and effect of Appendix 7 of the PMP at paragraphs 82 – 84.

However, I consider the PMP has set out who the 'leader' should be in relation to establishing the appropriate culture and behaviours in relation to safe and compliant working procedures. This is because the General Manager[6], Competent Person[7] and Project Manager[8], all of whom should in my view be regarded as project 'leaders', are responsible for overseeing the safety and quality aspects of the SCL Project. Paragraph 5.2.2 of the PMP provides that the General Manager is to ensure *"the SCL project is delivered on time, within budget and to the required construction, safety, quality and environment standards."*. Paragraph 5.2.3 of the PMP provides that *"The Competent Persons (CPs) are responsible for co-ordinating and supervising the works to ensure that the project is executed to the quality, safety, and environmental standards required by MTR Corporation as well as to fulfil the requirements under the consultation process"*. Further, paragraph 5.2.7 of the PMP provides that the Project Manager *"also makes sure that all necessary safety, quality, environmental and design standards are achieved in the execution of works and be responsible for the management of all interfaces with Government Departments, local authorities and residents, consultants and contractors in support of project delivery."*.

26. In paragraph 16 of the Rowsell Report Mr. Rowsell comments upon the BD submission process. However, and as I make clear in paragraph 22 above, the BD submission process requires engineering judgement and that is outside my area of expertise.

27. Regarding Mr. Rowsell's comment (paragraph 17 of the Rowsell Report) concerning communication and liaison between Government departments and MTRCL as set out in Section 10 of the PMP, I consider that when considering Section 10 of the PMP one needs to take into account Appendix 10 of the PMP which sets out the terms of reference for the 3-tier meetings. From my perspective, the terms of reference for the 3-tier meetings cover many major PM topics (see below). In my view, a construction project is dynamic in nature and in practice can give rise to many different scenarios and situations that need to be dealt with from a PM perspective. It would be impractical to set out details and provisions to cater for all situations that could occur. Nor is it the objective of the PMP to do so. On the contrary, whilst the PMP sets out the general basis for PM, it requires the PM team to exercise their experience and judgement to assess and determine how to handle the various issues which inevitably arise on any complex civil engineering project of the kind under consideration.

[6] Paragraph 5.2.2 of the PMP.
[7] Paragraph 5.2.3 of the PMP.
[8] Paragraph 5.2.7 of the PMP.

Shatin to Central Link

Project Management Plan
Appendix 10

The Terms of Reference for the 3-Tier Meetings are tabled below:

	Working Level	Management Level	Senior Management Level
Purpose	- Align planned submissions schedule, brief upcoming submissions and priorities according to the Submissions Shared Logs; - Conduct pre-consultation prior to formal submission; - Clarify and resolve technical issues; - determine issues to be escalated to management meetings; and - Consult government representatives on expectations on starting works.	- Review performance on making/reviewing submissions and discuss improvement ideas; - Resolve issues escalated from working level meetings; and - Coordinate cross-contract issues and priorities. - Discuss other Buildings Ordinance related issues	- Discuss resource planning issues; - Review overall programme and progress of projects; - Review management reports on the submissions to discuss performance and improvement; and - Resolve escalated issues. - Discuss other Buildings Ordinance related issues

2.3 MTRCL'S PROJECT INTEGRATED MANAGEMENT SYSTEM (PIMS)

28. I agree with paragraphs 18-21 of the Rowsell Report. In addition, I am of the view that it would be helpful to point out in terms of Mr. Rowsell's comment on the PIMS that MTRCL has engaged T&T to review and re-write its PIMS as part of the PIMS improvement process. I will provide my further comments on the PIMS improvement process in Section 4 of my report.

2.4 MTRCL'S OBLIGATIONS UNDER THE CONTRACT WITH LEIGHTON

29. As Mr. Rowsell brings up the topic of MTRCL's obligations under Contract 1112 with Leighton, I have included Leightons's important obligations in terms of quality management as follows in my report because I consider that this topic has a significant effect on the PM systems that are required to support successful project outcomes.

30. To fully address MTRCL's actions in relation to late / missing RISC forms, I consider it is important and relevant to take into consideration the contractual obligations of the parties to identify possible reasons why all of the requisite RISC forms were not provided.

31. In paragraph 23a of the Rowsell Report, Mr. Rowsell discusses issues pertaining to a target cost contract. I understand from the Original Inquiry that Mr. Rowsell was instructed to address the matter of a target cost contract while my instruction was not to do so, and that is still the position. Accordingly, in this regard I offer no comment.

32. In paragraph 23b of the Rowsell Report, Mr. Rowsell expresses the opinion that *"a lack of understanding and application of the contractual roles and responsibilities may have been*

a contributory cause to some of the problems being investigated by the Extended Inquiry". It seems that these problems, for example the fact that "*contractual communications were not properly controlled"*, did not stem solely from the language sets out in the PIMS. I consider that this is the case because in my view not strictly following the RISC process was the consequence of the manner in which the project team chose to administer Contract 1112. As such, I agree with Mr. Rowsell that training can help mitigate the issues he raises.

33. Nevertheless, as Mr. Rowsell also raises in paragraph 23b of the Rowsell Report [ER1 (Part 2)/1/16] the point that under Contract 1112 Leighton shall take instructions and directions from the Engineers (MTRCL) only, I need to point out that even though I agree that Clause 2.1(e) contains the provision referred to by Mr. Rowsell, under Conditions of Contract ("CoC") Clause 2.9 no act or omission on the part of the Engineer (i.e. MTRCL) shall in any way relieve the Contractor (i.e. Leighton) from any liability, responsibility, obligation, or duty under the Contract. In this context it needs to be pointed out that Leighton is an experienced contractor with a lengthy 'track record' in undertaking MTRCL works contracts and public works contracts in Hong Kong. Leighton should be fully aware of its contract obligations and should have performed them. Thus, for example, so far as Leighton's inability to prepare and provide the RISC forms to MTRCL timeously or at all is concerned, it would be no excuse for Leighton to seek to rely upon the fact that it had a shortage of staff, as any such shortage should have been managed by Leighton in accordance with its contractual responsibilities.

34. Mr. Rowsell also observes in paragraph 23c of the Rowsell Report [ER1 (Part 2)/1/16] that Leighton should have submitted a specific method statement for dealing with the stitch joints at the NAT and SAT and that its failure to do so "*was a failure to deliver the contract requirements and that it also breached the interfacing requirements set out in Appendix Z2 of the Particular Specification [BB420] which also required a method statement to be produced ….".* In my view, if the same type of couplers had to be used at the stitch joints, then a specific method statement may not have been necessary because the construction details and sequences at the stitch joints would have been the same as at other locations and would have been covered in the generic NAT / SAT method statements. However, in this case where the couplers used under Contract 1111 and Contract 1112 are different, it would be necessary to have a specific method statement covering the stitch joints in question. In fact, it is important to point out that Leighton did not fully carry out its interface obligations as set out in Table Z2.1.2 Exchange of Design Information [BB1/429] as enclosed in Appendix Z2 of PS (see below).

Interface Item	By 1111 Contractor	By 1112 Contractor	Purpose of Interface
1.3	To provide the necessary detailed drawings showing the As-built for temporary works, permanent works, waterproofing, drainage, structure, couplers, monitoring points and sequence at the Interface Location,	To review and take into account of the information provided by 1111 Contractor in his construction sequence and method statement for Contract 1112.	To review and confirm the information for planning the sequence and method statement at the Interface Location.

35. In this regard I pause to mention that MTRCL is reviewing its current suite of contracts (including target cost contracts and NEC contracts) and carrying out a complete overhaul of the PIMS [paragraphs 39 and 85-86 of Dr. Peter Ewen's statement].

36. Mr. Rowsell makes observations in paragraph 23d of the Rowsell Report [ER1 (Part 2)/1/17] concerning the fact that Leighton's Quality Plan was required to incorporate MTRCL's requirements in relation to RISC forms. Mr. Rowsell nevertheless acknowledges that MTRCL did take action and raised the problem of the missing RISC forms with Leighton, who still failed to comply with its obligations in terms of RISC forms. In these circumstances, Mr. Rowsell states that MTRCL "*should have taken firmer action to ensure the Quality Plan was followed*". Both the Contract and the PIMS are basically silent on what actions or steps MTRCL should take in rectifying these types of issues. Going forward, I consider there should be a procedure established in the PIMS setting out specific actions for MTRCL to take to address these types of issues.

37. Regarding Mr. Rowsell's observations concerning an alternative procedure for acceptance in paragraphs 23d and 44 of the Rowsell Report, it is my view that the issue of the lack of RISC forms was caused by Leighton at the outset due to its failure in not submitting RISC forms. In addition, during the course of the construction process Leighton did not raise any request to dispense with the use of RISC forms. Leighton continued to promise to MTRCL that it would submit all the RISC forms, which it never did, and the ones Leighton did submit were usually late. Further, Leighton has an obligation to comply with the contract requirements. Leighton could not expect MTRCL to unilaterally change the contract terms to accommodate the fact that it was not complying with its terms and requirements. The contract sets out the formal agreement between the parties and any agreed departure from its terms must be thoroughly considered and amended into the contract.

38. The decision to adopt an alternative contractual procedure, based upon the requirements set forth in the PIMS and in the Quality Assurance Plans, should have been established and enforced earlier in the Project once it was recognised that Leighton's promises to provide

the RISC forms clearly were not going to be met. The evidence indicates that this was a continual moving target as MTRCL was following up with Leighton, and Leighton was stating it would provide the RISC forms. As stated above, these reactive PM issues were simply a direct result of Leighton's not providing the RISC forms.

39. The evidence shows that Kit Chan, with MTRCL, was actively monitoring the situation and, quite rightly, singled out both missing and late RISC forms as separate topics which needed to be monitored.

40. In addition, as Mr. Rowsell states in paragraph 23d of the Rowsell Report, by the terms of Contract 1112, CoC Clause 57.4 [C3/1881-1882], Leighton is required *inter alia* by the date stated in the Specification to submit to the Engineer (MTRCL) for Approval a quality plan, which shall set out details of the quality management system to be implemented by Leighton in order to control all design, procurement, manufacture, construction and installation activities required by the Contract. I consider it would be helpful to take into account the following contract clauses as well.

41. The CoC Clause 57.6 [C3/1882] requires that *"Upon the Engineer confirming to the Contractor Approval to the said quality plan it shall be known as "the Quality Plan", and the Contractor shall adhere to the principles and procedures contained in or referred to in the Quality Plan and in any amendments, modifications or additions thereto to which the Engineer's subsequent Approval is given"*.

42. The CoC Clause 57.7 [C3/1882] further sets out that Leighton shall appoint a Site based, suitably qualified and experienced person to act as manager of the quality management system set out in the Quality Plan and shall, from time to time, provide such other personnel and resources as may be required to ensure effective implementation of the Quality Plan.

43. Leighton submitted its Quality Assurance Plan (Revision 02) ("QAP") dated 1 November 2013 to MTRCL[9]. This document sets out how Leighton would manage and control the quality aspects of the works to ensure the requirements for quality during each phase of the project are fully addressed and satisfied.

44. Even though the QAP was addressed in the Original Inquiry, I believe that it is also relevant to the Extended Inquiry because this QAP was in place for the entire duration of the Contract.

[9] CSF No: 1112-CSF-LCA-QUM-000012. [G1/721-788].

In this regard, the contractual provisions imposed upon Leighton in terms of fulfilling the quality management procedures as set out in its QAP are relevant to both the Original Inquiry and the Extended Inquiry as the Leighton QAP was duly approved by MTRCL and MTRCL was entitled to assume that Leighton intended to, and would, comply with it.

45. Mr. Kevin Harman was Leighton's Quality and Environmental Manager at all times during the course of Contract 1112. He was involved in the preparation of Leighton's QAP that satisfies MTRCL's requirements [C35/26713]. However, it seems to me that he did not take full control to ensure the RISC process was properly followed within Leighton's organisation.

46. In accordance with Leighton's QAP paragraph 3.2.3.3 [G1/738], the Quality and Environmental Manager has the authority to implement the approved QAP and take action on quality issues that arise on the project. Further, one of his primary responsibilities is *"monitoring the quality system on a day-to-day basis to make sure that the requirements of the quality plan are operational and effective"*.

47. In his witness statement produced for the Original Inquiry, Mr. Harman expressed the view that *"a completed set of RISC forms and Cast In-Situ Concrete Quality Checklist for an area would confirm that all of the connections between the rebars and couplers in that area had been inspected and approved by Leighton and MTRCL. This is indicated by Leighton representative signing the Cast In-Situ Concrete Quality Checklist (including to the section relating to "reinforcement") and MTRCL's representative signing the RISC form"* [C35/26714/paragraph 10].

48. I understand that in the Extended Inquiry, the evidence regarding the missing RISC forms centered on time pressures and the complexity of the administrative procedure associated with handling the RISC forms. However, based on the testimony[10] from the Original Inquiry, Leighton's personnel would be more familiar with their own quality assurance procedures and forms such as the Cast In-situ Concrete Quality Control Checklist[11]. Therefore, I consider this may have also played a role in terms of explaining why the RISC form procedure was not fully followed by Leighton.

[10] Transcripts from the Original Inquiry [T21/20:22-21:4; T21/21:22-22:1].
[11] Leighton form number: H2601-FRM-LCA-QAL-059.

49. I agree with Mr. Rowsell's comment in paragraph 23e of the Rowsell Report [ER1 (Part 2)/1/18]. However, based on the evidence that I have reviewed, both MTRCL and Leighton's engineer/inspector did co-ordinate and inspect the works, and Leighton did seek MTRCL's verbal consent before Leighton proceeded to concreting. I think it would be helpful also to point out that ITPs indicate clearly where witness points and hold-points are required respectively. I consider the ITP submission processes were properly followed and were unlikely to be a cause of confusion or problems.

3. RESPONSES TO SPECIFIC ISSUES RELATING TO MTRCL PROJECT MANAGEMENT PROCEDURES ARISING FROM THE OBLIGATIONS

3.1 ISSUE A: LACK OF RISC FORMS

50. I concur with Mr. Rowsell's observation with regard to MTRCL's inspection regime as set out in the contract, the specifications, the PIMS documents and the PMP [paragraph 35 of the Rowsell Report] [ER1 (Part 2)/1/22]. Mr. Rowsell states that *"Taken as a whole, the procedures described in the documents would in my opinion, if they had been fully implemented, have provided a robust inspection regime and a good degree of confidence that the works were provided in accordance with specified requirements"*. I agree with this opinion, but even though the best PM system can be established, it still requires Leighton's and MTRCL's project personnel to follow through and implement the established protocols. In this respect, I can only repeat that Leighton caused all of these tribulations by not fulfilling its contractual obligation and submitting the RISC forms. Leighton was reminded numerous times by MTRCL personnel about the problem of missing RISC forms and the need for such forms to be provided to MTRCL timeously, but to no avail.

51. I am aware of Mr. Rowsell's observations in paragraph 36 of the Rowsell Report [ER1 (Part 2)/1/22] concerning the statistics of the available RISC forms at the NAT, SAT and HHS which were reported in MTRCL's Final Verification Study Report [BB16/9952-10000]. On this basis he formed the view that the RISC procedures were not always followed. However, I consider it appropriate to mention that MTRCL engaged WSP, an internationally renowned consultancy firm, to carry out an audit of the structures at the NAT, SAT and HHS to check if the construction works were properly inspected [BB8/5155/paragraph 11].

52. WSP focused on checking and auditing the RISC documentation for the two essential hold-points which were rebar fixing and the pre-pour check. I have reviewed the WSP audit reports for the NAT [BB11/7625-7646], SAT [BB13/9199-9219] and HHS [BB16/10004-10028]. All three reports follow the same audit methodology, comprising Phase 1 and Phase 2.

53. Phase 1 of the audit included a detailed review of each available RISC form for the two essential hold-points. This was to address the necessary records from the perspectives of completeness, relevance, and authenticity [BB16/10016].

54. Phase 2 of the audit comprised the evaluation of supplementary documentation and information that was available to determine, notwithstanding that the RISC forms were inadequate in one or another respect, whether sufficient and satisfactory site supervision of the hold-points could nevertheless be evidenced [BB16/10017]. The supplementary documentation and information comprised the site photos provided by the CM team, site diary entries, and recorded work activities.

55. The intent of the Phase 2 audit was to provide *"a secondary level of confidence that quality supervision had been conducted, by the MTR CM Team, for works where no RISC form can be provided or the RISC form is inconsistent"* [BB16/10017].

56. The WSP audit found that 100% of the essential inspection hold-points for the SAT construction works could be validated through the available RISC forms or the supplementary / supporting information [BB13/9218]. For the NAT, the same validation of the essential inspection hold-points reached 96.1% [BB11/7646] and for HHS reached 88.3% [BB16/10027].

57. The WSP audit report for HHS concluded that "*Given the random nature of the small percentage of hold points across the site construction works where supervision could not be evidenced, and the general weight of evidence that the works on site were being adequately supervised, it is not unreasonable to be confident that the same strong site inspection regime would have been applied to all elements of structure, including those with less compelling physical evidence, as was confirmed verbally by the project staff interviewed during the audit"* [BB16/10027].

58. In my opinion, the WSP audit reports provide another independent view that the works were inspected by MTRCL prior to the subsequent work being allowed to commence, thereby providing assurance that the necessary inspections took place notwithstanding the missing RISC forms.

59. Mr. Rowsell raises pertinent questions regarding why the established and robust RISC procedures were not followed by Leighton and MTRCL [paragraph 37 of the Rowsell Report] [ER1 (Part 2)1/22-23]. He considers that the issue of missing RISC forms should have been *"escalated to MTRCL senior management to address with Leighton senior management"* [paragraph 43 of the Rowsell Report] [ER1 (Part 2)1/25].

60. MTRCL's Kit Chan (Construction Manager) has put forward five reasons from his perspective regarding late / missing RISC forms [T13/130:3-131:9; T14/1:11-2:25]. In terms of the reasons why the established RISC form process was not strictly followed, based on the evidence it was primarily due to the time pressure to maintain work progress and the fact that Leighton would not complete the requisite paperwork until shortly after the relevant inspection had taken place [BB5197/paragraphs 35 and 42; BB5257/paragraph 37].

61. Kit Chan says in his statement that *"I should emphasize that the toleration by MTRCL's CM Team was aimed at facilitating the progress of Leighton's works and avoiding delays and was based on the spirit of co-operation and trust that Leighton would complete the requisite paperwork shortly after such inspection"* [BB11/5197/paragraph 35]. Kit Chan goes on to say in his statement that, *"Initially, Leighton had envisaged that the problem would be resolved soon… the problem of late submissions was in fact not resolved"* [paragraph 39] [BB11/5198].

62. In this regard, I can understand the problems that MTRCL were experiencing in trying to take the necessary actions to resolve the missing RISC form problem which had been created by Leighton. However, and as mentioned above in paragraph 36 above, the Contract and the PIMS do not identify any specific action/step that MTRCL should have taken in this situation. In my view and with the benefit of hindsight, had MTRCL issued an NCR when Leighton repeatedly delayed in submitting the RISC forms this issue may have been addressed.

63. In fact, I agree with what Mr. Rowsell points out in paragraph 37e of the Rowsell Report that *"tolerance of informal and unapproved procedures by MTRCL staff who did not want to be the cause of delays to the programme and went along with the alternative arrangements"*.

64. Leighton's Jeff Lii (Engineer) also gave oral testimony as to why RISC Forms were prepared and submitted late. He also referred to the fact that Leighton was *"under pressure from project progress in which he was lacking behind on RISC forms"* [T7/16:9-17:3]. As the late RISC forms continued to pile up, it appears that Leighton could no longer catch up on the RISC records [T7/34:16-35:11].

65. While it should not have been an excuse, it appears that both parties considered time was of the essence under Contract 1112 and therefore taking steps to suspend work due to

Leighton's late submissions of RISC forms may not have been contemplated or, if contemplated, not thought to be a good idea.

66. Regarding Mr. Rowsell's comment concerning escalating the issue to senior management, Kit Chan had, in fact, raised his concern with Leighton concerning the late submission of RISC forms and required Leighton's input on the Special Request Register as early as in or about May 2015 [BB11/5198/paragraph 38]. The Special Request Register identified two general problems: (1) Leighton was making *"late RISC submission"*; and, (2) Leighton was *"not submitting RISC records inspection requests"* [BB11/5198/paragraph 38]. This initiative of using the Special Request Register continued after Kit Chan's departure from the Project [T13/124:18-129:13; T13/141:7-143:6].

67. Late or missing RISC forms is a vital site PM issue and, in practice, it should be resolved by the site-based Construction Management team. In this regard MTRCL's Kit Chan's testimony in fact showed that he was, as I would have expected, committed to resolving the situation at site level. He says, *"If I try my effort and still cannot resolve the situation, I will report to my general manager"* [T13/138:8-21].

68. In addition, various other members of MTRCL's site staff did take various actions in terms of asking Leighton to attend to the late / missing RISC forms during the course of the construction of the works. For example, as set out in MTRCL's Victor Tung's statement, Dick Kung (SIOW) of MTRCL complained to Kevin Harman, the Quality and Environmental Manager of Leighton, in early December 2014 about late RISC form submissions. Further, CK Cheung (ConE) of MTRCL also complained to Roger Lai of Leighton in May 2015 about the late submissions of RISC forms [BB8/5253/paragraphs 21 and 22].

69. Further, MTRCL's Tony Tang (IOW) made repeated oral complaints to Henry Lai, Chan Hon Sun, and Joe Tam (Construction Manager of Leighton) in relation to the outstanding RISC forms, but to no avail [BB1/126/paragraph 25]. MTRCL's Kenneth Kong even issued an email entitled *"Notice of works/submit of RISF"* on 24 March 2017 to Ian Rawsthorne (Project Manager of Leighton) and copied in a number of Leighton's senior site representatives (including the Project Director) concerning the lack of RISC forms, but again to no avail [BB1/126/paragraphs 26-27]. It is clear, therefore, that the issue was not simply ignored by MTRCL and consistent efforts were made by MTRCL to "escalate" the non-compliance to various senior Leighton people.

70. Thus, despite MTRCL's repeated requests by its site management team members to Leighton's PM team, Leighton did not address properly the issue [T13/124:18-128:11]. The responsibility for rectifying the situation fell on Leighton as Leighton was the originator of the RISC forms. In my view, Leighton did not fully fulfill its responsibilities or approach the issue with the 'spirit of cooperation' I would have expected from an apparently competent contractor.

71. At the end of the day, the fact of the matter is that Leighton persistently failed to respond positively to MTRCL's requests to resolve the issue and MTRCL implemented timeously PM processes to monitor and try and close out this issue. However, at the time, and from my PM perspective, based on all the evidence I have reviewed, in practical terms the missing RISC forms issue did not reach a critical stage where it was considered appropriate to suspend the works pending rectification of this outstanding paperwork. Any decision to suspend the works is not to be taken lightly as it will obviously have a critical impact on the completion of the works.

72. Mr. Rowsell at paragraph 39 of the Rowsell Report comments about the misunderstanding of the partnering / cooperative approach and stresses the need to ensure contractual compliance and to provide training in the application of partnering arrangements. I note that MTRCL's Dr. Peter Ewen acknowledges the training needs and sets out in his evidence the training plans in relation to PIMS and the quality assurance system [BB5173/paragraphs 76 and 78-80].

73. In paragraph 40 of the Rowsell Report, Mr. Rowsell also raise points concerning training. MTRCL has instigated an introduction to the PIMS training module for frontline project staff. The PIMS training module is specific in terms of corresponding to the roles of the frontline staff [BB8/5173/paragraph 78]. Further, MTRCL is developing staff competency mapping. This is to ensure that the responsible staff members possess relevant skills and training to deliver the duties for their specific roles [BB8/5173/paragraphs 79-80].

74. Paragraphs 41 and 42 of the Rowsell Report deal with the use of WhatsApp and the like for assisting with inspections and make the suggestion these arrangements were far too casual and unstructured. I understand from Dr. Peter Ewen's statement that the new technology being introduced by MTRCL (e.g. iComm) will address this issue [BB5166/paragraphs 50-51]. The iComm provides a secure platform for all team members in terms of instant

messaging. MTRCL's site team (both the Construction Engineering and Site Inspectorate teams), MTRCL's design management ('DM") team and the contractor can be included in the message distribution lists, as appropriate. The communication process is traceable enabling the necessary follow up actions to be taken and also permits accurate and up-to-date records to be kept. This initiative aims to bridge the communication gaps between different teams.

75. In addition, Dr. Peter Ewen gave evidence that MTRCL is also developing a number of other digital solutions, including iSuper and iRISC [BB5169/paragraph 59]. The iSuper is a tool for the digitalisation of the RISC form process, as well as for managing NCRs and site diaries. This tool will help resolve the pressing issue about whether or not the hold-points were actually inspected, and which individual signed-off the RISC forms. The iSuper can substantially reduce the risk of inspection records being missed [BB8/5168/paragraph 56]. iSuper is used to facilitate the inspection process in that it can be operated by the frontline staff, as opposed to relying on office-based colleagues to complete the documentation relating to the inspection process. iRISC keeps track of the number of RISC forms that it is necessary for the contractor to submit [BB8/5169/paragraph 57]. iSuper can also track the entire inspection process, including tracking the number of RISC forms submitted; when the RISC forms were submitted; and, how many RISC forms require MTRCL staff's action [BB8/5169/paragraph 58].

76. These are sound improvement initiatives to help alleviate the current concerns raised by the lack of RISC forms which I fully support from a PM perspective.

77. I concur in the point made in paragraph 45 of the Rowsell Report where Mr. Rowsell comments favourably regarding Dr. Peter Ewen's evidence pertaining to enhanced training and cultural development.

78. Mr. Rowsell raises another observation regarding the need for MTRCL to have a system for tracking the inspection process and the RISC forms [paragraph 46, Rowsell Report] [ER1 (Part 2)/1/27]. I consider that such system is, indeed, prescribed in the PIMS document as PIMS/PN/11-4 Monitoring of Site Works paragraph 5.1.2a [B3/1583] provides that *"The SConE/SIOW/SLS shall ensure an administration system is set up to receive, log and monitor the status of inspections and tests"*. Further, paragraph 5.1.2c [B3/1583] of the same PIMS document states that *"If possible, the project specific ePMS system should be used to*

administer this process [RISC process], otherwise the SIOW should set up an independent register to control and monitor the RISC process".

79. Based on MTRCL's Audrey Fung's Police Statement, she was responsible for handling RISC forms and she states that she had organised the information pertaining to RISC forms into a document entitled the *"RISC Form Register"* [BB13/8806/paragraphs 2-3]. The RISC forms were to be generated by Leighton. Leighton would then submit the forms to MTRCL. Audrey Fung would then register the RISC forms before distributing them to MTRCL's SIOW/IOW Kong Wong, Albert Wan, Victor Tung and Ivan Fong [BB13/8809/paragraph A3]. As such, it appears to me that the tracking system which Mr. Rowsell observes was required was already established. It was more a matter as to how personnel followed the established process.

80. I understand that personnel training is being implemented so far as MTRCL's relevant personnel are concerned and MTRCL's Dr. Peter Ewen in the Extended Inquiry gave evidence as to the various steps and initiatives on training that MTRCL as a 'learning' organisation [BB5176/paragraph 87] has and will implement.

81. Mr. Rowsell also suggests that the use of technology solutions for accessing the latest working drawings can better support site surveillance and works inspections [paragraph 138 of the Rowsell Report] [ER1 (Part 2)/1/62]. MTRCL is, indeed, taking action in this regard. Dr. Peter Ewen sets out in his statement at paragraph 57 that *"in order to address the risk of works being checked against the incorrect design data without the knowledge of the DM team, a new digital format of the RISC form has been introduced to also require permission from the DM team before the works can proceed beyond the relevant hold points"* [BB8/5169].

82. It is clear based on the evidence that the root cause of the issue regarding the missing RISC forms was that certain RISC forms were not created or provided by Leighton. If Leighton had produced the RISC forms, then the onus would have been on MTRCL to track and enforce the inspections of the works to which the RISC forms related. However, the fact that Leighton did not provide all the necessary RISC forms to MTRCL contributed to MTRCL's inability to administer and enforce the submission requirements for these missing RISC forms. It bears emphasis that the Contract did require Leighton to follow the RISC process and provide the RISC forms.

3.2 ISSUE B: INEFFECTIVE SITE INSPECTIONS

83. Mr. Rowsell lists out potential contributory factors in terms of the non-identification of defects during the inspection process. He raises a point of resource planning, observing that such planning could help address the quality management issue [paragraphs 48, 52, 53 and 56 of the Rowsell Report] [ER1 (Part 2)/1/29-32].

84. I understand that there is no definite conclusion with regard to why the defects at the stitch joints between Contract 1111 and 1112 were not identified during the inspection process. Leighton's Site Engineer, Henry Lai, confirms that he was responsible for conducting the rebar fixing check for Leighton [CC1/95/paragraph 35, CC6/3787/paragraph 8], yet he was not aware of the coupler incompatibility issue between the interface of Contract 1112 (the Leighton contract) and Contract 1111 (the Gammon contract). He was also not aware of and nor was he told about the series of Interface Meetings extending over a period of years in which the relevant coupler issues had been discussed and, so far as MTRCL was concerned, adequately dealt with. Notwithstanding the above, he *"did not closely inspect the thread inside the couplers installed by the contractor for SCL 1111"* [CC1/95/paragraph 36] and he *"supervised the installation of the rebar but did not pay special attention to the couplers"* [CC1/95/paragraph 37].

85. Under the QSP regime which I evaluated in the Original Inquiry, Leighton as the contractor is obliged to supervise 100% of the splicing assemblies. In light of this obligation, I also raise the same concern as Mr. Rowsell as to why the coupler incompatibility issue went unnoticed during the construction of the relevant works.

86. MTRCL's obligation is to supervise only 20% of the splicing assemblies. As set out in MTRCL's Closing Statement, with which I respectfully agree, *"it was not MTRCL's staff's responsibility to conduct any 'man-marking' or continuous supervision over the rebar fixers when they were conducting their works"* [paragraph 29.6 of MTRCL's Closing Statement] [CA1/4.2/19].

87. Given different couplers had to be installed at the stitch joints between Contract 1111 and Contract 1112 (i.e. Lenton couplers in Contract 1111 and BOSA couplers in Contract 1112), the existence and use of Method Statements which Leighton would have prepared may have assisted Leighton's and MTRCL's staff members in the installation and inspection process. MTRCL's Construction Manager for SCL, Michael Fu, covered the fact that there were no

Method Statements for the installation procedures of the stitch joints as there were for the stitch joint remedial works. However, if Leighton had prepared the necessary Method Statements, then the installation process would have been made clearer and MTRCL's inspectors would have been able to better understand and comment upon the method adopted to construct the stitch joints, as well as ensuring that the quality of the works conformed to the requisite standards[12].

88. Notwithstanding, it needs to be borne in mind once again that these types of construction projects are complex in nature and require continual co-ordination and contributions from a number of diverse workforces. It is almost impossible to be error free in terms of workmanship. As Mr. Rowsell and I pointed out in our First PME Joint Statement for the Original Inquiry, *"It is common that some mistakes or oversights will inevitably be made in the performance of the works of such scale and complexity. However, procedures should be in place to mitigate errors and enable the works to be executed in a professional manner"* [paragraph 5 of First PME Joint Statement] [ER1 (Part 1)/9-T-1].

89. Based on the evidence given by Karl Speed, Leighton's General Manager, Leighton's representatives attended the Interface Meetings and they knew that Lenton couplers were being used on Contract 1111. However, he considered that there was a *"communication breakdown"* within Leighton so far as such requirement was concerned[13]. Previously, in his testimony he had said that if Lenton couplers were used on the Gammon side of the stitch joint, it was Leighton's responsibility to ensure that the tapered threaded rebar which had to be used in conjunction with such couplers was ordered and supplied[14]. From a PM perspective, I respectfully agree.

90. Chris Chan of MTRCL stated that his understanding from attending the Interface Meetings was that everybody in attendance knew that Lenton and BOSA couplers may not be compatible and it was agreed that Leighton would check on their compatibility, and that MTRCL was not obliged to check for compatibility but to ensure that the two contractors talked about the issue of brands, which objective it achieved[15]. Kappa Kang of MTRCL also attended the Interface Meetings and gave evidence to identical effect as to who would check the compatibility of the couplers[16].

[12] [T11/43/14-46/19]
[13] [T8/51/1-53/8]
[14] [T8/13/1-14/23]
[15] [T11/82/11-83/12]
[16] [T12/11/4-22].

91. As stated in MTRC's Closing Statement,[17] *"Unfortunately, none of the LCAL witnesses could offer a satisfactory explanation for not remembering and/or taking into account the need to order compatible rebar for use with the Lenton couplers at the interface between Contracts 1111/1112"*.

92. MTRCL's Chris Chan, who personally attended many of the 1111/1112 Interface Meetings [BB109/paragraph 12], gave his testimony that MTRCL attended the Interface Meetings in a monitoring role to manage the contractors and ensure that they were able to exchange enough materials and information for their own works, which would include materials, monitoring and design, and to resolve any difficulties arising [T11/70:4-21].

93. It is clear the Interface Meetings were continually conducted and correspondence went back and forth about the different types of couplers; however, the contractors for Contract 1111 and 1112 did not resolve the problem between themselves before the Lenton and BOSA couplers were actually installed. From a PM perspective, once Leighton realised different brands of the couplers (Lenton vs BOSA) were required, Leighton should have taken the necessary steps to reconcile the coupler incompatibility issue. In such a situation, it would warrant having a specific method statement prepared by Leighton.

94. To resolve the potential contributory factors as identified by Mr. Rowsell in paragraph 52 of the Rowsell Report and improve the inspection process and quality management, I observe that MTRCL has already taken the various proactive measures as set out in Dr. Peter Ewen's statement [BB5164/paragraph 44]. These measures include:

(1) Digitalisation of the site inspection process and the adoption of BIM;
(2) Enhanced training of frontline staff for better implementation of PIMS;
(3) Enhancements to the quality assurance system; and
(4) Fundamental revision of PIMS.

95. It appears to me that MTRCL's initiative of developing and launching iComm, iSuper and iRISC will help alleviate many of the issues associated with the current RISC form process and serve to improve the site supervision, quality inspection as well as site communication. I have set out my comments regarding iComm, iSuper and iRISC in paragraphs 74 and 75 in this report.

[17] 7.12 [CA1/4.2/6]

96. Another factor is that as the new digital format of the RISC form is evolved, MTRCL's DM team will be required to be involved in the RISC process. This is because the new digital RISC form requires permission from the DM team before the works can proceed beyond the relevant hold-point. It is to safeguard that the correct design data is being used in the actual construction of the works [BB8/5169/paragraph 57].

97. The iRISC appears to answer Mr. Rowsell's query about inspection planning in paragraph 35 of the Rowsell Report. The main purpose of iRISC is to keep track of the number of RISC forms that is necessary for the contractor to submit [BB8/5169/paragraph 59]. The iRISC will be used to track the actual number of submitted RISC forms against the estimated number of RISC forms during the preparation of ITPs.

98. In addition, Mr. Rowsell raises a few observations regarding *"develop a forward programme of the RISC inspections that would be required which would have helped with resource planning"* in paragraphs 46, 49 and 50 of the Rowsell Report. Mr. Rowsell also refers to resource management in PIMS/P/11/A3 Construction Management paragraph 5.3.2 [B3/1382]. This paragraph provides that the Construction Manager shall offer and provide appropriate assistance or advice to the Contractor, with respect to the level of resources and plant, wherever possible, for the benefit of the Project, taking into consideration the Contractor's experience and performance.

99. This guideline aligns with typical large-scale international projects where the owner and/or its agent (the Project Manager, Construction Manager or Engineer) regularly monitor the progress of the works performed by the contractors. When it is evident that the contractor's resources in terms of labour, equipment and plant are not sufficient to stay on schedule or catch up with the work progress, an experienced Project / Construction Manager would raise his concern with the contractor. Nevertheless, it bears emphasis that it is the contractor's decision on resource deployment. If the progress is affected due to the contractor's lack of resources, then the contractor is liable for the potential delay damages.

100. It is also a common practice to have a so-called 'look ahead programme' prepared by the contractor, setting out what construction activities the contractor is going to perform in the near future. Such a 'look ahead programme' also gives the owner (or Project Manager) a tool to monitor the contractor's progress and to anticipate the upcoming inspections.

101. In terms of managing large scale construction projects, it is unlikely that the Project Manager / Construction Manager will intervene with the contractor's internal resource allocation as such allocation would relate to the contractor's commercial management of the contract. The Project Manager / Construction Manager would only raise a concern with the contractor prudently when the progress of works is seriously affected.

102. As for the resource planning for carrying out RISC inspections, MTRCL had its site inspection team carrying site surveillance at all times. They were aware of site progress and other issues arising out of the construction of the works. They were available for attending inspections when they were notified by Leighton. MTRCL also had its construction engineering team closely monitoring and administering the construction works. Leighton would notify them for the necessary hold-point inspections.

103. In light of the above, I have not seen any evidence concerning a lack of resources so far as MTRCL is concerned. The 'root cause' of the missing RISC forms in my opinion was the responsibility of Leighton, who did not prepare the RISC forms or, if it did, submit them timeously.

104. Mr. Rowsell raises another key consideration regarding training on the quality system [paragraph 45 of Rowsell Report] [ER1/1/26]. This type of training is always welcomed in the construction industry. I note that MTRCL's Dr. Peter Ewen also acknowledges such training needs and sets out in his evidence MTRCL's training plans in relation to the PIMS and the quality assurance system [BB5173/Paragraphs 76-80].

105. In many international construction and civil engineering projects, the owner team often would benefit by having a quality inspection team which reports directly to senior management and which is independent from the construction team. In this regard, I am encouraged to see that MTRCL is going to enhance its quality assurance system by appointing a Quality Manager who will report independently through a General Manager to the Engineering Director [BB8/5174/paragraph 81(2)].

106. Under the Quality Manager, there will be both a Monitoring and Verification Section and an Auditing Section. This team structure appears to be strategically set up to address the issues which have been identified in relation to RISC forms and the inspection processes. As such, in my view this represents a positive step in addressing the concerns and observations raised by Mr. Rowsell.

107. MTRCL is committed to fundamentally revising its PIMS. In this regard, I fully concur with MTRCL's Dr. Peter Ewen's statement that *"MTRCL is a 'learning' organization which makes continuous efforts to develop and enhance its management systems and that MTRCL has a track record of learning not only from its many successes, but also from the many challenges faced in its project"* [BB8/5158/paragraph 22].

108. In paragraph 52(l) of the Rowsell Report, Mr. Rowsell observes that *"doubt has been expressed as to whether some inspections actually took place."* In this connection, I have reviewed the PIMS for quality hold point inspections. The PIMS document PIMS/PN/11-4 Monitoring of Site Works [B3/1581-1717] sets out the definition of Quality Hold Points [PIMS/PN/11-4, paragraph 3.1] [B3/1582]. A Quality Hold Point is *"a point in time when a notice of permission, consent or no objection by the Engineer is required or an approval or consent by a Relevant Authority or Utility Undertaker is required before the Contractor can commence, proceed with or terminate an activity"*. This definition gives emphasis to getting the Engineer's notice of permission, consent, or approval before the contractor is allowed to proceed further on the works.

109. Based on my review of the witness statements [CC6/3787/paragraphs 8-9; CC6/3788/paragraphs 11-12; BB8/5252/paragraph 18], it is my opinion that MTRCL's site staff (SIOW/IOW/ConE) were consistent in stating that they would have to give consent to Leighton before Leighton proceeded with the works by pouring concrete. Leighton's witnesses also gave evidence to the same effect i.e. that they would seek and await MTRCL's consent before proceeding to the next stage [CC1/97/paragraph 44].

110. MTRCL's Kit Chan (Construction Manager) gave evidence in his statement and oral testimony [BB8/5196/paragraph 34; T13/115:19-118:13] that it would be unlikely that Leighton would be able to proceed with the concreting work without MTRCL's site staff noticing as the crews who did the concreting were different from those who did the rebar fixing operations.

111. As such, I consider that inspections were made at the hold-points albeit that the RISC forms may have been missing or not provided timeously. In addition, the WSP audit reports which I discussed in Section 3.1 above also validated and provided assurance that the necessary inspections have been taken place.

112. In paragraphs 27 and 53 of the Rowsell Report, Mr. Rowsell makes observations about the notice period for inspection. Based on the evidence that I have seen, generally Leighton would inform MTRCL's site team a day in advance of the need for the inspection to take place and it appears that such period was sufficient for both parties.

113. I agree with paragraph 54 of the Rowsell Report that there is *"no evidence to indicate that the Contractor sought formal approval to an alternative procedure to replace the RISC form procedure."*

114. Paragraph 57 of the Rowsell Report refers to a part of MTRCL's oral opening by its counsel [T2/63:6-10] from which Mr. Rowsell apparently deduces that only the construction engineers had access to the latest drawings as well as the fact that not all of the inspection teams had access to the most up-to-date drawings, a matter which concerns him. Having reviewed the part of MTRCL's oral opening to which Mr. Rowsell refers, it is plain to me that there was no statement by MTRCL's counsel that *only* the MTRCL construction engineers had access to the latest or most up-to-date drawings.

115. Sebastian Kong, who was a junior engineer from MTRCL, explains in paragraph 9(b) of his statement [BB8/5244-5245] how the rebar fixing hold-point inspections were conducted and explains that before he went on site to carry out an inspection, he and his fellow inspectors had to make sure that they had with them the most up-to-date working drawings, together with any relevant design amendment sheets as well as any responses to RFIs for the relevant works to be inspected, to which he and his fellow workers had electronic access through the ePMS system. Sebastian Kong goes on to say that during the course of the inspections the diameter, spacing, layering and lapping of the rebars being fixed, and the arrangement of starter bars (if any) and shear links (if any), would be checked against the working drawings for compliance therewith.

116. It was obviously important that the MTRCL persons who were responsible for inspecting the rebar fixing works had the most up-to-date working drawings and the relevant design amendment sheets and the RFI responses so that so that they could be used for the purposes referred to by Sebastian Kong.

117. I mentioned in paragraph 115 the ePMS. The ePMS is an electronic Project Management System with PM functions which is maintained by MTRCL. The PIMS document PIMS/PN/11-4 Monitoring of Site Works paragraph 5.4.1 [B3/1586] sets out that the ePMS *"is to be used by the Consultants, Contractors and all staff involved in projects managed by*

Projects Division for capturing, sharing, storing, controlling, managing and archiving of incoming and outgoing project documents throughout the project life cycle".

118. According to the PIMS document PIMS/PN/09-5 Production and Management of Drawings paragraph 5.1.5 [B20/20471], *"the most current set of 'controlled' set(s) of drawings (e.g. Corporation's drawings issues to Contractors or working drawings from Contractors which can be tracked through ePMS) are maintained and made available to the project team for day to day coordination and reference purpose throughout the project stages"*.

119. Proceeding on this basis and in responding to Mr. Rowsell's comment in paragraph 57 of the Rowsell Report, I am content that all MTRCL's site staff from both the construction engineering team (i.e., SConE/ConE) and the site inspectorate team (i.e., SIOW/IOW/AIOW) in fact had access to the available latest working drawings through MTRCL's ePMS.

120. I agree with paragraph 58 of the Rowsell Report pertaining to training / guidance for junior engineers and inspectors and for them to be accompanied by their seniors in order to ensure the junior members were competent and knew what they were doing and were following appropriate procedures. In fact MTRCL had done so with some of its junior ConEs as reflected in Sebastian Kong's statement paragraphs 9-10 [BB5244-5245].

3.3 ISSUE C: LEADERSHIP, COMMITMENT AND CULTURE

121. I agree with Mr. Rowsell's observations as set out in paragraphs 62-68 of the Rowsell Report. In fact, so far as I am concerned MTRCL's PM team did emphasise safety as a paramount consideration at all material times.

3.4 ISSUE D: GENERAL SITE SUPERVISION AND RECORD KEEPING

122. I agree with Mr. Rowsell's observations as set out in paragraph 69 of the Rowsell Report.

123. In responding to paragraph 76 of the Rowsell Report, the evidence shows the IOWs take numerous photos for their daily tasks. Those photos are considered to be relevant to record-keeping of daily site surveillance and site progress and were uploaded onto MTRCL's project server.

124. With regard to paragraph 77 of the Rowsell Report where Mr. Rowsell supports the wider use of digital systems for communication and record-keeping, MTRCL's Dr. Peter Ewen has set out a whole number of initiatives that MTRCL is undertaking in terms of using technology for the purpose of enhancing site supervision [paragraphs 45-75 of Dr. Peter Ewen's Statement].

3.5 ISSUE E: INTERFACE MANAGEMENT AND PLANNING

125. I agree with paragraph 80 of the Rowsell Report that *"the overall co-ordination is normally the Contractor's responsibility, MTRCL's CM is required to maintain close liaison with all internal and external interfacing parties and take timely action to intervene or expedite the works where appropriate."*.

126. I also agree with Mr. Rowsell's observation as set out in paragraph 86 of the Rowsell Report that *"the PIMS Construction Management guidance provide good procedures aimed at minimising the interface risks"*.

127. By reviewing Table Z2.1.2 Exchange of Design Information [BB1/429] as enclosed in Appendix Z2 of the PS, it appears to me that Leighton did not carry out the interface obligations as set out in Item 1.3 (see below). This can be observed by reason of the fact that there was a lack of a specific method statement for dealing with the stitch joints.

Interface Item	By 1111 Contractor	By 1112 Contractor	Purpose of Interface
1.3	To provide the necessary detailed drawings showing the As-built for temporary works, permanent works, waterproofing, drainage, structure, couplers, monitoring points and sequence at the Interface Location,	To review and take into account of the information provided by 1111 Contractor in his construction sequence and method statement for Contract 1112.	To review and confirm the information for planning the sequence and method statement at the Interface Location.

128. In addition, I agree with paragraph 87 of the Rowsell Report [ER1 (Part 2)/1/43-46]. However, I consider that it is helpful to refer to the testimony of Joe Tam, Leighton's Construction Manager, who confirmed that the interface meeting minutes were available to Leighton through ePMS [T8/164:19]. In Leighton's Closing Submissions at paragraph 48 [CA1/3.1/21], Leighton acknowledges that its staff by their attendance at the interface meetings ought to have known that Gammon's couplers were Lenton type couplers but, unfortunately, omitted to pass such information to Henry Lai who was the responsible

engineer. It is, therefore, my opinion that the procedures and systems put in place by Leighton were inadequate for effective interface management since there was no reliable method to handle transmitting specific design information for each interface point.

129. Regarding the regular / fortnightly interface meetings and the interface workshop as raised in paragraphs 82d, 87b and 87c of the Rowsell Report, I agree that it would be helpful to have regular meetings and workshops in dealing with interface issues. However, following upon these meetings/workshops, it would be important to make sure the issues identified were followed up by the appropriate parties. On the coupler issue, it is apparent that information discussed in the interface meeting and designated for Leighton's attention and action was not passed through to Leighton's site staff (Henry Lai) who was responsible for rebar inspection [T5/1:16-3:13].

130. I agree with paragraph 82e of the Rowsell Report in that Leighton was responsible for coordination, preparation and execution of inspections.

131. I also agree with paragraph 87g of the Rowsell Report [ER1/1/45]. I would go on to add that it should have been obvious that the coupler caps indicated something different in terms of the couplers, since one was yellow (Lenton) and the other was red or blue (BOSA). There were joint inspections regarding e.g. the handover of interfacing areas from Gammon to Leighton. Therefore, it was Leighton's responsibility to identify the coupler incompatibility issue and rectify the problem before proceeding with the works.

132. I agree with Mr. Rowsell's overall opinion in terms of this interface issue as set out in paragraph 89 of the Rowsell Report [ER1/1/46].

3.6 ISSUE F: TESTING OF REINFORCEMENT STEEL

133. I see that in paragraph 91 of the Rowsell Report [ER1 (Part 2)/1/47], Mr. Rowsell appears to be of the opinion that the only relevant reinforcement steel testing references are those referred to therein. I also concur with Mr. Rowsell as set out in paragraph 107 of the Rowsell Report that *"… whilst the specific testing requirements for the Contract were not fully achieved, the successful testing of 93% of the steel delivered to site should give a good degree of confidence that the reinforcing steel used in the project has met the required standards."*.

4. RESPONSES TO PART 3: ROWSELL'S OPINIONS ON STRENGTHENING SYSTEMS FOR SUPERVISION, MONITORING, CONTROL AND MANAGEMENT

135. Mr. Rowsell sets out his opinions with regard to strengthening the supervision, monitoring, and control and management systems in paragraphs 130-169 of the Rowsell Report. Set out below are my opinions on these matters which I hope will benefit the Commission.

Leadership and Culture

136. From the Original Inquiry, it is known that *"MTRCL has appointed Turner & Townsend as an independent consultant to review MTRCL's Project Integrated Management System (PIMS) and other related factors and provide recommendations on the improvement of future projects"* [B17/24424].

137. MTRCL has already received a recommendation from T&T to re-write the PIMS policy so that it contains a distinct quality policy statement, with the policy signed by MTRCL's Board and displayed across MTRCL's sites and offices [B17/24426].

138. T&T's Interim Report goes on to say that by re-writing this policy, the MTRCL Board would demonstrate publicly that quality is a clear priority and it would give a strong message to all MTRCL's sites and offices in terms of such priority [B17/24441], and the Board should sign this new PIMs in order to underpin management's commitment to quality [B17/24441].

139. Furthermore, Dr. Peter Ewen testified on behalf of MTRCL that the Capital Works Committee (CWC) *"took action immediately to implement the T&T Interim Report"* [BB8/5162] and *"MTRCL's Executive Committee endorsed this approach in November 2018 and set up a Special Taskforce to oversee the implementation process"* [BB8/5162].

140. T&T has already recommended that MTRCL's leadership should openly re-prioritise and communicate the importance of *"Quality"* by *"Build it right, build it safe"* [B17/24429]. Also, T&T recommended that encouraging a culture of quality should be a priority task for the project quality team, by including quality issues and NCRs in toolbox talks, in the same way that safety messages are already communicated [B17/24428].

141. Dr. Peter Ewen also testified that the MTRCL Executive Committee had set up a Special Taskforce *"drawn deliberately from both MTRCL's Projects and Engineering Divisions"* [BB8/5162] that had already undertaken the following work:

"(1) To establish a high-level implementation programme for addressing T&T's recommendations;
(2) To identify and appoint individual owners to champion or support implementation of T&T's recommendations;
(3) To seek the Executive's direction on strategic related recommendations prior to implementing detailed actions;
(4) To provide guidance to drive action owners to ensure recommendations are appropriately addressed in a timely manner; and
(5) To provide regular progress updates to the Executive". [BB8/5162]

142. In addition, Dr. Peter Ewen testified that *"MTRCL has already taken steps to action each and every one of the recommendations contained in T&T's Interim Report"* [BB8/5163]. Therefore, I consider MTRCL is acting in a proactive manner to improve upon its PM system.

RISC Form and Inspection Procedures

143. In relation to the RISC form and inspection procedures, Mr. Rowsell suggests that MTRCL should consider *"single source covering requirements on individual projects"* [paragraph 136 of the Rowsell Report] [ER1 (Part 2)/1/62]. In the First PME Joint Statement prepared for the Original Inquiry, it was agreed that MTRCL should *"review the current documents containing requirements in relation to supervision duties and aim to produce an all-inclusive supervision manual accessible to all involved in supervision duties and produced in multi-languages as required"* [paragraph 28b of the First PME Joint Statement] [ER/9/T-5]. Mr. Rowsell also raises a point regarding MTRCL's site staff's access to the latest working drawings [paragraph 138 of the Rowsell Report] [ER1 (Part 2)/1/62]. However, as set out in paragraphs 115-119 above, MTRCL's evidence was that such access is already available through ePMS, and this certainly accords with my understanding of the matter.

144. Mr. Rowsell again sets out his view that the ITP should be used to support MTRCL's resource planning and to monitor when inspections are expected [paragraphs 33, 34 and 139 of the Rowsell Report] [ER1 (Part 2)/1/62]. The new iRISC will serve the purpose of monitoring the number of inspections [BB8/5169/paragraph 60]. The iRISC will also track

the number of RISC forms actually submitted by the contractor and compare the estimated number of RISC forms from the ITP [BB8/5169/paragraph 60].

145. For handling non-compliances [paragraph 140 of the Rowsell Report] [ER1 (Part 2)/1/62-63], it was agreed as set out in the First PME Joint Statement [paragraph 22] [ER1 (Part 2)/9/T-4] that *"NCR need not be issued if the defective work is identified, corrected and immediately signed off on the same day. However, all site supervision and construction engineering teams should be made aware of this defective work and put on notice. If such defective work occurs again, an NCR should be issued"*.

Training and Development of Staff

146. Mr. Rowsell offers a number of suggestions with regard to staff training [paragraphs 141-146 of the Rowsell Report] [ER1 (Part 2)/1/63-64]. Based upon MTRCL's Dr. Peter Ewen's statement [BB5173/paragraphs 76-80], it appears to me that many ongoing and upcoming initiatives undertaken by MTRCL are aligned with Mr. Rowsell's suggestions.

147. MTRCL has established an internal working group named "*Project Division Quality Working Group" ("PDQWG"). This group is to "promote a sustainable quality culture amongst frontline construction teams for a high degree of compliance with statutory requirements and PIMS requirements in the areas of communication and site inspection"* [BB8/5173/paragraph 77]. This is a positive action in terms of addressing issues that are central to the Original and Extended Inquiries.

148. MTRCL has also launched a PIMS training module for its frontline staff in the Projects Division. This training module guides the staff through the PIMS system and its implementation. The PIMS covers a range of very wide topics on PM, but not all topics are relevant to individual staff's roles and responsibilities. As such, MTRCL has held job-specific training for frontline staff on the specific PIMS that relate to their current roles on site [BB8/5173/paragraph 78]. Further, there will be PIMS training for staff that corresponds to the nature of works. This, in my view, helps reinforce the frontline staff's knowledge in terms of how to implement the PIMS, which is a robust and well–established body of procedures, in the performance of the works.

149. Finally, MTRCL is also going to develop a staff competency mapping and training for the specific roles that the Project's staff members perform [BB8/5173/paragraph 80].

PIMS Procedures and Documentation

150. Mr. Rowsell discusses the use of technology for site record keeping. Based upon Dr. Peter Ewen's statement [BB5166/paragraphs 50-52], MTRCL has taken initiatives to develop a number of electronic platforms to enhance site record keeping. These electronic platforms include: iComm and iSuper.

151. I have discussed iComm and iSuper in previous sections of this report. In addition, MTRCL is also adopting BIM for design and PM as well as future maintenance, including quality management [BB8/5171/paragraph 68, BB5171/paragraph 73]. The BIM will connect to other digital management tools such as iComm and iSuper for enhanced site management and inspection [BB8/5171/paragraph 70]. MTRCL will also provide BIM training to its engineering and construction staff.

MTRCL's Organisational Roles

152. I note that T&T carried out a 'Health Check' in May 2019 [BB16/9746-9772]. I regard this 'Health Check' as a status update on the progress of the implementation of the recommendations made in T&T's Interim Report as provided to MTRCL's Executive Committee in October 2018.

153. The 'Health Check' reveals that MTRCL's Executive Committee has approved a re-organisation by adding an independent QA team in the Engineering Division. This re-organisation offers a better system of 'checks and balances' and enhances the '3 lines of defence' policy for quality management. The '3 lines of defence' includes: 1. Site QA/QC; 2. MTRCL's 'Independent' QA; and 3. External Audit / Support [BB16/9753]. This '3 lines of defence' is also set out in Dr. Peter Ewen's statement [BB8/5174]. I concur that this important re-organisation will significantly strengthen MTRCL's quality management. The second line of defence comprises a site based Monitoring and Verification team and an office based audit team under a Quality Manager's management. Their independence from the construction team will offer a much better check and balance on quality management.

Interface Risk Management

154. I agree with the observations set out in paragraphs 156-160 of the Rowsell Report. However, I understand from Dr. Peter Ewen's statement that MTRCL is going to adopt BIM on its projects which will help dealing with the interface issues [BB5171/paragraph 67 and 74].

Investigating Failures

155. I agree with paragraph 163 of the Rowsell Report. However, I wish to point out that the current NCR guidelines as set out in PIMS/PN/11-4 Exhibit 7.9/2 requires that *"Each Works NCR shall include corrective and preventive actions appropriate to the Works NCR. All actions shall be accompanied with a target completion date."* From my view, in order to come up with preventive actions, the contractor needs to investigate and evaluate the root cause of the issues which gave rise to the NCRs.

Expert's Declaration

I, STEVE HUYGHE DECLARE THAT:

1. I declare and confirm that I have read the Code of Conduct for Expert Witnesses as set out in Appendix D to the Rules of High Court, Cap. 4A and agree to be bound by it. I understand that my duty in providing this written report and giving evidence is to assist the Commission. I confirm that I have complied and will continue to comply with my duty.

2. I know of no conflict of interests of any kind, other than any which I have disclosed in my report.

3. I do not consider that any interest which I have disclosed affects my suitability as an expert witness on any issues on which I have given evidence.

4. I will advise the Commission if, between the date of my report and the hearing of the Commission, there is any change in circumstances which affect my opinion above.

5. I have exercised reasonable care and skill in order to be accurate and complete in preparing this report.

6. I have endeavoured to include in my report those matters, of which I have knowledge or of which I have been made aware, that might adversely affect the validity of my opinion. I have clearly stated any qualifications to my opinion.

7. I have not, without forming an independent view, included or excluded anything which has been suggested to me by others, including my instructing solicitors.

8. I will notify those instructing me immediately and confirm in writing if, for any reason, my existing report requires any correction or qualification.

9. I understand that:

(a) my report will form the evidence to be given under oath or affirmation;

(b) questions may be put to me in writing for the purposes of clarifying my report and that my answers shall be treated as part of my report and covered by my statement of truth;

(c) the Commission may at any stage direct a discussion to take place between the experts for the purpose of identifying and discussing the issues to be investigated under the Terms of Reference, where possible reaching an agreed opinion on those issues and identifying what action, if any, may be taken to resolve any of the outstanding issues between the parties;

(d) the Commission may direct that following a discussion between the experts that a statement should be prepared showing those issues which are agreed, and those issues which are not agreed, together with a summary of the reasons for disagreeing;

(e) I may be required to attend the hearing of the Commission to be cross-examined on my report by Counsel of other party/parties;

(f) I am likely to be the subject of public adverse criticism by the Chairman and Commissioners of the Commission if the Commission concludes that I have not taken reasonable care in trying to meet the standards set out above.

Disclaimer

I understand that this report will be made available to the Commission. This report has been prepared solely for that purpose. Neither I, nor CORE International Consulting, LLC, accepts or assumes responsibility for any other purpose, or to any other person to whom this report is shown, or into whose hands it may come save where expressly agreed by my prior consent in writing. I reserve my right to review any additional data and/or information provided by any party in relation to this dispute and, if necessary, revisit and possibly amend my analyses, opinions, and reports.

Statement of Independence

I have no conflict of interest with regards to providing an independent opinion in this matter.

Statement of Truth

I confirm that I have made clear which facts and matters referred to in this report are within my own knowledge and which are not. Those that are within my own knowledge I confirm to be true. I believe that the opinions expressed in this report are honestly held.

_____

Steve Huyghe

21 September 2019