# COMMISSION OF INQUIRY INTO THE CONSTRUCTION WORKS AT AND NEAR THE HUNG HOM STATION EXTENSION UNDER THE SHATIN TO CENTRAL LINK PROJECT

## CLOSING SUBMISSIONS FOR LEIGHTON

## A. The as-built works in the NAT, SAT and HHS are safe

1. As Counsel for MTRCL submitted in opening:-[1]

> *"... on the current evidence there are no concerns with the overall structural safety or indeed the integrity of NAT, SAT or the Hung Hom Stabling Sidings. I also point out in this regard that they show no signs of [distress], and there's no signs of distress in other structures either. That's confirmed by Pypun's recent site inspections."*

2. The NAT Stitch Joints were rectified and are safe.[2] The Government and PYPUN have verified the rectification works.[3] The Shunt Neck Joint will be rectified.[4]

3. The outstanding RISC forms do not impact safety because other site records and sworn witness evidence from the engineers and inspectors confirm that the hold point inspections were carried out and completed. Leighton witnesses confirmed that in respect of the areas that they were responsible for: (1) all formal joint inspections for rebar fixing and pre-pour checks were carried out and approved

[1] Day 2/82:12-18
[2] William Holden w/s §52 [CC1/79]
[3] Lok Pui Fai w/s §17 [DD7/10275]; Day 15/97:12-18
[4] The Government have accepted the remedial proposal: Lok Pui Fai [Day 15/99:11-13]

by MTRCL; and (2) concrete was poured only after hold points were inspected and MTRCL authorised Leighton to proceed.[5] MTRCL witnesses corroborated the above account.[6]

4. Other supporting evidence included:-

(1) photographs taken during the routine inspections;

(2) exchanges between ConEs and IoWs in WhatsApp groups;[7]

(3) site diaries;[8]

(4) concrete test results;[9] and

(5) permits to load (TW4).[10]

5. The concrete pour by Leighton's subcontractor at the VRV (Variable Refrigerant Volume) room before rectifying the defects identified in the rebar inspection [11] did not give rise to safety concerns: as

[5] Raymond Tsoi w/s §23 [CC6/3796]; Sean Wong w/s §22 [CC6/3806]; Jeff Lii w/s §25 [CC6/3815]; Alan Yeung w/s §26 [CC6/3825]; Saky Chan w/s §22 [CC6/3845]; Ronald Leung w/s §22 [CC6/3833]; Daniel Teoh w/s §26 [CC10/6503]. There is only one conflict between Henry Lai (Leighton) and Chris Chan (MTRCL) regarding who of MTRCL had conducted the formal inspections, but that is irrelevant for the purpose of this Inquiry for the reasons discussed below.
[6] Chris Chan w/s §§19-20 [BB1/115]; Kappa Kang w/s §§10-11 [BB14/9465]; Tony Tang w/s §§16-17 [BB1/125]
[7] Kappa Kang [Day 12/13:23-14:5]
[8] As remarked by the Chairman [Day 8/29:24-30:11], the site diaries confirmed both Leighton and MTRCL were aware of day-by-day individual building of different kinds on site and that they had such knowledge because they watched the works happening
[9] See concrete test results in NAT Records [CC6/3866], SAT Records [CC8/4399] and HHS Records [CC9/5657 and CC11/7003.1]. They prove the date of the concrete pours in the relevant areas and confirm that MTRCL was aware of the pours: Raymond Tsoi w/s §22 [CC6/3796]
[10] See TW4s in NAT Records [CC6/3866], SAT Records [CC8/4399] and HHS Records [CC9/5657 and CC11/7003.1]. A TW4 will only be issued after Leighton's Temporary Works Coordinator had inspected and approved the formwork: Raymond Tsoi w/s §22 [CC6/3796]
[11] Ronald Leung [Day 10/24:9-20]

MTRCL confirmed, that room occupies a very small area, and there is no structure to be built upon it.[12]

## B. Construction of the NAT Stitch Joints and Shunt Neck Joint

6. W&K admitted that for some of the threaded ends it had not screwed them in at all, and for some of them it had only screwed them in partially. Irrespective of the question (separately discussed below) as to whether W&K had been instructed by Henry Lai to do so (which is denied by Henry Lai[13]), it cannot be disputed that its defective workmanship at the NAT Stitch Joints and Shunt Neck Joint was the direct cause of the defective connections of the rebar and couplers.[14]

7. As the Chairman pointed out to Ng Man Chun, it was "very poor workmanship" by W&K, and this was accepted by W&K. Indeed, W&K even openly claimed to be prepared, on the (disputed) verbal instructions of a junior engineer, "not to do a safe and efficient job".[15] See the further exchanges below:-[16]

> *"CHAIRMAN: All right. So how have I got that wrong? It doesn't sound too professional to me, I must be honest, as a layperson. You are faced with a row of couplers which cannot be properly fixed to the reinforcing bars, and I've done the same thing here and, as you say, it just barely fits in. You were prepared to do that right the way along a section of the wall; correct?*

[12] Michael Fu [Day 11/38:9-18]
[13] Henry Lai w/s §§8-10 [CC10/6507]; Day 5:34:4-8
[14] Day 3/96:7-23; Day 3/120:13-121:7
[15] Day 3/120:8-11
[16] Day 3/120:13-121:7

*A: Yes.*

*CHAIRMAN: And as far as the concreted sections were concerned, where the couplers had not been opened up, you were prepared effectively not to insert the rebars there either, because you weren't going to chip away the concrete yourself; correct?*

*A: No, we are not responsible for chipping away the concrete.*

*CHAIRMAN: All right. So, as I understand it, there were two examples of very poor workmanship, correct, on your part?*

*A: Yes, you can put it that way.*

*CHAIRMAN: Yes, exactly. Thank you."*

8. There is a clear conflict between the evidence of W&K and that of Henry Lai. W&K alleged that their workers acted on the verbal instructions of Henry Lai. This is unbelievable (and thus untrue) for the following 10 reasons.

9. First, it would be incredible for Leighton to give such instructions, when the defective works would be rejected by MTRCL if they were identified at the routine or hold point inspections.

10. Contrast W&K's allegations with the detailed inspection process carried out by Leighton and MTRCL at the SAT as described by Pun Wai Shan of Fang Sheung:-[17]

[17] Day 2/111:17

*"A. It depends on the situation, whether it is complicated. If it is relatively simple, it would take a very short time. They count the rebars, they look at the couplers, whether the rebars were put in the wrong place, and that would complete the first, initial step.*

*Q. All right. Would, typically, the MTR inspectors or Leighton inspectors have with them any documents, any drawings?*

*A. Yes, they have the drawings. Definitely, they have to have the drawings, when they are looking at the rebars, otherwise they can't check whether the job was done right. They must have the drawings."*

11. There is no plausible reason why Leighton or MTRCL would have adopted a different standard in their inspections at the NAT.

12. Any problem with unexposed couplers could be rectified within a couple of hours for each area.[18] Ng Chun Man agreed with the Chairman that an unexposed coupler was not a major problem and could be fixed quite quickly.[19] Also, exposure of couplers on the Contract SCL 1111 side was the responsibility of GKJV.[20] There was no reason for Henry Lai not to ask GKJV for rectification.

13. It also bears emphasis that the Sub-Contract between Leighton and W&K required any variation in the works be in writing.[21] There is no reason for W&K nor Leighton not to follow such a requirement.

[18] Day 3/27:21-28:3
[19] Day 3/26:1-5
[20] Jacky Lee [Day 13/97:23-98:5]
[21] Clause 9.3 [CC2/881] and Clause 10.01(c) [CC2/881]

14. Indeed, there was every incentive for W&K to obtain the written confirmation from Leighton of the alleged instructions given to them to carry out the defective works.

15. Second, it would have been incredible for Henry Lai who joined the Project only in February 2016 as a junior engineer[22] to dare to give such instructions or agree on behalf of Leighton to pay W&K for any rectification work if required in the future.

16. Counsel for W&K put to Henry Lai in cross-examination that if he had admitted that he had told W&K to screw in a parallel threaded rebar into a taper-cut coupler as much as possible, his career with Leighton "would be over".[23] However, the point cuts both ways. If the giving of such unauthorized instructions would have grave career implications for Henry Lai, it is highly unlikely (and thus incredible) that he – as a young graduate engineer with a bright future ahead of him – would choose to put that at risk. It follows that there is no reason to doubt Henry Lai's evidence that he did not give such instructions.[24]

17. Third, as a corollary to the above, it would have been incredible for Ng Man Chun to act on the oral instructions of Henry Lai when he knew that Henry Lai had no authority to "call the shots" (which was why he asked Henry Lai to speak to his boss first),[25] but Ng said Henry Lai never confirmed that he had spoken to his boss.[26]

---

[22] Henry Lai w/s §3 [CC1/88]
[23] Day 5/98:19-99:4
[24] Henry Lai w/s §8-10 [CC10/6507]; Day 5/34:4-8
[25] Day 3/111:9-13
[26] Day 3/73:22-25, 111:20-112:12

18. Fourth, it would have been incredible for Ng Man Chun to follow Henry Lai's verbal instructions, when Henry Lai did not tell him (according to Ng's version of events) that there would be any adverse consequences to W&K if their workers did not carry out the works as he directed, either immediately or at all.[27]

19. There was nothing to stop Ng Man Chun from demanding that Henry Lai provide an official written confirmation from Leighton of his alleged oral instructions, either before he allegedly directed W&K workers to carry out the workss, or subsequently for record purposes.

20. Fifth, it made no sense whatsoever for Henry Lai to agree to pay W&K for double the amount of work, knowing that it was very likely that the works would eventually be rejected and W&K would have to redo it.

21. Sixth, Ng Man Chun did not inform anyone at W&K, including in particular his boss, Ben Cheung, with whom he communicated on a daily basis, about Henry Lai's alleged instructions,[28] despite:-

    (1) this being the first time Ng had encountered this type of situation;[29]

    (2) Ng claimed to be in shock and thought he needed to raise the matter with somebody;[30]

[27] Day 3/115:17-20
[28] Day 3/43:20-44:1, 45:10-20, 96:21-23
[29] Ng Man Chun w/s §49 [EE1/371.21]
[30] Day 3/108:15-16

(3) Ng being concerned with having to bear responsibility, and afraid of causing W&K to bear any responsibility;[31] and

(4) Ng was not responsible for commercial or money matters for W&K in relation to the works on site.[32]

22. Henry Lai's alleged oral promise to pay provided no assurance to W&K or Ng Man Chun, and if Henry Lai were to renege on his promise, it was plainly not a matter of Ng "losing out" to Henry Lai (whom he claimed to consider "one time as friends") if the works were subsequently rejected and had to be demolished and redone.[33] Ng was not the boss of W&K but was only an employee of a sub-contractor for W&K (Loyal Ease), and whether W&K would "lose out" was not his call at all.

23. It was only natural for Ng Man Chun to confirm with Ben Cheung that it would be acceptable and "risk-free" for W&K workers to proceed based on Henry Lai's alleged instructions, in order to protect himself from bearing the risks of proceeding with the defective works and, crucially, to protect W&K from any claim by Leighton. Despite this, he did not seek such confirmation.

24. Seventh, Ng Man Chun made no record of the alleged instructions from Henry Lai (for example, by simply sending him a WhatsApp message to confirm), and took no photographs of W&K's defective works at the NAT Stitch Joints and the Shunt Neck Joint for record

[31] Ng Man Chun w/s §49 [EE1/371.21]
[32] Day 3/104:15-18, 117:2-4
[33] Day 3/123:20-124:124:21

or as evidence, despite carrying his mobile phone around at work to take photographs of the workers' signatures (which he sent to Ben Cheung on a daily basis),[34] and Ng did take photographs of works generally conducted at the NAT Stitch Joints.[35]

25. As the Chairman observed, this put Ng Man Chun in a vulnerable position and unable to protect both himself and W&K, which Ng claimed to be in the forefront of his mind at all times:-[36]

> *"CHAIRMAN: Now you've got no evidence at all that your work is being carried out at the behest of Leighton. It's your word against the word of a junior engineer, if he denies it. You've got no evidence at all. You've got no photographs, you've got no WhatsApp that's recorded, you've got nothing at all there.*
>
> *A: That's correct.*
>
> *CHAIRMAN: Didn't you think that was a bit -- leaving you very vulnerable?*
>
> *A: At that moment? You were referring to that specific moment?*
>
> *CHAIRMAN: Or even an hour or two afterwards. You know, when a major event like this happens, we will often, later that afternoon, think to ourselves, "Oh, hang on, I think I'd better just get this sorted out. Maybe I'll send a WhatsApp to confirm the situation", or something like that. You don't have to think about it right at the time, but often, when you ponder the situation, you then realise you should do something to protect your position.*

[34] Day 3/104:19-105:7
[35] Day 3/9:18-20, referring to the photograph at [EE1/404]
[36] Day 3/114:11-115:15

*A: At that time, I didn't think so much. Later on, there were a lot of works and there was a time pressure, and after my dialogue with Henry, there was a consensus that if I had to demolish the works and redo it, he would have to -- I would have to charge him again. But he told me to continue, so there was no problem. So that's why I complied. So in case there were inspections and they didn't accept the works, then I would take pictures for record and submit that to him."*

26. Eighth, Ng Man Chun did not seek confirmation of Henry Lai's instructions with any of the foremen or engineers of Leighton or MTRCL during their routine site inspections which took place 5 to 10 times (by Leighton) and 5 to 7 times (by MTRCL) every day,[37] or at the two formal inspections for rebar fixing work and pre-pour checks which occurred at the hold points.

27. Ninth, it was incredible that Ng Man Chun was able to remember after all these years the specific "colourful language" in his various alleged conversations with Henry Lai.[38] These words were made up to create the credulence that the conversations actually took place.

28. Finally, it made no sense for Ng Man Chun not to tell Henry Lai's supervisor at the meeting in February 2018 that W&K only did as Henry Lai instructed, when he was asked around what percentage of couplers were not screwed in by W&K, to which he responded "definitely at least 70%".[39] He knew full well that the meeting was arranged amidst Leighton's allegation that there may be problems

[37] Day 3/53:8-54:10
[38] Ng Man Chun w/s §45 [EE1/371.20] and §72 [EE1/371.29]
[39] Ng Man Chun w/s §97 [EE1/371.36]; Cheung Chi Wai of Leighton confirmed that at the meeting Henry Lai was asked by Jonathan Kitching (and interpreted into Cantonese by him) to tell the truth on the percentage that W&K workers had screwed the rebar into the couplers: w/s §8 [CC10/6533]

with the rebar fixing works by W&K.[40] He claimed to be angry and felt that Leighton's criticism of W&K was "irresponsible" and "blame-shifting".[41] It was thus inconceivable for him not to defend W&K at the meeting. As the Chairman remarked:-[42]

> *"CHAIRMAN: Now, it may be suggested that when you realised that the reputation and perhaps the treasury of your company was at stake, and you were standing almost next to the man who had instructed you to do all these things, that you might not have raised the issue there and then, pointed at Henry Lai and said, "But look, I've done all this under his instructions. This is the man you need to speak to." But, from what you tell me, you didn't say anything about Henry Lai's participation in the work that had been done."*

29. Ng Man Chun did not mention Henry Lai's alleged instructions at the meeting, **because none were ever given**. He made up the story to Ben Cheung after W&K's defective workmanship was exposed in the dire hope of raising what has colloquially been called a "Nuremberg" defence (namely, "I was only following orders"), and hoped to bring Leighton down together with W&K in the process.

30. The Commission should reject Ng Man Chun's evidence. At the very least, there is insufficient cogent evidence for any finding that Leighton/Henry Lai instructed W&K/Ng Man Chun not to fully or properly screw the rebar into the couplers in the subject joints.

[40] Ng Man Chun w/s §92 [EE1/371.34]; see also Day 4/12:23-25, 14:19-15:3
[41] Ng Man Chun w/s §94 [EE/371.34-371.35]; see also Day 4/18:11-18
[42] Day 4/17:5-14

31. Ben Cheung claimed W&K had no motive or incentive to proceed with the rebar fixing works in spite of the problems with the rebar and couplers.[43] One main reason advanced was that W&K could charge for labour hours or labour provided,[44] so there was no rush for W&K to proceed. This contention fell away when he accepted in cross-examination that NAT works would be charged based on the unit weight of the materials under Leighton's Sub-Contract with W&K and there was no different formula for such works by reference to labour.[45] The earlier W&K workers completed the works, the quicker they could move on to other projects. In other words, they would not be paid extra for any prolonged period they remained on site, and it was therefore in the financial interests of W&K to complete the works as soon as possible.

32. Ben Cheung's evidence was based on what he said Ng Man Chun had told him and therefore provided no independent corroboration of Ng Man Chun's evidence. Significantly:-

(1) Ng did not tell Ben Cheung that Henry Lai had allegedly promised to pay W&K any rectification cost if the works were rejected and had to be redone.[46]

(2) Ng told Ben Cheung that he was told by Leighton that there was no need to tighten the rebar into all the couplers on the

[43] Ben Cheung w/s §79 [EE1/85]
[44] Ben Cheung w/s §83 [EE1/86]
[45] Ben Cheung did not adopt §30 of his w/s [EE1/69] which suggested a different formula applied to NAT works based on labour time; see also W&K's sub-sub-contract with Loyal Ease (which actually carried out the rebar fixing works) [EE1/402] confirming that the rebar fixing workers were paid by weight of materials (namely, $150/hundred catties).
[46] Ben Cheung w/s §58(4) [EE1/79]

Contract SCL 1111 side "because of a difference in the design in the two contracts" and so "Leighton did not hack off all of the concrete covering the couplers".[47] This was wholly inconsistent with Ng's oral evidence that Henry Lai had never told him anything to such effect.[48]

(3) Ng said that he first discovered the mismatch between the rebar and couplers **in January 2017** at the Shunt Neck Joint.[49] However, Ben Cheung's version set out in W&K's letter to Leighton dated 26 February 2018 was that:-[50]

(a) There was no mention of any alleged instructions from Henry Lai in January 2017.

(b) Rather, it stated that Ng inquired with Henry Lai in February 2017 about the type of threaded rebar and coupler used in the Contract SCL 1111 side.

(c) The reference to Ng's discovery of the mismatch was in July 2017 in relation to the construction of the NAT Stitch Joints, not the Shunt Neck Joint.

33. Leung Chi Wah (the rebar fixing worker) acted on Ng Man Chun's instructions.[51] His evidence also did not corroborate Ng's story.

[47] Ben Cheung w/s §58(5) [EE1/79]
[48] Day 3/130:12-17
[49] Ng Chun Man w/s §42 [EE1/371.19]
[50] [EE1/290-291]
[51] Leung Chi Wah w/s §18 [EE1/57.4]

34. This is a classic "your word against my word" situation where Henry Lai's words are pitched against those of Ng Man Chun. The contemporaneous documents and inherent probabilities are firmly in favour of Henry Lai's version, but at the end of the day, it may not be strictly necessary for the Commission to get to the bottom of the point since this Inquiry is not concerned with individual fault but focuses on making findings and recommendations that are of relevance to the Project and other construction projects in Hong Kong in the future. The undisputed fact is that W&K performed defective works that were not spotted during inspections by Leighton and MTRCL, and the Commission and all parties should work towards avoiding a repetition of the same. Whether Ng had acted on Henry Lai's instructions has clear repercussions on civil liability, and the Commission could very well take the view that that is a matter best dealt with in the context of dispute resolution and it is therefore unnecessary to resolve that issue here.

## C. Inspections did take place at the NAT Stitch Joints and Shunt Neck Joint during the original construction phase

35. There is no doubt that the NAT Stitch Joints were properly inspected and approved when they were rectified in 2018. It is also clear that Leighton and MTRCL performed the formal inspections for the rebar fixing and pre-pour checks at the NAT Stitch Joints and Shunt Neck Joint when they were first constructed. Whilst there are differences in the factual accounts of who from MTRCL conducted the formal inspections for rebar fixing, the evidence points to the

established inspection procedure being followed at the relevant hold points, even though the relevant RISC forms had not been issued.

36. Henry Lai recalled that he carried out the formal inspections for rebar fixing at the NAT Stitch Joints and the Shunt Neck Joint with Chris Chan of MTRCL.[52] He had "some certainty in his memory" because Chris Chan was the first person he would contact to attend the formal inspections for rebar fixing. He did not recall carrying out formal inspections for rebar fixing at the NAT Stitch Joints or Shunt Neck Joint with Kappa Kang or the IoWs of MTRCL.[53]

37. Chris Chan denied having conducted any formal inspections at the NAT Stitch Joints and the Shunt Neck Joint,[54] and he believed that either Kappa Kang or Tony Tang had carried out the inspections. He considered it more likely that Kappa Kang attended those inspections.[55] He did not recall carrying out the rebar fixing check procedures, and so his view was that he did not carry out such inspections.[56]

38. Kappa Kang could not remember whether she had carried out the formal inspections for rebar fixing at the NAT Stitch Joints, but she did not positively say that she did not do so, noting that the areas for which she was responsible under Contract SCL 1112 were large and she had to inspect a lot of rebar, and could not recall whether she did any inspection in a particular location.[57]

[52] Day 4/127:10-128:7
[53] Day 4/129:10-130:13
[54] Day 11/97:4-8
[55] Day 11/98:13-99:6
[56] Day 11/97:23-98:12
[57] Day 12/30:7-34:8

39. Tony Tang (who is an IoW and should therefore be dealing with the formal inspections for pre-pour checks) said that he was not involved in the formal inspections for rebar fixing in the NAT area,[58] which he expected to be carried out by one of the two ConEs (Chris Chan/Kappa Kang).[59] However, he confirmed that he carried out the formal inspections for pre-pour checks at the NAT Stitch Joints and the Shunt Neck Joint.[60]

40. It is unnecessary for the Commission to resolve any differences in the above factual accounts for the purpose of this Inquiry. One witness' memory may differ from another simply because of the time that has elapsed, not necessarily because one (or more) of them is putting forward a false story.

41. On the evidence, on the MTRCL side it would either be Chris Chan (according to Henry Lai) or Kappa Kang (who had not ruled out the possibility) who had conducted the formal rebar fixing and pre-pour check of the NAT Stitch Joints and the Shunt Neck Joints.

42. What is important is that the evidence from Leighton, MTRCL, and even W&K, all consistently and unequivocally pointed to the established inspection procedure being followed at the hold points for the NAT Stitch Joints and the Shunt Neck Joint:-

    (1) Henry Lai's evidence is set out above. Despite the dispute as to who from MTRCL carried out the formal inspections for

[58] Day 12/72:24-73:2
[59] Day 12/73:20-74:3
[60] Day 12/90:12-22

rebar fixing with him, there was no factual or rational basis to contend that Henry Lai ignored the inspection procedure for the NAT Stitch Joints and the Shunt Neck Joint and did not carry out inspections with anyone from MTRCL. There was no reason for him to omit the inspections.

(2) Chris Chan believed the formal inspections for rebar fixing were carried out given that such inspections were happening on a continuing basis and there were no problems reported to him.[61] It was no more than a "possibility" that no one from his team had conducted the formal inspections for rebar fixing at the NAT Stitch Joints and the Shunt Neck Joint.[62]

(3) Kappa Kang confirmed that the IoWs of MTRCL who were responsible for the formal inspections for pre-pour checks would not only rely on input from Leighton's engineer but also had a responsibility to check with the MTRCL engineer or other IoWs whether the formal inspection for rebar fixing had been carried out by MTRCL or not.[63] See also:-[64]

*"CHAIRMAN: No. You have said, I think, "Now, the inspectors would be on site, and when they are requested to do a pre-pour check, they would have to verify whether a rebar hold-point check had already taken place." So they receive a request, "Can we do a pre-pour check?" They need to make sure that there has already been a hold-point rebar check. Question: how do they check that out?*

[61] Day 11/100:12-23, 107:7-18
[62] Day 11/108:8-14
[63] Day 12/46:6-49:23
[64] Day 12/60:8-61:5

*A: Well, I send the WhatsApp message, they would know that rebar inspection has taken place at a particular location. If they didn't see the message, they can ring up the ConE team. We are sitting in the same office. It would not be hard for them to approach us about whether we have done the inspection. A simple communication like that would suffice.*

*CHAIRMAN: Could I ask this: was it then part of the inevitable procedure that if a request like this was received for the pre-pour check, that the inspector of works would always go back to the MTR ConE team and say, "Can you confirm that the rebar inspection has already taken place"?*

*A: Well, if they are not sure the rebars have been inspected, they probably would do this."*

(4) Victor Tung (an IoW) also confirmed that he would check with the MTRCL engineer who did the formal inspection for rebar fixing before he proceeded with the formal inspection for pre-pour checks:-[65]

*"Q: The question I want to ask you is this. When Henry Lai calls you at the time, what would he say to you, if he were to invite you to conduct a pre-pour check?*
*A: He would say, "Tony, I'd like to make an appointment with you at a certain location to do the inspection", and then I would ask him to submit the form, then I would ask, "Have you inspected the rebar?" If he could give me the name, then I would call the responsible engineer, that is the hold-point engineer, and confirm that, and then I would follow up.*

[65] Day 12/112:7-113:5

*Q: You said just in your answer there -- I'm not trying to catch you out -- but you said that if he could give the name of the MTR engineer who did the check with him; is that right? If Henry Lai could give you that name, then you would call that engineer; is that right?*

*A: Yes.*

*Q: Were there occasions when Henry Lai simply told you, "We have conducted the rebar fixing check", without specifying who the team of engineers were who conducted the rebar fixing check?*

*A: No, because as I said just now, in the NAT or NSL, there was only one engineer left and he knew who to call exactly. So, after he gave me the name, I don't think he would remember the details wrong."*

See also the following exchanges:-[66]

*"Q: In other words, whenever you were required to carry out the hold-point inspection, the pre-pour inspection, you would invariably phone up the engineer to confirm that there had been hold-point inspection for the steel fixing works; right?*

*A: Yes."*

(5) Ng Man Chun accepted that formal inspections would happen in <u>every location</u> after W&K had done their work.[67]

[66] Day 12/125:10-15
[67] Day 3/56:1-5

43. One also must not lose sight of the routine inspections by Leighton and MTRCL engineers and IoWs, which took place every day and covered the NAT Stitch Joints and the Shunt Neck Joint.[68]

44. Ng Man Chun claimed that W&K's defective workmanship at the NAT Stitch Joints and Shunt Neck Joint was "very apparent and could be clearly noticed upon sight".[69] The insinuation appeared to be that there was no inspection at all.

45. The Commission could look at the available photographs to come to its own view.[70] They show that given the congestion and lighting condition,[71] the defects were not that readily apparent and could have well have been missed by Leighton and MTRCL. Leighton accepts that there is room for improvement and it is now taking steps to improve its quality management framework including the process for performing physical inspections.

46. In the premises, there is no foundation for any finding that the formal inspection process at the relevant hold points was somehow not followed at the NAT Stitch Joints and the Shunt Neck Joint when they were first constructed.

47. In any event, we reiterate that this is a historical matter because the NAT Stitch Joints have been rebuilt and Leighton has committed to rectifying the Shunt Neck Joint.

---

[68] Joe Tam w/s §23 [CC1/85]; Henry Lai w/s §27 [CC1/91]; Chris Chan w/s §22 [BB1/116]; Tony Tang w/s §13 [BB1/123]; Kappa Kang [Day 12/11:23-13:12]; Ng Man Chun [Day 3/53:8-54:10]
[69] Ng Man Chun w/s §87 [EE1/371.33]
[70] See e.g. [BB14/9505] [BB14/9511]
[71] William Holden gave evidence that the joints were in confined areas and it would be difficult to see the internal layers of the rebar [Day 8/88:23-16]

## D. Material mismatch at the 1111/1112 interface

48. Leighton acknowledges that its staff by their attendance at the interface meetings ought to have known that GKJV's couplers were of LENTON type but unfortunately omitted to pass this information to Henry Lai who was the engineer responsible for supervising the rebar fixing works at the NAT Stitch Joints and the Shunt Neck Joint. There was also miscommunication between the Leighton staff who attended the interface meetings. In particular, Regina Wong assumed that Jim Wong would inform the engineers about the choice of LENTON couplers,[72] and Jim Wong thought that by the time he left the project in September 2016 it was still "too early" to do the compatibility check.[73]

49. It should also be noted that the drawings supplied by MTRCL's design team did not specify the type of coupler to be used. Whilst taking responsibility for the communication error, we submit that a properly notated drawing would have removed the requirement for engineers to search through meeting minutes to be made aware of issues such as those which occurred in this instance.

50. Leighton has learned from the communication error and has started to actively put in place procedures which improve communication and distribution of key documents between its engineers.

[72] Day 7/121:18-22
[73] Day 9/118:18-23

51. To help reduce the risk of any similar miscommunication in other construction projects in Hong Kong, the Commission may consider recommending that materials used at interfaces should be properly identified and reflected on the approved drawings.

## E. RISC forms

52. The Government's witness, Ralph Li, agreed that the absence of RISC forms "by itself" would not create any public safety concern:-[74]

> *"Q. That's why I focus on "by itself"; the simple fact that there may or may not be RISC forms by itself would not create any public safety concerns. You need to go behind to ask why. So you can't just look at the fact that RISC forms were not there. Do you agree?*
>
> *A. I agree because you mention "concerns". We do need more information and more specifics to talk about concerns*."

53. As stated above, whilst there are outstanding RISC forms for the NAT, SAT and HHS, there is other evidence which confirms that the relevant formal inspections were completed. Such evidence is an effective substitute for the RISC forms and provides sufficient proof that the inspections were conducted and the works were approved by Leighton and MTRCL. This is accepted by MTRCL in its WSP Audit Report for verification of the inspections completed for the NAT [75] and SAT, [76] and was the methodology adopted by the Government in dealing with the late RISC forms in the Hong Kong-

[74] Day 15/75:25-76:6
[75] [BB11/7239+] in particular the section "Phase 2 Audit" at [BB11/7641+]
[76] [BB13/9199+] in particular the section "Phase 2 Audit" at [BB13/9215+]

Zhuhai-Macao Bridge project.[77] On that project, the contractor had failed to submit on time about 10,000 RISC forms, which is significantly more than the number of outstanding RISC forms on this Project. Despite this, the Government was satisfied that the contractor had carried out the works in accordance with the contract requirements and that the technical and safety requirements of the works were met.[78]

54. MTRCL and Leighton worked on the basis and (in effect) agreed that RISC forms did not need to be submitted prior to formal inspections being completed in order to not hold up the work progress.[79] Such a practical approach certainly did not affect or compromise quality and safety. The formal inspections for rebar fixing and pre-pour checks were carried out, even if they were not promptly documented in a RISC form.

55. MTRCL was not concerned at the time by the absence of the RISC forms and did not issue NCRs until April 2018, after the defects at the NAT Stitch Joints and the Shunt Neck Joint were identified and only did so at the time for the NAT and SAT. MTRCL considered the absence of RISC forms as a "low" risk matter.[80] The evidence clearly demonstrated that MTRCL at the time had prioritised and demanded Leighton to achieve progress, and did not insist upon strict compliance with the contractual requirement of submitting RISC forms as a pre-requisite to formal inspections.[81]

[77] See Legislative Council Paper §§10-17 [DD10/12780-12781]
[78] See Legislative Council Paper §§10-17 [DD10/12784]
[79] Chris Chan [Day 11/89:3-14]
[80] See MTRCL RISC Register for NAT [BB12/8373-8376] and SAT [BB14/9304-9305]
[81] Jeff Lii w/s §20 [CC6/3814]; Sean Wong w/s §19 [CC6/3804]; Kit Chan w/s §42 [BB8/5198]

56. It is also noteworthy that the Government did not require PYPUN to audit the RISC forms in order to assess the public safety of the works.[82] This highlighted that the RISC form requirement is purely a contractual one as between MTRCL and Leighton, and the actual completion of the forms has no direct bearing on quality or safety.

57. The system for the completion and submission of RISC forms is very time-consuming and not user-friendly. As Kit Chan said:-[83]

> *"... the RISC forms are very time-consuming and labour intensive, and it was there some 40 years ago when the industry was totally different from now, and the construction work was a lot simpler at that time and now the construction is so complicated, and the expectations from society are so high ... But the system is still there. Four parts. If you look, every RISC form has four parts, have to sign off by four different people. It takes a long, long time. It's not practical. I think the industry got to start thinking to reverse the system to more user-friendly, with the help of new technology."*

58. The RISC form system is out-dated and no longer practical. As the Chairman pointed out to Counsel for the Government:-[84]

> *"CHAIRMAN: ... Are you suggesting -- will it be government's view that the good old RISC form which has stood everybody in good stead for 40 years should remain as a document, a bit like the flintlock musket when put up against machine guns?*
>
> *MR CHOW: No, of course not, Mr Chairman."*

[82] Yueng Wai Hung w/s §103 [GG1/46]
[83] Day 12/130:10-25
[84] Day 14/23:5-10

59. As Kit Chan pointed out, the reality in the Hong Kong construction industry is that it is common for RISC forms to be submitted late or not submitted at all. The RISC form is not a statutory requirement and the contractors do not pay a high level of attention to it.[85] That said, it is accepted that the absence of RISC forms may make it difficult to track down and identify who had conducted the formal inspections and the time when they took place, in the event that a subsequent dispute arose. Inspection records (such as a RISC form) inevitably help to save the time and effort that may be required to collate the other types of extraneous evidence referred to above.

60. Based on his experience as an engineer working in the Hong Kong construction industry for over 40 years, Kit Chan rightly pointed out that the inspection record-keeping system should be "as simple as possible".[86] One also needs to be realistic and practical in the context of a large-scale construction project such as the present with time pressure and milestones to achieve. It would be unfair to criticize Leighton for failing to complete RISC forms in the NAT, SAT and HHS in a timely manner, when Leighton's engineers at the relevant time prioritised the substantive tasks necessary to achieve progress at the behest of MTRCL, and MTRCL allowed the paperwork to become a secondary priority and did not insist on the necessary paperwork being completed before the next stage of work could commence.

[85] Day 13/131:1-9
[86] Day 13/133:9-15

61. In addition, it would be unfair to draw a conclusion that the issue of outstanding RISC forms is due to a mis-allocation of personnel by Leighton. In fact, the issue arose due to the low priority given to these forms by MTRCL and the (de facto) practical arrangement that they did not need to be submitted before inspections could (and did) take place. Consequently, Leighton's engineers continued to prioritise the substantive tasks required to achieve progress and the filling out of paperwork became a lower priority.

62. It is clear that MTRCL was fully aware of the outstanding RISC forms for the works at the NAT, SAT and HHS but was clearly unconcerned and did not act to enforce this contractual requirement during the construction phase.

63. In fact, MTRCL issued only one written reminder to Leighton (by email sent in March 2017) during the construction period for the NAT, SAT and HHS.[87]

64. As noted, MTRCL then issued NCRs for the NAT and SAT in April 2018 after the defective works at the NAT Stitch Joints and Shunt Neck Joint had been identified.

65. Leighton accepts that its quality control system did not keep track of those concrete pours where RISC forms were not generated (i.e. the system only tracked RISC forms that had been generated as a draft or issued).[88] This made it more difficult to follow up with the engineers who were responsible for submitting RISC forms.

[87] [CC10/6208-6209]
[88] Karl Speed w/s §45[CC1/62]

66. Leighton is firmly committed to achieving best practices in the Hong Kong construction industry and to improving its quality control systems based on the recommendations of Leighton's Task Force.[89]

67. Since April 2018, Leighton has been developing and implementing a comprehensive Quality Management Framework ("**QMF**") to support the effective delivery of Leighton's existing quality management systems and respond to current industry challenges.[90]

68. A key goal of the QMF is to develop systems and processes which have an "end-user focus" and provide tools to enable and support both Leighton's staff in the effective delivery of its projects.

69. The QMF is made up of the following 6 core elements: (1) Quality Management System; (2) Digital Tools Platform; (3) Quality Best Practice; (4) Quality Metrics; (5) Quality Governance; and (6) Quality Culture and Leadership.

70. Of particular interest to this Commission, Leighton is developing and implementing:-

    (1) as part of its Quality Management System, "Tracker-Tools", which are designed to monitor the status of all critical quality verification records that are required for the close-out of each element of construction. Tracker-Tools are designed to ensure that the critical records associated with inspections and

[89] Karl Speed w/s §57 [CC1/65]
[90] Details of the QMP are set out in the first witness statement of Dean Cowley (leave pending)

tests are compiled and maintained throughout the entire duration of the works; and

(2) a Digital Tools Platform (anticipated to go live in November 2019) which is designed in collaboration with a leading IT developer and is tailor-made to suit the specific needs of Leighton's clients and operational staff with the following key characteristics:-

(a) user friendly digital tools accessible through personal mobile devices ensure that the management of key construction stages is executed effectively, and key vital construction related data is effectively captured, stored and accessible to all those who need it; and

(b) tools to effectively manage key construction data for inspection processes, material management, defects management, drawings, photographs, event management and provide fast access to Leighton's quality best practices and quality alerts.

71. Leighton is confident that the Digital Tools Platform will ensure that its supervision teams are able to efficiently record and retain all necessary documents associated with the construction process when it is rolled out later this year.

## F. Testing of rebar and couplers

72. 100% of all the rebar batches were tested by the manufacturers, and 93% were tested by a HOKLAS accredited laboratory after delivery to site. 100% of these tests passed.[91] There is no basis to doubt the mill test certificates provided for the rebar.

73. On site testing is not required in other developed countries. From a public safety perspective, the testing conducted by Leighton is far more than what comparable countries would find acceptable.[92]

74. Leighton will adduce expert evidence from a statistician to show that the number of tests performed on the rebar was adequate in light of international quality standards and the statistical likelihood of untested material on site not passing testing.

75. Leighton has systems in place to identify batches of rebar that were not tested in a HOKLAS laboratory and those that had passed the tests.[93] In any event, such systems are not of consequence because the rebar used in the Project is compliant. As set out above, 100% of the rebar was tested once and 93% of the rebar was tested twice and no batches of rebar failed these tests.

76. The Government suggested in cross-examination that a particular manufacturer of steel rebar (namely, Kobe Steel) had forged mill test certificates.[94] In fact, that manufacturer did not supply rebar for the

[91] Karl Speed w/s §§5-8 [CC11/7287-7288]
[92] Karl Speed w/s §63 [CC6/3762]
[93] William Holden w/s §45 [CC6/3782-3783]; Alan Yeung w/s §27 [CC6/3825-3826]
[94] Cross-examination of Karl Speed [Day 8/63:14-18]

Project.[95] There is no basis to doubt or question the mill test certificates provided for the rebar used in the Project.

## G. Use of couplers in place of lapping

77. Couplers were used on a limited basis in the NAT, SAT and HHS for constructability issues, including to allow access routes for the works and for co-ordination with designated contractors.[96]

78. Couplers and lapped bars are interchangeable.[97] MTRCL knew and approved the use of couplers in the NAT, SAT and HHS.[98] The use of couplers instead of lapping (or vice versa) is a minor change in detail and is not a design change, and does not require prior BD consultation.[99] Lok Pui Fai referred to Appendix 9 of the PMP,[100] which is only a flow chart and says nothing about the type of works that requires prior BD consultation. Indeed, this flow chart suggests that minor changes should be submitted to BD **after** completion. On the other hand, §9.1.3 of the PMP (which Lok did not refer to in his witness statement) provided that the IoE and IoC define the various types of structures which are subject to consultation and the appropriate actions to be undertaken,[101] but Lok was unable to

[95] [CC11/7283]
[96] William Holden w/s §27 [CC6/3777]; see also his oral evidence in Day 8/123:4-126:8; Ronald Leung w/s §29 [CC6/3834]; Alan Yeung w/s §30 [CC6/3826; Jeff Lii w/s §27 [CC6/3816]; Sean Wong w/s §25 [CC6/3807]; Raymond Tsoi w/s §26 [CC6/3797]. Chris Chan of MTRCL also confirmed this: see his oral evidence in Day 11/135:13-15, 136:6-137:4; Kit Chan [Day 14/33:6-9]
[97] BD Code of Practice for Structural Use of Concrete 2013 at §8.7.1 [C13/8478]; Kit Chan [Day 14/45:4-46:8]; Chris Chan [Day 11/135:11-136:1]. See also Section 8 of Nick Southward's Expert Report in Part One of the Inquiry [ER1, Item 5]
[98] William Holden w/s §27 [CC6/3777]; Ronald Leung w/s §30 [CC6/3835]; Alan Yeung w/s §31 [CC6/3826]; Jeff Lii w/s §28 [CC6/3816]; Sean Wong w/s §26 [CC6/3807]; Raymond Tsoi w/s §27 [CC6/3797]. See also Chris Chan's evidence in Day 11/117:23-118:22, 119:12-21
[99] William Holden w/s §38 [CC6/3777]; Chris Chan's evidence in Day 11/120:3-5, 135:11-136:1
[100] Lok Pui Fai w/s §7 [DD9/12277] ; Appendix 9 of PMP at [H7/2498]
[101] [H7/2257]; IoE at [H7/2270-2281]; IoC at [H7/2285-2298]

pinpoint any specific provision in the IoE or IoC requiring the change from use of lapped bars to couplers be submitted to the BD for prior consultation.[102]

79. As Kit Chan pointed out, it was not practical to detail such a minor change in a new drawing.[103] In any event, MTRCL, not Leighton, is responsible for determining whether to consult the BD.

80. Leighton satisfied the usual supervision conditions that applied to couplers in the NAT, SAT and HHS because it deployed full-time qualified engineers (at least TCP T1 grade or above), which (as explained below) is sufficient for the purposes of the BD consultation letters to supervise the installation of rebar and conducted (jointly with MTRCL) the formal inspections for rebar fixing and pre-pour checks at all the relevant construction joints in the NAT, SAT and HHS.[104]

## H. <u>Leighton satisfied the applicable supervision standards</u>

### H1. General site supervision

81. There were various Site Supervision Plans (**SSPs**) for the works at the NAT, SAT and HHS areas.

82. Leighton has prepared charts (**Annex 1** to these submissions, which has been provided separately to the Commission) which show that

[102] Lok Pui Fai w/s §7 [DD9/12277]
[103] Day 14/35:8-36:3
[104] See §H.1 of these Closing Submissions

Leighton's nominated TCPs under the different SSPs conducted site visits at or above the required frequency. Indeed, many of these staff were present at the site far more frequently or were working there on a full-time basis.

83. The charts show that Leighton had over 113 site supervision and engineering staff involved in the supervision of the works during late 2014 to 2018 (i.e. the relevant period of construction).

84. There is no doubt that Leighton nominated appropriately qualified people to act as TCPs under the SSPs. This is demonstrated by **Annex 2** to these submissions (provided separately) which sets out the qualifications and experience of all relevant TCPs.

85. The charts at Annex 1, and the summary at Annex 2, demonstrate Leighton has complied with the general supervision requirements under the SSPs and the BD consultation letters (see **Annex 3**).

## H2. Supervision/inspection of coupler connections

86. The opening address by Counsel for the Commission briefly summarises the respective positions of the Government, MTRCL and Leighton on the application of the supervision standards that apply to couplers (including the applicability of the QSP) in relation to the NAT, SAT and HHS.[105]

[105] Day 1/66:12-71:22; §90 of the Opening Address by Counsel for the Commission

87. It is common ground, or must be, that the enhanced supervision standards for couplers (including the requirement for a QSP) arise from the BD consultation letters. All parties, as well as Counsel for the Commission, referred to the relevant BD consultation letters when determining the applicable supervision standards in relation to the installation of couplers within the NAT, SAT and HHS.[106]

88. The express words of the relevant BD consultation letters state that the higher supervision standards (including the QSP) only apply to couplers with a "ductility requirement".[107] This phrase is clear. It does not mean "ductile couplers" (as the Government contends) or couplers that have a "ductility capacity". The correct interpretation of these words indicates that the higher supervision standards (including the QSP) apply where a coupler is "required" to be ductile. The actual use of ductile or non-ductile couplers does not change the construction of this phrase.

89. The Government's position that the phrase "couplers subject to a ductility requirement" refers to any and all ductile couplers is wrong as a matter of basic interpretation. It is also flawed from a factual and policy perspective for the following reasons:-

(1) The process of installing ductile and non-ductile couplers is the same.[108] There is no evidence or even any suggestion that the process is different or that there is any added complexity

[106] §23 of MTRCL's Opening Statement; §26 of Government's Opening Address; §90 of the Opening Address by Counsel for the Commission
[107] See §34 of Leighton's Opening Submissions
[108] See BOSA Manual for Type 1 Non-Ductility Coupler [A1/475ff] and BOSA Manual for Type 2 Ductility Coupler [A1/556ff]. The installation method for the Type A **non-ductile coupler** shown at [A1/507] is the same as the installation method for the Type A **ductile coupler** shown at [A1/590].

in installing rebar into ductile couplers that, as a result, requires additional supervision (i.e. over and above the supervision required for installing rebar into non-ductile couplers). The process is not complicated and was easily demonstrated by Mr Gillard at the hearing during Part One of this Inquiry.[109] It is a simple task that is conducted in all construction projects in Hong Kong by unqualified labour (i.e. not TCPs) and does not require much (if any) training. MTRCL's Dr Peter Ewen put it quite simply that: [110]

> *"... having a female portion and a male thread that goes in it and tightens up, I don't know if that's got to be a long, long training course."*

(2) It must be borne in mind that ductile couplers may be used at a location because they are *required* to be used, or because, even though not required, the contractor decided to use them nonetheless (for whatever reason). One may ask why the triggering feature is whether there is a ductility *requirement*, rather than whether *in fact* ductile couplers had been used. This leads one to examine the rationale for imposing a requirement for ductility.

(3) Ductile couplers are intended to be used at locations where cyclic, tension and compression loads are likely to occur. Dr Mike Glover noted that such couplers are designed for more

[109] [Part One] Day 2/131:20-133:5; 134:4-135:5
[110] Day 14/75:22-25

extreme loading conditions.[111] Similarly, Professor Don McQuillan agreed that ductile couplers have been designed for cyclic loading as would arise from a seismic event.[112] This is consistent with §3.2.8.4 of the Code of Practice for the Structural Use of Concrete 2013 ("**CoP**") [C13/8383] which requires that type 2 mechanical couplers (i.e. ductile couplers) should satisfy specified cyclic tension and compression tests. It follows that couplers with a ductility requirement are intended to be used at locations where extreme or cyclic loading may occur. This is the reason why the BD consultation letters require enhanced supervision of couplers used at locations where there is a ductility requirement (i.e. because there may be added strain on those joints).

(4) If a coupler is not subject to a ductility requirement, the contractor is free to use ductile or non-ductile couplers. The choice of ductile couplers at such locations does not increase the supervision standards. If a contractor decides to "over-engineer" it by using something that is not strictly required (but is a better piece of material), that cannot possibly affect the supervision standards. Any suggestion to the contrary would be "putting the cart before the horse".

90. It follows that it is the location of the coupler that is important (not the type of coupler used) when determining whether it is subject to a ductility requirement.

---

[111] See §4.5 of Dr Mike Glover's Expert Report in Part One of this Inquiry, which states that *"A Type II coupler has been designed for more extreme loading conditions where the connection is subjected to stress reversal (i.e. tension to compression) through a number of cycles of such stress reversals, as would be the case in very strong ground motions caused by large earthquakes."*

[112] See §57 of Professor Don McQuillan's Expert Report in Part One of this Inquiry

91. In this context, the structural engineering experts in their evidence in Part One of this Inquiry agreed that none of the couplers should be subject to a ductility requirement because the levels of seismic activity or type of loads that they will be exposed to are not sufficient to justify it.[113]

92. The assessment as to whether a coupler in a particular location of the Project was subject to a ductility requirement (i.e. a coupler was "required" to be ductile) could only be made at the time of construction when supervision was required.

93. At that time, the key authorities that were available to Leighton to make that assessment were the working drawings and CoP. Unless the working drawings identified a ductility zone, there would be no need for the enhanced level of supervision that applies to the installation of a "ductility requirement" coupler.

94. In this context, Leighton's opening submissions explain why the high supervision standards (including the QSP) do not apply to the couplers in the NAT, SAT and HHS.[114]

95. The opening submissions for the Government and MTRCL now limit the potential application of the higher supervision standards (including the QSP) to the SAT.

[113] Joint Expert Memorandum §1 [ER1]; MTRCL Closing Submissions (COI Part One) at §63
[114] See §38-50 Leighton's Opening Submissions

96. In relation to the SAT, Leighton reiterates its position that there are no ductility zones in the original design or working drawings at the time of construction for which Leighton was responsible. There were no ductility zones covering the intersection of the diaphragm walls and the slabs or any other part of the slabs in the SAT.

97. It is the case that some drawings for the SAT show ductility zones in the diaphragm walls (as the Government has noted). Intrafor was responsible for installing the rebar cages and for inspecting the coupler connections in the diaphragm walls. Leighton was not responsible for the supervision of such couplers for the purposes of the BD consultation letters.

98. Importantly, there were **no ductility zones** across the intersection of the diaphragm walls (for which Leighton and Intrafor shared responsibility for coupler installation) or within the slabs (where Leighton had responsibility) at the SAT.

99. As explained in Leighton's closing submissions for Part One of the Inquiry, there was only one location in the Project (i.e. Area A of the NSL) where the intersection of the diaphragm wall and the slabs was shown to be within a "ductility zone" on the drawings.

100. Subject to the aforesaid exception, there was no location in the Project where any part of the slabs were shown to be within a "ductility zone" on the drawings.

101. Under the BD consultation letters, an RSC (Registered Specialist Contractor) can assume responsibility for the supervision of coupler connections. In fact, as established in Part One of this Inquiry, Intrafor (as the relevant RSC) took responsibility for and handled the supervision of coupler connections in the diaphragm walls.

102. Importantly, Leighton was responsible for and handled supervision of couplers used in the slabs and at the intersection of the diaphragm walls and slabs. It follows that according to the approved drawings, the higher supervision standards under the BD consultation letters for couplers (including the application of the QSP) **did not apply to couplers under Leighton's supervision**, except for those couplers used to connect bars from the slabs to couplers cast into the diaphragm wall at Area A of the NSL.

103. Having regard to the above, the enhanced supervision standards imposed by the BD consultation letters (including the requirement for a QSP) do not apply in relation to the NAT, SAT and HHS.

104. Leighton complied with the lower standards for the installation of couplers in these areas because:-

(1) It deployed full-time qualified engineers (TCP T1 grade or above) to supervise the rebar fixing. Leighton's construction engineering team consisted of many highly experienced engineers who worked full-time on site and supervised the works by making multiple site visits every day (which included routine and formal inspections); and

(2) Its records either evidence such supervision or if certain records are not available, other evidence confirms that the necessary supervision occurred.

105. Leighton complied with the requirement to keep an inspection log book by:-

(1) producing and updating organisational charts, which recorded the details of Leighton's construction engineering teams who supervised the installation of the reinforcement (including the engineers who conducted routine and formal inspections of the reinforcement);[115]

(2) producing Site Supervision Plans, which recorded the names and qualifications of Leighton's nominated TCPs;[116]

(3) completing RISC forms which recorded the names and positions of Leighton's engineers who conducted the inspections;

(4) adducing sworn witness testimony from the engineers who conducted the inspections where RISC forms are outstanding to confirm that all formal inspections were completed and MTRCL gave approval for the works and authorised concrete to be poured; and

[115] [CC2/526-535]
[116] NAT [CC1/311] [CC6/4007-4114]; SAT [CC8/4783]; HHS [CC10/4007]

(5) retaining copies of the organisational charts, Site Supervision Plans, RISC forms and other supervision records at the site office and on Leighton's electronic record management system (which was accessible from the site office).

Dated this 19th day of July 2019

Paul Shieh SC
Jonathan Chang
Counsel for Leighton