COMMISSION OF INQUIRY INTO THE DIAPHRAGM WALL AND PLATFORM SLAB CONSTRUCTION WORKS AT THE HUNG HOM STATION EXTENSION UNDER THE SHATIN TO CENTRAL LINK PROJECT

WITNESS STATEMENT OF CHAN KIT LAM
FOR
MTR CORPORATION LIMITED

I, **CHAN KIT LAM**, of AECOM, 8/F, Tower 2, Grand Central Plaza, 138 Shatin Rural Committee Road, Shatin, Hong Kong, **WILL SAY AS FOLLOWS**:

1. I was formerly the Construction Manager ("**CM**") of MTR Corporation Limited (**"MTRCL"**) in various projects. I left MTRCL in March 2018 and joined AECOM as Principal Engineer in June 2018.

2. I first joined MTRCL in July 2010 as the CM for the South Island Line Project (Contracts 903, 907 and 908), and I remained in that position until November 2013. Thereafter:-

   (i) From December 2013 to November 2014, I was the CM for the West Island Line Project (Contract 704);

   (ii) From November 2014 to May 2016, I was the CM for the Shatin to Central Link Project ("**SCL Project**") (Contract 1112). I was also appointed as the Competent Person Representative ("**CP Representative**") for Contract 1112 on December 2014;

   (iii) From June 2016 to December 2016, I was the CM for the South Island Line Project (Contract 901);

   (iv) From December 2016 to March 2018, I was the CM for the Express Rail Link Project (Contract 811B).

3. In or around June 2018, I was assigned by AECOM, a consultant to MTRCL, to work on the construction of the Exhibition Centre Station of the SCL Project. In or around

late July 2018, I was asked to assist in dealing with queries raised by the Commission of Inquiry into the Diaphragm Wall and Platform Slab Construction Works at the Hung Hom Station Extension under the SCL Project (**"Commission of Inquiry"**)).

4. I obtained a Bachelor's Degree in Applied Science from the University of Toronto, Canada in 1978. I am a Registered Professional Engineer of the Engineers Registration Board of Hong Kong (since February 2010) and a member of the Hong Kong Institute of Engineers (since June 1985). I was also a member of the Institution of Civil Engineers, UK (December 1982 to December 2017).

5. I am providing this witness statement in response to various matters raised in a letter dated 27 July 2018 from Messrs Lo & Lo (**"Letter"**), who I understand are the solicitors acting for the Commission of Inquiry. In this statement, I shall address the matters listed as items 2, 4-7, 8(a), (e), 11(a), (d), (f), 11(g)-(i), 11(l)-(n), 11(r)(ii)-(iii), 11(s), and 13(c) of the Letter.

6. While I am aware of the matters raised in items 2, 4-7, 8(a), (e), 11(a), (d), (f), 11(g)-(i), 11(l)-(n), 11(r)(ii)-(iii), 11(s), and 13(c) of the Letter based on my first-hand observations and personal involvement in the SCL Project from November 2014 to May 2016 and I confirm that the contents of this statement are true to the best of my knowledge and belief, there are occasions when I can only speak to matters by reference to MTRCL's documents due to the lapse of time, in which case I believe the contents of those documents are true and correct.

Item 2: Where contracts and agreements are adduced, please identify the relevant sections, parts and contents pertaining to the diaphragm walls and platform slabs construction works at the Hung Hom Station Extension and the system of supervision, monitoring, inspection and reporting to ensure the compliance, quality, safety and integrity of such works.

7. With regard to the relevant sections, parts and contents of Contract 1112 pertaining to the system of supervision, monitoring, inspection and reporting to ensure the compliance, quality, safety and integrity of such works, I enclose tables setting out the same (**Appendix 1**). I have reviewed the contents and believe they are in order.

Item 4: Identify the type of work and duties undertaken by such managers, supervisors and inspectors.

8. I shall briefly explain the types of work and duties undertaken by the CM and CP Representative for Contract 1112 of the SCL Project, which is also set out in the Project Management Plan ("**PMP**") for the SCL Project.

9. As the CM for Contract 1112 of the SCL Project, I was responsible for construction management and maintaining corporation and statutory standards of construction works and giving advice to the Project Manager (Mr. Brendan Reilly, who left MTRCL in December 2015 and the role was left unfilled thereafter) ("**PM**") and the Competent Person ("**CP**") (Mr. Aidan Rooney and then Mr. Jason Wong) on all construction related matters during the construction phase of Contract 1112. After the commencement of construction works, as the CM, I would support the CP and be responsible for overseeing the site supervision requirements in the Instrument of Exemption ("**IoE**") and the Instrument of Compliance ("**IoC**").

10. In addition, as the CM, I would assist the CP for submissions to the Buildings Department ("**BD**") / Railway Development Office ("**RDO**") and be responsible for managing and reviewing contractors' submissions such as temporary works designs and ensuring the submissions were made in a timely manner and complied with the requirements set out in the IoE and IoC, and relevant standards.

11. As the CP Representative, I was responsible for assisting the CP to deliver his duties to ensure different sections of the project are executed to the quality, safety, environmental and design standards required by MTRCL, as well as fulfilling the requirements under the consultation process.

Item 5: Describe and explain the steps, procedures and timeline in the construction and completion of the steel fixing works in the diaphragm walls and platform slabs. With reference to the said steps, procedures and timeline, please describe and explain the respective roles and involvement of the Government, Your Company, Leighton, Fang Sheung, Intrafor and China Technology and elaborate on the interaction and relationship between Your Company and these parties on site and on a day-to-day working basis.

Item 6: Explain with reference to the terms of Contract 1112, sub-contract(s), approved plans, drawings, laws and regulations, practice notes, handbooks, guidelines, circulars, industry standards, practice and requirements (the "Requirements, Standards and Practice"), how the steel bars in the diaphragm walls and platform slabs should be installed and connected to ensure the compliance, quality, safety and integrity of the structures.

12. The construction of the steel fixing works in the diaphragm walls were carried out by Leighton Contractors (Asia) Limited ("LCAL")/Intrafor between July 2013 and May 2015. The steps and procedures of the construction of such steel fixing works are described and explained in paragraph 6.10 of the approved Construction Method Statement for Diaphragm Wall & Barrette Construction (1112-CSF-LCA-FDN-000009B)) and the Inspection and Test Plan ("**ITP**") (1112-CSF-LCA-FDN-000287). I shall refer to the same for the purpose of this question.

13. In relation to MTRCL's interaction and relationship with the various parties, I shall provide my answer by reference to the various types of meetings that I personally attended as the CM of MTRCL on a day-to-day basis. During my tenure as the CM of MTRCL for the SCL Project under Contract 1112, I attended the following meetings:-

    (i) Contract 1112 – Monthly Progress Meetings: these meetings were attended by the representatives of MTRCL and LCAL. I personally attended these meetings between December 2014 and May 2016. After each meeting, I would prepare minutes of the meeting recording the items discussed. Matters that were typically discussed at these meetings are (i) Safety, Environment and Risk Management; (ii) Quality; (iii) Stakeholder Management and Coordination with other Contractors & Utilities Companies; (iv) Programme; and, (v) Progress of works under Contract 1112. An issue that was commonly raised and discussed at these meetings was LCAL's slow progress in carrying out its works under Contract 1112. MTRCL frequently had to remind and request LCAL to take measures to mitigate anticipated and actual delays in the works. By way of example, at the meeting held on 6 May 2015, MTRCL expressed concerns over the progress of various works and requested LCAL to put in more resources to speed up the progress of critical activities, including diversion of the drain to the 1875 box culvert between Gridlines 30 and 31, diversion of the emergency vehicular access (EVA) to its

permanent alignment at HHS, underpinning works in Area A, the EWL slab in Area A, the capping beam at the Coliseum, the Underpinning South works for the L&R tracks, pipe piling in Area A2, and the capping beam at SAT (*see*, for example, item 6 of the minutes of the meeting held on 6 May 2015).

(ii) Design Coordination Meetings: these meetings were attended by the representatives of MTRCL, LCAL, BD, and Atkins. I occasionally attended some of these meetings between April 2015 and March 2016. Matters that were typically discussed at these meetings related to the design of HUH.

(iii) Monthly Coordination Meetings with BD, RDO and the Geotechnical Engineering Office ("**GEO**"): these meetings were attended by representatives of MTRCL, BD, RDO, and GEO. I personally attended most of these meetings between February 2015 and March 2016. The purpose of these meetings was typically to discuss the issues in relation to RDO/BD/GEO submissions, submissions schedules during the construction phase, site progress and SCL Project wide issues under the IoE and the IoC.

(iv) Monthly Financial Meetings: these meetings were attended by representatives of MTRCL and LCAL. I personally attended most of these meetings between January 2015 and March 2016. Matters that were typically discussed at these meetings related to the monthly financial report, which covers cost expenditure, procurement, sub-contract claims, and sub-contractor payment.

(v) Work Proposal Meetings: these meetings were attended by representatives of MTRCL and LCAL every two to three weeks. I personally attended most of these meetings between November 2014 and March 2016. Matters that were typically discussed at these meetings related to work proposals and future work proposals such as the addition of the lift pit, increased working hours and various tests. I should mention that in the Work Proposal Meeting held on 2 September 2015, LCAL reported to MTRCL that there was an incident on or around 1 June 2015 when LCAL had mistakenly treated around 100 anchorage starter bars as a temporary diaphragm wall support cage during the concrete breakout on the eastern side. As a result, these anchorage starter bars were accidentally cut. To clarify, this incident does not relate to the alleged cutting of steel bars which

featured in the news recently. The anchorage starter bars which were accidentally cut were subsequently fixed by hacking concrete for fixing the required anchorage bars back to the capping beam.

(vi) Weekly Works Meetings: these meetings were attended by representatives of MTRCL and LCAL. I personally attended most of these meetings between February 2015 and May 2016. Matters that are typically discussed at these meetings are the daily construction issues at working level. I should mention that from early March to early May 2016, Mr. Jason Poon also attended the Weekly Works Meetings for HUH with me and he did not raise any concern regarding cutting of steel bars in any of these meetings.

Item 7: Describe and explain Your Company's system and measures in place at the material time to ensure that the steel bars in the diaphragm walls and platform slabs were properly installed and connected in compliance with Requirements, Standards and Practice and that any irregularities, non-compliances and defects will be reported and addressed by the appropriate parties and/or persons.

14. MTRCL has an extensive system and measures to check that the steel bars in the diaphragm walls and platform slabs were properly installed and connected and that any irregularities, non-compliances and defects would be reported and addressed by the appropriate parties and/or persons. For the purpose of my witness statement, I shall deal with the system regarding the issue of Non-Conformance Reports ("**NCR**") to LCAL, the Record of Specific Tasks Performed by Technically Competent Person under the CP Stream ("**TCP Records**"), and the Quality Supervision Reports of Coupler for Diaphragm Wall/ Barrettes ("**QSR**").

NCR

15. For cases where the site works have serious or recurrent problems or defects which require remedial action to remedy or prevent a recurrence of these problems or defects, the SIOW / SLS should review with the SConE the need to raise an NCR as appropriate. In this regard, paragraph 5.3 of "PIMS/PN/11-04 Monitoring of Site Works" provides that non-conforming works may be identified by members of the project team during their monitoring of the contractor or by the contractor itself. For non-conforming works identified by the project team, NCRs may be issued to the

contractor to record the non-conforming works. The contractor shall then propose corrective measures and preventive actions to rectify the works and to eliminate the causes of non-conformance to prevent a recurrence. Proposed actions shall be appropriate to the effects of the non-conforming works encountered. NCRs should only be issued to the contractor for a 'Works NCR' as defined in the guidelines provided in Exhibit 7.9 of PIMS/PN/11-04.

16. As explained in Exhibit 7.9 of PIMS/PN/11-04, a Works NCR is issued to report a nonconforming product which does not fulfil the specified requirements of a contract. The non-conforming product shall be dealt with before proceeding to the next stage of work or before covering it up. A Works NCR is only raised where the nonconforming product is significant and corrective and preventive actions are required to prevent a recurrence of a similar nature. Any Works NCR overdue beyond the agreed completion date would be elevated to the CM or PM level and the contractor's senior management to ensure prompt actions would be taken by the contractor.

17. By way of example, a Works NCR should be issued to the contractor for matters such as a pile which has been constructed out of the specified tolerance, major concrete defects, missing reinforcement bars in structures contrary to the design requirements and non-approved material incorporated in the works. "*Minor defects reported in routine inspections*" or "*commencement of works without approved method statement*" are specified in Exhibit 7.9 of PIMS/PN/11-04 as examples where NCRs should not be raised.

18. For the purpose of this statement, I enclose a table summarising the NCRs issued by MTRCL to LCAL which relate to the construction of the EWL slab and diaphragm walls and a table summarising the close out records of NCRs. These tables are attached to this statement as **Appendix 2**. I have reviewed the contents and believe they are in order.

19. As can be seen in the tables attached, there was only a handful of NCRs issued in respect of the construction of the EWL slab and diaphragm walls, since issuing NCRs was in my view a measure of last resort. Whenever issues regarding quality of the works were reported to me, I would always try to understand the nature of the issues

first and contact my counterpart at LCAL to see if such issues could be resolved on site. It was only when the issues could not be resolved on site or where there were repeated instances of non-conformance that MTRCL would formally issue NCRs to LCAL.

20. I now set out below two examples to illustrate how non-conforming matters were dealt with before proceeding to the next stage of work:-

(i) On 18 June 2015, I issued NCR No. 26 on behalf of MTRCL to LCAL in relation to the deviation in the as-built record of the diaphragm wall at HUH from the working drawing, including: (i) T40 U-bars were missing at top of steel cage; (ii) T25 instead of T40 U-bars were used at the top of steel cage,; (iii) shear keys in conjunction with EWL/NSL slab were missing; (iv) the arrangement of slab starter bars/ couplers was not in compliance with the design (which relates to the change of reinforcement bars arrangement as explained in paragraphs 34 to 37 below); and, (v) the reinforcement arrangement in conjunction with OTE slab/ relocation of main bar reinforcement to adjacent. The situation was subsequently rectified by LCAL and the NCR was closed out.

(ii) On 15 March 2016, I issued NCR No. 47 on behalf of MTRCL to LCAL as the cast in slab couplers at NSL Mezzanine level for Barrette/ diaphragm wall (i.e. WH5 to WH24 and EH 5 to EH24) in Area A form GL0 to GL7 exceeded the vertical tolerance by 1mm to 104mm. The situation was subsequently rectified by LCAL and the NCR was closed out.

TCP Records

21. As explained in paragraphs 18 to 28 of Jason Wong's witness statement, the CP was required under the IoE/IoC and the Code of Practice for Site Supervision 2009 ("**CoP**") to devise check lists for his TCPs by making reference to the typical items listed at tables 5.1 to 5.4 of the CoP and to include any other particular items considered appropriate and necessary for his projects and surrounding conditions. The TCPs were required to carry out their duties as per the check lists devised by their heads of stream and all the check lists and inspection records were required to be kept on site for inspection by the Buildings Authority. As CP Representative, I was required to and I did sign off these TCP Records signifying my satisfaction in respect of various matters including the following:-

(i) Monitoring check points were installed and readings were taken in time;

(ii) Reports of non-conformity were registered and relevant parties were informed of the non-conformity; and

(iii) Lateral supports were installed in accordance with approved/agreed sequence and were not to be removed in advance of adequate propping or restraint being provided.

QSR

22. Qualified site supervision of mechanical splice works by an experienced and competent person was provided to ensure that the works were carried out in accordance with the agreed proposal and that the required quality standards were complied with. A quality control supervisor (MTRCL staff) was assigned to supervise the works by the CP. The frequency of inspection by the quality control supervisor was not less than once a week. A quality control co-ordinator (LCAL staff) was assigned to supervise the works by the contractor. In terms of the frequency of his inspections, the quality control co-ordinator was full-time and continuously on site.

23. Pursuant to paragraph 4(c) of Appendix VIII (Mechanical Couplers for Steel Reinforcing Bars for Ductility Requirement) of BD's acceptance letter dated 25 February 2013, QSRs were prepared by the CP to confirm that the quality supervision for the diaphragm wall/ barrettes had been adequately provided. As TCP-T5, I assisted the CP in checking the logbooks signed by the quality control supervisor and quality control co-ordinator, as the case may be. I also signed-off two QSRs as TCP-T5.

Item 8: Given the extensive public concern about the safety of the diaphragm walls and platform slabs and allegations that there might have been unlawful shortening, cutting or defective connection of the steel bars in the diaphragm walls and platform slabs ("Defective Steel Works"):

(a) Explain and confirm whether Your Company has any knowledge of the Defective Steel Works (whether undertaken by Leighton and/or its sub-contractors) and if so, identify and describe the relevant events and occasions. Please describe the defects, explain in what ways Requirements, Standards and Practice had been

breached and provide particulars of such events and occasions (with reference to plans and drawings, photographs and documents as necessary and appropriate), including but not limited to the dates, time, locations, number of steel bars affected and the equipment used to shorten or cut the steel bars.

(e) Following Your Company's knowledge of the relevant events and occasions, please describe and explain what steps and measures were taken by Your Company to (i) investigate the Defective Steel Works; (ii) alert and report the matter to the Main Parties and the Government or any of them and (iii) rectify the Defective Steel Works.

24. I was made aware of an instance of cutting of steel bars at the end of December 2015 when I received a Document Transmittal Form No. 1112-DTF-LCA-QUM-000067 from LCAL enclosing NCR No. 157 issued by LCAL to Fang Sheung stating that "*threaded bars at 3m thickness EWL slab at Area C3 bay C3-2/C3-3 was found 5 number of threaded steel bars heads- Y40 at bottom layer which were wire cut and hadn't screwed into couplers face to bay C3-1/C3-4/eastern Dwall).*". That NCR had since been closed out.

25. Since the matter referred to in paragraph 24 above had already been satisfactorily addressed, there was no reason at all to suspect any systemic or widespread problem. I was not aware of any further alleged incidents of shortening, cutting or defective connection of the steel bars in the EWL slab until sometime after 30 May 2018 when the news regarding alleged cutting of steel bars was reported in the press.

Item 11: Given the matters and allegations stated in the Press and Media Reports and the evidence of Fang Sheung as extracted in items 9 and 10 of the Letter:

(a) Provide your detailed comments and explanation on the matters and allegation stated in the said Press and Media Reports.

26. During my tenure as the CM for Contract 1112, Aidan Rooney (General Manager) and I would conduct weekly joint site visits with LCAL's representatives to inspect the works. Occasionally, we would run into representatives of China Technology,

including Mr. Jason Poon who at the material time was (according to my recollection) on site at least two or three times a week, and we would discuss any concerns/issues relating to the works. I remember that the representatives of China Technology never brought up any issue regarding cutting of steel bars on site or during any of the meetings which China Technology's representative occasionally attended.

27. Apart from weekly site visits with Aidan Rooney, I also conducted additional site walks with the representatives of LCAL, which Jason Poon joined occasionally. Again, Jason Poon never mentioned in these site walks that there was any issue regarding cutting of steel bars.

28. If there were in fact issues regarding shortening of steel bars at the time, it is unclear to me as to why Jason Poon or other representatives of China Technology never raised such issues with the representatives of MTRCL at the material time but, instead, decided to make these allegations at this very late stage.

(d) Confirm whether Your Company has any additional information and materials to supplement the MTRCL Report and if so, please adduce such additional information and materials by way of a supplemental report.

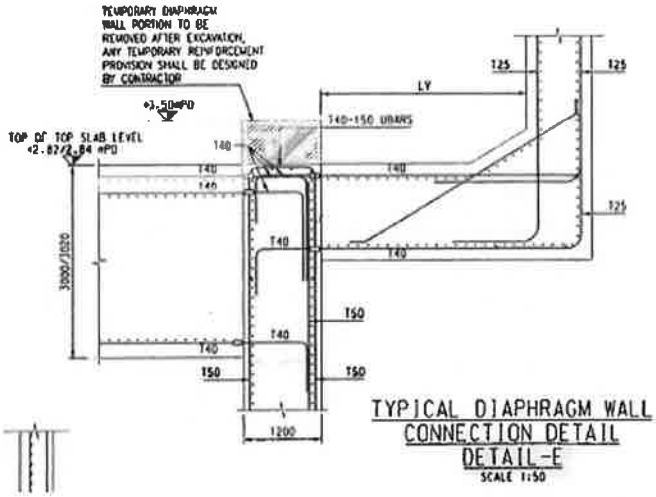
29. I shall take this opportunity to provide information and comment regarding the change in the steel reinforcement construction details of the EWL and OTE slabs and the diaphragm wall connections at Areas B and C (Gridline 15-50).

30. Subsequent to BD's acceptance of the first design package of drawings for the diaphragm wall submitted by MTRCL on 25 February 2013, Andy Leung on behalf of MTRCL instructed Atkins' Team A to prepare working drawings which were then issued by MTRCL to LCAL for construction purposes.

31. These working drawings show that the original design intent was that generally there would be two layers (T1 and T3) of reinforcement bars at the top of the east diaphragm wall in Areas B and C (Gridlines 15-50). In particular, working drawing no. 1112/W/HUH/ATK/C12/607 Rev. A dated 8 March 2013 entitled *'Coupler Schedule and Typical Details for NSL SAT, Area A, Area B, Area C and Coliseum Area'*

("**Original Coupler Schedule**") showed that there would generally be two layers (T1 and T3) of reinforcement bars at the top of the east diaphragm wall in Areas B and C (Gridlines 15-50) to be connected to the EWL slab by cast-in couplers. The spacing between the reinforcement bars in these top layers was uniformly at 150 mm centre-to-centre.

32. In addition to the Original Coupler Schedule, Atkins also produced working drawing no. 1112/W/HUH/ATK/C12/606 Rev. A dated 8 March 2013 entitled *'Permanent Diaphragm Wall RC for Panels Typical Details (Sheet 2 of 2)'*, which shows in Detail-E that the top layer reinforcement bars of panels EH47 to EH115 of the east diaphragm wall (*i.e.* Area C and part of Area B) would be connected with the reinforcement bars in the OTE slab using cast-in couplers on the earth side of that diaphragm wall: see the extracts from the drawing below. It is noteworthy that this is only an indicative 'typical' detail, and does not show the actual layers of reinforcement bars/couplers in each of the diaphragm wall panels. The number of layers is only shown in the Original Coupler Schedule.



CONNECTION SCHEDULE FOR DIAPHRAGM WALL

AREA:	PANEL NO:	CONNECTION TYPE:
AREA A	WH5 TO WH15	DETAIL B3
AREA A	WH16 TO WH18	DETAIL B5
AREA A	WH19 TO WH22A	DETAIL B2
AREA A	EH5 TO EH13	DETAIL B4
AREA A	EH13 TO EH25	DETAIL B1
COLSEUM	WH23 TO WH30	DETAIL C1
COLSEUM	EH25 TO EH38	DETAIL C2
AREA B	EH40 TO EH46	DETAIL D
AREA B	EH47 TO EH55	DETAIL E
AREA B	WH38 TO WH46	DETAIL E
AREA B	WH47 TO WH56	DETAIL D
AREA C	WH57 TO WH119	DETAIL A or F
AREA C	WH119 TO WH137	DETAIL E
AREA C	EH56 TO EH115	DETAIL E
NSL SAT	WH1 TO WH4	DETAIL G
NSL SAT	EH4	DETAIL G

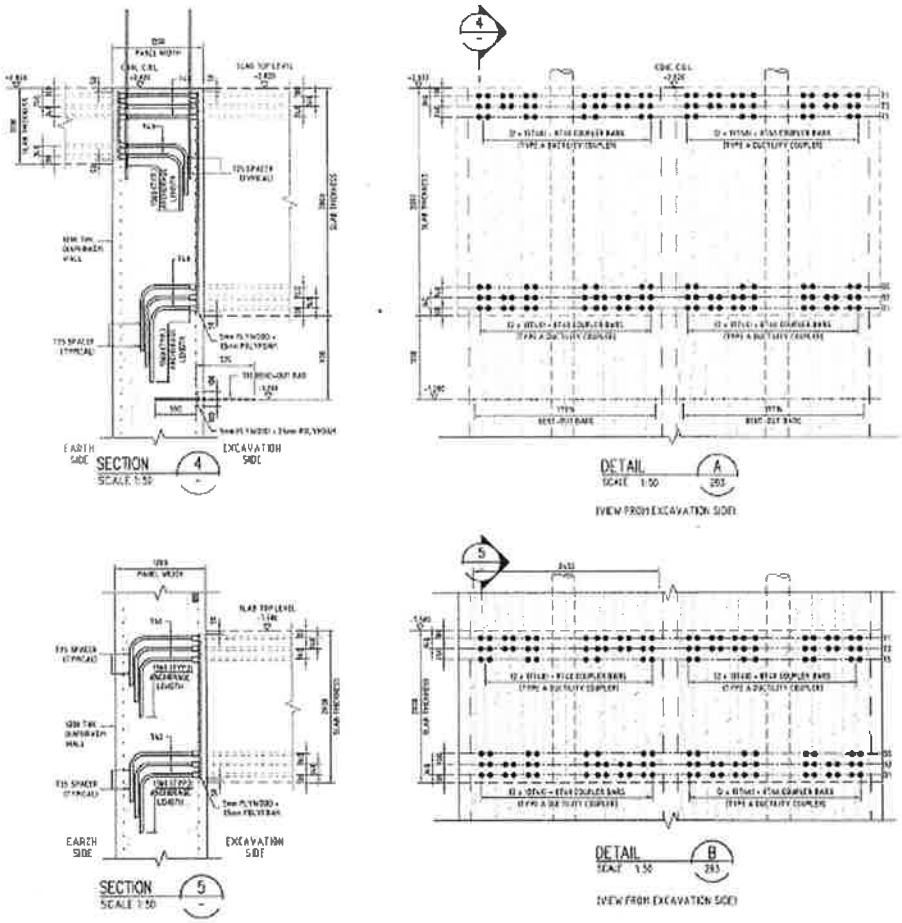
33. It should be noted at this juncture that subsequently, in or around September 2015, this working drawing was revised to incorporate, among other things, a number of permutations to the above connection details at different locations/panels of the east diaphragm wall in (amongst other areas) Areas B and C. These were not changes in design, but permutations of the same design intent catering for the local conditions of each panel wall. It is common and necessary to include such permutations. By way of example, in drawing no. 1112/W/HUH/ATK/C12/606 Rev. C dated 21 September 2015

which was issued by Mr. Kenneth Tan (Design Management Engineer I) to LCAL for construction on 22 September 2015, one can see that Detail-E2 is a permutation specifically made to cater for the utilities troughs that exist at various diaphragm wall locations. The number of connection detail permutations often increases during the course of construction to suit the local conditions.

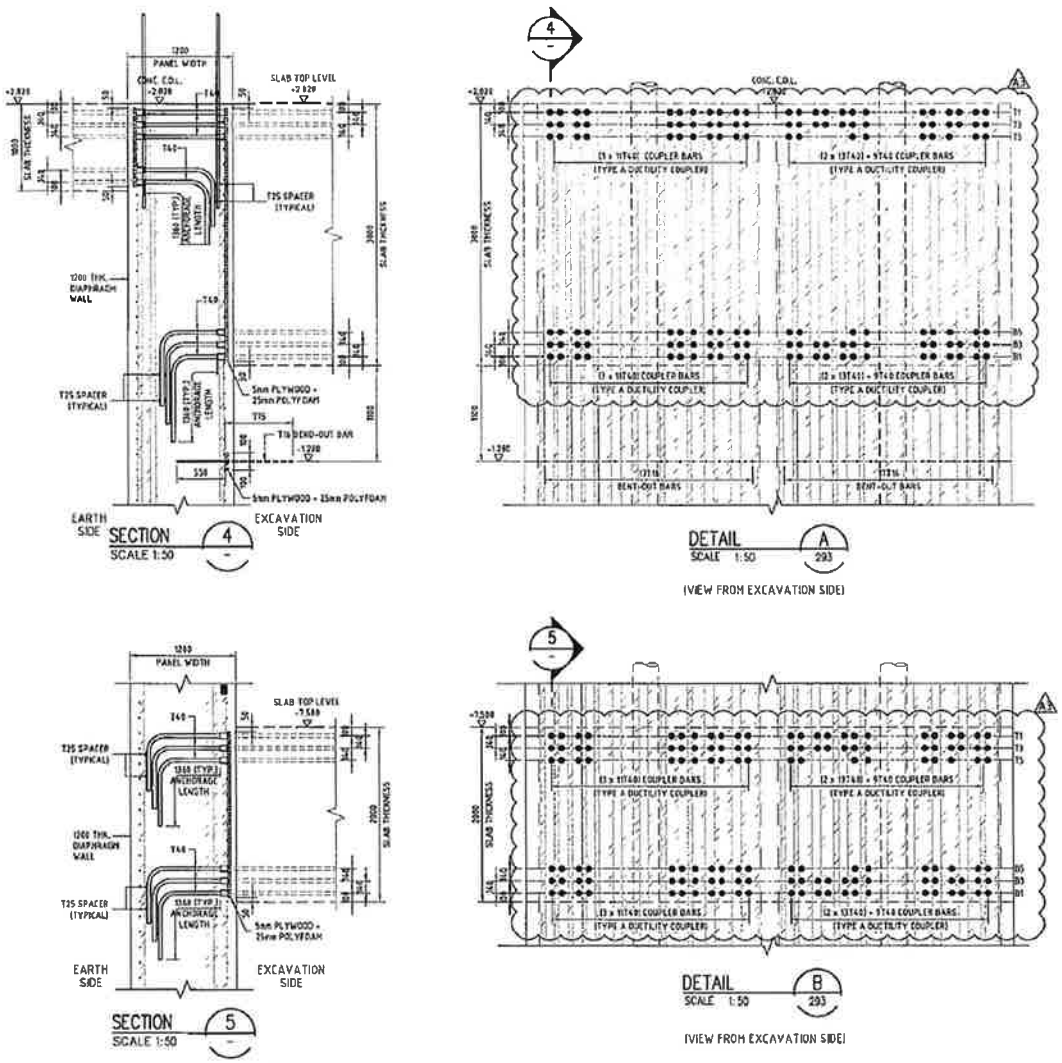
34. As regards the steel bar arrangements, I note that the original design of the steel bar arrangements with uniform 150 mm centre-to-centre spacing in both the east and west diaphragm wall (which was accepted by the BD as stated in paragraph 30 above) was changed such that the revised layers of reinforcement bars were arranged to concentrate on the sides of the 300mm-tremie pipes (which were positioned within the diaphragm wall temporarily for concreting purposes) with non-uniform spacing in the east and west diaphragm wall.

35. Whilst I do not have personal knowledge as to the reason underlying this change, it is not uncommon for such a change to be made on site as the original design of the steel bar arrangements may not (as in this case) have taken into account the spatial clash with the tremie pipes and other cast-in items which were required for the concreting works of the diaphragm wall.

36. This change was reflected in Intrafor's shop drawings as issued for construction – see e.g. shop drawing nos. 1112/C/HUH/LCA/C12/298 Rev. A2 dated 14 November 2013 and A3 dated 16 January 2014, the revised details of which showed three layers of reinforcement bars and Type A ductility couplers at the top of panel EH 84 of the diaphragm wall in Area C (as shown in the extract below).



Shop drawing nos. 1112/C/HUH/LCA/C12/298 Rev. A2 dated 14 November 2013



Shop drawing nos. 1112/C/HUH/LCA/C12/298 A3 dated 16 January 2014

37. These changes were eventually incorporated into and reflected in the various batches of submissions to the Buildings Department from January 2015 to January 2016 for the Completion of Works for Foundation (Load Bearing Diaphragm Wall/Barrette) (commonly known as BA-14) – see e.g. as-built drawing no. 1112/Z/HUH/LCA/C12/833 Rev. A in respect of Area C, which was submitted as part of Batch 1 on 27 January 2015. These changes have been approved by the Buildings Department.

38. The rebar fixing works in the EWL slab began with the 1875 box culverts and Area C1-1. For the 1875 box culverts (Gridline 30 to 31), the rebar fixing works were carried out from 10 March to 27 May 2015 in accordance with the number of rows (two rows of top layer) and spacing of rebars as indicated in working drawing no.

1112/W/HUH/ATK/C12/181 Rev. B, which was issued on 25 October 2013 and was current at the time. I should add that at this location, the cut-off level of the east diaphragm wall is lower than at other locations, such that through-bars were adopted from the EWL slab across the diaphragm wall up to the OTE/soil side.

39. Between 13 July and 25 July 2015, the rebar fixing works for Area C1-1 were carried out. Apart from panel EH 74, the slab-to-wall connections in this Bay followed the coupler connections and number of layers in the diaphragm wall as reflected in the BA-14 as-built submissions.

40. Panel EH 74 was the subject of Technical Query ("**TQ**") 34 (the system of TQ is further explained below) dated 27 July 2015, which arose from the vertical misalignment of the top-most layer (T1) of cast-in couplers on the excavation face of panel EH 74, and the consequential difficulties encountered by LCAL in completing the splicing assembles at the joint with the EWL slab. In essence, the solution adopted was as follows:

    (i) The T1 layer of cast-in couplers and diaphragm wall concrete were trimmed down, but the T3 and T5 layers of cast-in couplers and concrete were retained.

    (ii) Through-bars were used in layer T1 to connect the EWL slab to the diaphragm wall, whereas for layers T3 and T5, the starter bars in the EWL slab were spliced to the cast-in couplers in the diaphragm wall.

41. As the difficulties arising from EH 74 also existed in other panels, after some verbal discussions between my construction team and the representatives of LCAL (who should have been Mr. Malcolm Plummer (Project Director), Mr. Ian Rawsthorne (Project Manager) and/or Mr. Gary Chow (Construction Manager) but I cannot remember whom in particular I spoke to), it was agreed sometime between 28 July 2015 and 1 August 2015 that the construction of the east diaphragm wall panels in Area C1-2 should adopt the remedial proposal in response to TQ 34 with the first row in the top layer being replaced with a through-bar. Between 1 August and 13 August 2015, the rebar fixing works for Area C1-2 were carried out in accordance with the remedial proposal in response to TQ 34.

42. At or around the same time, further issues were discovered by LCAL during the reinforcement steel bar fixing at the east diaphragm wall. In particular, it is noted that in a TQ 33 dated 27 July 2015 issued by LCAL to Atkins' Team B, LCAL raised various issues, including:-

(i) With reference to sketch LCA-SK-000108 (PWD-059A3), it was discovered that there were locations where the OTE slab length was less than 1200mm.

(ii) With reference to sketch SK-0033-001: (a) the L-shape bar could not be fixed onto the couplers in the diaphragm wall; (b) the L-shape bar that lapped with the horizontal bar did not have enough lapping lengths; (c) the reinforcement bar for the chamfer could not be fixed; and, (d) the reinforcement bar could not provide a 30 diameter 1200mm anchorage length for some panels.

43. Amongst other things, Team B of Atkins in TQ-URS-0033 replied in the "Response" section within TQ 33 in late July 2015 stating that "*please be reminded that in order to comply with the design assumption, the OTE wall must be* ***concrete/pour together at the same time (monolithically)*** *with the 3m EWL slab and the wall to extend to 300mm above the chamfer section of the wall to provide the kicker for the OTE wall above*" (my emphasis).

44. Further, I understand from Mr. James Ho that there was an email from Mr. Wan Cheung Lee of Atkins Team B dated 24 July 2015 which repeated the "*design assumption* [that], *the OTE wall must be* ***concrete/pour together at the same time (monolithically)*** *with the 3m EWL slab*" (my emphasis). That email was not copied to me as I was on leave from around 24 July to 5 August 2015.

45. I also understand from Mr. James Ho that there was an email from Mr. Rob McCrae of Atkins Team A to Mr. Brendan Reilly dated 25 July 2015 confirming that it was necessary to cast the EWL slab and OTE slab monolithically. Mr. McCrae added that the RSE view was that it was acceptable "*to cast the OTE slab after the EWL slab providing it* [was] *cast before future activities which would further load the structure, in particular dewatering or excavation below the EWL slab*". Again, this email was not copied to me as I was on leave.

46. I note that Mr. James Ho has explained these two emails in paragraph 64 of his witness statement, a draft of which I have reviewed.

47. Further, at the material time, the construction process also faced the following difficulties:-

(i) Modification work was required to address the difference in connection details between the EWL slab and the diaphragm wall. While the reinforcement bars in the EWL slab were arranged in a uniform spacing, the couplers cast into the diaphragm wall were not uniformly spaced due to the requirement to accommodate tremie pipes and reservation tubes within the diaphragm wall panel as noted above;

(ii) The starter bars that extended into the OTE wall base were required to be bent to ensure adequate anchorage length. This meant that the threaded ends of such bars required Type B threaded ends and non-cast-in couplers (instead of the Type A starter bars and cast-in couplers which were being used at the time) which permit couplers to be connected to the bars by turning the couplers to screw onto the bars, rather than rotating the bars into the couplers (the latter process was not possible for bent bars as the bent portion would clash with the adjacent bars, thereby hindering the installation process).

48. In light of the need to proceed in accordance with the design intent/assumption and to overcome various problems relating to the couplers connections as noted in paragraph 47, which would be time-consuming and costly, I discussed the matter with my team and the representatives of LCAL (who should have been Mr. Malcolm Plummer (Project Director), Mr. Ian Rawsthorne (Project Manager) and/or Mr. Gary Chow (Construction Manager) but I cannot remember whom in particular I spoke to and when) and concluded that it was not feasible to continue implementing the construction detail of connecting reinforcement bars of the EWL slab with the three or four layers of cast-in couplers on the excavation side of the east diaphragm wall.

49. Based on the discussions referred to above, the construction management teams of both MTRCL and LCAL eventually decided in or around August 2015 to revert back to the original construction detail of having two layers of reinforcement bars with uniform

spacing at the top of the east diaphragm wall for the rest of the panels in Areas B and C (with the exception of panels in Areas C1-1 and C1-2, which had already been constructed at the time in the manner as explained above), which was possible because the concrete had been cast for the east diaphragm wall by then and the tremie pipes had since been abandoned, although Atkins did not formalise any revisions to the working drawings at the time as far as I am aware. The work sequence which ensued on site was generally as follows:

(i) first, LCAL trimmed down the top 450mm (approximately) of the east diaphragm wall;

(ii) second, LCAL used one through-bar to replace three fragments of reinforcement bars connected by two couplers on the EWL slab facing and the OTE slab facing sides of the respective east diaphragm wall panel. The design of these through bars follows the same design intent as reflected in the working drawings (which follows the BD approved drawings) showing a construction detail of reinforcement bars with uniform spacing at the top of the east diaphragm wall in Areas B and C;

(iii) finally, LCAL completed the concrete pour over the reinforcement-bar structure (which extended from the EWL slab to the OTE slab) in one go, such that the top part of the diaphragm wall (which was then trimmed off) would form a monolithic part of the EWL and OTE slabs after concreting.

50. By using the "through bar method" referred to in paragraph 49 above in Areas B and C, there was no longer any need to use couplers as there was no 'joint' or 'connection' between the top layers of the EWL slab and the diaphragm wall and between the diaphragm wall and the OTE slab.

51. LCAL proceeded with the "through bar method" in constructing the EWL slab in the rest of Areas B and C starting with Area C1-3 on 29 August 2015. The Construction Management team was under the impression that the Design Management team would update the working drawings of the EWL slab reinforcement and thereafter obtain approval from BD. This was because in the email dated 25 July 2015 from Mr. Andy Leung to Mr. Justin Taylor (Risk Manager of LCAL), which was copied to Mr. James

Ho, Mr. Andy Leung pointed out that "*Portion of the wall should be cast together with the OTE slab as a good practice. Otherwise, one more CJ* [construction joint] *is introduced between them. I can't see how this CJ can be located given the width of the slab available.*". Reading this email together with the email chain prior to this email, Mr. James Ho and I understood this to mean that the sensible thing to do was to cast the EWL slab, OTE wall and the top of the east diaphragm wall monolithically so that there would not be multiple construction joints between the EWL slab, diaphragm wall and OTE slab.

52. LCAL/ Atkins Team B should have submitted proposal for change in permanent works design to the Design Management Team and Atkins Team A for their review and approval, who would then issue working drawings for construction to LCAL. On this occasion, they failed to do so.

53. In fact, this kind of failure on the part of LCAL/ Atkins Team B was persistent during the construction phase of Contract 1112. The Design Management team frequently had to chase them to submit proposal for changes in construction details. For example, in an email dated 19 October 2015 sent by Andy Leung to Justin Taylor and Rob McCrae, which I was copied in, Andy Leung made the following complaint:-

"*Justin,*
I have not received any proposals from you to incorporate the changes initiated by your team (e.g. those resulting from your TQs to Atkins) since the design coordination meeting last week. I cannot allow this malpractice on drawing management to continue. I will have no choice but not to issue any drawings with such amendments if you do not submit your proposals to us formally in a timely manner.

Rob,
Please take note of this and you, as the C1106 DDC, should not change any permanent works drawings under C1106 without my instruction."

54. In any event, I consider the change referred to above was only a minor one and as such the Construction Management Team did not specifically request the Design

Management team to update the working drawings at that time. Further, I consider that the change was a better construction detail as the number of joints was reduced.

55. Further, the original design intent in the working drawings and coupler schedules (as issued in 2015 for construction and accepted by BD) has always been based on the uniformly spaced and generally two layers of reinforcement bars for the connection between the EWL slab and the top of the east diaphragm wall in Areas B and C. The working drawings issued by Atkins' Team A (which reflect the design intent accepted by BD) also generally show a two-layer reinforcement bar connection between the top of the diaphragm wall and the EWL slab in Areas B and C.

56. I should add that on 29 July 2015, Andy Leung of MTRCL issued a letter to BD enclosing the "Design Report for HUH Station Primary Structure" [Deliverable No. TWD-004B3]. In this Design Report at section 6.2, it is stated that:-

(i) The top of the diaphragm wall panel would be trimmed to the lowest level of the top rebar for the EWL slab (a minimum of 420mm below the top level of EWL slab);
(ii) The top rebar of EWL slab at the diaphragm wall panel would then be fixed to the top rebar of OTE slab to achieve full tension laps; and
(iii) The EWL slab and OTE slab would be cast concurrently with temporary openings around the existing columns and pile caps.

57. In any event, I do not consider that this change in construction detail was a major change that required prior BD approval. This is because the principle of the original design intent that was approved by BD was never changed as explained above.

58. Further, the Construction Management Team is presently reviewing as-constructed typical detail and as-constructed drawings of the EWL slab connections to verify submission to BD. It is noted that there are further connection permutations included in these drawings. However, and as noted above, it must be emphasised that these are permutations of the original typical details and are not changes in design.

(f) Explain the reasons for the existence of cracks and water leakage on the diaphragm walls as reflected in the Press and Media Reports, and explain whether it is related to the steel bar fixing works

59. I do not know precisely where and when the alleged water leakage on the diaphragm walls as reflected in the Press and Media Reports took place. However, I note that water seepage on the diaphragm wall is not uncommon. This is because there are no reinforcement bars in between panels and there is no waterproof membrane. In any event, water seepage on diaphragm walls can easily be rectified by grouting and should not pose any major concern.

60. As far as I recall, there were actually fewer instances of water seepage on the diaphragm walls at HUH than one would expect. This is not surprising as Intrafor is a reputable contractor for the construction of diaphragm walls.

(g) In relation to the steel fixing works undertaken by Leighton and its subcontractors, explain whether they or any of them have experienced and/or reported any difficulties and issues to Your Company including by not limited to, the fixing of steel bars into couplers.

(h) If so, describe and explain the difficulties and issues and provide the reasons for such difficulties.

(i) Explain and confirm how often or common it was that Leighton and its sub-contractors would encounter difficulties in the steel fixing works

(l) Confirm whether Leighton, its subcontractors and/or their respective workers had referred such difficulties and issues to Your Company and if so, please identify (with particulars) the entities and/or person(s) who referred the difficulties and issues to Your Company and describe the replies and instructions given by Your Company to resolve the difficulties and issues. Please state whether the replies and instructions were given orally or in writing. If orally, identify by whom and to whom the same were made, when and in what circumstances. If in writing, please produce all relevant documents

(m) Please provide contemporaneous written documents (if there were any) recording the reports made by Leighton, its subcontractors and/or their respective workers

on the said difficulties and issues to Your Company and the replies and instructions given by Your Company (if any)

(n) Confirm whether Your Company was aware that instructions were given by Leighton for the steel bars to be shortened and cut in order to overcome the said difficulties and issues. If so, at which point in time did Your Company become aware of such instructions

(s) Explain and confirm whether there would have been other effective solutions or steps to resolve the issues and difficulties encountered by Leighton and/or its sub-contractors and if so, why such solutions and steps were not taken by them or any of them

61. Where LCAL or its sub-contractors encountered difficulties, such difficulties were typically dealt with by issuing Requests for Information ("**RFI**"). A RFI is a formal document for LCAL to request for information or clarification that might be required for constructing the works. The submission is done through the "electronic Project Management System" (ePMS) in accordance with General Specification for Civil Engineering Works GS 15.1.4.

62. Where the issues relate to LCAL's own design or proposals, LCAL would raise its issues and queries to its own designer, and the designer would reply to LCAL using a TQ Form. Some of these TQs were also sent to MTRCL under a Contractor Submission Form (CSF) for record purposes.

63. For the purpose of this statement, I enclose a table of RFIs and a table of TQs which relate to the construction of the EWL slab and diaphragm walls (attached as **Appendix 3** and **Appendix 4** respectively). These tables contain information relating to the nature and reasons for such difficulties and how those issues were resolved and closed out. I have reviewed the contents and believe they are in order.

64. I am not personally aware if any instruction was ever given by LCAL for the steel bars to be shortened and cut in order to overcome any difficulties or issues.

(r) In cases where steel bars were shortened and/or inserted into the couplers but not to the full extent as specified under the Requirements, Standards and Practice, explain and confirm whether:

(ii) it would be apparent on a visual inspection to supervisors and/or inspectors that the steel bars were shortened and cut and not properly inserted into the couplers

(iii) it is possible on inspection (visual or otherwise) to detect and identify that the steel bars were shortened and cut and not properly inserted into the couplers

65. Where steel bars were shortened and inserted into the couplers but not to the full extent required, it may not be apparent and would be difficult to detect on a visual inspection. As to how inspections were carried out in practice, I refer to paragraphs 79 and 92 of Mr. Kobe Wong's statement. Having said that, I note that depending on how a steel bar is being shortened, it may not be possible to insert such shortened steel bar into a coupler. For instance, if steel bars were shortened and cut by hydraulic cutters as alleged in the Press and Media Reports, the threaded end of the steel bar would most likely deform as a result and would not fit into the couplers.

Item 13(c): Confirm whether workers engaged by Leighton and/or its subcontractors had used hydraulic cutters to shorten and cut the steel bars embedded or to be embedded within the diaphragm walls and platform slabs and if so, please identify the works and/or entities who carried out such shortening or cutting work by hydraulic cutters, and the persons and/or entities who gave instructions (i) for such work to be carried out and (ii) for hydraulic cutters to be acquired.

66. Please see my answer to Items 8 (a) and (e) above. It is further noted that the incident as reported by LCAL's NCR No. 157 to Fang Sheung refers to 5 threaded steel bars being "*wire cut*", rather than shortened or cut by hand-held hydraulic cutters. I am not aware of nor have I ever seen any hand-held hydraulic cutter on site.

67. Finally, I would like to mention the following:

(i) The events in question and which form the subject matter of the Commission of Inquiry took place several years ago and my recollection of every detail is not therefore perfect.

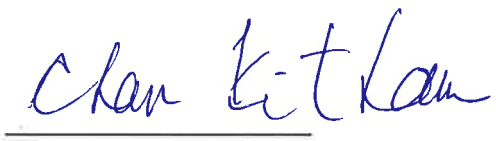
(ii) Accordingly, in preparing this witness statement I have reminded myself of the events in question by reference to various hard copy and electronic documents and materials, including contemporaneous email correspondence, meeting minutes and contractual documents and other records. I understand these materials were retrieved by MTRCL's Legal Department, with the assistance of the MTRCL's external lawyers, Mayer Brown.

(iii) The hard copy documents were: (1) extracted from physical files kept at the Hung Hom site office or the Hung Hom main office of MTRCL; (2) printed from the MTRCL's "Electronic Project Management System" (ePMS); or, (3) printed from other electronic sources in response to the matters specifically raised by the Commission of Inquiry or matters which were discussed in the course of preparing this witness statement.

(iv) I understand that MTRCL's Legal Department and external lawyers have recently established a database using software named Relativity which has captured a large amount of data from hard disk drives, including some of those that stored my emails and other electronic documents for the relevant period. I understand that they have commenced the process of identifying specifically relevant documents by use of search terms and date ranges and that this is an ongoing process due to a large volume of data. I have been given some of the documents identified from Relativity during the last week or so and commented on these in appropriate sections of this statement.

(v) I would like to add, therefore, that there may be matters referred to or stated in other documents which have not been recently placed before me. To that extent, I would be happy to comment on any such other materials at a later date if and when identified and placed before the Commission of Inquiry.

Dated 13 September 2018



CHAN Kit Lam

Corrigendum to the Witness Statement of Chan Kit Lam

dated 13 September 2018

Page	Paragraph	Content
B266	13(ii)	Replace "*these meetings were attended by the representatives of* ***MTRCL, LCAL, BD****, and Atkins*" with "*these meetings were attended by the representatives of* ***MTRCL, LCAL*** *and Atkins*"
B266	13(iv)	Replace *"I personally attended most of these meetings between January 2015 and* ***March*** *2016."* with *"I personally attended most of these meetings between January 2015 and* ***May*** *2016."*
B266	13(v)	Replace *"I personally attended most of these meetings between November 2014 and* ***March*** *2016."* with *"I personally attended most of these meetings between November 2014 and* ***May*** *2016."*
D267	After 13(vi)	Add *"Apart from the meetings referred to above, I also attended the meetings (to the extent that they are not referred to above) referred to in paragraph 33 of Mr. James Ho's witness statement."*
B277	41	Replace "*it was agreed sometime* ***between 28 July 2015 and 1 August 2015*** *that the construction of the east diaphragm wall panels in Area Cl-2 should adopt the remedial proposal in response to TQ 34...*" with "*it was agreed sometime* ***before commencement of rebar fixing works for the top layers of the EWL slab*** *that the construction of the east diaphragm wall panels in Area Cl-2 should adopt the remedial proposal in response to TQ 34...*"

B287.1