SCOTTISH HOSPITALS INQUIRY

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Hearing Commencing 26 February 2024

Witness Statements

Volume 2

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Scottish Hospitals Inquiry

Witness Statement of

Graeme Greer

Preamble

1. This is my second witness statement for the Scottish Hospitals Inquiry ("SHI"). My first statement was dated 23 February 2023 **(A42760846 – Witness Statement of Graeme Greer – Final (Redacted) – Bundle 13, Volume 5 – Page 7)**. I provided oral evidence to the SHI on 5 May 2023. My previous evidence to the Inquiry broadly encompassed my involvement for the period from the Invitation to Participate in Dialogue ("ITPD") up to Financial Close (**"**FC").

2. On 10 November 2023, solicitors instructed to act on behalf of Mott MacDonald Limited (**"**MML") received an email from the SHI requesting the production of additional witness statements. This statement is intended to address, insofar as I was involved, the matters raised by the SHI in their email of 10 November 2023. In preparing this statement, I have had regard to contemporaneous correspondence and documents which I sent, was copied into or have since been shown, as well as my own recollections. The SHI has provided a list of questions on which further information is sought. I have endeavoured to answer these questions to the best of my recollection.

Background

3. I am Graeme Greer. My address for the purposes of this Inquiry is c/o Clyde & Co (Scotland) LLP, Albany House, 58 Albany Street, Edinburgh, EH1 3QR. I graduated in 2002 with BEng (Hons) degree in Civil Engineering. On leaving university I began employment with Babtie Group (which later become Jacobs UK), where I worked for about 10 years, initially as a graduate civil engineer in the reservoir and dams teams, before moving to hydropower schemes and sewer design.

This involved interfacing with PFI projects, increasingly moving away from design and into project management. In 2011 I left Jacobs UK and took up employment with MML. I joined MML as a Consultant, and then in summer 2016 I was promoted to Associate.

4. Having joined MML, I worked on various healthcare projects as technical advisor. In May 2013 I moved onto the Royal Hospital for Children and Young People & Department of Clinical Neuroscience ("RHCYP/DCN") project. By the time I became involved in the project, MML's role was to provide project management and technical advisor services to NHS Lothian ("NHSL"). My role within the RHCYP/DCN project was MML's internal Project Manager and Lead Technical Advisor, although my job title was Consultant and then Associate. From around 2019 I handed over my other roles within MML to focus exclusively on the remedial works at RHCYP/DCN. I continued to carry out this role until May 2022 when I then left MML and joined NHSL.

5. The RHCYP/DCN Project Execution Plan indicates the MML staff involved. The input from the technical team would generally report into myself and the Project Management team, and I would report to NHS Lothian. I would also report to Richard Peace (MML Project Director) and Richard Cantlay (MML Technical Advisor Director). My RHCYP/DCN role included managing the MML project team, though I did not have any line management responsibility.

6. Some of the correspondence below I was copied into, however others I was not copied into, and I have retrospectively found. The correspondence issued by MML to Project Co, would have in the majority, been discussed and agreed with NHSL prior to issue to Project Co. There is generally a significant amount of correspondence that sits behind the final issued copy to Project Co.

7. Full details of my involvement within the RHCYP/DCN project are provided within my first witness statement to the SHI **(A42760846 – Witness Statement of Graeme Greer – Final (Redacted) – Bundle 13, Volume 5 – Page 7)**.

Construction Phase

8. FC was reached on Friday 13 February 2015. After this date the project entered what is commonly referred to as the "construction phase". Whilst it is correct to say that this is the phase during which construction took place, a significant amount of design work was also undertaken during this period by Project Co. The undertaking of design work after FC is a common feature of the NPD model. This can be a consequence of the procurement model. As I understand it, the Preferred Bidder covers their own costs prior to the signing of the Project Agreement ("PA"). Until FC is reached, there is no guarantee that a project will proceed, and that the Preferred Bidder will realise a financial return. In such circumstances it is common for a Preferred Bidder not to produce a finalised design prior to FC.

9. In the early part of the construction phase, it was agreed with NHSL that I would continue as MML Project Manager and lead Technical Advisor on a full-time basis for the first six months. In agreement with NHSL, I would then reduce my input to 75%, and then to 50% as the project entered into a steady state phase, with the responsibility sitting with Project Co to deliver the Facility. After FC, MML's input was largely to provide project management support using a core team, and ad hoc technical support to NHSL's reviews of Project Co's design via the support team, as explained in paragraph 11 of my witness statement to SHI dated 22 February 2023. The support team provided technical input on a wide range of matters from civil and structural engineering, energy modelling, mechanical and electrical services and even aviation. NHSL reviews of Project Co's design were undertaken within the context of the Review Procedure, Reviewable Design Data ("RDD") **(A32435789 – Schedule Part 6: Construction matters, section 5 (Reviewable Design Data) – Bundle 13, Volume 5 – Page 44)** and the PA risk allocation.

10. My role in the construction phase was largely to lead the MML Project Management team in the coordination of NHSL reviews of RDD information. Upon receipt of an item of RDD from Project Co, this would be disseminated to the relevant technical teams within both MML and NHSL.

A collaborative sample review in the context of the Operational Functionality risk allocation would then take place. As explained at paragraph 18 of my first witness statement to the Inquiry, the architectural layouts and clinical adjacencies fell within the definition of Operational Functionality, which was the only element of the design where NHSL Lothian accepted the design risk in terms of the Project Agreement. Following the sample reviews, comments would be fed back to those of us in the Project Management team, which would then collate the comments received and issue a response to Project Co.

11. I understand that it has been suggested by the SHI that the RDD process involved a thorough review of items such as Project Co's EM. Whilst I did not undertake the reviews myself, this is not consistent with my understanding. My understanding is that NHSL entered into a contract with Project Co to undertake the design in accordance with Project Co's own quality assurance procedures. The design would therefore be checked and approved by Project Co prior to issuing RDD submissions through the Review Procedure. NHSL were therefore relying on Project Co's own design assurance and did not undertake a line by line review themselves. As NHSL had already employed Project Co to undertake the design and design check, NHSL did not ask MML to duplicate that work and it was not part of MML's remit. For example, in October 2017 TUV SUD said they had done a line-by-line review of their design. I recall discussions with NHSL, along the lines of why NHSL would pay twice for the same work product. MML did however support NHSL with respect to Operational Functionality reviews, and support NHSL with the sample reviews of the broader RDD submissions. RDD items would be returned as Level A, B, C or D. The decision on which Level was to be granted would be made by NHSL with input from MML. Irrespective of which Level was awarded, the approval granted by NHSL under the RDD process related only to Operational Functionality. Project Co remained responsible for ensuring compliance with the BCRs.

12. In addition to facilitating the review of RDD items, I would also support the administration of the Change Protocol **(A35301659 – 3.1.3 3_1 Conformed Project Agreement - Bundle 13, Volume 5 – Page 231)**. My role post-FC included attending NHSL Project Management Executive and NHSL internal

Change meetings. I also attended NHSL meetings with Project Co including the Project Management Group ("PMG"), Project Delivery Group, Design Steering Group, Change Meeting, Monthly Construction Progress Meeting, Joint Commissioning Group Meeting, Settlement Agreement meetings, Workstream meetings, Programme and Readiness meetings and the Operational Management meetings.

13. MML's input post-FC was commensurate with NHSL's requirements and reflective of the risk allocation within the PA, as I will go on to explain. On the technical side, in line with MML's agreed input with NHSL, one person per discipline was generally assigned from MML to undertake sample reviews on selected items of design data. NHSL did not require MML to undertake a detailed review and it was not MML's role in terms of their appointment as Technical Advisor to undertake a line-by-line review of all areas of Project Co's design. This also reflected the contractual risk allocation. Design reviews were undertaken as a collaborative exercise between MML and the relevant technical individual(s) within NHSL. NHSL was aware and supportive of the level of review MML was undertaking. NHSL was also aware MML was not undertaking a shadow design. NHSL's understanding of MML's role is set out in a letter from Brian Currie of NHSL to Health Facilities Scotland ("HFS") dated 1 April 2019 **(A41293071 – Three letters relating to assurances regarding the delivery of the RHSC and DCN Project, dated 01 April 2019, 12 February 2019 and 13 March 2019 - Bundle 4 – Page 228).**

14. The underlying understanding of MML (and I believe NHSL) during the construction phase was that ultimate design responsibility rested solely with Project Co, subject to the Board's retention of responsibility for matters relating to Operational Functionality. Project Co's design responsibility included an obligation to update their Environmental Matrix ("EM") in accordance with the relevant provisions of the PA and to ensure its accuracy. In line with the scope of their appointment, MML, together with NHSL, undertook sample reviews of Project Co's EM and other RDD submissions.

15. Throughout the construction phase MML was responsible for issuing correspondence to Project Co on behalf of NHSL. The correspondence issued by MML to Project Co would normally have been discussed and agreed with NHSL prior to issue. Typically, there was a significant amount of correspondence discussing the RDD item between MML and NHSL that sat behind the approved version issued to Project Co.

16. MML's role remained consistent throughout the construction phase. In spring 2018 NHSL and Project Co entered into negotiations regarding a potential Settlement Agreement ("SA1"). Although obviously not a party to SA1, MML, in its role as Project Manager and Technical Advisor, supported NHSL during the negotiations. SA1 was of course not anticipated at the time of either the PA or MML's appointment. MML raised concerns with both NHSL and the Board's other advisers, regarding a possible alteration to the PA risk profile as a result of SA1. MML were not legal advisers and I understand NHSL sought and obtained legal advice regarding the project risk allocation.

Reviewable Design Data (RDD)

17. As set out in my previous statement, at FC the Preferred Bidder's design was not yet complete. A significant amount of design work was required during the construction phase, though as I have mentioned, this is anticipated as a common feature of the NPD model. The NPD provider (Project Co) bears the risk of providing a compliant design. To develop their design during the construction phase, Project Co was required to submit items of RDD to the Board. The ability of the Board to review RDD is governed by the Review Procedure within the PA. **(A35301659 – 3.1.3 3_1 Conformed Project Agreement - Bundle 13, Volume 5 – Page 394)** It was my understanding that although the Board may have returned an item of RDD with comments, actioning these in order to provide a compliant design was the sole responsibility of Project Co.

18. As I explain in more detail later in this statement, my understanding was that Project Co's EM, in its entirety, was an item of RDD. Post-FC Project Co submitted multiple revised EMs to the Board for review. In total, Project Co

produced approximately 11 different iterations post-FC. MML, together with NHSL, undertook sample reviews of Project Co's EMs in the context of the Operational Functionality risk allocation within the PA. Where inconsistencies or potential non-compliances beyond matters relative to Operational Functionality were identified during these sample reviews, the Board would include a comment in their response to Project Co as a helpful pointer. It was for Project Co alone to ensure that any such issues were resolved and to ensure that their design complied with the Board's Construction Requirements ("BCRs").

19. Items of RDD ought to have been submitted by Project Co in accordance with the agreed schedule of submissions (a rolling look ahead RDD programme was required). Throughout the construction phase Project Co failed to adhere to this schedule. This resulted in the NHSL/MML team often becoming overburdened by the number of submissions made in a short space of time. For example, in the period 21 July – 31 July 2015, NHSL's project team received a total of 369 drawings from Project Co for review. This issue was raised with both NHSL and Project Co, for example in an email from Kamil Kolodziejczk of MML to NHSL dated 5 August 2015 **(A46802935 – Email from Kamil Kolodziejczk to NHSL dated 5 August - Bundle 13, Volume 5 – Page 907)**, and in a subsequent email from Kamil to Multiplex dated 6 August 2015 **(A46802808 – Email from Kamil Kolodziejczk to MPX dated 6 August - Bundle 13, Volume 5 - Page 913)**. It was highlighted that due to the lack of adherence to the programme and number of submissions, items would not be returned within the 15 days required under the Review Procedure.

FC EM Comments

20. The FC EM approved at Level B included a number of specific comments for Project Co to address. According to the PA, Level B meant you could proceed subject to the amendments that were noted and Level C meant would mean any amendments had to be made first and resubmitted before being granted approval **(A35301659 – 3.1.3 3_1 Conformed Project Agreement - Bundle 13, Volume 5 – Page 403)**. At FC it was always clear that Project Co would require to submit an updated EM to address the FC comments, in addition to any other changes

identified by Project Co themselves, which were required to ensure that their design was developed in compliance with the BCRs. The FC comments were issued to Project Co in November 2014 **(A42878468 – Collated comments issued by MML dated 7 November 2014 - Bundle 13, Volume 5 – Page 918).** The seven comments made at that point did not in any way detract from Project Co's overarching design responsibility for the EM, which was pointed out to them on a number of occasions, as I gone to on to explain later in my statement.

21. Project Co issued their commentary on the FC EM comments on 26 May 2015. While MML and NHSL were reviewing the EM commentary, Project Co issued an updated EM on 15 June 2015, with an Excel copy issued on 17 June 2015 **(A46803020 – Excel copy issued on 17 June 2015 - Bundle 13, Volume 5, Page 919)**. MML, on behalf of NHSL, responded to Project Co on 22 July with the Board's comments on their EM commentary via an email from Kamil Kolodziejczyk of MML to Ken Hall of Project Co **(A45500303 – 07 Re Environmental Matrix NHSL Comments Feedback - Bundle 13, Volume 5 – Page 955)**. A number of the FC comments, including the requirement to provide a detailed ventilation proposal, had not been addressed by Project Co in their commentary.

22. I understand that it is Project Co's position that the EM was only RDD to the extent of the seven FC comments, and that the rest of the EM had somehow been approved by the Board. It is my understanding that this view misapplies the risk allocation within the PA.

    The FC EM comments were made in the context of the broad risk allocation of the contract, namely that it was for Project Co, or the Preferred Bidder as they were at the time, to design the hospital and ensure compliance with the BCRs. As I go on to say, Project Co were issued with several reminders in relation to their design responsibility during the construction phase. The Board reviewed the EM within the context of the Operational Functionality risk allocation and provided helpful pointers where other discrete issues were identified. To the extent the EM contained any non-compliances which did not relate to Operational Functionality, whether identified by the Board or not, these were for Project Co alone to identify and address. Project Co had an obligation to comply with the

BCRs, and it was for them to satisfy themselves that they had done so. Although I did not personally undertake any reviews of Project Co's EMs, I did look at them retrospectively after the issues with ventilation became apparent. I understand from this that the changes made by Project Co in subsequent EMs extended to areas beyond the seven FC comments.

EM Revision 2

23. Project Co issued EM Revision 2 to NHSL and MML for RDD review on 4 December 2015 **(A32623047 – 3.2 008 20151126 WW-XX-XX-DC-XXX-001 (Rev 2) - Bundle 13, Volume 5 – Page 959)**. By this point the project was already facing the prospect of significant delay due to the failure of Pile 133 in September 2015. Programme delay created financial pressure for Project Co, due to payment being contingent upon Practical Completion being attained. However, as significant delays on site had already been experienced, IHSL and NHSL entered into discussions in December 2015 about the potential for a phased handover. I understand that a phased handover could have allowed Project Co to receive the unitary charge payment notwithstanding non-completion of other parts of the facility and would have had both practical and contractual complications. I do not believe the discussions advanced beyond the exploratory stage.

24. While I was not involved in undertaking technical reviews of the various iterations of the EM produced by Project Co, I am now aware based on the cells highlighted in red that Revision 2 contained a large number of changes compared to the previous version. As I recall, it was discussed and agreed by Project Co that any changes they made to the EM would be highlighted red on the Excel version, in accordance with good industry practice. When retrospectively reviewing EM Revision 2 in or around the second half of 2019, I observed that Project Co had changed the wording of Guidance Note 15 ("GN15"). In relation to Critical Care Areas, the words "for isolation cubicles" had been inserted after "10 ac/hr supply". This changes GN15 from stipulating that 10ac/hr was required in Critical Care bedrooms generally, to requiring 10ac/hr in Critical Care isolation rooms. Unlike the other changes which Project Co had made to EM Revision 2, the change to

GN15 was not highlighted by Project Co and therefore I suspect it would have been harder to spot them during a sample review.

25. On 9 February 2016, MML, on behalf of NHSL, issued the Board's comments on Project Co's EM **(A34225481 – 2.7_0059_20160209 MM-GC-001184 – Bundle 13, Volume 5 – Page 994)**. Level C was awarded in light of the significant number of Board comments. Although I was not personally involved in the technical review of the EM, I understand that the Board's comments related to both outstanding matters from FC and further issues identified as a result of post-FC design development by Project Co.

26. Although I was not part of the M&E technical team reviewing Revision 2 of Project Co's EM, I do not believe any of the reviewers identified the change to Guidance Note 15. The team's remit was to undertake sample reviews, with a particular focus on specific changes highlighted by Project Co.

EM Revision 5

27. On 18 March 2016 Project Co issued Revision 5 of their EM for RDD review by the Board **(A34225520 – 2.7 0074 20160415 WW-XX-XX-DC-XXX Rev 5 - Bundle 13, Volume 5 – Page 997)**. I can trace no record of EM Revisions 3 or 4 being received by MML. I assume these were internal Project Co designations. The fact Project Co appears to have developed internal versions which were not ultimately issued to NHSL is not surprising. Project Co had responsibility for the development of their design, which necessarily included a need to develop their EM over time. An Excel version of EM Revision 5 was provided on 5 April 2016, as mentioned above.

28. Project Co's revised EM was discussed during a Project Management Group ("PMG") meeting of 6 April 2016 **(A34225500 – 2.7_0071_20160406 PMG Meeting Notes – Bundle 13, Volume 5 – Page 1045)**. At this meeting it was noted by Project Co that the Room Data Sheets ("RDS") could not be populated until the EM was finalised. Accordingly, in order to make progress on their design and avoid further delay, Project Co was pushing the Board to grant the revised

EM Status B on account of the FC comments only. This course of action was agreed by NHSL during the PMG meeting.

29. Following the PMG meeting and the agreement between NHSL and Project Co, MML prepared a draft response to Project Co which was issued to Brian Currie for approval **(A46803060 – MML draft response to Project Co issued to Brian Currie - Bundle 13, Volume 5 - Page 1049).** The covering note by MML to NHSL specifically noted Project Co's desire to begin immediate production of the RDS. These would inform many parts of Project Co's design and without their production there could have been further programme delay. NHSL in response to MML confirmed agreement for Project Co to progress production of the RDS without further updates to the EM being submitted.

30. On 15 April 2015 MML issued MM-GC-001398 **(A34443843 – 3.4_0226_6.17.3 MM-GC-001398 – Bundle 13, Volume 5 – Page 1098)** on behalf of NHSL, awarding the EM status B on the basis of the FC comments. In the context of any wider design issues, the following was noted:

IHSL are also reminded that the reference design has no relevance to the current contract, and IHSL are to comply with the Project Agreement and in particular the BCRs and PCPs. Any non-compliance with the BCRs and PCPs should be highlighted to the Board.

This email reminded Project Co that they had responsibility for the development and design of their EM. They could not simply rely upon the EM which had been issued to them as part of the Reference Design. Project Co had responsibility to develop their EM so that it complied with the BCRs and SHTM 03-01. This is just one example of several reminders which NHSL's project team had to send to Project Co during the construction phase to drive home to them that they had responsibility for developing the design. As I will go on to explain, it seems clear from other correspondence issued by Project Co that they were aware they had an obligation to ensure that their design complied with SHTM 03-01, notwithstanding the content of the EM issued with the ITPD and the seven comments issued at FC.

31. Shortly after MM-GC-001398 the project was met by further delays. On 19 June 2016, for example, Dunne Group, a sub-contractor of Project Co, went into administration. This caused significant programme delay while Project Co sought to appoint a new sub-contractor to complete the concrete frame of the building.

Room Data Sheets ('RDS')

32. I spoke about RDS in paragraphs 59 to 71 of my witness statement to SHI of 22 February 2023 **(A42760846 – Witness Statement of Graeme Greer – Final (Redacted) – Bundle 13, Volume 5 – Pages 26-31)**.

    As I mentioned in paragraph 67 of my statement, Project Co had not produced a complete set of RDS by FC as had been planned. On 12 May 2015, which was three months after FC, Project Co-wrote to NHSL **(A46803025 – Project Co wrote to NHSL proposing that they delay the production of RDS - Bundle 13, Volume 5 - Page 1100)** proposing that they delay the production of RDS, suggesting that underlying sources of the relevant data be reviewed instead. This proposal specifically mentioned that the EM would directly inform the RDS.

33. Later, on 7 November 2016, MML wrote to Project Co on behalf of NHSL **(A46803033 – MML wrote to Project Co on behalf of NHSL expressing concern – dated 7 November 2016 - Bundle 13, Volume 5 – Page 1102)** expressing concern over "potential inaccurate information being transferred to the Room Data Sheets being submitted through RDD". The email further noted that "the Board still does not believe the Environmental Matrix and resultant design complies with the Project Agreement. Project Co's failure to comply with the BCR's / PCPs (as per MM-GC-002084) **(A46440429 – Appendix 5 – MM-GC-002084 – Bundle 13, Volume 5 – Page 1106)**, the Board believes would result in a non-compliant Facility. The Board would suggest that Project resolve the non-compliant issues as a matter of urgency."

34. While I was not directly involved in technical reviews of RDS, I reviewed our files at some point during 2019, when the issues with critical care ventilation had

become apparent. I observed that Project Co issued Rev 0B of the RDS via MPX-TRANSMIT-010149 on 5 January 2018 **(A46803341 - Project Co issued Rev 0B of the RDS via MPX-TRANSMIT-010149 on 5 January 2018 - Bundle 13, Volume 5 - Page 1109)**. The hospital would have been largely complete by that stage. When I looked at the Rev 0A and Rev 0B RDS later, I observed that in each iteration, the Clinical Activities for the Critical Care bedrooms rooms have been altered further from the original ADB sheet Clinical Activities and appear to be more like a normal bedroom.

In the RDS for 1-B1-009 for example **(A35272509 – 2.7.8 1.B1.009 rev B – Bundle 13, Volume 5 – Page 1111)**, which is a four bedded room in critical care, the clinical activities include: “a patient may take meals and refreshments in bed or by the bed” and “a patient may receive visitors”.

Neither of these activities appear in the original ADB sheet for multi-bedded rooms in critical care. The clinical activities given for critical care bedrooms in the original ADB sheets are very different and include for example: “Accommodating a patient needing continuous medical and nursing care using piped medical gases, vacuum and life-support system and 2) Medical and nursing procedures requiring all sides access to patient whilst 1-6 staff use specialised equipment”.

35. While I was not involved in undertaking technical reviews myself, my understanding is that reviewers would have had regard to the clinical activities to be performed in the room, when looking at samples of the RDS. The inclusion of activities such as taking meals and refreshments in the critical care RDS for RHCYP might have caused reviewers to form the understanding that these RDS did not relate to critical care bedrooms. The change in the clinical activities might have made any discrepancies in the air change rates harder to spot during a review.

Project Co Derogation Requests

36. Shortly prior to issuing Revision 6 of the EM, Project Co submitted derogation request WW014 **(A46365902 – Appendix 32.1 – ANX_EDN000379537 – Bundle 13, Volume 2 – Page 543)**. A derogation request was a submission from

Project Co which contained a proposal to deviate in some way from a technical standard with which their design would otherwise require to comply. It is worth noting that post-FC the PA does not provide a mechanism for contractual derogations. I understand any alterations to the design requirements during the construction phase ought to have been procured either through a Project Co Change or a Board Change. In this case, the correct form would have been a Project Co Change. Notwithstanding the form, the content of WW014 specified that Project Co sought to derogate away from the requirements of SHTM 03-01. Project Co sought to increase the air change rate in single suite en-suite bathrooms from 3ac/hr to 10ac/hr. Project Co issued WW014 in response to the Board's request for information in respect of Project Co's proposed number of air changes in en-suites being higher than that required by SHTM 03-01. My understanding is that, in submitting WW014, Project Co was accepting the fact their EM did not achieve compliance with the relevant standards. It is also an indication that Project Co was aware they had an overriding obligation to comply with SHTM 03-01, notwithstanding the content of any previous iterations of the EM, or any comments which had been issued on it. If Project Co had not believed that such an obligation existed, then there would have been no need for them to seek a derogation.

37. In addition to WW014, Project Co shortly afterwards on 1 August 2016 issued a further derogation request, WW015 **(A46365903 – Appendix 33 – ANX_EDN000429472 – Bundle 13, Volume 5 – Page 1114)**. This included a request to decrease the air change rates in single bedrooms from 6ac/hr to 4ac/hr. As with WW014, Project Co was seeking to depart from the requirements of SHTM 03-01 in order to reflect the design data contained within their EM. Once again, it appears from this request that Project Co were aware that they had an obligation to comply with SHTM 03-01. The underlying issue WW015 sought to address, single bedroom ventilation, ultimately became Item 13 of the Technical Schedule to SA1 **(A46409292 – Schedule 1 Part 1 Technical Schedule - Bundle 13, Volume 2 – Page 1315)**. As I will go on to discuss further in relation to Item 13 of the Technical Schedule, as WW015 refers to a request to reduce the air change rate from 6ac/hr rather than 10ac/hr, it is not immediately apparent

to me that WW015 would apply to single bedrooms within Critical Care, and I do not think it was apparent to other reviewers either.

38. Upon receipt of the derogation request, both WW014 and WW015 were reviewed collaboratively by MML and NHSL. On 22 September 2016 MML, on behalf of NHSL, communicated to Project Co that neither WW014 or WW015 were acceptable to the Board **(A34443840 – 3.4_0224_6.17.1 MM-GC-002006 – Bundle 13, Volume 5 – Page 1144)**.
The response issued to Project Co requested clarification from Project Co as to how compliance with SHTM 03-01 in relation to air change rates, balanced ventilation, and room heat recovery would be met.

39. Discussion surrounding WW014 and WW015 continued after the Board's initial rejection of the proposals.

EM Revision 7

40. Project Co issued EM Revision 7 on 18 September 2016 **(A32623058 – 3.2 0010 20160919 WW-XX-XX-DC-XXX-001 (Rev 7) - Bundle 13, Volume 5 – Page 1148)** for RDD review by the Board. After review, MML issued, on behalf of NHSL, MM-GC-002084 **(A46440429 – Appendix 5 – MM-GC-002084 – Bundle 13, Volume 5 – Page 1106)** to Project Co on 17 October 2016. This correspondence raised significant concerns, including that some ventilation rates within Revision 7 of the EM did not appear to comply with the BCRs. The response by the Board contained both general comments and a selection of specific comments. Significantly, it contained another reminder that design responsibility lay with Project Co, namely:

> *"Whilst the Board has noted general and specific comments above, the Board reminds Project Co that unless the Board has already accepted a derogation, it is Project Co's obligation to comply with the BCR's/SHTMs etc, and the Board not commenting, does not remove that obligation on Project Co."* **(Page 1107)**

41. Revision 7 of Project Co's EM was discussed during a PMG meeting of 2 November 2016 **(A46802201 - PMG meeting notes dated 2 November 2016 - Bundle 13, Volume 5 – Page 1170)**. Although the email of 17 October 2016 **(A46802219 – Email from MML dated 17 October 2016 - Bundle 13, Volume 5 – Page 1166)** did not give an EM Status, it appears from the minutes of the PMG meeting that it was returned to Project Co as Level C. At the PMG meeting Colin Grindlay of Project Co requested that the Board re-review Revision 7 and re-issue as Status B with comments. Mr Grindlay repeated this requested in an email to Kamil Kolodziejczyk of 3 November 2016 **(A43103333 – Email from MML to NHS Lothian dated 7 November 2016 – Environmental Matrix Status B – Bundle 13, Volume 5 – Page 1205)**. In his email to Kamil, Mr Grindlay explained that the re-issuing of the EM at Level B "would help [Project Co] greatly." A further email from Mr Grindlay of 10 November 2016 sought to further impress upon MML and NHSL why Project Co required Level B for RDD items more generally **(A46802192 - Email from Mr Grindlay dated 10 November 2016 - Bundle 13, Volume 5 – Page 1180).** In his further email Mr Grindlay noted Level C was directly delaying and stopping works onsite.

42. Upon receipt of Mr Grindlay's emails, MML undertook a review of the comments which resulted in the EM being awarded Level C. Thereafter, MML prepared a draft response to Project Co returning the EM at Level B together with caveats. In the covering email to NHSL, MML expressed unease about whether the caveats would provide the Board with sufficient protection. In an email from Kamil to Brian on 7 November 2016 **(A43103333 – Email from MML to NHS Lothian dated 7 November 2016 – Environmental Matrix Status B – Bundle 13, Volume 5 – Page 1178)**, he produced a draft caveat stating:

> '*The Board have serious concerns over the upgrading Environmental Matrix to Status B considering some of the issues raised (as per MM-GC-002084) being the same as the issues that had been raised since FC. There are also concerns over the potential inaccurate information being transferred to the Room Data Sheets being submitted through RDD.*'

43. NHSL's preference was to return Project Co's EM at Level B. Brian Currie explained the rationale for this decision in an email to Kamil of 7 November 2016 **(A34225583 – Email RE Environmental Matrix – Status B - Bundle 13, Volume 10– Page 10)**.

44. I recall NHSL awarded Status B in an attempt to avoid delaying progress on matters which were not in dispute. NHSL was attempting to finely balance the risk of continued issues in the EM against delays on all other aspects of the project, including the associated programme and commercial implications that would entail. I understand that NHSL's logic in upgrading the EM was ultimately due to the risk allocation within the PA and, in particular, Project Co's assurance that their design would be compliant. Due to the significant delays already experienced, NHSL was conscious not to cause further delay by commenting on design issues when it was not NHSL's responsibility to undertake the design.

Pre-SA1 Multi-Bedded Rooms Discussions

45. By November 2016 there was a significant difference of opinion between NHSL and Project Co as to whether Project Co was producing a compliant design. On 11 November 2016, Brian Currie wrote to Project Co **(A35004572 – Letter from B Currie to W Weir re ventilation and compliance dated 11 November 2016 - Bundle 13, Volume 5 – Page 1184)** noting the appearance of non-compliant ventilation ductwork on site and inviting Project Co to produce a fully compliant design for all ventilation related issues at the earliest opportunity. At this point the issue of ventilation compliance was escalated to Project Co board level.

46. On 11 January 2017 MML, on behalf of NHSL, responded to Project Co's email of 16 December 2016 **(A46802247 - MML responded to Project Co's email of 16 December 2016 - Bundle 13, Volume 5 - Page 1185)** regarding Project Co's proposed derogations. MML's response encapsulated the ongoing difference of opinion as to whether Project Co had provided a compliant design and proposed a ventilation workshop to work through the issues.

47. Following the initial ventilation workshops, Project Co produced revised proposals for the single and multi-bedded rooms on 31 January 2017. These proposals were referenced in a Project Co Bedroom Ventilation Key Considerations document **(A34443872 – 3.4 0241 MPX Generated Aconex 4 - Bundle 13, Volume 5 – Page 1193)**. From my understanding, Colin McRae provided technical support to NHSL in these workshops and Kamil Kolodziejczyk would provide Project Management support on any outputs.

    I do not recall being involved in these workshops myself, and I was not involved in the technical review of the updated document.

48. Project Co's proposals were further developed in an additional document issued on 9 February 2017 **(A46802501 - Project Co's proposals were further developed in an additional document issued on 9 February 2017 - Bundle 13, Volume 5 - Page 1195)**. In this document, prepared by TÜV SÜD, Project Co specified multi-bed ductwork amendment proposals to achieve room balance in 12 rooms. The 12 rooms were identified using room codes: G-A2-54, G-A2-046, G-A2-028, 1-B1-063, 1-B1-031, 1-B1-009, 3-C1.3-011, 3-C1.3-013, 3-C1.2-026, 3-C1.2-023, 3-C1.1-018, 3-C1.1-046. Project Co's proposed solution was generally to reduce the ac/hr supply from 4 ac/hr to between 3 ac/hr & 2.7 ac/hr, and increasing the dirty extract from 10 ac/hr to 17 ac/hr. Although I was not involved in the technical review of this document or the associated workshops, I understand the key objective of the proposals was to achieve the Board's requirement for pressure to be balanced or slightly negative to the corridor for rooms.

49. Project Co further updated their proposals on 23 February 2017. This update included an additional group of rooms: 1-B1-065, 3-D9-022, 1-L1-100, 1-L1-097, 3-C1.8-027, 3-C1.8-016, 3-C1.4-084, 3-C1.4-061. These additional rooms brought the total number to 20. I understand the proposed solution was broadly the same as that in in the initial proposal, in other words to reduce the ac/hr supply from 4ac/hr to between 3ac/hr & 2.7ac/hr, and increase the dirty extract from 10ac/hr to 17ac/hr. Once again, I have reviewed this document retrospectively, and it appears that as with the initial proposal, Project Co presented their solution on the basis that it was a normal bedroom and, although

room codes were provided, they did not specifically highlight that Critical Care wards were included in the proposal. I would not have been aware that these room codes related to Critical Care wards, and I believe if it had been clearer this would have helped with the review.

50. The updated proposal of 23 February 2017 added a further column to the table which specified the Severity of Works and included an indication that all the ventilation was already fabricated. In addition, from retrospectively reviewing various Construction Progress Reports issued by Project Co, it is apparent that air handling units ("AHUs") were being installed on site from at least October 2016. Although I do not have a detailed technical knowledge of AHUs, I understand they are a significant piece of plant with a long procurement lead time. Ventilation capacity of the facility was therefore "baked in" at a very early stage of the construction phase. If additional capacity was required to allow an alteration, I understand this may have necessitated significant programme delay and additional expense. Resolving system capacity proved to be a particular challenge during the remedial works of late 2019.

51. On 24 February 2017 a bedroom ventilation update meeting took place **(A46802258 - Ventilation Amendment Proposal - 24.02.17 - Bundle 13, Volume 5 - Page 1201)**. I do not recall being personally involved in the meeting, however I understand the purpose was to identify the rooms within Project Co's proposals for which a balanced/slightly negative pressure regime was considered to be essential. 14 rooms were marked as being essential: G-A2-054, G-A2-046, G-A2-028, 1-B1-063, 1-B1-031, 1-B1-009, 3-C1.3-011, 3-C1.3-013, 3-C1.2-026, 3-C1.2-023, 3-C1.1-018, 3-C1.1-046, 1-B1-065, 3-D9-022. The 14 rooms considered to be essential ultimately comprised the rooms within Item 7 of the Technical Schedule to the Settlement Agreement **(A46409292 – Schedule 1 Part 1 Technical Schedule - Bundle 13, Volume 2 – Page 1308)** Following this meeting Project Co continued to progress their proposals for the essential rooms.

52. Further developed proposals were issued by Project Co on 23 May 2017 **(A34443801 – 3.4 0230 6.19 FW R.A.M-GC-000278 Bedroom Ventilation -**

Bundle 13, Volume 5 – Page 1207). In their email providing the updated drawings, Project Co indicated their belief that the amendment to the environmental conditions and operation of the essential rooms constituted a Board Change. Project Co estimated the cost of the change would be in the Medium Value category and invited the Board to submit a formal Board Change request to advance the proposal.

I understand this position was premised on Project Co's belief that the EM was approved by the Board as Level B, subject only to the seven FC comments. At this point the principal dispute began to shift from being technical in nature to contractual.

Further Ventilation Issues

53. By June 2017 a number of design issues, and the approach being adopted by Project Co in relation to responsibility for those issues, was causing the Board a significant degree of concern. By this point in the project each side was taking a fundamentally different position on the project risk allocation. As exemplified by the multi-bedded ventilation dispute discussed above, Project Co was unwilling to alter their design in relation to these issues unless a formal Board Change request was submitted. The Board's position was that design responsibility, subject to Operational Functionality, rested solely with Project Co, and as things stood Project Co was failing to produce a compliant design. I recall NHSL were concerned about many issues, including three that were escalated:(a) design of MRI/IOMRI facilities; (b) multi bedded room ventilation; and (c) HV resilience. NHSL sought advice from their legal advisors on these points.

54. MML was asked to prepare a Design Issues Paper which summarised the key technical position in relation to each of the areas of dispute. MML issued the paper on 4 July 2017 **(A46802704 - MML issued the Design Issues Paper on 4 July 2017 - Bundle 13, Volume 5 – Page 1215)** ahead of a meeting between NHSL and Project Co, intended to allow both parties to share their views on the issues openly. MML's Design Issues paper identified bedroom ventilation as a "Change liability" issue. The other two disputes were categorised as non-

compliance issues. MML's paper provided a summary of the technical issues together with the Board's opinion. From my non-technical perspective, the paper highlighted that the fundamental concern to the Board was the risk of the spread of bacterial airborne infections into corridors and surrounding patient rooms.

It was specifically noted that Project Co's amended design provided a solution which was an operational compromise, with the matters in question focussing on whether it was for Project Co or the Board to submit a change request to action the alteration.

55. In early August 2017 Project Co made their first substantive proposal to resolve the dispute between the parties. Their proposal was for the Board to take the facility without rectification works to HV or ventilation being completed. On the face of it, this appeared to be an attempt by Project Co to secure Practical Completion notwithstanding that the facility remained incomplete. This proposal was not acceptable to the Board and the dispute remained unresolved. A "without prejudice" technical workshop took place with Project Co on the same day in an effort to define the scope of potential rectification works.

56. An independent technical expert was instructed around that time from David Rollason. The expert had copies of the documents which defined Project Co's proposed ventilation solution including the air change rates. I recall that achieving the correct pressure regime was the principal concern of the Board in relation to the multi-bedded room ventilation issue.
From my recollections, discussion of the appropriate pressure regime dominated discussions surrounding this issue during both the construction phase and SA1 negotiations.

57. By December 2017 parties had become further entrenched in their positions. I attended a meeting on 6 December 2017 which included NHSL, Project Co and the Independent Tester ("IT") **(A33394837 – 6 December 2017 – HV and Ventilation Meeting Note (061217) - Bundle 13, Volume 5 – Page 1236)**. At the meeting the IT highlighted the parties' differing interpretations of the FC documentation. Project Co again confirmed they did not accept the Board's

position of non-compliance and advised they were in the process of obtaining their own expert technical opinion. The IT noted no further progress could be made until Project Co provided their expert report.

Project Co issued an expert report on 26 December 2017, and referenced in **(A33394073 – 261217 HCP UK-GC-000945 – HV - Bundle 13, Volume 5 – Page 1240)**.

58. On 1 February 2018, Project Co, MML and NHSL met in an attempt to reach a possible compromise agreement. I understand the multi-bedded rooms were reviewed by the NHSL project and clinical teams to determine which were essential to be negative or balanced. Following the meeting the NHSL clinical director circulated an updated multi-bedded room tracker spreadsheet **(A34443845 – 3.4 0218 6.14 RE 010218 EM 4 Bed Room Tracker – revised 01 Feb xlsx - Bundle 13, Volume 5 – Page 1243)** identifying which rooms were considered by the clinical team to be essential. The tracker returned by the Clinical Director identified two rooms within Critical Care which were considered essential to be of balanced or negative pressure. This was a reduction of two rooms from the February 2017 list of essential rooms and was suggested as a means of compromise with Project Co. The Technical Schedule to SA1 ultimately provided for all four Critical Care multi bedded rooms to be balanced or negative pressure.

59. Following a Principals Meetings of 20 and 21 February 2018, Project Co issued a Contractor's Change Proposal – MPX-CCP-050 **(A35004447 – Contractors Change Proposal MPX-CCP-050 – Bundle 13, Volume 5 – Page 1245)** which included a formal request to reduce the mechanical ventilation rate in single bedrooms from 6ac/hr to 4ac/hr. This broadly mirrored derogation request WW015 and represented an acknowledgment from Project Co that relief from SHTM 03-01 was being sought in relation to the issue of single bedroom ventilation. The proposed change was discussed amongst the NHSL/MML project team. On 14 March 2018, MML issued a response on behalf of NHSL **(A35004455 – RHSC+DCN: Board Response to Contractor Change Single Bedroom Vent dated 14 March 2018 - Bundle 13, Volume 5 – Page 1246)** that sought to clarify certain matters in relation to the detail of the change. These

clarifications were intended to allow the change to be fully reviewed from a technical perspective. This change in its final agreed form ultimately comprised Item 13 of the Technical Schedule to SA1.

60. Notwithstanding the best efforts of NHSL to reach a suitable compromise agreement with Project Co, there remained a significant difference of opinion as to the contractual responsibility for the proposed change to multi bedded room ventilation. Matters were becoming increasingly tense.

61. On 22 March 2018, Project Co issued a settlement proposal **(A33393778 – 22 March 2018 – 180322.MT.SG.Settlement Proposals - Bundle 13, Volume 5 – Page 2750)**. The proposal included completion of items said to be non-compliances, NHSL post-completion works and multi bedded rooms ventilation changes. After protracted negotiations this settlement proposal formed the underlying basis for SA1.

Early Stages of Settlement Agreement Negotiation

62. Upon receipt of Project's Co's settlement proposal, NHSL emailed MML on 23 March 2018 to indicate their intention to invite Project Co to a meeting on 27 March 2018 to discuss the basis of a commercial negotiation **(A46802669 - NSHL email to MML on 23 March 2018 to indicate intention to invite Project Co to meeting on 27 March 2018 - Bundle 13, Volume 5 - Page 1248)**.
Ahead of the meeting, NHSL asked MML to produce a number of items to inform NHSL's position at the meeting. Included within the items was a request to prepare further comments on the three solutions proposed by Project Co to resolve the multi bedded rooms ventilation issue. I did not personally undertake the review; however I understand the focus was to be an assessment of whether the timescales proposed by Project Co were attainable.

63. Ahead of the Principals Meeting of 27 March 2018, MML collaborated with NHSL to produce a list of current issues **(A46802228 - MML collaborated with NHSL to produce a list of current issues.msg - Bundle 13, Volume 5 - Page 1251)**.

The list was compiled using the issues and change registers maintained by MML during the construction phase.

The finalised list comprised 76 items. Project Co produced their own list. Scottish Futures Trust ("SFT") collated the lists and on 6 April 2018 issued a Technical Completion Schedule **(A36012322 – Project Technical Completion Schedule Rev 01 – Bundle 13, Volume 5 – Page 1264)** which included all issues identified by the parties. In total the Technical Completion Schedule prepared by SFT contained 81 individual items. Item 7 was the multi bedded rooms ventilation issue. Item 13 was single bedroom ventilation. SFT's Technical Schedule included a column describing each individual issue and a second column with the Latest Agreed Action or Close Out Statement. Another column noted the current status of the issues. Item 7 was noted to be an outstanding issue. Item 13 was classified as closed. SFT's Technical Schedule was subject to a number of revisions by the parties during the SA1 negotiations. Both MML and legal advisors assisted NHSL with reviewing and revising the Technical Schedule. The agreed Technical Schedule formed the basis of the technical solution achieved by SA1.

64. In addition to the Technical Schedule, SA1 contained a front-line agreement. This set out the legal obligations of SA1. I do not recall MML having any substantive involvement in drafting the terms of the front-line agreement.

65. Beyond the front-line of the SA1 was the Disputed Works Schedule **(A46409292 – Schedule 1 Part 1 Technical Schedule - Bundle 13, Volume 2 – Page 1308)**. The documents within the Disputed Works Schedule specified the scope of the Agreed Resolutions, for example the four bedded rooms for which balanced/negative pressure would be provided.

66. By the time SA1 was proposed by Project Co, the technical issues, and in particular those concerning ventilation, had been under discussion between the parties for a considerable period of time. Although the final technical solutions in relation to Items 7 and 13 had yet to be agreed at the time SA1 was first proposed, the vast majority of engineering work and clinical reviews had already been undertaken by the time of SA1 negotiation. To the extent these issues

remained outstanding at this stage, the primary concern was one of scoping and defining rather than technical review.

Accordingly, by the time of SA1 the majority of MML's technical involvement was dedicated to other substantial issues such as heater batteries and sump pumps.

Risk Allocation

67. Early in the SA1 negotiations the question of project risk allocation was raised by both NHSL and Project Co. On 29 May 2018 I exchanged correspondence with Brian Currie regarding a proposal from Matthew Templeton of Project Co concerning the addition of a confirmation statement to the Technical Schedule **(A47277176 – RE RHSC + DCN – Little France – Draft Tech Schedule - Bundle 13, Volume 10 – Page 7)**. I cautioned such an addition may alter the long-term risk allocation. Mr Currie agreed with my concern and explained NHSL sought closure of issues but not to the effect that their rights under the PA were diluted. Mr Currie noted the purpose of the Technical Schedule was to capture the agreed alteration to the specification and where this is evidenced. The protection of NHSL's rights was a matter for the authors of the front-line agreement. We did not provide legal advice on SA1 and I am aware that NHSL took advice from their legal advisors on it.

68. On 1 June 2018 I was sent an email from Brian Currie containing a note of a meeting held with Project Co **(A46802336 - 1 June 2018 - Email from Brian Currie containing a note of a meeting held with Project Co - Bundle 13, Volume 5 - Page 1269)**. During the meeting Project Co stated their understanding that SA1 was a "settlement" of the PA and as such stood alone without being impacted by any other document. It was also suggested by Project Co during the early stages of SA1 negotiations that the Board must confirm all BCR clauses had been met. If Project Co were correct in this assertion, I was concerned SA1 would represent a fundamental realignment of the project risk allocation. Under the terms of the PA, compliance with the BCRs was a matter for Project Co alone.

69. In light of the comment from Project Co suggesting an alteration to risk allocation, I discussed my concerns internally with MML and subsequently on 4 June 2018 I emailed Brian Currie to highlight these concerns **(A46802701 - Email on 4 June 2018 from Graeme Greer to Brian Currie - Bundle 13, Volume 5 - Page 1272)**. MML had understood the function of SA1 was for the Board to remove any further objections to the design solutions proposed by Project Co and for those resolutions to be approved under the existing PA mechanism, in other words in terms of Operational Functionality only. I highlighted that should the Board agree to confirm compliance with the BCRs then there would, in my opinion, be a significant alteration of the risk allocation in favour of Project Co. I went on to explain that I did not believe the Board would be in a position to fully confirm compliance with the BCRs. MML was not appointed to design the hospital and would not be able to provide NHSL with the necessary level of design assurance to confirm Project Co's design complied with the BCRs. As this was a legal matter, I concluded my email by suggesting that NHSL obtain clarification from their legal team. Although I was privy to correspondence between NHSL and their legal advisors, I do not feel that it is my place to disclose the content of the correspondence to the Inquiry.

70. I did, however, remain concerned about the potential alteration of the project risk allocation. Between June and July, I discussed this matter internally with colleagues at MML. Given these concerns, we considered whether MML could take any further mitigation measures to protect the Board's position. I discussed with Brian Currie on or around 28 June 2018 whether this was something the Board required. Mr Currie understood why we were considering offering further mitigations however I recall Mr Currie commenting that due to Project Co's assurances of compliance to the broader NHSL team, no greater level of review was required of MML by NHSL, this was also in the context of the programme and commercial pressure noted elsewhere in the statement.

71. On 17 July 2018 Project Co issued a revised version of the Technical Schedule **(A33406349 – 16 August 2018 Technical Schedule 16 August 2018 – Bundle 13, Volume 5 – Page 1276)**. This revision included the insertion of an adjustment to Clause 7.1 of the PA.

The wording of this alteration suggested the Agreed Resolutions in the Technical Schedule were to be given precedence over the terms of the PA. As before, I was concerned a clause of this nature represented an alteration of the Project Risk allocation and included this as a comment on my review of the Technical Schedule. I raised concerns on this in an email **(A46802705 - Graeme Greer raising concerns over Clause 7.1 over email dated 20 July 2018 - Bundle 13, Volume 5 – Page 1314)**.

MML's Role During SA1 Negotiations

72. At the time of MML's appointment as Technical Advisor it was not anticipated that a settlement agreement would be required to resolve a dispute between NHSL and Project Co. SA1 was a unique situation for which there was no set formula or procedure for MML to follow in their role as Technical Advisor to the Board. I remember the attitude of everyone on the NHSL Project Team and MML team at the time was to approach matters in a manner which allowed us to assist NHSL to achieve the best possible outcome in the circumstances. Everyone did their best to move the project on as best as we could.

73. To the best of my recollection, I do not think anything fundamentally changed in MML's role during SA1 negotiations. As with the construction phase I would broadly categorise MML's involvement during SA1 negotiations to be split into both project management and technical reviews. MML continued to review technical design submissions from Project Co in collaboration with NHSL. The same RDD framework was applied to items reviewed during SA1 negotiations as was used during the wider construction phase. NHSL did not instruct any alteration to the level of design review MML was to provide. It remained the case that as MML was not designer, it was unable to provide NHSL with design assurance.

74. MML also assisted NHSL with framing the Technical Schedule. This was a collaborative process between MML, NHSL and legal advisors. The purpose of the Technical Schedule was to encapsulate the description of disputed items and

also the Agreed Resolution to resolve the item. The Technical Schedule went through a number of revisions from April 2018 to January 2019. MML assisted NHSL and legal advisors to frame the issues within the schedule and review changes in drafting made by Project Co.

Agreed Resolutions

75. The concluded Technical Schedule to SA1 contained two substantive columns. The first was a summary of the dispute between the parties. This section was intended to provide a high-level summary of the technical issue, together with a brief description of each party's position in relation to the dispute. The second column was a description of the Agreed Resolution. This section provided a summary of the technical solution agreed between NHSL and Project Co. Each Agreed Resolution provided a statement advising that the technical solution has been reviewed in accordance with the PA review procedure and, where appropriate, specified the RDD status (A or B) of approved documents. The approved documents referred to in each Agreed Resolution were included in a Disputed Works Schedule appendix and provided the technical specification of the Agreed Resolutions.

76. The Agreed Resolutions for each of the 81 items within the Technical Schedule were negotiated over a considerable period of time. The Technical Schedule went through a number of revisions and its development was very much an iterative process. The first versions of the Technical Schedule in April 2018 did not contain Agreed Resolutions. The first version of the Technical Schedule to contain fully drafted Agreed Resolutions was issued by NHSL to Project Co on 22 June 2018. Project Co responded with a heavily revised Technical Schedule in early July 2018. Negotiations then continued until the Technical Schedule was agreed on 22 February 2019. Although it took nine months to agree the Technical Schedule, the original intention was for it to be concluded within a matter of weeks. There was always a lot of urgency and pressure to reach agreement within a relatively short timeframe.

77. Drafting the agreed resolutions was a collaborative process. From NHSL's perspective, all of NHSL, MML and legal advisors were heavily involved in framing the terms of the Agreed Resolutions. At a general level, when we were drafting the Agreed Resolutions, our objective was to keep the content as narrowly drawn as possible. NHSL's aim for each of the 81 Agreed Resolutions was to ensure every resolution was precisely defined. Project Co, on the other hand, as an example sought to include the whole EM in the Agreed Resolution. The wider an Agreed Resolution was framed; the more flexibility was afforded to Project Co in terms of what was agreed. An inaccurately defined Agreed Resolution would have created risk for the Board in terms of the technical solutions agreed within SA1. When revisions to the Technical Schedule were received from Project Co, comments would be added by MML and legal advisors. While there was a degree of technical expertise required to frame the Agreed Resolutions, the underlying technical solution was contained in the approved documents within the Disputed Works Schedule **(A46409292 – Schedule 1 Part 1 Technical Schedule - Bundle 13, Volume 2 – Page 1308)**. Accordingly, insofar as the Agreed Resolutions were concerned the most important aspect was to ensure precise drafting in order to best mitigate the risk from an NHSL perspective.

Item 7 – Multi-Bedded Room Ventilation

78. By the time SA1 was proposed, the issue of multi-bedded room ventilation had been under discussion between NHSL and Project Co for a considerable period of time. Although parties remained fundamentally opposed by the time of SA1 as to whether Project Co's design in relation to multi-bedded room ventilation was compliant, the technical solution of how to achieve balanced or negative pressure for those rooms identified as being essential had been broadly agreed since around spring 2017. The effect of SA1 in terms of multi-bedded room ventilation was essentially to agree the compromise technical solution which had been developed by Project Co and risk assessed by the NHSL clinical team in 2017.

79. The outstanding technical issues in relation to multi-bedded room ventilation were extremely limited by the time the SA1 negotiations began. In the first version

of the Technical Schedule issued by SFT, it was specifically noted that 14 rooms at 4 ac/hr had already been confirmed. This was initially discussed in February 2017 and refined in 2018, as I will go on to explain. Project Co's first revision of the Schedule was issued on 9 April 2018 and noted that the design process and intent for Item 7 was generally agreed.

80. On 12 April 2018 an M&E workshop took place between NHSL and Project Co to discuss Project Co's multi-bedded room ventilation design. Kamil Kolodziejczyk was the only MML project management team attendee. Two engineers attended from the technical side. Ronnie Henderson attended on behalf of NHSL. Following the meeting, Project Co issued MPX-GC-026400 **(A45499907 – 16 GRC_002_1_00000009-22891 – Bundle 13, Volume 5 – Page 1402)** containing revised ventilation drawings demonstrating how a room balance at 4ach/hr would be achieved. On 18 April 2018 NHSL wrote to Project Co **(A39975863 – NHSL-GC-002953 dated 18 April 2018 - Bundle 13, Volume 7 – Page 362)** noting that the current schedule still referred to air change rates between 2.7ac/hr & 3.5ac/hr. NHSL sought clarification from Project Co that 4ac/hr would be provided for all 14 rooms.

    Project Co responded on 18 April 2018 to confirm TÜV SÜD had been briefed to provide 4ac/hr **(A45500078 – 18 ANX_EDN000276512 - Bundle 13, Volume 5 – Page 1404)**.

81. On 2 May 2018, Project Co submitted their revised ventilation drawings for RDD approval. MML and NHSL reviewed the submission on a RDD basis on 3 May 2018. On 4 May 2018 MML on behalf of NHSL issued MM-GC-003999 **(A32782012 – MM-GC-003999 – Bundle 13, Volume 5 – Page 1408)** accepting Project Co's multi-bedded room ventilation design at RDD Level B.
    The ventilation drawings of 2 May 2018 and Project Co's "Multi Bed – Ventilation Amendment Proposal to Achieve Room Balance" (WW-SZ-XX-DC-XXX-010) Version 7 **(A39975868 – WW-SZ-XX-DC-XXX-010 Rev 7 – Environmental Matrix – Bundle 2 – Page 1390)** comprise the agreed technical solution for multi-bedded room ventilation. The 14 rooms identified within WW-SZ-XX-DC-XXX-

010 are the same 14 rooms identified as essential in February 2017. Any approvals related to Operational Functionality only.

82. I am asked by the Inquiry to clarify how the Agreed Resolution for Item 7 applies to Critical Care rooms. The Agreed Resolution for Item 7 identifies 20 multi-bedded rooms. 14 of those rooms are to be to be balanced or negative to the corridor at 4 ac/hr. The remaining six rooms are to be as per Project Co's final Environmental Matrix (Revision 11). The 20 multi-bedded rooms are identified within WW-SZ-XX-DC-XXX-010 **(A33656531 – WW-SZ-XX-DC-XXX-010 (1) – Bundle 13, Volume 5 – Page 1412)**. As explained above, WW-SZ-XX-DC-XXX-010 forms the substance of agreed technical solution and can be found within the Disputed Works Schedule Appendix 1 Item 7 **(A46409292 – Schedule 1 Part 1 Technical Schedule - Bundle 13, Volume 2 – Page 1308)**. Of the 14 rooms to be balanced at 4ac/hr, four are within critical care (1-B1-063, 1-B1-031, 1-B1-009, 1-B1-065).

83. The Agreed Resolution for Item 7 followed the same drafting and negotiation process as I have already described. As the bulk of the technical work on this issue had been undertaken well in advance of SA1, the majority of MML's involvement with Item 7 during SA1 negotiations was limited to framing the wording of the Agreed Resolution. As with the other Agreed Resolutions, NHSL, MML and legal advisors were all involved in the collaborative drafting process.

84. SA1 was generally a compromise between the parties, intended to set out a technical solution to the 81 items within the Technical Schedule. Although I was not directly involved in undertaking the technical reviews, I developed an understanding from discussions with those undertaking the reviews that the air change rates could have an impact on the pressure balance and achieving an appropriate solution was not straightforward.

In terms of Item 7, the air change rate had been an integral part of the multi-bedded room ventilation issues from the time when it first came under discussion. Multi-bedded ventilation was a problem from a clinical perspective as NHSL required co-horting of patients with infectious diseases. In order for these

patients to be accommodated within a multi-bedded room, that room could not have a positive pressure to the hospital as this could potentially allow the spread of infectious diseases to other parts of the facility. From a clinical perspective, it was therefore essential for NHSL that at least a certain number of the multi-bedded rooms be at least balanced to the corridor. When Project Co were first invited to provide a proposal to achieve balanced pressure, their design included a proposal to reduce the air change to between 3ac/hr and 2.7ac/hr. The air change rate was therefore always an integral part of the technical solution required to reverse engineer balanced pressure into Project Co's design. Accordingly, for Item 7 to represent a complete technical solution, the inclusion of the required air change rate to achieve the correct pressure was an inherent feature of the design and necessitated inclusion within the Agreed Resolution.

85. I was not personally involved in the technical review of the ventilation proposals for multi-bedded rooms; however, I have had sight of correspondence and documentation relating to the reviews undertaken. I understand the decision for which rooms were to be included in Item 7 can be traced back to the meeting of February 2017 where NHSL confirmed the rooms for which balanced pressure was essential. From my recollections, the rooms were always simply described as bedrooms at a project team level. Each room was identified using a code rather a description of its location. It would not have been readily apparent which department each room was located in. Clinical risk assessments, including broader clinical input were undertaken by NHSL for each of the rooms identified as being essential. The clinical risk assessments identified the department in which each room was located. Due to the understanding within the NHSL Project Team that the solutions were being presented for normal bedrooms, I do not believe any specific air change rate consideration was given to the requirements for Critical Care.

86. As during the construction phase, NHSL took technical advice from a number of entities, including in relation to the proposed air changes. MML provided advice commensurate with their appointment as technical advisor. As I have discussed, I was not personally involved in the provision of advice in relation to air changes during SA1 negotiations, however I understand that to the extent this was

provided it would have been done in the context of the existing PA review mechanisms. This is reflected in the wording of the Agreed Resolution itself, which specifically refers to RDD approval.

87. I am unable to comment on the clinical advice given, as this was not within our remit.

Item 13 – Single Bedroom Ventilation

88. Unlike the multi-bedded room ventilation issue, Project Co accepted a Project Co Change was required for single bedrooms. On 1 August 2015, Project Co issued derogation request WW015 **(A46365903 – Appendix 33 – ANX_EDN000429472 – Bundle 13, Volume 2 – Page 544)**. This included a request to reduce the air change rate in single bedrooms from 6ac/hr to 4ac/hr. Although initially rejected by NHSL, technical agreement on the single bed issue was reached a long time in advance of SA1. On 19 June 2017, Project Co issued RAM-GC-00285 noting an agreed design solution had been reached for single bedroom ventilation and a Project Co Change would follow in due course **(A46803307 - Issuing of RAM-GC-00285 - Bundle 13, Volume 5 – Page 1415)**. My recollection was that it was not known to the team that any of these bedrooms were in Critical Care.

89. Ultimately the single bedroom issue also made its way into SA1 at Item 13. The first version of the Technical Schedule provided by SFT noted the technical solution for Item 13 had been agreed, with Project Co to submit Change wording for review **(A36012322 – Project Technical Completion Schedule Rev 01 – Bundle 13, Volume 5 – Page 1264)**. From a technical perspective, NHSL compromised on the air change rate to relieve Project Co of their SHTM 03-01 requirements. Item 13 was essentially concluded by the time of SA1 negotiations.

90. Once SA1 negotiations commenced, Project Co submitted Project Co Change 51 for approval on 14 May 2018. Project Co had proposed to decrease the mechanical air change ventilation rate within single bedrooms from 6 ac/hr to 4

ac/hr and increase the mechanical air change ventilation rate within single bedroom WCs from 3 ac/hr to a minimum of 10 ac/hr. Ross Southwell of MML reviewed the change on 29 May 2018. Given that the technical solution was already agreed, the focus of Mr Southwell's review was to capture the nature of the Change within the wording. Mr Southwell noted the Change should explicitly identify the elements that had been changed from FC. I do not believe that Mr Southwell otherwise commented on the technical substance of the Project Co Change.

91. The Agreed Resolution for Item 13 (single bed ventilation) states "[t]he Board/Project co agree this item is closed, and the agreed technical solution approved through Schedule Part 8 (Review Procedure) and agreed by the Board and Project Co as resolving the Dispute is as set out in Disputed Works Schedule Appendix 1 Item 13." **(A46409292 – Schedule 1 Part 1 Technical Schedule - Bundle 13, Volume 2 – Page 1308).** Accordingly, as with the multi-bedded rooms, I understand an agreement was accepted through the RDD process.

92. I am informed that SHI are seeking to understand how the Agreed Resolution for Item 13 interacts with critical care rooms. The technical solution is framed simply in terms of reducing the mechanical air change rate within single bedrooms from 6ac/hr to 4ac/hr. In terms of SHTM 03-01, my understanding is that critical care rooms ought to have 10ac/hr using mechanical ventilation only. Given that Item 13 seeks to reduce ventilation rates from 6ac/hr rather than 10ac/hr, my understanding of Item 13 is that it is not altogether clear the Agreed Resolution applies to critical are rooms at all.

93. WW015, and the associated Project Co Change, sought to reduce from 6ac/hr. It may therefore not have been obvious to the Project Team at the time that any alteration was being made to the ventilation requirements for single bedrooms in critical care.

    Given the Project Team were unaware of a potential application to Critical Care, my understanding is that the appropriateness of the change in relation to Critical Care was not considered.

94. Although I cannot recall any consideration being given to critical care in relation to the single bedroom ventilation issue, I do remember some discussions with Project Co regarding a room by room approach being adopted for single bedrooms. Project Co felt this would be impractical given the large number of rooms involved and a room-by-room approach was therefore not pursued further. To the best of my recollections, the single bedroom issue was always considered by the NHSL Project Team and presented by Project Co on the basis of ordinary single bedrooms in the context SHTM 03-01 Part A Appendix 1 **(A36372676 – H6A – SHTM 03-01 Part A (1) Draft - Bundle 13, Volume 5 – Page 2016)**.

95. As I say, the technical content of Item 13 was agreed between NHSL and Project Co a considerable period of time prior to SA1 negotiations. MML's input by the time of SA1 was therefore restricted to assisting with drafting the wording of the Project Co Change. As with the other Agreed Resolutions, the focus was on precisely defining both the issue and agreement reached. I understand that given Item 13 relieved Project Co of any physical construction works, there was much less discussion of this resolution than others. I believe this was because it was cost neutral for Project Co. To the extent MML provided technical advice on the single bedroom issue itself, this would all have been provided during the construction phase. As I have discussed elsewhere, MML's role during the construction phase involved collaborating with NHSL to review Project Co design submissions from the context of the Operational Functionality risk allocation.

96. I was not directly involved in either the technical or clinical review that resulted in the agreement of 4ac/hr. I do not believe a specific clinical risk assessment was undertaken in relation to the proposal to reduce the air change rate from 6ac/hr to 4ac/hr. Sourcing clinical input was generally a requirement for NHSL rather than MML.

    I am not in a position to comment upon the involvement of NHSL's Infection Prevention and Control Team in relation to Item 13 in any detail.

Time & Commercial Pressures

97. SA1 was first proposed in March 2018 and was ultimately signed in February 2019. While on one view this might suggest there was a considerable period of time in which to conclude the agreement, the reality was somewhat different. By the time SA1 negotiations began, the project was already nine months delayed beyond the original Completion Date of 4 July 2017.

    There was significant political, financial and reputational imperatives incumbent upon NHSL and Project Co to ensure the hospital could open as soon as possible. There was a continuous emphasis throughout the SA1 negotiations to progress matters as quickly as possible.

98. In addition to time and commercial pressures, the Technical Schedule itself was significant in size. SA1 was intended as a wrap up agreement to resolve essentially all outstanding design issues. As a result, the Technical Schedule extended far beyond all of the issues identified at the meeting of 20 and 21 February 2018 **(A46802815 - Agenda ahead of meeting of 20 and 21 February 2018 - Bundle 13, Volume 5 - Page 2202)**. The Technical Schedule was so large that in late June 2018 I recall having internal discussions within MML about the 81 items. A large number of the 81 items were issues which simply required greater design focus rather than genuine areas of dispute between Project Co and NHSL. Not only did this create greater risk to NHSL in agreeing the final Technical Schedule, but it also caused substantial complication for drafting, particularly as many of the items were not appropriately defined for inclusion within a definitive settlement agreement.

99. During SA1 negotiations the project was then met by further delay due to a burst water pipe at the site. Not only did this attract further adverse media coverage but Project Co also submitted a delay notification on 22 June 2018 **(A34483118 - 6.4_0112_20180622_Templeton_RE_RHSC DCN Notification of Delay re Flooding – Bundle 13, Volume 5 – Page 2212)**.

100. Throughout SA1 negotiations Project Co sought to apply considerable commercial pressure on NHSL to finalise the agreement. During this period

NHSL were placed in a difficult position whereby their hospital designer, being Project Co, was advising that their building was fully compliant and fit for opening, while the IT, NHSL's project team and MML, who were not the designers, were continuing to identify issues with Project Co's design. Ultimately, my recollection is that Project Co parties were unhappy when we attempted to raise further issues.

On 18 October 2018 Project Co exerted further commercial pressure on NHSL by issuing two letters relating to Notice of Delay and Compensation Events **(A34483162 – 6.4_0147_181018-lHSL-Notices of Delay – Bundle 13, Volume 5 – Page 2218**).

101. Despite being advised on multiple occasions that the facility was not yet ready for Completion, Project Co insisted NHSL and the IT attend a Completion Meeting at the site on 31 October 2018. Following this meeting and associated walk around of the incomplete facility, the IT issued a letter containing a Notice of Outstanding Matters **(A33406496 – 7 November 2018 Notice of Outstanding Matters – Bundle 13, Volume 5 – Page 2226)**. This included a list of 74 items which were continuing to prevent completion. This list differed from the Technical Schedule. Multi-bedded room ventilation was not included on the list of ongoing issues.

102. While I have explained there were significant time and commercial pressures surrounding SA1, the Agreed Resolutions were nevertheless drafted with care and attention. Everyone on the NHSL Project Team was committed to ensuring the best possible outcome was secured in the circumstances.

Much of the commercial and time pressures, for example NHSL's decision to begin paying for an incomplete facility, were focussed beyond the Project Team level and are therefore not matters I am in a position to comment upon. By this I mean this type of decision was taken at a high level.

Other Issues

103. The 81 issues comprising the Technical Schedule were generally made up of the collation of outstanding Project Co Changes, Board Changes, RDD Status C items and potential non-compliances. Items in the Technical Schedule were spread across a range of different engineering disciplines. A number of these issues such as heater batteries, void detection and foul drainage were substantial concerns and remained under discussion between NHSL and Project Co into the winter of 2018.

104. It is worth mentioning that ventilation was far from the only concern which arose during the project. Other concerns included issues over the location of a movement joint and the location of a sewage sump pump, multiple problems relating to firestopping which had to be addressed, and other construction defects.

105. By the time SA1 negotiations commenced, the hospital was essentially complete from a building envelope perspective. Accordingly, for the most part, any unresolved issue or non-compliance in Project Co's design was now built into the hospital itself. My recollection of the focus of the SA1 negotiations was a desire to draft appropriate Agreed Resolutions to generally provide mitigating technical solutions and retrospectively adjust the contract to reflect the as built hospital. I understand this then allowed the Independent Tester to issue a completion certificate.

Declaration

106. I believe that the facts stated in this witness statement are true. I understand that this statement may form part of the evidence before the Inquiry and be published on the Inquiry's website.

Scottish Hospitals Inquiry

Witness statement of

Kenneth Hall

Introduction

1. My name is Kenneth William Hall. I am currently employed by Multiplex Construction Europe Ltd (Multiplex) as a Package Manager.

2. I have been asked to provide this witness statement in relation to the post Financial Close (FC) period at the Royal Hospital for Children and Young People and Department of Clinical Neuroscience Project in Edinburgh (the Project). I have been provided with a list of issues from the Solicitors to the Public Inquiry and I address these, where I am able to, below.

3. This is the second witness statement I have provided for the Scottish Hospitals Inquiry. My education and career background remains as set out in my first witness statement **(A41962682 – Witness statement of Ken Hall (Final redacted) – 4 April 2023 – Bundle 13, Volume 7 – Page 338)**.

4. After FC, my role on the Project was to manage the Mechanical, Electrical, Plumbing (MEP) detailed design development. The design was produced by Wallace Whittle and provided to the Board and their technical advisers Mott MacDonald (MML) for review. My role did not extend to leading the MEP site team, and I was not involved with site related installation activities, commissioning, and/or site verification.

5. I have been asked to comment on the following - "*Ken Hall and Graeme Greer corresponding by email on 26 May, 15 June and 22 July 2015 in terms indicating that both parties (through Multiplex and Mott MacDonald) were proceeding on the understanding that the Environmental Matrix (the Matrix) was only Reviewable Design Data (RDD) to the extent of NHSL's seven comments from the meeting of 11 November 2014, which were subsequently included in*

Section 5 of Schedule Part 6 to the Project Agreement." **(A32435789 – Schedule Part 6: Construction matters, section 5 (Reviewable Design Data) – Bundle 13, Volume 5 – Page 44).**

On 26 May 2015, I emailed Graeme Greer of Mott MacDonald in relation to the seven comments which had been received from NHS Lothian (the Board) on the Environmental Matrix and included in Schedule Part 6 of the Project Agreement**. (A46365636 – Appendix 01 – PID_001_1_00000001-069128 – Bundle 13, Volume 2 – Page 9)**.

6. Wallace Whittle were in the process of producing the post FC updated version of the Environmental Matrix taking into account the Board's comments, and we wanted to ensure all outstanding matters were captured.

7. My email dated 26 May 2015 therefore takes all of the Board's comments included in the Project Agreement and shows how they are addressed in the new Environmental Matrix revision that was in the process of being produced by Wallace Whittle. It was intended to ensure that Mott MacDonald were in agreement with the changes made by Wallace Whittle, prior to submitting the Matrix formally via RDD.

8. I then sent a second email, with a copy of the updated revision of the Environmental Matrix produced by Wallace Whittle, to Graham Greer on 15 June 2015. As my email notes, this was again in an attempt to ensure that Mott MacDonald were happy with the Matrix prior to formal submission. (Appendix 2 - PID_001_1_00000001-106970) **(A46365851 – Appendix 02 – PID_001_1_00000001-106970 – Bundle 13, Volume 2 – Page 12)**.

9. Mott MacDonald responded on 22 July 2015 (Appendix 3- PID_001_1_00000001-157202) **(A46365856 – Appendix 03 – PID_001_1_00000001-157202 – Bundle 13, Volume 2 – Page 48)** providing their comments. The original seven Board comments included in the Project Agreement are set out in red text, the Wallace Whittle comments are set out in blue text and the Mott MacDonald response is set out in green text.

10. In relation to Point 4 and the single bedrooms, this was the change to the pressure regime requested by the Board prior to FC that I discuss in my first Witness Statement (see for example para 65) **(A41962682 – Witness statement of Ken Hall (Final redacted) – 4 April 2023 – Bundle 13, Volume 7 – Page 338)**.

11. In the email above Mott MacDonald asked for Note 26 in the Guidance Note to be updated to reflect what was agreed pre-FC, and for the Ventilation Type to be updated in the body of the Environmental Matrix. By "Ventilation Type" I understand Mott MacDonald to be referring to one of the columns within the Environmental Matrix titled “Ventilation (type)”. The changes requested by Mott MacDonald were made by Wallace Whittle and included within Revision 2 of the Environmental Matrix.

12. In relation to the change requested to the Guidance Note, I have copied Note 26 below – the text in black shows the FC wording and the underlined text shows the change to take account of Mott MacDonald’s comment above:

> *Single Bedroom - The design philosophy for ventilation is for a mixed mode operation where natural vent is encouraged which has benefits both physiological with users being partly in control, and from an energy stand point where mechanical vent loading is partly reduced (2/3rds). This strategy results in zero pressure differential regime within the room where supply and extract is balanced.*
>
> *<u>En suite dirty extract volume flow rate has been increased to achieve a balanced ventilation system.</u>*

13. On 25 August 2015, Mott MacDonald then emailed stating (Appendix 4 - ANX_EDN000224613) **(A46365857 – Appendix 04 – ANX_EDN000224613 – Bundle 13, Volume 2 – Page 52)**.

"I understand that IHSL are currently updating the Environmental Matrix, if possible and to assist the Board can you please provide a list of the associated environmental information for the isolation rooms including gowning lobbies/department".

14. On 2 September 2015, I provided a response (produced by Wallace Whittle) which explains how ventilation rates would be achieved in isolation suites via extract from the en-suites attached to these rooms **(A46365858 – Appendix 05 – ANX_EDN000320683 – Bundle 13, Volume 2 – Page 53)**.

15. As noted in the email accompanying this information, there was a specialist ventilation workshop held on 1 September 2015 where these matters were discussed. I was not at this workshop.

16. On 22 September 2022 Wallace Whittle then issued a query seeking guidance in relation to isolation cubicles, which I forwarded to Mott MacDonald on the same date. Mott MacDonald responded on 25 September 2015, and I forwarded their response to Wallace Whittle **(A46365859 – Appendix 06 – ANX_EDN000427817 – Bundle 13, Volume 2 – Page 55).**

17. Wallace Whittle produced a further Request For Information ("RFI") **(A46365860 – Appendix 7 – ANX_EDN000276437 – Bundle 13, Volume 2 – Page 58)** which I again forwarded to Mott MacDonald **(A46365861 – Appendix 08 ANX_EDN000321774 – Bundle 13, Volume 2 – Page 60)**.

18. On 21 October 2015 Mott MacDonald responded with a further list of queries **(A46365863 – Appendix 09 – ANX_EDN000228196 – Bundle 13, Volume 2 – Page 62)**.

19. I requested responses to these queries from Wallace Whittle. Wallace Whittle provided their responses on 22 October 2015 **(A46365862 – Appendix 10 – ANX_EDN000276606 – Bundle 13, Volume 2 – Page 65)** which I issued to Mott MacDonald **(A46365864 – Appendix 11 – ANX_EDN000494344 – Bundle 13, Volume 2 – Page 69**).

20. Mott MacDonald responded seeking some further clarification from Wallace Whittle **(A46365865 – Appendix 12 – ANX_EDN00336120 – Bundle 13, Volume 2 – Page 73)**, and so I asked Wallace Whittle to clarify **(A46365866 – Appendix 13 – ANX_EDN000490219 – Bundle 13, Volume 2 – Page 77).** They responded on 29 October 2015 and again I provided this response to Mott MacDonald **(A46365867 – Appendix 14 – ANX_EDN000486518 – Bundle 13, Volume 2 – Page 82).**

21. Mott MacDonald then responded with a further query which I issued to Wallace Whittle **(A46365868 – Appendix 15 – ANX_EDN000497776 – Bundle 13, Volume 2 – Page 87).** My understanding is that this was then discussed at a meeting with Mott MacDonald, the Board and Wallace Whittle, with Wallace Whittle then confirming to Multiplex that the matter had been closed **(A46365869 – Appendix 16 – ANX_EDN000269230 – Bundle 13, Volume 2 – Page 92).**

22. Revision 2 of the Environmental Matrix **(A32623047 – 3.2 0008 20151126 WW-XX-XX-DC-XXX-001 (Rev 2) - Bundle 13, Volume 5 – Page 959)** was then produced by Wallace Whittle and issued to the Board for RDD on 4th December 2015 **(A46365870 – Appendix 17 – ANX_EDN000083461 – Bundle 13, Volume 2 – Page 97)**. On the face of this document, it is noted that the Matrix has been amended in line with the Board's comments and the seven points from Financial Close had been incorporated into a table at the start of the document, with comments showing how they had been addressed.

23. However, on 20 January 2016 the Board then issued further new comments on Revision 2 of the Environmental Matrix **(A32623047 – 3.2 0008 20151126 WW-XX-XX-DC-XXX-001 (Rev 2) - Bundle 13, Volume 5 – Page 959)**, via Mott Macdonald. I was surprised to see the extent of the comments given a review had been carried out pre-FC by the Board, culminating with seven points carried over at FC to be reviewed via the RDD process.

24. As is noted in the email accompanying the comments, a workshop was arranged for 26 January with Multiplex, Wallace Whittle, the Board and Mott MacDonald to review and discuss these. **(A46365872 – Appendix 18 – ANX_EDN000251878 – Bundle 13, Volume 2 – Page 134)**.

25. Following the workshops on 26 January 2016, and another on 2 February 2016, the Environmental Matrix Revision 2 was then returned officially through RDD as Level C on 9th February 2016. **(A46365874 – Appendix 19 – EDL_001_1_00000001-78894 – Bundle 13, Volume 2 - Page 139)**. At the same time the Board provided an updated version of their comments issued previously. They provided these comments in track changes, so that you could see the deletion of comments and also in clean copy.

26. The track change version shows that the first comment relating to single bedroom ventilation, (previously item 4 of the “Seven Point” FC comments) had been addressed and so had been deleted:

27. I sent Mott MacDonald's email with the Board's Comments of 09 February 2016 to IHSL and asked to discuss **(A46365877 – Appendix 20 – ANX_EDN000507144 – Bundle 13, Volume 2 – Page 149)**. The purpose of the discussion was to seek direction over the extent of the comments that had been made to the Environmental Matrix.

28. I also issued it to Wallace Whittle asking for them to review, with a view to meeting with Mott MacDonald to review the comments before any resubmission of the Environmental Matrix through RDD was made. **(A46365881 – Appendix 21 – ANX_EDN000428014 – Bundle 13, Volume 2 - Page 159)**.

29. Other people from Multiplex were involved in the discussions between IHSL and NHSL. I was advised the Board's fifty comments were to be addressed. I therefore asked Wallace Whittle to address the comments and update the Matrix.

30. Revision 3 and 4 of the Environmental Matrix were then issued by Wallace Whittle to Multiplex as “drafts” prior to formal RDD issue to ensure all comments had been captured.

31. Revision 5 of the Environmental Matrix was then submitted through the RDD procedure on 18 March 2016 **(A46365883 – Appendix 22 - EDL_001_1_00000001-63063 – Bundle 13, Volume 2 – Page 169)**. This revision captured the updated comments previously provided by the Board in relation to their Level C. All of the Board's comments were noted in a table at the start of the Matrix and responses were provided by Wallace Whittle to show how these had been addressed.

32. Revision 5 was returned on 15th April 2016 marked as Level B **(A46365887 – Appendix 23 – ANX_EDN000086893 – Bundle 13, Volume 2 – Page 218)** and **(A46365890 – Appendix 24 – WW-XX-XX-DC-XXX-001 Rev 05 – Bundle 13, Volume 2 – Page 277)**, meaning Multiplex could proceed with procurement and construction in accordance with the Matrix, subject to the comments provided.

33. As I recall none of the Board's comments raised any questions over the air change rate, or pressurisation in the single or multi-bed wards in Critical Care.

34. Whilst the Contract did not require a resubmission of the Level B Environmental Matrix, I asked Wallace Whittle to update the Matrix so it could be resubmitted “for information”, capturing all the Board's comments to allow all stakeholders to be aligned and in agreement, and achieve closure on the Financial Close Environmental Matrix **(A46365891 – Appendix 25 – ANX_EDN000430272 – Bundle 13, Volume 2 – Page 365)**.

35. Revision 6 of the Environmental Matrix was then issued to the Board on 28 June 2016 **(A46365893 – Appendix 26 – GRC_002_1_00000008-18944 – Bundle 13, Volume 2 – Page 414).** This was issued for information, review, or both, only and was not submitted through the RDD process, given the previous Rev had already received Level B.

36. I have been asked to comment on the following *"The design of the ventilation system, including AC, Ductwork, Air Handling Units, and Plant Space being necessary to supply the AC number, was reviewed by NHSL and Mott MacDonald, including (1) during the RDD process, where NHSL's requirement for 4 air changes in critical care bedrooms was confirmed: (2) during discussions in relation to the pressure regime for the multi-bed wards, were in an email of 18 April 2018* ***(A39975863 – NHSL- GC-002953 Dated 18 April 2018 – Bundle 13, Volume 7 – Page 362)*****.** *NHSL stated that they were "seeking a design for 4 air changes for all 14 rooms", which included the multi-bed wards in critical care, and (3) in the settlement agreement between NHSL and IHSL dated 22 February 2019"* **(A32469163 – Settlement Agreement and Supplemental Agreement – 22 February 2019 – Bundle 4 – Page 11 – Documentation relating to the Certificate of Practical Completion)**.

RDD Process

37. The MEP RDD process consisted of a number of elements. Firstly, the agreed list of deliverables were captured within a separate RDD MEP Tracker shared regularly with NHSL and Motts by our document control, updated throughout the course of the design and construction phase.

38. The RDD MEP Tracker contained all of the drawings, schedules and reports, and tracked every document during the submission process each time it was revised and issued for RDD Review. Additional procedures put in place are identified in my first witness statement, see for example paragraph 72 **(A41962682 – Witness statement of Ken Hall (Final redacted) – 4 April 2023 – Bundle 13, Volume 7 – Page 338)**.

39. Pre RDD review meetings were held, where Wallace Whittle would review with Mott MacDonald the design intent and work in progress drawings, prior to formal RDD Review. Once the relevant pack was ready for RDD review Wallace Whittle would issue it to Multiplex document control, who then put it in a workflow and submitted it to the Board. The pack would then be returned by the Board after review with the appropriate Level of classification, be it Level A, B,

C or D, and commented upon accordingly. This would then be returned to Wallace Whittle for action.

Critical Care RDD

40. I think it is important to remember that the Environmental Matrix is only one part of the design review process on the Project and that, in parallel, the detailed ventilation design including layout drawings and schedules for all of the ventilation design elements had to be submitted for review and approval, through RDD. These drawings and schedules contain the detailed design to achieve the parameters shown in the Environmental Matrix.

41. In relation to critical care the ventilation design drawing which covers this area is drawing WW-04-01-PL-524-001 titled Zone Z4 Level 01 Ventilation Distribution Sheet 1 of 2 **(A46365895 – Appendix 27 – WW-04-01-PL-524-001 – Bundle 13, Volume 2 – Page – See Paper Apart).** This was reviewed and approved through RDD with Rev J being approved as Level B by Brian Currie of NHSL on 03 May 2018. During the life of the drawing, there were the following RDD submissions: Rev01, August 2015 was given a Level B, Revision E was given Level B June 2016, Revision F Level B July 2016, Revision G Level A September 2016, Revision H Level A December 2016, Revision I Level A November 2017, Revision J Level B May 2018.

42. WW-04-01-PL-524-001 **(A46365895 – Appendix 27 – WW-04-01-PL-524-001 – Bundle 13, Volume 2 – Page – See Paper Apart)**. details duct routes, duct ancillaries, duct sizes and contains the grille references. The ventilation flow rates to be achieved at each grille shown on WW-04-01-PL-524-001 **(A46365895 – Appendix 27 – WW-04-01-PL-524-001 – Bundle 13, Volume 2 – Page – See Paper Apart)**. are detailed on the associated grille schedules.

43. The grilles schedules for critical care were as follows:

- WW-Z4-01-SH-524-001 **(A46365896 – Appendix 28 – WW-Z4-01-SH-524-001 – Bundle 13, Volume 2 – Page 509)** titled Zone 4-1 Level 01

Schedule of Supply Grilles. Rev H was approved as Level A by Brian Currie on 23/08/2018. During the life of the grill schedule, there were the following RDD submissions: Rev D Level B June 2016, Rev E Level A October 2016, Rev F Level A October 2017, Rev G Level B May 2018, Rev H Level A August 2018.

- WW-Z4-01-SH-524-002 **(A46365897 – Appendix 29 – WW-Z4-01-SH-524-002 – Bundle 13, Volume 2 – Page 524)** titled Zone 4-1 Level 01 Schedule of Extract Grilles Rev I was approved as Level A by Brian Currie on 23 August 2018. During the life of the grill schedule, there were the following RDD submissions: Rev D Level B June 2016, Rev E Level A October 2017, Rev F Level A April 2018, Rev H Level B May 2018, Rev I Level A August 2018.

- WW-Z4-01-SH-524-003 **(A46365898 – Appendix 30 – WW-Z4-01-SH-524-003 – Bundle 13, Volume 2 – Page 532)** titled Zone 4-1 Level 01 Schedule of Dirty Extract. Rev E was approved as Level A by Jackie Sansbury on 02 May 2018. During the life of the grill schedule, there were the following RDD submissions: Rev D Level B June 2016, Rev E Level A May 2018.

44. I have set out below some specific discussion details that took place in relation to the single bedroom ventilation and multibed ventilation design.

Single Bedroom Ventilation

Derogation WW014

45. On 19 May 2016, Mott MacDonald sent an email noting that (as per the approved Environmental Matrix Rev 5 Matrix) the air change rates within the single bedroom en-suites were higher than that required under the relevant SHTM **(A46365900 – Appendix 31 – ANX_EDN000258277 – Bundle 13, Volume 2 – Page 538)**. They recognised that this design was to provide adequate air changes for both the en-suite and the bedroom, and the balanced

pressure required between the en-suite and bedroom in these rooms. They also recognised that no heat recovery would be possible on air extracted via the en-suite. Heat recovery is where the heat on waste air is recycled and reused as energy to heat the building. Heat recovery is not possible on air extracted via an en-suite because this would be considered "dirty air".

46. The Board asked Project Co to confirm whether a derogation needed to be approved by the Board to account for these points.

47. From my point of view derogations are a matter for Health Boards, the contractor designs and constructs in accordance with the specific requirements of the contract, if those requirements are to change then this is done through the Change Process under the contract, rather than derogations. Multiplex did not need a change or "derogation" in relation to this matter, as the design was in accordance with the Board's Construction Requirements and the Environmental Matrix. To me, this looked to be Mott MacDonald wanting to record what the design on this Project was for the single bedrooms and I took the email and request for a derogation as a positive marker, showing they understood and were happy the design met the Board's requirements.

48. In response to this email, I therefore asked Wallace Whittle to prepare a derogation and submitted this, as requested, to Mott MacDonald. **(A46365901 – Appendix 32 – ANX_EDN000379536 – Bundle 13, Volume 2 – Page 539) (A46365902 – Appendix 32.1 – ANX_EDN000379537 – Bundle 13, Volume 2 – Page 543).** The derogation stated:

> *"The air change rate has been increased within the single bedroom en-suite from 3 air changes per hour to 10 air changes per hour (min) to provide a fresh environment for patients and ensure single bedrooms are balanced as per SHTM 03-01 requirements."*

49. The proposal read as follows:

> *"En-suite to have a ventilation dirty extract of 10 air changes per hour (min)"*

Derogation WW015

50. Whilst reviewing the Board's derogation request in relation to the single bedroom en-suites (derogation WW014), Wallace Whittle prepared a separate derogation for the agreed air change rates in single bedrooms, given that the Board seemed eager to have their formal derogations in place.

51. This was derogation WW015, which was provided by Wallace Whittle on 26 July 2016 **(A46365903 – Appendix 33 – ANX_EDN000429472 – Bundle 13, Volume 2 – Page 544)** and submitted to the Board on 1 August 2016 **(A46365904 – Appendix 34 – ANX-EDN000340413 – Bundle 13, Volume 2 – Page 545)**.

52. WW0015 stated:

    "the air change rate has been decreased within the single bedrooms from 6ac/hr to 4ac/hr. Mixed mode ventilation has been provided with additional natural vent available from the opening windows. Single bedrooms without opening windows have been provided with 6ac/hr".

53. With the proposal being:

    "Single bedrooms with opening windows to have a mechanical ventilation rate of 4ac/hr".

54. As can be seen from the tone of my emails issuing the derogations, I did not consider these would be controversial – both reflected the Board's Construction Requirements and the Environmental Matrix which had been approved through RDD by this point. (As discussed above Rev 5 was awarded Level B with no comments which related to these derogation requests). Indeed, in our discussions in May and July 2015 (see paragraphs 5-12 above), Mott MacDonald had specifically asked for Guidance Note 26 to be updated in the Environmental Matrix and it reflected what was now being recorded in these derogation requests.

    *"**Single Bedroom** - The design philosophy for ventilation is for a mixed mode operation where natural vent is encouraged which has benefits both*

physiological with users being partly in control, and from an energy stand point where mechanical vent loading is partly reduced (2/3rds). This strategy results in zero pressure differential regime within the room where supply and extract is balanced.

En suite dirty extract volume flow rate has been increased to achieve a balanced ventilation system."

55. However, at a meeting on 20 September 2016, to my surprise I was told the Board would be rejecting both derogations WW014 and WW015. I requested reasons for this, which were provided in an email on 22 September 2016 **(A46365906 – Appendix 35 – ANX_EDN000246755 – Bundle 13, Volume 2 – Page 547)**. The main reason given was to do with heat recovery and the increased AC rate in the en-suites. It also referred to 4 bed wards, which weren't relevant to these derogations. This is because, the design solution for single bedrooms was different to that for multi-bedrooms. The design solution in the single bedrooms was designed to achieve balanced pressure in the single bedrooms. The Board's Environmental Matrix at FC (and the Environmental Matrix that had then been approved Level B) required the multi-bedrooms to have positive pressure.

56. After discussing with Wallace Whittle, Multiplex and IHSL provided a joint review and response on 16 December 2016 **(A46365908 – Appendix 36 – ANX_EDN000301098 – Bundle 13, Volume 2 – Page 549**) stating the derogations related to single bedrooms and were based on the design at FC, which had then been captured in the Environmental Matrix.

<u>Revision 7 of the Environmental Matrix</u>

57. Whilst the discussions in relation to derogations WW014 and WW015 were ongoing, Revision 7 of the Environmental Matrix was prepared by Wallace Whittle and issued for review on 19 September 2016 (Appendix 37 - EDL_001_1_00000001-18751) **(A46365907 – Appendix 37 – EDL_001_1_00000001-18751 – Bundle 13, Volume 2 – Page 552)**, picking

up changes which had been made since the last revision. For example, an additional table was added to the beginning of this revision of the Matrix which addressed lighting comments made by the Board.

58. The air change rates and pressure for the single bed isolation cubicles, single bedrooms, and multi-bed wards all remain unchanged.

59. On 17 October 2016, the Board returned Revision 7 of the Environmental Matrix Level C **(A46365910 – Appendix 38 – ANX_EDN000088432 – Bundle 13, Volume 2 – Page 649)**. This came as a surprise given the previous grading of Level B at Revision 5. Further, by this point in time a considerable amount of the detailed design drawings and schedules had been through the RDD process, had been approved, procured and was being installed on site.

60. As I explain at paragraphs 37 to 41 above, for example, by October 2016 the critical care drawings and schedules had been designed around the contents of Rev 5 of the Matrix, and submitted for RDD, and approved at a Level B or above by the Board allowing the design to proceed to procurement and installation.

61. Therefore, the sudden downgrading of the Matrix to Level C, meaning contractually we were not to act on it, was unusual. Particularly Revision 5 of the Matrix had been given a Level B, "proceed", and that no substantive changes had been made to the version now being awarded Level C.

62. The main comment in relation to ventilation is General Comment No. 6 in Mott MacDonald's cover email, stating:

> *"Some ventilation rates don't appear to comply with BCRs. The Board would like to point that is still awaiting response from PCo to the issues raised as per MM-RFI-000172 & MM-GC-002006 relating to ventilation rates."* **(A46365910 – Appendix 38 – ANX_EDN000088432 – Bundle 13, Volume 2 – Page 649)**.

63. The "MM-RFI-000172" correspondence referred to relates to the CT, MRI, Fluoroscopy and Gamma camera rooms ventilation and was addressed and closed out – see mail number MPX-RTRFI-001075 **(A46365913 – Appendix 39 – ANX_EDN000208018 – Bundle 13, Volume 2 – Page 652)** and **(A46365916 – Appendix 40 – ANX_EDN000301119 – Bundle 13, Volume 2 – Page 653)**.

64. "MM-GC-002006" is then the Aconex reference for the correspondence in relation to derogations WW0014 and WW0015, which I have discussed above, which reflected the Board's Requirements and (as I explain below) were confirmed in the Settlement Agreement.

65. Overall, it appeared that the Board had re-reviewed their own clinical needs for multibed ventilation and wanted the design changed from what was agreed and recorded at FC and within the Level B approved Environmental Matrix, and corresponding design drawings and schedules already submitted and approved through RDD.

66. Following subsequent discussions between IHSL and the Board, the Environmental Matrix was then upgraded to Level B, without any changes being made to the Environmental Matrix. I was not directly involved in these discussions.

67. The upgrade was made on 07 November 2016 under reservation that the Board still had "serious concerns" about the document, noting that they believed the design to be non-compliant **(A46365914 – Appendix 41 – ANX_EDN000079746 – Bundle 13, Volume 2 – Page 654)**. However, the reference given for the "non-compliance" was correspondence MM-GC-002084, which are the Board's comment on Rev 7 from 17 October 2016 which I discussed above. The main comment on ventilation being in relation to WW0014 and WW0015 which aligned with the Board's requirements, as confirmed in the Settlement Agreement.

Multi-bed Ward Ventilation – Pressurisation

68. After Multiplex had received the approved RDD ventilation designs, the Board then started to raise comments about the pressure regime for the multi-bed ventilation.

69. This was raised for the first time in relation to the discussion around the single bed derogations WW0014 and WW0015, which I discuss above. With the Board suggesting the discussions around the single bedroom pressure regime pre-FC also applied to multi-bed wards. That was not my understanding **(A46365915 – Appendix 42 – ANX_EDN000168759 – Bundle 13, Volume 2 – Page 658)**.

70. A meeting was therefore held to discuss the position on 23 January 2017.

Wallace Whittle Notes and Revised Design Proposals

71. It became clear from the meeting with the Board on 23 January 2017 that the Board's position on the ventilation design had changed and they now wanted the design for multi-bed wards to give balanced pressure.

72. The existing design for the multi-bed wards, as per the original H+K Environmental Matrix and that approved though RDD, was to have positive pressure and 4ac/hr.

73. As part of the meeting Wallace Whittle agreed to produce a paper explaining the design. On 31 January 2017, Wallace Whittle issued a note entitled "Bedroom Ventilation Key Considerations" **(A46365917 – Appendix 43 – ANX_EDN000208856 – Bundle 13, Volume 2 – Page 666) (A46365919 – Appendix 43.1 – ANX_EDN000208857 – Bundle 13, Volume 2 – Page 667)**. This document looked at both the ventilation in the single bedrooms and in the multi-bed wards.

74. In relation to the single bedrooms, it explained how the design solution to achieve balanced pressure worked and explained the need for an air change rate in excess of 10ac/hr (17ac/hr) in the en-suites for these rooms.

75. In relation to the multi-bedrooms, the report looked at the implications of changing the pressure regime in these rooms to balanced, including the ductwork alterations that would be required.

76. The note was discussed at a meeting on Monday 6 February 2017 and on 9 February 2017, Wallace Whittle then provided a further note entitled "Multi Bedroom Ventilation Amendment Proposal to Achieve Room Balance" **(A46365921 – Appendix 44 – ANX_EDN000209393 – Bundle 13, Volume 2 – Page 668) (A46365923 – Appendix 44.1 – ANX_000209394 – Bundle 13, Volume 2 – Page 669) (A46365922 – Appendix 44.2 – ANX_EDN000209395 – Bundle 13, Volume 2 – Page 672)**.

77. This document details a possible design solution to provide balanced pressure in the multi-bed wards on a room-by-room basis. The multi-bed wards in this document include those in Critical Care (those containing the "B1" in the room reference). The solution for the three multi-bed wards in Critical Care is stated as involving reducing the air change rate in these rooms to 3ac/hr, from the 4ac/hr previously required in the Environmental Matrix.

78. Although Wallace Whittle was supplying the detailed design information and impact analysis, the design review and optioneering was very much being led by the Board. Once this note was issued, the Board took the information away for dialogue with their clinical teams. Multiplex were not party to those discussions other than listening to the feedback that would be provided at the next meeting by the Board.

79. By this stage, there were weekly meetings being held with the Board; and Wallace Whittle would take the comments made by the Board on the proposals at these meetings and then provide updated notes and impact analysis.

80. On 21 February 2017 Wallace Whittle then produced another note entitled "Accommodation Design Criteria – Single Rooms & Multi Bed Wards" **(A46365924 – Appendix 45 – ANX_EDN000301171 – Bundle 13, Volume 2 – Page 675) (A46365929 – Appendix 45.1 – ANX_EDN000301172 – Bundle 13, Volume 2 – Page 676) (A46365925 – Appendix 45.2 – ANX_EDN000301173 – Bundle 13, Volume 2 – Page 678)**.

81. On 23 February 2017, Wallace Whittle then issued the third revision of their "General Ward – Ventilation Amendment Proposal" **(A46365930 – Appendix 46 – ANX_EDN000199766 – Bundle 13, Volume 2 – Page 680) (A46365931 – Appendix 46.1 – ANX_EDN000199767 – Bundle 13, Volume 2 – Page 681)**. This contained the same proposal to achieve balanced pressure in the multi-bed wards as set out previously in their note of 9 February 2017 but provided more detail on the ductwork changes that would be required to implement this change. This again includes the proposal to reduce air change rates in the multi-bed wards (including Critical Care) from 4ac/hr to 3ac/hr.

82. On 24 February 2017, another meeting was held with the Board. I provided a note of this meeting on 27 February 2017, which included a marked-up schedule containing all of the multi-bed wards that were being discussed **(A46365933 – Appendix 47 – ANX_EDN000273257 – Bundle 13, Volume 2 – Page 684) (A46802206 – Paragraph 51 – Ventilation Amendment Proposal – 24.02.17 – Bundle 13, Volume 7 – Page 365)**. Each room has been marked as either "essential" or "non-essential". This reflects the discussions at the meeting where the Board went through each of the design solutions to provide balanced pressure in these rooms and decided whether it was essential or not that the changes were made.

83. This meeting was attended by Brian Currie (Project Director for the Board), Janice McKenzie (NHSL Clinical Director), Dorothy Hanley (Project Manager Children's Services Lead), and Ronnie Henderson (NHSL commissioning manager) **(A46365934 – Appendix 48 – ANX_EDN000273259 – Bundle 13, Volume 2 – Page 689)**. The Board led the marking up of the schedule and Ms

Hanley fed back what the Board's clinical team considered was essential or non-essential in terms of the changes to the multibed rooms.

84. The outcome of this exercise was that the Board decided that not all 20 multibed rooms had to be modified, instead they said only 14 rooms (including those in critical care) were "essential".

Revision 9 of the Environmental Matrix

85. Whilst the Multi-bedroom discussions were ongoing, revision 9 of the Environmental Matrix was produced by Wallace Whittle and submitted through the RDD process on 19 May 2017 **(A46365935 – Appendix 49 – EDL_003_1_00000004-05305 – Bundle 13, Volume 2 – Page 690)**. The revision box notes that the Matrix had been updated to take account of the Boards comments from 17.01.17.

86. On 18 July 2017, the Board provided their comments confirming Level B. The body of the email accompanying the Board's comments stated **(A46365937 - Appendix 50 - ANX_EDN000074523 – Bundle 13, Volume 2 – Page 748)**:

> *"The Board notes it is the Board's opinion the ventilation design for multi bedrooms is not compliant with the BCRs and separate discussions are ongoing relative to the satisfactory resolution of the design.*
>
> *Please also note the Board rejected Project Co's derogation for single rooms and are considering the compliance of the alternative solution."*

87. I forwarded the Board's comments to Wallace Whittle on 19 July 2017 and requested that they review them **(A46365938 - Appendix 51 - ANX_EDN000522744 – Bundle 13, Volume 2 – Page 808)**. Wallace Whittle requested a meeting with the Board for clarity on some of the points raised, this was arranged for 28 August 2017.

88. The Board then provided further comments on revision 9 of the Environmental Matrix which were issued on 28 August 2017 **(A46365941 - Appendix 52 - ANX_EDN000075337 – Bundle 13, Volume 2 – Page 867).**

89. Revision 10 of the Environmental Matrix was then produced by Wallace Whittle and submitted for RDD on 12 September 2017 **(A46365943 - Appendix 53 - GRC_002_1_00000009-33240 – Bundle 13, Volume 2 – Page 926)**.

90. As is recorded in my email of 26 September 2017, a meeting was then held on 28 September 2017 with the Board and Mott MacDonald **(A46365947 - Appendix 54 - ANX_EDN000301372 – Bundle 13, Volume 2 – Page 1045)**. The aim of this meeting was to address any outstanding comments from the Board on the latest revision of the Environmental Matrix.

91. I provided a note of the discussions at this meeting in an email of 5 October 2017 **(A46365818 - Appendix 55 - ANX_EDN000202126 – Bundle 13, Volume 2 – Page 1048)**. As is noted in this email, a revised revision 10 of the Matrix was to be submitted for RDD which captured the comments made at the meeting. At point four in my email, I note that multi-bedrooms were not discussed at the meeting. I also note that a change was to be instructed, in relation to the change from positive to balanced pressure in the multi-bed wards.

92. Revision 11 of the Matrix was then produced by Wallace Whittle and submitted to RDD on 26 October 2017 **(A46365824 - Appendix 56 - EDL_003_1_00000004-11083 – Bundle 13, Volume 2 – Page 1052)**.

93. The Board returned comments on Revision 11 of the Matrix on 17 November 2017 **(A46365821 - Appendix 57 - ANX_EDN000074985 – Bundle 13, Volume 2 – Page 1172)**. The body of their email stated that:

> *"the design for single and multibedroom ventilation design being progressed by Project Co remains non-compliant and this non-compliance*

should either be rectified, a PCo change submitted for the Board's consideration or a dispute raised between the parties."

94. No further details were provided, and Revision 11 of the Matrix was approved Level B.

Wallace Whittle April, May and June 2018 Design Notes

95. Following Rev 11, the discussions continued in relation to the multi-bed wards and on 13 April 2018, Wallace Whittle provided a pack of drawings for a "revised ventilation proposal to achieve a room balance at 4a/c" **(A46365826 - Appendix 58 - ANX_EDN000276472 – Bundle 13, Volume 2 – Page 1235) (A46365827 – Appendix 58.1 – ANX_EDN000276473 – Bundle 13, Volume 2 – Page 1236) (A46365828 – Appendix 58.2 – ANX_EDN000276474 – Bundle 13, Volume 2 – Page 1237) (A46365829 – Appendix 58.3 – ANX_EDN000276475 – Bundle 13, Volume 2 – Page 1238) (A46365831 – Appendix 58.4 – ANX_EDN000276476 – Bundle 13, Volume 2 – Page 1239) (A46365832 – Appendix 58.5 - ANX_EDN000276477 – Bundle 13, Volume 2 – Page 1240) (A46365830 – Appendix 58.6 – ANX_EDN000276478 – Bundle 13, Volume 2 – Page 1241)**. As by this stage the Board had confirmed they wanted balanced/negative pressure, but wanted to maintain 4AC, rather than reduce it to 3AC as per the previous option.

96. This revised proposal was discussed at a meeting with the Board on 12 April 2018. **(A46365833 - Appendix 59 ANX_EDN000274412 – Bundle 13, Volume 2 – Page 1242)**.

97. In an email of 18 April 2018, the Board noted that revision 5 of the "General Ward – Ventilation Amendment Proposal to Achieve Room Balance" still showed air change rates between 2.7 and 3.5, whereas they were "seeking a design for 4AC" for all of the rooms addressed in the schedule – which included critical care **(A46365843 - Appendix 60 - ANX_EDN000204253 – Bundle 13, Volume 2 – Page 1255)**.

98. In response to this email from the Board, I replied and confirmed we understood *"4ACH is the brief"* and that the Schedule was being updated to reflect the 4ac/hr and balanced pressure requested for these rooms **(A46365842 - Appendix 61 - ANX_EDN00276512 – Bundle 13, Volume 2 – Page 1258)**.

99. Wallace Whittle updated the documents and on 22 May 2018, revision 6 of the "General Ward – Ventilation Amendment Proposal" was issued for RDD **(A46365844 - Appendix 62 - EDL_003_1_00000004-03195 – Bundle 13, Volume 2 – Page 1262)** and then returned with Level B on 31 May 2018 **(A46365846 - Appendix 63 - ANX_EDN000057169 – Bundle 13, Volume 2 – Page 1268).** This document states that the multi-beds in Critical Care are to have an overall air change rate of 4ac/hr. None of the Board's comments included with the Level B query the 4ac/hr rate.

100. Revision 7 of the "General Ward – Ventilation Amendment Proposal" was then issued through RDD on 21 June 2019 **(A46365847 - Appendix 64 - EDL_003_1_00000004-05147 – Bundle 13, Volume 2 – Page 1271)** and given Level A by the Board on 27 July 2018 **(A46365854 - Appendix 65 GOA_001_1_00000002-22293-1 – Bundle 13, Volume 2 – Page 1279)**. The Level A return meant that the Board had reviewed the document and had no comments.

101. Wallace Whittle then updated the relevant rooms in the Environmental Matrix to reflect the changes that had been made to the multi-bed ward pressure regime.

102. This updated extract of the Environmental Matrix was then issued to the Board on 05 July 2018 **(A46409312 - Appendix 66 - ANX_EDN000497477 – Bundle 13, Volume 2 – Page 1337)**.

Settlement Agreement

103. On 22 February 2019, the Board and IHSL agreed a Settlement Agreement (SA) **(A33406223 – 28 February 2019 Report on PA Settlement Agreement**

– Bundle 10 – Documentation relating to Supplementary Agreement 1 (SA1) – Page 156). A step-down Settlement Agreement was also agreed by Multiplex and IHSL on 22 February 2019.

104. I was not involved in the commercial negotiation of the SA. I did attend some of the meetings along with other technical members of the Multiplex team in relation to the technical resolution being agreed and I liaised with Ronnie Henderson from the Board where further dialogue was required.

105. There were also various workshops where the technical position on the wording to be included in the SA would be discussed. These would then be reviewed by Ronnie Henderson and his team on behalf of the Board.

106. In relation to the matters, I have discussed in this statement, Item 7 – 4 Bed Ventilation and Item 13, Single Bedroom Ventilation air changes of the Technical Schedule included in the SA (Appendix 65A – Extracts from SA) **(A46409292 – Appendix 65A – Technical Schedule - Bundle 13, Volume 2 – Page 1308)** are relevant:

    Item 7 – 4 Bed Ventilation. As previously discussed, this item was closed out technically by Revision 7 of the "General Ward – Ventilation Amendments Proposal" which was returned Level A. This was then resolved contractually as being the agreed final position in the SA. No further works were required.

    Item 13 – Single Bedroom Ventilation air changes. This item related back to derogations WW0014 and WW0015 in relation to the air change rates in the single bedrooms. The agreed position can be seen in Item 13 to the SA and has two parts, reflecting the two previous separate derogations. Again, no further works were required.

107. I have been asked to comment on the following *“After the agreed approach to the number of air changes per hour in Critical Care (HDUS) was questioned by IOM in their first issues log, circulated by email by Brian Currie on 25 June 2019*

(A32653249 – 3.13_0007_IOM Issues Log Dated 25 June 2019 – Urgent – Bundle 13, Volume 7 – Page 368) *NHSL approached IHSL to undertake additional work to achieve 10AC in critical care on the basis that this would be a change in accordance with Schedule Part 16 (change protocol) to the project agreement"*

As I understand it, IOM were brought in by NHSL to validate the as installed installation and commissioning results. As this related to site based activities, I was not involved in this dialogue.

108. I have been asked to comment on Stewart McKechnie of TUV-SUD/Wallace Whittle having referred in his evidence to having clarified that the rooms treated with 10AC and 10Pascals of pressure was a correct interpretation.

This is a matter for Mr McKechnie. My understanding was the Environmental Matrix was the brief and contained the Board's requirements.

109. I have been asked to comment on the following *"At page 23 of their closing submissions MML note the alteration to guidance note 15 (after financial close)* ***(A44443771 – Mott MacDonald – Final Closing Submission – 30 June 2023 – Bundle 13, Volume 7 – Page 370*****)** *to make it reference isolation rooms only. MML claims this change was not raised with MML or NHSL"*

As I explain at paragraph 22 above Revision 2 of the Environmental Matrix was produced by Wallace Whittle and issued to the Board for RDD on 4th December 2015 **(A46365870 – Appendix 17 – ANX_EDN000083461 – Bundle 13, Volume 2 – Page 97)**. The document having been updated by Wallace Whittle to reflect the Board's comments. As part of this the Guidance Notes were also updated by Wallace Whittle to take account of the Board's comments and discussions since FC. However, I am now aware that Item 15 "Critical Care areas" contains a change that is not highlighted in red in Revision 2. This being the addition of the words "for isolation cubicles" after the words "10ac/hr". I was not aware of this change at the time. Multiplex did not make this change. I am unable to comment further.

110. I have been asked to comment on the following. *"At Para 55.13 MML identifies emails from 2016 that it contends are relevant to understanding the evidence led to date".*

The October 2016 and November 2016 correspondence referred to by Mott MacDonald relates to Revision 7 of the Environmental Matrix which I have discussed at paragraphs 57-67 above.

111. As I explain above, whilst the Board refer to "non-compliance" the main comment on ventilation from the Board was in relation to WW0014 and WW0015 which reflected the Board's Requirements, as confirmed in the Settlement Agreement.

112. I have been asked to comment on the following *"On 31.1.19, there was confirmation from IHSL that the design solution complied with SHTM's. IHSL's letter dated 31 January 2019 is in Bundle 14 at Page 99".* **(A43103366 – IHS Lothian Letter Re Compliance with SHTM – 31 January 2019 – Bundle 13, Volume 7 – Page 425)**.

I was not involved in this dialogue.

113. I have been asked to comment on the following 3 paragraphs, *"On 31.1.19, Wallace Weir of IHSL wrote to Brian Currie* ***(A43103366 – IHS Lothian Letter Re Compliance with SHTM – 31 January 2019 – Bundle 13, Volume 7 – Page 425)*** *with confirmation that":*

> "*All ventilation systems have been designed, installed and commissioned in line with SHTM 03-01 as required, systems are maintained in such a manner which allows handover at actual completion to meet SHTM 03-01 standards"*

114. *On 12 February 2019, Mr Currie wrote to Mr Weir 'seeking written assurance on various matters, including that engineering systems had been designed and were being installed and commissioned to meet current guidance: that the*

engineering systems had been commissioned, validated and set to work to ensure safety, quality and compliance: and that the systems to be handed over at actual completion met the specified requirements and were safe and effective' **(A40988842 – Part A 4.2.6 – 20190212 – Letter from NHSL To IHSL Re Assurance – 12.09.19 – Bundle 13, Volume 7 – Page 427)**.

115. *On 13 March 2019, Mr Weir wrote to Mr Currie in slightly different terms to his letter of 31 January 2019, 'confirming inter alia that the engineering systems had been designed, installed, commissioned and validated in accordance with the Project Agreement* ***(A40988855 – Part A 4.2.8 – 20190313 – IHSL LHB Assurance – Bundle 13, Volume 7 – Page 429)*** *standards' (Mr Weir's letter of 13 March 2019 is enclosed with Mr Graham's letter to Mr James of 1 April 2019)* ***(A41293071 – Three letters relating to assurances regarding the delivery of the RHSC and DCN Project – Bundle 4 – Documentation relating to the Certificate of Practical Completion – Page 228)****.*

    I was not involved in any of this dialogue noted by the Inquiry at paragraphs 113 – 115 above.

116. I have been asked what steps, if any, were NHSL taking to verify compliance with guidance? Were NHSL placing reliance on IHSL and the independent tester to ensure compliance, without any further verification by the health board.

    This appears to be a question for NHSL.

Declaration

117. I believe that the facts stated in this witness statement are true. I understand that this statement may form part of the evidence before the Inquiry and be published on the Inquiry's website.

Scottish Hospitals Inquiry
Witness Statement of
Lindsay Guthrie

Introduction

1. My name is Lindsay Jane Guthrie.

2. I have been asked to provide a statement detailing my involvement with the Royal Hospital for Children and Young People and Department of Neurosciences (RHCYP / DCN) Project (the Project).

Qualifications and professional experience

3. I am a registered general nurse with the Nursing and Midwifery Council (NMC). I attended the North Lothian College of Nursing and completed my General Nurse training 1991 to 1994 (allowing me entry to the NMC register as Registered General Nurse from 23 January 1995). I have the following post graduate qualifications: Post Graduate Diploma (Distinction) Infection Prevention & Control - University of Highlands & Islands (completed in 2008, awarded 2010); Post Graduate Diploma Healthcare Quality Improvement – University of Dundee (completed 2018, awarded 2019); Healthcare Infection Society – Engineering Aspects of Infection Control (RCPath accredited CPD course July 2019) (Falfield Course) and The Built Environment (Infection Prevention & Control) – SQA Level 11 CPD Module (Distinction) University of Highlands & Islands (awarded 2022).

4. I am also a member of the Infection Prevention Society and Hospital Infection Society, previously I was the Deputy Chair and Chair of NHS Scotland Senior Infection Control Nurses Network (2019-2020; 2010-2021) and I am currently the Chair of NHS Scotland Infection Control Managers Network (2022-present).

5. Below is a summary of my career history:

- Student nurse Oct 1991 to Dec 1994 – North Lothian College of Nursing
- January to April 1995 - NHS Lothian Department of Clinical Neuroscience Theatres Western General Hospital – Neurosurgery - D grade staff nurse
- April to September 1995 – NHS Lothian St Johns Hospital Theatres – plastic surgery, gynaecology, obstetrics, endoscopy, general surgery, orthopaedic surgery, urology - D Grade staff nurse
- October 1995 to 1996 – NHS Lothian Outpatient Theatres Western General Hospital – specialising in General Surgery, Urology, Endo-urology - D Grade staff nurse
- 1996 to 1998 - NHS Lothian Department of Clinical Neurosciences Theatres Western General Hospital – E grade staff nurse
- 1998 to 2005 - NHS Lothian Out Patient Theatres - E grade staff nurse
- January 2005 to September 2010 - G Grade, then H Grade, Clinical Nurse Specialist Infection Prevention and Control (IPC) NHS Lothian (Royal Infirmary of Edinburgh and Western General Hospital) – all aspects of clinical infection prevention and control, education, audit and policy, including specific remit for Decontamination of Reusable Medical Devices and IPC response to the Glennie Technical Requirements. This post required completion of a formal post graduate academic qualification (master's level) in Infection Prevention and Control in addition to role specific training and education which was provided whilst in post. Similar to other specialist nursing posts, formal post graduate training and education was a requirement for the Infection Prevention Control Nurse (IPCN) post in all NHS Scotland health boards.
- September 2010 to August 2013 - Associate Inspector - Healthcare Environment Inspectorate Healthcare Improvement Scotland 2010 - external scrutiny of NHS Hospital compliance with Healthcare Associated Infection (HAI) Standards, registration, inspection, complaints and enforcement role for Independent Hospitals

- August 2013 to June 2015 - Senior Nurse Health Protection – NHS Lanarkshire – professional lead for Health Protection Nursing, communicable disease control, surveillance and incident management
- June 2015 to January 2021- Lead Nurse Infection Prevention & Control – NHS Lothian - professional lead for IPC Nurses, subject matter lead advising NHS Lothian on operational and strategic aspects of IPC and HAI. All aspects of clinical IPC; built environment; decontamination; audit, surveillance and monitoring; education and policy development, incident management. Representing NHS Lothian and wider IPC network on national working groups (Health Protection Scotland (HPS), Antimicrobial Resistance and Healthcare Associated Infection Scotland (ARHAI), NHS Education for Scotland (NES)) and contributing to development of national guidance. Supporting and advising the then Infection Prevention and Control Head of Service who was not an IPC subject matter specialist (similar to some other health boards in Scotland). The Head of Service fulfilled the requirements for the Infection Control Manager required by (**A47086948 – HDL 2005 (8) – dated 18 March 2006 – Bundle 13 – Vol 7 – Page 6)**. This is a Scottish Government directive which sets out the main responsibilities for Chief Executives and Infection Control Managers, and the governance arrangements expected for Infection Control in Health Boards. The post holder had overall responsibility for management processes and risk assessment relating to infection control. They were a very experienced registered Nurse, with extensive clinical experience in both the NHS, the British Army, and specialist qualifications in Burns Nursing and Nursing Education, but did not hold any post registration qualification in Infection Control.
- October 2019 to March 2020 - Acting Head of Service Infection Prevention & Control (in addition to lead nurse role), NHS Lothian - covering periods of long-term sickness absence of the Head of Service – overall responsibility for management processes and risk assessment relating to infection control (including the issue of antibiotic resistant infections and antimicrobial prescribing), medical devices

decontamination, medical devices management, and cleaning services as per HDL 2005(8)

- 2021 to present - Associate Director Infection Prevention & Control – NHS Lothian (continuous employment as the subject matter lead for IPC in NHS Lothian since 2015 (lead nurse)) - overall responsibility for management process and risk assessment relating to infection control, decontamination, cleaning as per HDL 2005(8). Providing strategic leadership and advice as a clinical subject matter lead for NHS Lothian with designated responsibility and accountability for HAI/IPC in NHS Lothian. Professional leadership for IPC nursing service.
- As an Infection Prevention and Control Nurse, between 2005 and 2010, I had limited experience of dealing directly with the IPC implications of a hospital building design. This was principally limited to advising on the fit and finish of surfaces, fixtures and fittings of small-scale refurbishment or reactive maintenance projects in line with published technical guidance. Prior to 2019 I had no practical experience of the process for commissioning new water or ventilation systems as I had never been involved in a project where such systems were installed. I had a working understanding of critical ventilation systems in the operating theatre environment (air change rates, pressure cascades) in line with Scottish Heath Technical Memorandum (SHTM) 2025 and latterly SHTM 03-01 from both my clinical roles in theatre and my previous IPC roles supporting theatre services and medical device Decontamination. This knowledge was acquired on the job and through self-directed learning.
- As Lead IPC Nurse between 2015 and 2019, my role involved the assimilation and interpolation of a wide range of national guidance, policy, technical documents, safety alerts or Scottish Government Directives, with reference to Infection Prevention and Control and advising the Head of Service IPC, and indirectly NHS Lothian Board of any required action or risk. I undertook these duties in consultation with others including the Lead Infection Control Doctor where required or appropriate. I therefore developed a broad understanding of basic technical principles contained in various SHTM and the ability to ask

critical questions of technical subject matter experts to inform a view on clinical infection risk associated with non-compliance with these documents. In 2019 my understanding of the design and management of water distribution systems developed in response to the outbreak of *Pseudomonas aeruginosa* in The Department of Clinical Neurosciences (DCN) at the Western General Hospital (WGH) site.

- In addition to my post, NHS Lothian Infection Prevention and Control team current has 21 infection control nurses employed in posts ranging Band 6 to Band 8a. All are registered nurses; some hold dual training or registration (for example, they are registered adult and sick children's nurses or mental handicap nurses). They have come from a range of different clinical backgrounds and experiences including critical care, infectious diseases, acute medicine, theatres, paediatrics, orthopaedics, medicine of the elderly, community nursing and residential nursing homes. Some have previous managerial experience. All are required to complete post graduate training to achieve a formal qualification in Infection Prevention and Control in addition to role specific training and development. The composition of the IPC team in NHS Lothian is broadly similar to that of other territorial health boards across the NHS in Scotland.

6. During the period of the Project, I held the following roles in NHS Lothian:
    - Clinical Nurse Specialist Infection Prevention and Control (2005 to 2010)
    - Lead Nurse Infection Prevention and Control (2015 to 2021)
    - Acting Head of Service Infection Prevention and Control (concurrently with Lead Nurse role) (October 2019 to March 2020)
    - Associate Director Infection Prevention and Control (Jan 2021 to Present)

7. My main duties involve:

    - Through clinical expertise and leadership, translate policy directives and initiatives in relation to infection prevention and control into operational procedures and implementation plans.

- Through professional leadership and influencing skills, play a key role in shaping the development of practice in relation to infection prevention and control, supporting patient safety through the reduction in healthcare associated infection.
- Provide line management to NHS Lothian Infection Prevention and Control Nurses
- Contribute to the development of local, national and international knowledge of HAI through contribution to research and specialist publications.
- To provide strategic leadership and management of Infection Prevention and Control within NHS Lothian and the responsibilities set out in HDL 2005 (8)
- Accountable for an annual programme of work and work autonomously within a framework of annually agreed objectives.
- Accountable for all decision-making relating to the agreed work programme.
- Expected to anticipate problems, changing needs and emerging issues, identifying and initiating actions required.
- Independently advise partner organisations in relation to healthcare associated infection.

Role in the Project

8. I was aware of the initial discussions for the Project concept and design prior to 2010. I was not directly involved in the Project at that time as the Royal Hospital for Sick Children was not part of my clinical 'patch'. At that time, the Project was not progressed significantly prior to my leaving NHS Lothian in 2010.

9. NHS Lothian established the HAI Scribe Lead Nurse post in February 2014 as a seconded role. Prior to this date IPC nurse support for any building work, including the planned reprovision of the Royal Hospital for Sick Children, was usually assigned to whichever IPCN held clinical remit for the service (that is, the IPCN who 'covered' RHSC provided advice on the building Project). It is my

understanding that staffing levels in the IPC team in 2014 were sufficient to provide a dedicated post for this build Project in the short term. The post holder seconded into the role was an experienced and qualified Band 7 IPCN who was employed in a substantive capacity as a Band 7 Geographical Lead IPCN (for example, a team lead). They did not have any additional built environment specific qualifications or experience to other IPCN in the team but were interested in the subject area. This was a new role created specifically to support capital projects (initially limited to the RHCYP/DCN Project, but quickly a more extensive remit to include other major capital projects), unique to NHS Lothian, and the post was occupied by a single post holder until their retiral in 2018. The job involved providing the same type of advice and input that others in the Infection Prevention and Control Team (IPCT) had provided in relation to major refurbishment or building work, but this post provided a single point of contact and consistency of advice for defined projects. Supporting these types of projects is time consuming. The HAI Scribe post allowed other IPCNs employed in NHS Lothian to focus on the core clinical aspects of their role. Formal job evaluation was submitted to the Workforce Organisational Change Committee to make this a substantive post in February 2015. Job evaluation is formal organisation policy and process that allows new posts or service change requests to be considered by Human Resources, Finance, senior management and Staff Partnership representatives to ensure the proposed change meets a defined service need, fairness and equity in pay for work undertaken, and to ensure compliance with equal pay legislation. Posts endorsed through this process are allocated a recurring funding source. The new post was aligned to the existing IPC team structure during the period of secondment, and subsequently allowed the permanent appointment of a Band 7 Geographical Lead IPCN to the secondee's substantive post. To the best of my knowledge, NHS Lothian was the only Board in Scotland to have this type of post as a substantive role rather than a project specific secondment. NHS Lothian had a number of refurbishment, expansion or new construction projects in development over the period 2014 to 2019 including East Lothian Community Hospital and the Royal Hospital for Children and Young People. The creation of the post recognised the increased expectation for IPC involvement in projects in line with the directive of Scottish Health Planning Note 30 (SHPN 30) HAI

risk in the Built Environment (2014, previous version issued 2005). The role had not previously existed because historically the Built Environment was not a defined priority area for IPCT. The key areas of focus for teams aligned with Scottish Government Scottish Antimicrobial Resistance and Healthcare Associated Infection – Strategy Group (SARHAI) are HAI policy or plans. IPCT were expected to support implementation and comply with any and all guidance issued by Health Facilities Scotland or any other Scottish Government directive, including the Scottish Health Facilities Note 30: Infection Control in the Built Environment (SHFN 30), as a mandatory requirement for capital projects. **(A33662182 - Scottish Health Facilities Note 30 Part 1: Infection Control in the Built Environment – Design and Planning – Bundle 13 – Volume 3 – Page 553)** It highlighted the multidisciplinary nature of project teams and advised that all members of the Project team understand principles of prevention and control of infection. There was less expectation at that time for IPC teams (nurses and doctors) to contribute to design and technical aspects of planning and construction. The HAI Scribe role was designed to be held by an experienced IPCN but did not require the post holder to have or undertake any additional or specific training or education in relation to the healthcare-built environment. It required a working understanding of SHFN 30 and other technical guidance. The knowledge, skill and competence to do the role was core to the role of any qualified IPCN. Janette Rae (formerly Richards) was seconded, then appointed to the role between 2014 and her retiral in 2018. I cannot comment on why other Health Boards did not have a similar role, but this may be related to local arrangements for project specific IPC roles, the absence of any planned major refurbishment or new build projects in other Boards, or because this was not a defined priority delivery area for the Board IPCT at that time. There are advantages and disadvantages of a dedicated post.

10. On my return to NHS Lothian in 2015 my role included leading on all aspects of communicating and implementing national policy and other directives, clinical IPC advice, local policy development, HAI Education strategy, audit and surveillance, risk assessment and incident management, IPC in the healthcare

built environment and IPC workforce development as detailed above. See paragraph 5 in relation to my role relating to aspects of SHTM.

11. On return to NHS Lothian in 2015, I was the professional and subject matter lead with responsibility and accountability for IPC and HAI. Part of my role was to provide professional (subject matter) oversight of the HAI Scribe Lead Nurse. In practice, this was achieved in real time through regular discussion, email, or progress reports in meetings. The post holder reported directly to the Head of Service IPC for line management and appraisal purposes. This was an existing arrangement that was established at the time of Janette Rae's original secondment and prior to me coming into post in June 2015. The IPCT had been without a Lead IPCN for approximately 6 months before this. This reporting arrangement was retained by the Head of Service along with some others (the Band 7 Clinical Scientist, and all administrative posts). It provided the Head of Service with direct oversight and evaluation of the HAI Scribe role but was also intended to provide workload balance and distribution of functional managerial responsibility (such as carrying out appraisals, managing sickness absence, coaching) for myself and the Head of Service. I provided direct line management for four Geographical Lead Band 7 nurses. I had weekly one to one meetings with the Head of Service which provided opportunity to discuss progress, or any concerns relating to performance of any IPC staff. In June 2015, the Project was (to the best of my knowledge) well advanced and had moved into the construction phase (ground works, foundations, infrastructure) I reported directly to the Head of Service Infection Control for all aspects of my own line management (for example, sickness absence, performance and appraisal) and professional support and management as a registered nurse. As the Head of Service did not hold a subject matter qualification in IPC, my role as Lead Nurse was to provide senior subject matter expertise and leadership for the IPCT and Clinical teams, and to provide, through the Head of Service, reports to NHS Lothian Board advising them of performance against mandatory targets, HAI or IPC issues and risks.

12. Any issues or concerns arising from any built environment project were escalated to me as IPC subject matter lead for the IPCT and professional lead

for HAI Scribe Lead Nurse on ad hoc basis as required. The HAI Scribe Lead Nurse was a qualified and experienced IPCN, and I was confident that they were able to advise and support projects independently based on my understanding of the IPCN role and requirements of SHFN 30. This did not include providing detailed technical expertise of hospital design, critical system design or engineering. My expectation of the IPC role was to provide advice or a view on any clinical infection risks associated with the design, or during construction (risks to adjacent areas and working clinical areas). There was regular opportunity for the HAI Scribe Lead Nurse to discuss any emerging issues, questions where IPC opinion was required in the absence of formal guidance, or where any disagreement or difference of opinion was raised. I did not attend project meetings or provide regular commentary or input into the design or construction of the Project. This was the principal purpose and function of the HAI Scribe Nurse post. Input, or advice, or both, in relation to specific issues or concerns was usually provided in conjunction with Dr Donald Inverarity (Lead Infection Control Doctor) (Lead ICD) or input from a Consultant Microbiologist. My direct involvement in relation to the Project in the period June 2015 to December 2018 was therefore to some extent 'at arms length', other than when asked to provide advice or commentary on specific questions (as noted above) or where Janette Rae specifically requested senior support in relation to these. This could take the form of us both contributing to email, discussion, telephone call or short meetings with other individuals in relation to specific questions or topics. I do not believe the practices employed in NHS Lothian at this time were materially different to those of other IPC teams in other Health Boards. This is based on my understanding of the role of the IPC defined in national guidance (SHFN 30) at this time, and the very broad requirements of the Healthcare Improvement Scotland Standards for Healthcare Associated Infection (versions issued in 2008 and 2015). Health Boards were independently assessed against these standards, with reports published and available to Scottish Government and the wider public. Specifically, in relation to the built environment, the standards required evidence of compliance with national directives (for example, the CEL letter referred to in paragraph 9) and provision of a safe environment for care. Delivery against these standards was NHS Lothian's responsibility, and not solely an IPCT responsibility.

13. I received periodic updates from the HAI Scribe Lead Nurse at departmental meetings – mostly verbal, some written. The purpose of these updates was to provide overall progress and reporting by exception any areas of specific concern for IPC. This was primarily an operational update and provided at the monthly IPC Business Meeting which I chaired. We also had a monthly Senior Management Team meeting chaired by the Head of Service for IPC and attended by all Band 7 nurses including the HAI Scribe Lead Nurse and myself. This provided another regular forum for any exceptions to be reported or discussed in real time. I would discuss or provide advice on areas of infection control (subject matter) specifically. The Head of Service would be made aware of any areas of contention, or dispute, or both, which may require further discussion, or senior management input, or both, and for oversight (in line with their responsibility for overall management of process and risk assessment). As the Head of Service retained line management and one to one oversight of the HAI Scribe Lead Nurse for most of the period between June 2015 (when I returned to Lothian) and December 2018 on the retirement of HAI Scribe Lead, there was also opportunity for the HAI Scribe Lead Nurse to raise any specific points for discussion. As a small team we had a close working relationship, with regular (daily, weekly) and open discussion and communication. The work and workload of the HAI Scribe Nurse in all building projects including RHCYP/ DCN was primarily directed by the stage of the Project, the frequency and type of input the project teams were requesting, or the actions set out in the HAI Scribe documents (stages 1-4). For example, during development of 1:200; 1:100 or 1:50 plans there may be more frequent meetings until a final design is agreed by all parties. Stage 4 Scribe requires room review (on site). The HAI Scribe advisor also retained some clinical IPC remit supporting Marie Curie Hospices under service level agreement to maintain their wider clinical skills and support registered nurse revalidation.

14. On the retirement of Janette Rae, the HAI Scribe Lead Adviser post (previously titled HAI Scribe Lead Nurse) was advertised July 2018. The post and job description remained unchanged, but the job title was amended to reduce confusion about the difference in Lead IPC Nurse (my post), Geographical Lead

IPC Nurses and the HAI Scribe Lead Nurse post, and route for communication and escalation. The post had to be re-advertised due to lack of interest, or suitable candidates, or both. I led the interview panel in 2018 and appointed an internal applicant, Sarah Jane Sutherland, as replacement to this post. Sarah Jane took up post in December 2018. It was agreed that professional oversight and line management responsibility for the role would both sit under my direct supervision. This change in line management was discussed and agreed with the Head of Service in recognition of the increasing complexity and potential IPC issues being recognised in other building projects across Scotland, delays and queries relating to the RHCYP Project, and acknowledging that Sarah Jane would require more active subject matter support and development in a newly promoted post. It also took account of impending periods of planned sickness absence for the Head of Service. This aligned to my responsibilities as Lead Nurse for IPC rather than a purely line management or oversight role. This positively reflected the changing and emerging focus for IPC and the Built Environment. Similar to many IPCNs in Lothian and across Scotland, Sarah Jane had extensive experience of supporting day to day reactive building work and small and medium scale refurbishment projects using HAI Scribe as part of her IPC role but did not have any experience of major capital or construction projects. Construction projects are often a ‘never’ or ‘once in a career’ experiences for the majority of IPCNs. Sarah Jane had had not received any formal training on construction projects, critical systems, or engineering. To the best of my knowledge, no such education or training existed for IPC nurses or doctors at that time (as further explained in paragraph 5).

15. The HAI Scribe Nurse post was created as a secondment in 2014 initially to support the RHCYP Project. The one Whole Time Equivalent (WTE) post holder, Janette Rae, then concurrently was asked to support another new hospital construction project (East Lothian Community hospital) and a range of other capital improvement projects on hospital and community sites across the whole NHS Lothian Board area (East, Mid, West Lothian, and Edinburgh City). The workload demand with each project was dynamic and, at times, overlapping or conflicting deadlines for review of documents, meeting attendance or other project related activities would have occurred. Prioritisation

of IPC support would be made to the area of greatest need. There was no formal review of IPC capacity or capital planning workload demand between 2015 and 2018 but we were increasingly aware that the number of larger projects, or capital projects, or both, and volume of work was not sustainable for a single post holder. I did discuss this with the Head of Service as part of a one to one meeting, and there was already a process in place for Geographical Lead IPCNs to cover all HAI scribes for small and medium scale refurbishment work within their area of work.

16. My involvement in the Project increased significantly from December 2018 until migration of all services to the new hospital in 2021. This involvement was in part due to phased retirement of Janette Rae (IPCN) in the latter part of 2018, the delay in securing a successor to this post, ongoing discussions about commissioning, handover and HAI Scribe requirements for the RHCYP/DCN, emerging information and consideration of potential risks associated with built environment design and function, and to support Sarah Jane Sutherland (as a newly promoted, newly appointed role). The leadership and senior decision-making component of my role was also increasingly important over this period in light of the scrutiny being placed on the Queen Elizabeth University Hospital (QEUH) building Project, and emerging information about water, ventilation, and design issues.

17. Over this period, I was a core participant in discussion which:

    a) a sought commissioning and other data to inform the completion of the HAI Scribe stage 4
    b) b. was in response to the evolving situation at the QEUH and potential issues and risks associated with the hospital environment
    c) c. was in response to significant clinical incidents in NHS Lothian (Pseudomonas outbreak at the DCN, Western General Hospital and Cardiothoracic Mould infections at the Royal Infirmary of Edinburgh (RIE)) which Dr Donald Inverarity and myself were concurrently providing senior and expert IPC support and

leadership, and our own emerging understanding of infection risks in the healthcare built environment.

18. I was asked by Professor Alex McMahon (HAI Executive Lead) via Fiona Cameron (Head of Service IPC), my line manager, to prioritise and provide full time support to the Project from mid June 2019. I did not receive any 'back fill' into my post and provided support concurrently with my existing Lead Nurse duties, and later both the Lead Nurse and Acting Head of Service roles. In conjunction with Dr Donald Inverarity (Lead ICD), I provided day to day review, risk assessment and subject matter advice to NHS Lothian senior management in response to the emerging information provided by the Project team, external companies, Health Protection Scotland, and Health Facilities Scotland.

General Infection Prevention and Control Involvement in RHCYP/DCN Project

19. As detailed above, until 2019 I had an indirect role only in the Project through professional oversight of the HAI Scribe Lead Nurse. I was consulted on a reactive and ad hoc basis in relation to specific questions or problems highlighted by exception.

20. The IPCT were principally represented on the Project by the HAI Scribe Lead Advisor Janette Rae who was appointed into a seconded role for all capital works in February 2014. She was a qualified and experienced IPCN. Janette also held dual registration as a registered general nurse (adults) and registered sick children's nurse.

21. IPC specialists are expected to be core members of a project team in any major refurbishment or construction project. The roles and responsibilities for all stakeholders including IPCT are set out in SHFN 30 Part A and Part B (Health Facilities Scotland: 2014). It is important to note that responsibilities for aspects of infection prevention and control apply to all members of the Project team and is not the sole domain of the IPCT as subject matter experts. The IPCT is required to be involved at all stages of the Project from design and planning, through construction and commissioning and handover.

22. A named IPCN, Janette Rae, was available to the RHCYP/DCN Project team from February 2014 as the principal contact. She attended some design and Project meetings and latterly the construction from 2015 until her retiral in 2018. Prior to this, I am aware that Jean Harper and Carol Horsburgh were consulted and had some input into the very early stages of the Project. These IPCNs had specific clinical remit for the existing RHSC as part of their clinical 'patch' at some point between 2010 and 2014. Prior to the creation of a dedicated role for Janette Richards in 2014, this was the normal process for teams seeking IPCN involvement in any HAI Scribe work including capital projects.

23. As I was not part of the Project Team, I was not aware that there was an overarching Programme Board for this Project and, to the best of my knowledge, there was no IPC representation at any other senior management group or committee where this Project was considered or reviewed other than the workstreams which reported into the Project team. Although the Pan Lothian Infection Control Committee included oversight of building plans and project updates over this period, these related more to non-capital projects, and were assigned to Estates representatives to provide an update rather than Capital Planning or Project team leads.

24. The HAI Scribe Lead Nurse was not a core member of the Pan Lothian Infection Control Committee and was not required to submit any papers. I have no recall of the Project ever being discussed at this committee up until April 2019, and no reference is made in minutes to this.

25. I had a formal role in providing IPCN oversight for this Project from October 2018 onwards during Janette Rae's phased retiral (for example site review with Dr Olson, Consultant Microbiologist and Dr Donald Inverarity to review the Heater Battery arrangements in Critical Care in December 2018) and after Sarah Jane Sutherland took up the post in December 2018. Although Sarah was an experienced IPCN who had used HAI Scribe for estates work and refurbishment projects, she had no experience of capital or construction projects, and this was her first promoted post. Therefore, although she

provided day to day input from January 2019 onwards her level of autonomy in the role was very limited.

26. I also provided subject matter advice to Fiona Cameron, the Head of Service IPC in relation to issues and risks from the Project (for example, following the flooding incident in early 2018). I discussed and escalated requests to the Head of Service where water and ventilation commissioning information had not been met, referenced in (**A47086952 – 20190412 PLICC Minutes – dated 12 April 2019 – Bundle 13 – Vol 7 – Page 20)** and requested that she seek clarity on whether emerging or known issues in the QEUH Project were replicated in RHCYP (for example chilled beams). This provided her with a level of assurance and oversight of IPC activity, and informed discussion or escalation to the HAI Executive lead or others.

27. In relation to informal role, roles, or regularity of informal communication, or discussions, or both, from my perspective this can split into two periods during my time as Lead Nurse: 1) June 2015 to December 2018 and 2) October and November 2018 onwards.

28. For the first period, I attended regular meetings with the HAI Scribe Lead Nurse including our monthly IPC business (whole team) meeting which I chaired, and the monthly IPC senior management team meetings chaired by Fiona Cameron (Head of Service IPC). The purpose of the business meeting was, and is, to review the IPC team's actions and progress against the agreed IPC workplan including active capital projects supported by the IPCT and HAI Scribe Lead Nurse, to provide feedback from other internal and external meetings, and to share information and support learning from issues or incidents. It is attended by the IPC nurses, surveillance staff, administrative staff and, when capacity allows, the Lead ICD. The Head of Service did not attend the business meeting given the operational focus of the meeting. The Senior Management Team meeting was only attended by senior members of the IPC team who held line management responsibility. It was chaired by the Head of Service IPC. The focus of this meeting was on staffing, finance, workforce development, and any other more service/strategically focused discussion or actions. These meetings were both regularly attended by the HAI Scribe Lead Nurse, we were

intermittently provided with a very brief update on the progress of various capital projects, or less frequently, any emerging issues by the HAI Scribe Lead Nurse. These meetings were not designed or intended to serve a formal governance role for the RHCYP or other capital planning projects, as IPC consideration was only one part of the overall Project and the IPCT did not have project or programme management responsibility for this. It was my expectation that formal reporting on progress or risks, including any IPC issues or risks, associated with the RHCYP would have been provided by the Project Director or Project Manager through the wider Capital Planning structure. This is in line with my understanding of the roles and responsibilities set out in sections 2.6 and 2.7 of SHFN 30 Part B.

29. Any informal discussion/support and advice to the HAI Scribe Lead Nurse as required – frequency varied – daily, weekly, monthly. There would be periodic email communication seeking advice or input on specific issues – for example CT room air changes, ventilation design arrangements, flooding. Specific advice was frequently provided by Dr Donald Inverarity as Lead ICD as part of wider discussions. I was copied into email communications between HAI Scribe lead nurse and Project team for awareness and oversight on an ad hoc basis.

30. The second period from October/ November 2018, Janette Rae was moving into her phased retirement and had begun a process of hand over of all live projects. In October 2018 she advised the RHCYP Project team to copy me into all correspondence regarding heater batteries noting she was retiring. We had not appointed a successor to her post at this stage.

31. The senior IPCT received a written handover from Janette Rae on 5 November 2018 as part of preparation for her retirement (**A47086947 – Region update – dated 22 October 2018 – Bundle 13 – Vol 7 – Page 29)**. Although this provided limited detail it notes commissioning for the Project was delayed from the intended date of October 2018, noting that a move in date likely to be ‘late spring’ and that room reviews had recommenced. The room reviews formed part of the HAI Scribe Stage 4 process.

32. For all escalated issues – HAI Scribe completion, handover, water and ventilation commissioning, correspondence with Dr Donald Inverarity, Project team, I became point of contact/lead for the IPCT. Both Sarah Sutherland and I were included in discussion/communication – Sarah undertook some independent activity (room reviews, meeting attendance, correspondence) but escalation/dialogue with Head of Service/Executive Team and others was via myself and Dr Donald Inverarity.

33. There was a significant increase in dialogue between the IPCT and the Project team from late 2018 onwards. The IPCT had been advised in early November 2018 via a Board wide 'everyone' email that Project handover had been pushed out from the revised date of October 2018 to allow 'independent assessor' work to be completed with anticipated hand over in 'late spring'. The IPCT did not request or schedule any HAI Stage 4 Scribe meetings at this stage, as further information was required from the Independent Assessor (any work completed or information received after completion of a HAI Scribe review may invalidate the findings of that review) and because a final hand over and completion date was not known or confirmed at that time.

34. The frequency and intensity of the email discussions between the IPCT, members of the Project Team and other senior managers also increased relative to commissioning of water and ventilation systems, room reviews and planning for the HAI Scribe stage 4. This coincided with wider discussions about emerging information from QEUH incident and concurrent incidents in NHS Lothian from early 2019 onwards relating to water quality and patient infections (*Pseudomonas aeruginosa* infections in DCN patients at Western General Hospital and Cardiothoracic mould infections at the Royal Infirmary of Edinburgh). Information about the emerging issues in QEUH were shared in confidence directly between the Infection Control Managers Fiona Cameron from NHSL and Tom Walsh from NHS Greater Glasgow and Clyde (for example, SBAR report (summarising the situation, background, assessment and recommendations) which was shared with me on 14 December 2018 following discussion on this point at the IPCT senior management meeting).

None of the documents or information shared divulged patient specific or patient identifiable information. There was ongoing discussion in the Scottish Parliament prompting Lothian Health Protection Team to contact Dr Donald Inverarity by email on 15 February 2019 (and shared with me) in relation to a query from the parliamentary inquiry on Health Hazards in the Healthcare Environment. The NHS Lothian Director of Facilities had also prepared an internal briefing paper in February 2019 in relation to building management, risk and assurance citing ongoing dialogue with Scottish Government in relation to both water and ventilation. In early 2019 there was direct correspondence and discussion between representatives of HPS (now ARHAI) – Annette Rankin (Nurse Consultant), Ian Storrar, (Principle Engineer) - and myself and Dr Donald Inverarity in early 2019 in relation to both water quality and water safety as part of the DCN *Pseudomonas aeruginosa* Incident Management Team, and ventilation in relation to the Cardiothoracic mould infection issue at RIE.

35. In both of the NHS Lothian incidents noted above, the potential role of both water and ventilation systems was either known or being actively investigated. Through our roles as Lead Infection Control Nurse and Doctor, and our ongoing dialogue with the Project team about commissioning and Project completion, Dr Donald Inverarity and I were very keen to ensure that that we had confidence about the water quality in the new DCN building given the issues we had with the water system in the old DCN building at Western General Hospital.

36. I have been asked by the Inquiry to provide brief details of forums available through which I or, separately, IPC may raise patient safety concerns around the RHCYP/DCN Project and individuals or groups outside of IPC that I liaised with, or reported to, as part of the RHCYP/DCN Project. As Lead Nurse for Infection Prevention and Control, there were a limited number of forums open to me and wider IPC colleagues to raise or discuss patient safety concerns around the RHCYP/DCN Project. Infection Control risks would usually be discussed with wider stakeholders through site infection control committees or the Pan Lothian Infection Control Committee. Capital projects including the RCHYP Project were not a regular agenda item at these meetings. The IPCT were not members of the Project Programme Board and did not attend Capital

Planning or Finance meetings. The nature of any concern, the risk associated with it, the phase of the Project and the expected action or outcome would usually determine where, by, and with whom concerns were raised. Escalation of concern by the IPCT would usually be to the Project team directly, or by email to senior managers/responsible Directors.

37. During the planning and construction phase, infection control and patient safety risks associated with the Project related primarily to either the design, compliance with published guidance or the potential impact of construction on adjacent clinical areas at RIE. I was not employed in NHS Lothian between 2010 and 2015 so can offer limited commentary on the processes followed at that time. It would be my expectation that any design detail with potential to impact on any aspect of patient safety was discussed and managed by the Project team. This is in line with the roles and responsibilities of section 2.6 of SHFN 30 Part B which was extant guidance at this time. Outside of the regular Project meetings including the design and commissioning workstreams, I am not aware of any regular committee or other forum within NHS Lothian where the IPCT specifically had opportunity to raise concerns about the design or construction of the RHCYP/DCN. I am aware that questions or advice on developing a compliant and safe design were shared directly between the IPCT (Janette Rae) and the Project team, for example in September 2016 in relation to ventilation air change rates in CT scanning. Health Facilities Scotland principal architect and engineering leads were also contacted for expert advice and input. It was my expectation that the Project team would seek a solution to address any potential patient safety issues flagged in this way rather than requiring wider escalation. From an IPCT perspective, this is the type of issue that was highlighted for awareness via email to myself, Dr Donald Inverarity or the Head of Service and/or discussed at IPC business or senior management meetings.

38. Towards the end of the Project (2018-2021) there was discussion at the Pan Lothian Infection Control Committee (PLICC) in April 2019 in relation to the handover of the Project and completion of Stage 4 HAI Scribes. Prior to this date, I can find no evidence of discussion or formal reports submitted to PLICC

in relation to this or other capital projects. The terms of reference for PLICC at this time referred to oversight of 'building/estates development plans' but responsibility for reporting against this item was assigned to the Facilities team rather than the Capital Planning or project teams. The HAI Scribe Lead Nurse was a not core member of PLICC and did not attend this meeting. The Director of Facilities or the deputy was usually in attendance. Capital projects/project teams were not directly represented at this meeting. Individuals or groups outside of the IPCT that I communicated directly with in relation to the Project include:

- Informally – IPC colleagues in NHS Greater Glasgow & Clyde in late 2018 to 2019
- Executive Management Team (HAI Executive lead, Executive Medical Director, Chief Executive/Deputy Chief Executive, Director of Facilities, Programme Director) – on a daily, weekly basis from Spring 2019 onwards
- HPS (latterly ARHAI) – for wider water/ventilation queries from late 2018, for RHCYP Project specifically, from June 2019 onwards
- HFS - for wider water/ventilation queries from late 2018, for RHCYP Project specifically, from June 2019 onwards
- Mary Morgan/other members of the Oversight Board – through the RHCYP Incident Management Team (IMT) /Lothian Executive Steering Group from July 2019 onwards
- IHSL – through regular, weekly meetings from July 2019 onwards
- Multiplex – through regular weekly meetings from July 2019 onwards
- TUV SUD – through meetings held from July 2019 onwards
- Mott MacDonald – through regular, weekly meetings from July 2019 onwards
- Bouygues – through regular weekly meetings from July 2019 onwards
- Westfield Caledonian – in response to specific water testing requests or reports from 2019 onwards
- Institute of Occupational Medicine (IOM) – through the commissioning phase late spring 2019 onwards

- Authorising Engineers (Water, Ventilation) – from late spring 2019 onwards
- Clinical teams/ Clinical Management Team RHCYP – from early 2019 onwards

39. From June 2019 onwards, the principal forum for Dr Donald Inverarity or myself to escalate any issues or concerns was via the NHS Lothian RHCYP Incident Management Team (IMT) meeting, which subsequently became the Executive Steering Group of which I was a core member.

40. In the period between at least March 2018 and July 2019, the NHS Lothian IPCT were aware of emerging concerns in relation to the QEUH RHC Project in NHS Greater Glasgow and Clyde and were seeking to actively understand, in more detail and in real time, any potential issues and types of issues that had been identified with the building design (specifically water and ventilation systems) and how this was translating into patient risk. We were also looking to take any relevant learning about water and ventilation systems to inform our management of the *Pseudomonas aeruginosa* incident in DCN at the WGH in early 2019, and the Cardiothoracic mould incident at RIE from March 2019. Information and learning from Glasgow was not being proactively shared with us as an IPCT by HPS or HFS at that time. Annette Rankin (Nurse Consultant HPS) and Ian Storrar (Principal Engineer HFS) attended or were consulted as part of the WGH and RIE Incident Management Team (IMT).

41. I was aware from discussions Dr Donald Inverarity had had with colleagues in NHS Greater Glasgow & Clyde as far back as 2016 that there had been potential concerns regarding ventilation room design or performance in the QEUH building which had been, as I understand it, raised in discussion at professional microbiology meetings. I understood that those discussions were with Dr Teresa Inkster (Consultant Microbiologist) and Dr Christine Peters (Consultant Microbiologist).

42. There was mainstream media coverage of some of these emerging issues which we were aware of from at least March 2018 (**A47086949– Water**

Concerns BBC News – dated 20 March 2018 – Bundle 13 – Vol 7 – Page 34). We were seeking information in the context of professional and peer to peer discussion between members of the Microbiology and IPCTs in NHS GGC and NHS Lothian. We were reliant on this as a means of gaining real time insight and understanding of the issues. No information, guidance or alerts were issued to NHS Lothian by HPS or HFS in this period. Although the RHCYP Project was not at the point of completion or handover, NHS Lothian, and specifically the IPCT were being asked to actively respond to questions about IPC risk and this Project by March 2018. We had received a Freedom of Information request on 22 March 2018 seeking information relating to the RHYCP Project and infection control documents, reports and correspondence with Health Facilities Scotland with regards ventilation and air change rates. In or around late November or early December 2018, the Head of Service IPC received from Mr Tom Walsh who was Infection Control Manager GGC at the time, in confidence a copy of the SBAR dated 13 November 2018 prepared by GGC in relation to a range of infections considered linked to the water at QEUH. The senior IPC nursing team discussed the issues relating to water safety being raised in the media, the progress with the RHCYP Project and potential implications of the ongoing infections at QEUH at our IPC Senior Management Team meeting on 18 December 2018. With the agreement of Mr Walsh, and on the proviso that I did not subsequently share this document, I was provided with a copy of that SBAR in confidence by the Head of Service's personal assistant Morven Jamieson.

43. I was also aware through peer-to-peer discussions and occasional telephone calls with Pamela Joannidis (NHS GGC Nurse Consultant for IPC) of the types of investigation explored by GGC in relation to these infections, and specifically in relation to both water exposure and ventilation systems over the course of 2018 but I am unable to provide precise dates and times for these discussions.

44. In early January 2019 NHS Lothian was being asked to respond to potential concerns raised by our Infection Control Committee public partner regarding pigeon access to ventilation plant rooms and potential infection risks which were also being covered in national media (the BBC) at this time. I was made

aware indirectly in conversation with the Director of Facilities that these, and other issues were being formally discussed at a meeting chaired by Paul Gray (Chief Executive NHS Scotland) on or around 22 January 2019. I cannot recall or find records of any formal communication with HPS (now ARHAI) or HFS in relation to Cryptococcus or managing the risk of pigeons in healthcare premises until a guidance document was eventually issued by HPS (now ARHAI) later in March 2019.

45. After issues relating to the design, installation and performance of critical ventilation systems at RYCHP DCN were identified in early July 2019, I can see from my handwritten notes at the time that NHS Lothian were still seeking information in real time from NHS GGC in relation to the issues at QEUH. On 1 July 2019, I noted an action for myself to contact Pamela Joannidis to confirm the air change rate in their critical care area and to understand what was being retrofitted to critical ventilation systems in QEUH, and where. These notes are contained in (**A47085953 – Q119 20190701 LG Handwritten Notes – dated 01 July 2019 – Bundle 13 – Vol 7 – Page 35).**

46. On 2 July 2019, Dr Donald Inverarity was authorised by Dr Teresa Inkster to share SBAR reports circulated in NHS GGC in 2016 and 2018 in relation to ventilation design and suitability for isolation rooms and containment of airborne infection with myself and Dr Pota Kalima (Consultant Microbiologist and ICD for RHCYP). We considered this useful intelligence in informing our risk assessment of the information provided in the IOM ventilation commissioning reports. This information was not available to us via HPS or HFS.

47. From these peer-to-peer conversations we learned in more detail issues relating to heater battery design, isolation room design (relevant to the Project), issues relating to the use of point of use filters as a local control measure (this was relevant to the DCN *Pseudomonas aeruginosa* outbreak). This approach of Board peer to peer discussion and sharing of knowledge is a normal part of how IPCT work across NHS Scotland on an ongoing basis.

General Infection Prevention and Control (IPC) involvement during commissioning and construction phases of the Project

48. I have been asked to provide an overview of IPC's involvement, and my role, in ventilation design, construction and commissioning in the following clinical areas with reference to the time period:

Critical Care:

- 2009 to Feb 2014 – IPC involvement in capital projects during the design phase was expected as part of the HAI Scribe stage 1 and stage 2 processes (initial brief and proposed site for development; design and planning which was mandated by CEL 18 (2007)). This would have been provided by Jean Harper and Carol Horsburgh (Infection Control Nurses in NHS Lothian) in the very early stages of project scoping and project design. Their role was to advise the Project team on principles of infection prevention and control and contribute to risk assessment and advice for susceptible patient groups. This is in line with section 2.9 of SHFN 30 Part B. I am confident that the advice anyone from the IPCT provided at this time would have reflected extant guidance (SHTM 2025) prior to the publication of SHTM 03-01. SHTM 2025 provided limited guidance for ventilation parameters outside of those expected in operating theatres. I cannot comment further on the development of plans or an environmental matrix during this period. I was not employed in NHS Lothian between September 2010 and June 2015. In 2014, Janette Rae was appointed as the IPC contact for the Project from February 2014 (see response and paragraph 20).
- June 2015 to Nov 2018 – I had a minimal active role in advising the Project and provided ad hoc advice to specific queries raised by Janette Rae or the Head of Service IPC only. During this period, I was included in a question about air change rates in CT scanning, and air sampling as part of commissioning. Please see responses in paragraphs 19 to 35.
- During the period February 2014 to Oct 2018, Janette Richards (later Rae) was available to the Project Team as the principal IPC contact and

the HAI Scribe lead nurse. The IPC role was advisory to the Project through the HAI Scribe Lead Nurse. With reference to design - email correspondence that I was either copied into at the time, or aware of through discussion with Fiona Cameron (the Head of Service IPC), Dr Donald Inverarity or Janette Rae shows that the HAI Scribe Lead Nurse directed the Project team to SHTM/HTM 03-01 guidance on more than one occasion, and to HFS (Ian Storrar Principal Engineer, Susan Grant Principal Architect) for technical advice on design or performance in relation to CT air changes (more detail below)

- I was copied to an email from Janette Richards (later Rae) (HAI Scribe Lead Nurse) on 23rd Jan 2017 (**A47086954 – Email Other matters - dated 19 March 2018 – Bundle 13 – Vol 7 – Page 37**). Ronnie Henderson on behalf of the Project team sought guidance on ventilation parameters required for 4 bed rooms – although this does not explicitly reference which part of the hospital this related to. I cannot recall being approached with any specific question about ventilation design other than CT scanning rooms between 2017 and June 2019.
- I was made aware of dialogue between Dr Donald Inverarity, Janette Rae and the Project team in August 2018 requesting independent validation and verification of the theatres and isolation room ventilation. This request was in line with the requirements of STHM 03-01 but also provided for the Project team, with the context by this time of known and emerging issues from the QEUH relating to both design and performance of these critical ventilation systems and the importance of seeking evidence and assurance that the RHCYP/ DCN building was not affected by similar issues given shared design and construction contractors. The reference to the QEUH was important in reinforcing the seriousness and potential implications of not having this information in terms of corporate liability but more importantly in informing and mitigating any clinical infection risk for patients who would be cared for in the new building.

Haematology/Oncology (“the Lochranza Ward”):

- June 2015 to June 2019– I had no active or formal involvement in the ventilation design or construction phase. I can find no record of being asked to comment or note any derogation or risk assessment specific to air change rate or pressure cascades other than the provision of multiple isolation rooms from a single air handling unit (AHU) in August 2016.

General single rooms:

- Pre 2019 – I had no formal involvement as noted above. From late June 2019/early July 2019 I was actively involved in the review of ventilation system commissioning, validation and risk assessment for all clinical and non-clinical areas in RHYCP/ DCN.

General Multi-bedded rooms

- Pre 2019 – I had no formal involvement. From late June 2019 my involvement was as noted in the point above.

From mid-June 2019:

- I attended a meeting on 19 June 2019 with senior members of the Project team (Janice Mackenzie, Brian Currie) and the RHCYP senior management team (Dr Edward Doyle, Fiona Mitchell) at the request of the deputy Chief Executive to discuss issues ahead of the planned move. Ventilation commissioning reports were not available at that time
- From on or around 28 June 2019, along with Dr Donald Inverarity I attended twice daily meetings with the senior Project team and executive team to review emerging information from independent commissioning of critical ventilation systems undertaken by IOM.
- In early July 2019 I was provided with copies of ventilation commissioning data from external contractors for review and comment – in conjunction with Dr Donald Inverarity, this was discussed at the twice daily meetings noted above.
- These meetings were also variously attended by representatives from Multiplex (Darren Pike, Colin Grindlay), Bouygues (Richard Hair),

Wallace Weir, Craig Simpson (HCP) as well as IOM, NHS Lothian Executive Nursing and Medical Directors, Estates Director, senior Project team and RHCYP senior management team.

- By 1 July 2019 it was apparent there were some significant issues emerging from the IOM review in relation to theatre ventilation performance and critical care ventilation capability and performance.
- By 11 July 2019, NHS Lothian was advised in a letter from Jim Miller, Director Procurement Commissioning and Facilities at NSS (HPS/HFS) of the scope of their intended technical review that had been commissioned by Scottish Government. This included review of ventilation systems.
- From July 2019 onwards, I attended regular meetings with the RHCYP Project team, architects, authorising engineers, technical designers and members of NHS Lothian Executive Team to discuss, agree and confirm actions and solutions for the areas of non-conformance identified by the independent commissioning reports. Representatives from HPS (Annette Rankin) and HFS (Ian Storrar) were invited to attend and comment on the emerging information and proposed actions. There were a variety of meetings in relation to both critical and non-critical ventilation systems with specific objectives at that time. The membership of each meeting reflected the purpose of the group.

  In relation to the ventilation design solution for critical care and aspects of ventilation system improvement, rebalancing and recommissioning in theatres and other critical systems.

HAI-Scribe Process

49. The HAI-SCRIBE is a mandatory process to be followed for all work including planned and reactive maintenance, refurbishment, medium and large-scale projects and full construction. This requirement was issued through Health Department Letters (HDL) by Scottish Government to NHS Boards in 2015 and reiterated in 2019.

50. The HAI Scribe process covers the whole life of the Project. There are 4 stages with specific documentation to be completed by the Project team for each:

    Stage 1: Initial brief and Proposed site for development
    Stage 2: Design and planning stage
    Stage 3: Construction and refurbishment
    Stage 4: Pre-handover check

51. Scottish Health Facilities Note 30 Part B section 2.9 defines the main responsibilities of Infection Prevention and Control specialists to be:
    - advising the Project Team on the principles of infection prevention and control of infection as applied to the built environment
    - contributing to risk assessment and providing advice on infection risk to susceptible patients
    - contributing to advice and guidance on control measures to be implemented
    - advising Project Manager/Estates Manager as to the need to stop work where infection prevention and control measures have not been adequately implemented or have failed
    - providing education on infection prevention and control measures to relevant staff involved in the Project where required
    - determining with the Project Team and Health & Safety representatives a suitable and sufficient dust monitoring methodology for each project
    - assisting in the review of all HAI-SCRIBE assessments within agreed timescale.

52. The IPCT would expect to be invited as part of the Project team to review the completed build project as part of the Pre-Handover check (commonly referred to as the Stage 4 Scribe). This involves an on-site review of the physical environment and confirms that key requirements set out by Scottish Health Facilities Note 30 Part A for the fit, finish and function of the building has been achieved. This assessment also encompasses some comment on compliance

with relevant technical and design guidance (for example, SHTM 04-01 Water safety for healthcare premises, SHTM 03-01 Ventilation for Healthcare Premises, SHTM 64 SHTM Building Component Series Sanitary Assemblies) and the suitability of the design/materials to comply with cleaning and wider requirements of national infection control policy. It also requires those completing the document to have both knowledge and sight of other project information such as commissioning data.

53. Our role as infection prevention and control nurses, or infection control doctors is to comment on any clinical infection or wider IPC risk associated with the design or fit out or finish of the building, and how we understand the space will be used by clinical staff, and the risk profile of the patient population. It may also include contributing to a risk assessment where derogation from guidance is required or desired to ensure any hazards or risks associated with these are recognised and that adequate mitigation is put in place. It also helps the Board understand the level of any residual risk associated with the derogation and whether this is acceptable to them.

54. The IPCT are a stakeholder in the HAI Scribe process. The ‘ownership’ and coordination of the process for commissioning and handover including completion of the HAI Scribe is the responsibility of the Project team as defined by sections 2.4-2.7 of SHFN 30 Part B: HAI-SCRIBE Implementation strategy and assessment process. I cannot confirm who, if anyone, within the Project team was formally assigned as the HAI Scribe Project manager. The practical arrangements for HAI Scribe review were usually confirmed by Janice Mackenzie, Ronnie Henderson, Dorothy Hanley, or Ashley Hull. There is a common (and persisting) misconception which the IPCT have encountered before, during and since the RHCYP Project that HAI Scribe is an ‘infection control’ process and that we lead the process and are responsible for ‘signing off’ work. The successful completion of the Project and assurance that all infection risks have been identified and adequately mitigated for requires all relevant stakeholders to confirm they are content, for example, confirmation from the Authorising Engineer (Ventilation).

55. It is my experience that, in reality, the attendance at these Stage 4 HAI Scribe and review meetings is frequently limited to members of the Project team and IPCT only. This is not appropriate as the IPCT cannot represent all stakeholder views. For example, the HAI Stage 4 question set includes questions about ease of domestic cleaning and suitability for clinical care and service provision. These points need to be confirmed by domestic services and clinical teams responsible for the delivery of domestic cleaning and clinical care. SHFN 30 Part B: Questions 4.25 -4.42 relate to engineering services (water, ventilation, lighting, vacuum units) and seek to confirm compliance of design, operation and access for technical maintenance. The IPCT are not qualified in aspects of healthcare engineering design or maintenance. Therefore, confirmation and assurance should be provided by the relevant Duty Holder (Authorised Person, Authorised Engineer etc).

56. It was (and remains) normal practice for members of the IPCT to annotate a copy of the Stage 4 document during physical review to reflect any comments, snagging or additional actions required from an IPC perspective which we then retain. A copy of our notes are then shared by email with the Project team while they collate any and all comments and contributions from other stakeholders.

57. The Stage 4 HAI Scribe reviews that I participated in (May 2019) were annotated by me to reflect the fact that we were not provided with evidence or confirmation to satisfy the questions regarding engineering services design or performance compliance. The document template used in NHS Lothian at that time was a Word based version of SHFN 30 (Part C) 2014 HAI Scribe question sets and checklists – P38-42 Pre-Handover check, ongoing maintenance and feedback Stage 4 which is only provided to NHS Boards as a PDF document.

58. A final copy of the Project document which is signed by all relevant stakeholders confirming they are content with the physical review and information provided should be retained by the Project team. This may be provided by means of an electronic rather than physical signature.

Ventilation

59. The concerns expressed prior to 2019 re ventilation that I was aware of mainly relate to design and functionality of ventilation systems and applied mostly during the design and construction phase. Most of these discussions centred on compliance with technical guidance rather than being framed as patient safety concerns specifically – these were implied as being associated with a non-compliant design. Some of the concerns raised I was aware of but not directly involved in at the time the concern was raised, and some I became more aware of in late 2018 as part of Janette Rae's handover.

60. In August 2016, Janette Rae had included me in correspondence relating to Air Handling Units (AHU) provision for isolation rooms as the design proposal included serving multiple rooms in paediatric oncology (latterly Lochranza) (**A41263185 – Email DI LG JR Lochranza ventilation for comments – dated 22 August 2016 – Bundle 13 – Vol 7 – Page 38)**. The consensus view of the IPCT was that more resilience for planned and unplanned shutdown of ventilation was required, specifically for oncology. A SBAR summarising the IPCT position was developed by Janette Rae and shared in September 2016 (**A41295528 –2016 08 22 Ventilation – dated 22 August 2016 – Bundle 13 – Vol 7 – Page 40)**. The risk associated with this issue would be the loss of protection for very vulnerable children and young people if the ventilation to one or more isolation rooms was shut down for any period of time. These issues were raised with the Project team and shared with the IPC Head of Service, Dr Kalima site ICD, Dr Donald Inverarity as Lead ICD and myself as Lead IPCN. I am not aware where this was discussed outside of the Project meeting, and I cannot comment on how the issue was resolved or where the governance arrangements surrounding this decision to accept this arrangement or not. The SBAR prepared by Janette Rae dated 14 September 2016 **(A34443762 – NHS Lothian SBAR Ventilation – dated 14 September 2016 – Bundle 13 – Vol 7 – Page 41)** noted that:

"Multiplex (previously Brookfield Multiplex) have agreed that they will provide a re-route facility that if one air handling unit e.g. in Haematology/Oncology fails

it will be backed up by an air handling unit that supplies only one room in another part of the facility, until the faulty air handling unit is repaired or until maintenance has been carried out".

On that basis, my assumption would be that this solution had been engineered as described at the time. It appears there was a meeting on 3 November 2016 with IHSL, MPX, Motts and the AE for NHSL, John Reiner, at which Janette Richards (later Rae) was present where the isolation suite ventilation design philosophy and strategy appears to be discussed (**A47086951 – IHS Lothian Meeting RHSC DCN Isolation Rooms – dated 03 November 2016 – Bundle 13 – Vol 7 – Page 43)**. I do not recall Janette discussing that meeting with me. The IPCT were not members of the Project Programme Board. We provided an advisory service into the Project, our role was not to approve or endorse any wider project decisions in line with section 2.9 of SHPN 30 Part B. The IOM commissioning reports dated 2 to 9 July 2019 confirmed the presence of several isolation rooms with shared air handling units which was contrary to HBN 04-01 supplement 1 para 2.37. This suggests to me that either the required re-route solution was not enacted, or a decision was made not to pursue this option.

61. In Autumn 2016, there was a separate dialogue relating to the design of the ventilation in CT scanning, which included external stakeholder advice from HFS (Ian Storrar – Principal Engineer). The IPCT consensus was in line with the advice provided by HFS to provide 15 ac/hr. The patient risk associated with sub optimal ventilation in this context would be post procedure infections. The infection risk would be associated with patients undergoing complex surgeries which expose brain, bone and other tissue to room air which may have a higher concentration of microbiological contaminants during intraoperative CT scanning or CT assisted procedures i.e., in a room which did not offer optimal air quality. This risk is different to the risk to patients receiving a diagnostic CT scan in the absence of an invasive or surgical procedure. A higher room air change rate is associated with a higher rate of dilution and extraction of any potential microbial contamination (bacteria, mould) in that room air. A positive pressure differential of at least 5 Pascals (5 Pa) between

the interventional room and surrounding spaces is also desirable. This helps to push 'dirty air' away from the wound site and outwards from the procedure room. This pressure also helps prevent ingress and egress of contaminated air between adjoining rooms. In operating theatres, higher pressure differentials are advised with pressure stabilisers at junctions between spaces (SHTM 03-01 Part A). Pressure stabilisers are designed to help manage and control the flow of air between rooms. These allow air at different pressures to pass in one direction only (from clean to less clean). They help to mitigate the risk of loss of room pressure when doors are opened in the suite. The consequences of brain infections can be very serious, may require prolonged antimicrobial treatment, and be associated with poorer patient outcomes or death. These risks were raised with the Project team, clinical team, HFS through the SBAR (**A47088790 – Email from Janette Richards to Donald Inverarity regarding air changes – dated 16 September 2016 – Bundle 13 – Vol 7 – Page 45)** and email correspondence, (**A47088789 – Air Changes JR Email 2018 (Email from Janette Richards regarding air changes – dated 19 March 2018 – Bundle 13 – Vol 7 – Page 54)** and copied to microbiology, Dr Donald Inverarity as Lead ICD and myself as Lead IPCN. The CT room ventilation design was resolved in line with the guidance from HFS and the IPCT.

62. I was made aware in 2018 during collation of information for a Freedom of Information request (see paragraph 42) of correspondence between Janette Rae and Ronnie Henderson from January 2017. Ronnie Henderson was seeking to confirm the definition of a 4 bedded room, and whether this would be deemed as a 'general ward area' for the purpose of ventilation design, and whether a 4 bedded room should have the same ventilation configuration as a single bedroom for the purposes of infection control/patient isolation. No further detail was provided in the email trail about what type of patient care/ ward area this correspondence related to. Janette advised that the ventilation parameters set out in SHTM 03-01 for a general ward area should be followed. She also explained that if a number of patients with the same infection were cared for in a 4 bedded room (a 'cohort') then the provision of extract ventilation in toilets and showers which would likely render the bedded space as balanced or slightly negative pressure to the corridor and was desirable. Dr Donald

Inverarity was also copied to the correspondence between Janette and Ronnie Henderson. The patient risk that might be associated with this bed and ventilation arrangement would depend on the type of ward and patient care delivered there. In a high-risk ward such as critical care or paediatric haematology/oncology such as Lochranza, the patients in the ward are considered more susceptible to acquiring infection because of possible immunosuppression associated with their underlying disease or treatment. These patients frequently have other risk factors for developing infection, such as the presence of invasive devices (central lines, peripheral cannula, invasive monitoring) or immune system immaturity and not having received all routine childhood immunisations based on age at the time of admission to hospital.

63. In July of 2018, the IPCT and Project team sought advice from HFS (Ian Storrar) and HPS (Annette Rankin) in relation to rectification work, risk of environmental moulds and discussion on air quality monitoring following a significant flood of water at the RHCYP in 2018 which resulted in significant water damaged to clinical areas across several floors.

64. In December 2018, we were involved in discussion with Ronnie Henderson in relation to isolation room heater battery arrangements and a proposed solution to run additional pipes within the ceiling void. This was followed up with a site visit by myself, Dr Donald Inverarity, and Dr Olson (Consultant Microbiologist) jointly with Ronnie Henderson. Although this wasn't specifically a risk to the ventilation system, the proposed solution did include potential to create further access points in the solid ceilings provided as part of the overall ventilation design. It also raised questions of water safety, and we were also keen to understand any similarities to a solution provided at the QEUH which was associated with mould growth and potential risks.

65. On 2 April 2019, I became aware, through reading notes of a meeting I had not been able to attend, of water leaks from air conditioning units in the MRI unit in DCN theatres. This was new information to me, Dr Donald Inverarity and Sarah Jane Sutherland who had attended some meetings and had noted a point about snagging which Sarah Jane Sutherland planned to discuss with Janice

Mackenzie, RHCYP Project Clinical Director, in more detail ahead of planning for the Stage 4 Scribe reviews. This incident caused concern as we were already aware that Legionella had been detected in water in the building, we had the potential legacy of the flood damage from 2018, and this represented a further potential hazard for patients and staff where the IPCT were not actively advised of at the time of the issue being identified. This contributed to an overall lack of confidence and assurance that the information we had been provided with to that point was adequate in helping us understand the scale, scope and impact of any environmental issues or the potential impact on patient or staff safety following planned transfer of services.

66. I do not recall, and cannot locate any emails, files or minutes which highlight any other specific escalations from the IPCT to the RHCYP/ DCN Project team regarding ventilation design or function until 2019.

67. The IPCT made repeated requests in discussion and by email to the Project team for information to inform the Stage 4 HAI Scribe sign off in 2018 and 2019 as the Project was scheduled or reported to be near to complete and handover. This included advice that independent confirmation of ventilation systems was advised as part of hand over. Some of these requests and the rationale and supporting technical directive were previously communicated by the IPCT to the Project team at various points from 2016 onwards.

68. IPCT were made aware through email chain from Brian Currie of 11 March 2019 (**A47088787 – Email regarding Infection Control and Ventilation issues from Sunday Herald article on Glasgow QEH/RHCYP – dated 18 March 2019 – Bundle 13 – Vol 7 – Page 65)** that there was ‘sub optimal air change rates’ in side rooms and 4 bedded rooms but this did not specify further which wards were affected.

69. The first time I was aware that critical care did not achieve 10 ac/hr was from information provided to us (Dr Donald Inverarity & myself along with others in the IMT that had been convened to consider all issues) on 1 July 2019 and receipt of the IOM report on 2 July 2019.

70. As more information emerged from QEUH we were able to probe specific elements of design (for example, heater batteries) to offer a view on potential IPC risks and the significance of patient safety considerations increased. Similarly, our experience with Cardiothoracic surgery mould infections had highlighted significant questions about ventilation design, maintenance, performance, and validation.

Independent validation of ventilation systems

71. I have been asked to refer to an email from me to Ronnie Henderson of 17 May 2019 (**A40988859 – 20190524 RE RHSC Ventilation – dated 24 May 2019 – Bundle 6 – Page 152).**

72. I did have concerns with the ventilation and/or water systems at this point in time. My concerns were primarily that the IPCT had not been provided with adequate information or responses to specific questions about compliant design, commissioning and validation raised by any of the IPCT (but principally through myself, Sarah Jane Sutherland or Dr Donald Inverarity) in relation to both ventilation and water systems over a period of some months. With specific reference to ventilation, the IPCT had requested through a variety of conversations, meeting forums and emails that independent commissioning and validation of the critical ventilation systems should be undertaken, and the results from this shared with us. This was necessary to provide assurance that these systems were installed and functioning correctly and would mitigate risk of infection to patients. We had also asked if there were any derogations from design guidance, so that we might be able to provide a view on any clinical IPC risk relative to this once the hospital was occupied. We had also asked for further clarification on ventilation contamination issues identified as part of the Settlement Agreement between NHS Lothian and IHSL dated 22 February 2019 (SA1) (part of the 81 residual risks reported at the April 2019 Pan Lothian Infection Control Committee). These questions were principally posed to Ronnie Henderson as the Hard FM Commissioning manager but were raised

with Brian Currie (Programme Director) and Janice Mackenzie (Clinical Director). In addition to the requirement to complete the Stage 4 HAI Scribe and demonstrate assurance against design guidance, we were cognisant of the potential for issues at QEUH which had been shared with us by colleagues in NHS GGC (see paragraph 34) to affect the RHCYP DCN. If similar hazards or risks did exist, we were keen to ensure that adequate control or mitigation was achieved prior to patient occupation to avoid the risk of preventable patient infections which could be linked to the hospital environment. It became clear that some of the information was not yet available (until IOM commenced independent commissioning in late June 2019) or that information held was not contemporary (i.e., further work had been undertaken within the system which invalidated previous information).

73. I was also concerned that the IPCT had only learned via a general communication to all staff 26 February 2019 (**A47088785 – Update on new Royal Hospital (Email from Carol Horsburgh regarding update on RHCYP – dated 26 February 2019 – Bundle 13 – Vol 7 – Page 75)** that the Project had been 'handed over' and accepted by NHS Lothian. It was my understanding from that communication that this meant that construction was complete, and plans would be enacted to begin transfer of patient services. At that time, I was concerned that the Project was considered to have concluded without the HAI Scribe Stage 4 process being completed.

74. Given the number of issues and potential hazards already known to the IPCT (flood, heater batteries, air conditioning units in MRI, water samples positive for Legionella, Pseudomonas and raised Total Viable Counts (TVC) of other microorganisms), our own understanding of environmental hazard and infection risk arising from the Western General Hospital Pseudomonas IMT and the Royal Infirmary of Edinburgh Cardiothoracic mould IMT, and some possible parallels with issues identified at the QEUH, I was not comfortable that either the IPCT or the Project team had sufficient oversight and understanding of risk and mitigation required as part of a single structured review process.

75. Specifically in relation to ventilation, at that time most of our concerns focused on critical ventilation systems, and particularly theatres and MRI where there had been issues during construction or recent months (the flood, air conditioning leaks).

76. As a service, we had highlighted concerns about mould risks following a leak that affected areas including MRI in July 2018. An SBAR (**A47095870 – 201807 06 SBAR RHCYP DCN – dated 06 July 2018 – Bundle 13 – Vol 7 – Page 77)** was prepared by Janette Rae and shared with members of the Project team at the time (**A47095685 – RHCYP SBAR Flood – dated 06 July 2018 – Bundle 13 – Vol 7 – Page 80)** and (**A47096126 – RE RHC and YP Hospital – dated 05 July 2018 – Bundle 13 – Vol 7 – Page 91)**. Ian Storrar (Principal Engineer at HFS) was also included in this communication. We flagged again in early April 2019 (**A47096239 – Re REHSC DCN Queries – dated 09 April 2019 – Bundle 13 – Vol 7 – Page 94)** following reports of a further small leak, that questions about further air sampling that had not been satisfactorily resolved and no further information had been received in relation to this. Questions had also been raised in relation to theatre design and inclusion of ultraclean ventilation (UCV) in the new DCN theatres and the ability to use this in conventional theatre or UCV setting in March 2019. We had highlighted in walk round some considerations for the safe use of the UCV theatres from a practice perspective (for example, setting up instrument trays underneath the UCV canopy and not at the margin).

77. Dr Donald Inverarity had also again raised specific questions about the information provided about theatre ventilation in the RHCYP/DCN in May of 2019 (**A47088786 – HAI Scribe Stage 4 Reviews RHSCDCN – dated 03 May 2019 – Bundle 13 – Vol 7 – Page 96)** and (**A47088791 – DI Theatre Validation – dated 13 May 2019 – Bundle 13 – Vol 7 – Page 99)**. This noted a lack of detail and information that would allow either the IPCT or anyone else in NHS Lothian to take meaningful assurance of compliance or functionality of the system. This information was required to complete the HAI Scribe Stage 4 in relation to questions 4.25 to 4.34. The independent commissioning and validation reports that were expected to be provided to address these questions

would provide more information about compliance, suitability and functionality than is summarised in the questions noted within the HAI Scribes stage 4 template. This information would be considered alongside any permitted design derogations or other issues identified during construction.

78. Dr Donald Inverarity and I had discussed ventilation and potential risk at length as we had already involved both HPS and HFS in March 2019 about queries about theatre ventilation at the RIE as part of the cardiothoracic mould IMT. We also understood some of the concerns about ventilation more generally that had arisen at QEUH through our peer-to-peer discussions over a long period of time (see paragraph 34) which related to several parts of the ventilation system. A summary of these prepared by Dr Teresa Inkster was shared with permission by Dr Donald Inverarity on 5 July 2019 to be considered along with the IOM commissioning reports. The NHS GGC summary highlighted issues relating to heater battery units, chilled beams, pressure differentials reversed, potential entrainment of contaminated air through thermal wheels, isolation room design. Throughout late 2018 until 1 July 2019 (when IOM commissioning information was becoming available) I remained concerned that similar issues may be discovered at RHCYP given that the same contractors had been involved in the design and construction of both facilities, and in the absence of documentation to confirm satisfactory design, installation and performance.

79. Project documents were not accessible to the wider IPCT as these were held on a separate system which required access rights and training in its use. I do not know if Janette Rae had access to this system. I did not request access to the system. As subject matter expert advisors I did not expect the IPCT to be able to access all project documents, nor would we have time to navigate all such records. It was my expectation that relevant data, reports and documents defined in technical guidance such as SHTM 04-01 Water safety for healthcare premises or SHTM 03-01 Ventilation for Healthcare Premises would be shared in way that we as clinicians would be able to access and interpret with ease.

80. My understanding of SHTM 03-01 is that independent commissioning and validation was required for all critical ventilation systems including theatres,

critical care, LEV – as defined in SHTM 03-01 Part A (2014 version). SHTM 03-01 Part A: Design and Validation (2014 version) in section 1.26 defines departments which require 'special ventilation'. This includes 'intensive treatment unit' (ITU) which is an older, alternative term for critical care units. Section 7.2 also sets out a requirement for specialised ventilation in a range of areas which includes operating theatres, all critical care and high dependency units and isolation facilities, including oncology units and those delivering chemotherapy. These sections provide the definitions of where 'critical ventilation' systems would be installed. Section 8 of this guidance sets out the definitions for commissioning and validation of ventilation systems. Commissioning of all systems is essential as this provides information on the fitness and performance of the system moving from installation to full operational state. The general note in section 8 advises that in house staff are not likely to possess the required skill, knowledge, or equipment to complete this. Independent expert contractors would therefore usually be advised. Section 8.15 advises that for critical systems, independent validation of the performance of the system may be advised.

81. An independent validation is required to be arranged in advance of project completion and before patient occupation. Although the requirement for independent commissioning and validation is not explicitly stated in sections 4.26 to section 4.34 of the HAI Scribe stage 4 template, it is implicit through the questions asked confirming that the design, quality of installation, and functionality is relative to the risk profile of the area it is installed in and capable of controlling pathogens through means of 'dilution or entrainment'. To achieve these criteria, the system should be designed, installed, commissioned, and validated in line with SHMT 03-01. This should be reflected in the HAI Scribe Stage 4 process to give assurance that a compliant system had been provided and was operating correctly prior to patient occupation.

82. There are clear statements that an independent validation is a requirement in SHTM 03-01 Part A of the guidance (see paragraph 80 above). There had already been request for this by Dr Donald Inverarity in prior emails to the

Project team and in discussion at various points from as early as 2016 and reiterated in 2019.

83. I emailed Ronnie Henderson on 17th May 2019 (**A47090715 –Email RH LG RHSC Ventilation – dated 17 May 2019 – Bundle 13 – Vol 7 – Page 115)** following a face-to-face discussion with him and others following one of the HAI Stage 4 reviews on the same day. In this email I restated that:

> "We (the IPCT) do think that it would be useful to have independent validation by an authorising engineer, recognising there is a cost associated with this".

My use of language in this email to the Project team was intended to be measured and collaborative, rather than being seen to instruct the Project team to arrange commissioning or being construed as critical of them in not providing commissioning information. This is because there was some tension developing in the relationship between the Project team, estates, and IPC by this stage in the Project. I had highlighted in the face-to-face discussion my ongoing concerns the IPCT had about not having sight of more detailed information on either water testing, water quality, or ventilation design and performance, and the lack of independent validation. In my email, I also referenced the other issues around water safety and ventilation that had been part of email and other discussion in the preceding weeks. I was given verbal assurance by Ronnie Henderson that most of the 81 items identified as part of the SA1 had little or no HAI component, and that all of those which carried residual risk had been captured on the Project risk register. The IPCT had not been directly part of discussions relating to SA1 and had learned of this, and the remaining risks from a verbal report by the NHS Lothian Director of Facilities at the Pan Lothian Infection Control Committee on 12 April 2019. I had not received any documents setting out the risks identified or information in detail of what actions had been taken. A meeting had been scheduled on 5 June with the IPCT and wider members of the Project team to review and discuss these residual risks.

84. The Project team present at the meeting on 17 May 2019 were aware that there had been discussion at the infection control committee in April 2019 (**A47086952 – 20190412 PLICC Minutes – dated 12 April 2019 – Bundle 13 – Vol 7 – Page 12)** about the Project but that they were not present and voiced some concern that they had not been invited to participate in this discussion. The minutes reflect a number of points relating to derogated air change rates, potential mould contamination following reported leaks, availability of water sampling and problems with theatre flooring as well as the 86 (later confirmed as 81) non-conformances accepted at SA1.

85. By advising that independent commissioning and validation of the ventilation system would be 'useful', I was seeking to be conciliatory and influence this action in a collegiate manner rather than create a perception that I was 'instructing' the Project team (which was not my role) which I felt may further impact on the working relationship we had with them at that time.

General Overview of HAI Scribe Process

86. The process to undertake hand over and commissioning review was phased and required several separate visits with a separate Scribe document produced for each department or area being reviewed. This was agreed with the Project team and confirmed in email from Sarah Sutherland on 3rd April 2019 (**A47088988 - RE RHSC DCN HAI Scribe Phasing – dated 03 April 2019 – Bundle 13 – Vol 7 – Page 102)**.

87. The Scribe document from 26 April with IPC notes from the review of the ward areas including Lochranza and critical care (**A35230420 - HAI SCRIBE Stage 4 – Inpatient Wards and PICU - dated 3 May 2019 – Bundle 13 – Vol 7 – Page 104)** is annotated to reflect verbal information we were provided with by members of the Project team during the physical review. There are asterisks on points where additional information was required (specifically ventilation and water).

88. At the meeting on 26 April 2019, I discussed with the Project team (Ronnie Henderson, Fiona Halcrow, Dorothy Hanley) the outstanding information relating to water commissioning and testing, and ventilation commissioning and testing (which had been requested in the preceding weeks) and made clear that I would not sign the document to confirm that the IPCT were assured all criteria had been met or witnessed. This in effect meant that the Project team did not have IPC 'sign off' to complete this part of the process.

89. I emailed Dr Donald Inverarity on 29 April 2019 **(A40980763 – Email 29th April FW RHS - dated 29 April – Bundle 13 – Vol 7 – Page 110)** highlighting that Sarah and I had carried out a Scribe review on the previous Friday (26 April 2019) and that we had not 'signed off' due to the outstanding requests for information and assurance. I wanted to discuss in more detail some of the ongoing questions we had in relation to water and ventilation. Dr Donald Inverarity had not been available to join us on the 26 April 2019.

90. The covering email to the Project team on 3 May 2019 by Sarah Sutherland made clear that the two HAI Scribes from our reviews on 26 April and 2 May 2019 were not 'signed off' by the IPCT.

91. I emailed Janice Mackenzie and other members of the Project team on 13 May 2019 **(A47088786 – RE HAI Scribe Stage 4 Reviews RHSCDCN - dated 29 April – Bundle 13 – Vol 7 – Page 96)** clarifying what further information was required by us to help inform completion of the stage 4 Scribe process.

92. This email also highlighted that we would not be in a position to finally 'sign off' the Scribe ahead of a planned meeting with the Project team and others on 5 June 2019. This had been arranged to allow the IPCT to understand in more detail a number of 'non-conformances' that the Board had accepted as part of the Project handover in relation to SA1 earlier in the year.

93. The non-conformances were first brought to the attention of the IPCT in a verbal update from George Curley the Director of Facilities at the Infection Control Committee of 12 April 2019 (**A47086952 – 20190412 PLICC Minutes – dated**

12 April 2019 – Bundle 13 – Vol 7 – Page 20). We were keen to understand and advise on any residual IPC risk associated with these non-conformances.

94. I emailed Ronnie Henderson on the evening of 17 May 2019 **(A47090715 – Email RH LG RHSC Ventilation - dated 17 May 2019 – Bundle 13 – Vol 7 – Page 115)** following on from the Stage 4 Scribe review of theatres and Imaging earlier that day. This email refers to theatre ventilation validation which he advised had been scheduled for 24 May. In the absence of this validation information and assurance at 17 May 2019 the HAI Scribe for theatres and imaging was therefore not considered 'signed off'. A subsequent email from Ronnie Henderson to IPCT on 24 May advised that the scheduled testing in theatres had been postponed until 28 May.

95. The HAI-Scribe process should be multidisciplinary, recognising that IPCT are clinical staff with specific remit for clinical infection control advice and must work within their professional regulatory requirements (i.e., act within limits of skill, knowledge and competence). Our staff do not hold any formal training or qualification in construction, plumbing or mechanical engineering.

96. Some of the more technical questions relating to engineering services should have the relevant Authorising Engineer confirmation.

97. The evidence IPCT would require to see would be:

- the commissioning records – ventilation design and performance compliance to SHTM 03-01
- water sampling records to demonstrate compliance for L8 and SHTM 04-01 sampling requirements
- specific risk assessments, operational procedures etc relevant to any approved derogation against design guidance, the rationale for derogation and any identified risk/issue.

98. This evidence should be required by the Project team, not just the IPC team. The IPC team can only advise on the aspects of microbiological or clinical

safety or risk associated with engineering systems. The Project Team should be assured on the performance of water distribution systems and that engineering controls are adequate in maintaining water quality (for example, temperature control on flow and return legs of water systems, water pressure).

99. If there was not a structured review with input from relevant stakeholders including IPC, there may be further unidentified hazards and risks associated with design, construction, quality or performance of the built environment which could be associated with avoidable infections for vulnerable patients, staff or the wider public.

100. There is a risk that where even the most basic of standards are not met at the time of patient occupation (for example, incomplete sealant round shower floor to wall junctions) this may lead to rapid damage and deterioration of the new hospital environment (for example, through water ingress during normal use). In some cases, this could reduce the expected lifespan of materials or fittings.

101. Where surfaces are not intact, sealed, impervious and capable of being cleaned, this can be associated with a microbiological hazard and nosocomial infection risk (for example, development of mould in patient care areas leading to mould spore exposure and infections which can be severe and life threatening).

102. This type of snagging/defects log can be associated with service disruption caused by access to achieve remedial repair or rectification. Depending on the nature of the work and the type of clinical area, achieving effective mitigation of risk to protect adjacent occupied service and patient care areas can be complex (e.g. erection of temporary PVC walls (hoard fast) or sealed dust barriers, use of HEPA cubes) This work may also incur significant additional and avoidable financial costs.

103. There are corporate risks associated with statutory non-compliance and wider contractual, financial, reputational risks. Failure to identify issues prior to

handover with limited ability to retrospectively seek action or compensation from contractors.

104. SHFN 30 Part A section 4.105 states “Upon completion of construction, the facility must be brought into use; the complexity of the task involved generally means that a Commissioning Manager and Commissioning Team will be needed. Senior managers, infection prevention and control teams, specialist teams and users should be fully involved in the process.”

105. As detailed above, the Scribe review should be completed, and counter signed by all relevant stakeholders including the clinical team. The Project manager has overall responsibility for coordinating, leading and completing HAI Scribe stages 2, 3 and 4 (SHFN 30 Part B section 2.7). In my view, it would also be appropriate to request the input of the relevant Authorising Engineers to check and endorse commissioning and validation information as they have the qualifications, training, and competence to advise on technical aspects of design, function and safety which are not likely to be held by individuals within the Project team, including the IPCT. This is in line with SHTM 03-01 Part A section 8 definitions and note. This acknowledges that the expertise to validate critical systems is not likely to be available ‘in house’.

106. The Project team retain overall ownership and responsibility for the document and process. The process for signing-off on the Stage 4 HAI-SCRIBE is an area which lacked clarity at the time and subsequently. It is my perception from many years of using the HAI Scribe document in a number of settings and both small and large scale projects, and from feedback from other members of the IPCT that I manage, that the Scribe was viewed as an infection control document rather than a project document, and that the ‘sign off’ was expected to rest solely with the IPCT.

Stage 4 HAI Scribe Process Review

107. My role in the HAI-Scribe process is as detailed in the above paragraph19.

108. The HAI Stage 4 scribe document covered all in patient wards including critical care and Lochranza (haemato-oncology). I was not aware at the time of the HAI Scribe review meeting on 26 April 2019 that multi bed bays in critical care had been inadvertently included in derogation of air changes rates. Sarah Jane Sutherland and I were advised verbally by Ronnie Henderson during the HAI Scribe stage 4 review of Lochranza ward, Paediatric Intensive Care (PICU) and DCN Acute Care that derogation had been approved for single rooms to achieve 4 air changes/hr from mechanical ventilation in the ward for single rooms and that this had been risk assessed, however no documentation to confirm this position was seen during the review.. I understood that this applied to single rooms rather than isolation rooms (PPVL rooms) in the general ward areas which included DCN Acute Care and excluded PICU.

109. Sarah Jane Sutherland had also shared information with Dr Donald Inverarity, myself and other members of the IPCT on 4 April 2019 (**A47088988 - RE RHSC DCN HAI Scribe Phasing – dated 03 April 2019 – Bundle 13 – Vol 7 – Page 102)**, stating that Janice Mackenzie, Clinical Director for the Project had advised all single rooms in DCN would be considered the same as single rooms in Paediatrics from a design and performance perspective. She had also been advised that:

> "any issues we thought should have been picked by the project teams own room reviews and specifications/requirements should have been addressed during HAI Scribe Stage 2".

I had only recently been made aware at Pan Lothian Infection Control Committee on 12 April 2019 that a number of non-compliances had been agreed as a derogation as part of SA1, but at that stage had not been provided with any detail of what those were. Independent ventilation commissioning information for the critical system in Critical Care and Theatres had been requested by the IPCT most recently as 18 March 2019 in email correspondence between the Programme Director, Professor Alex McMahon (HAI Executive Lead), Dr Donald Inverarity and others in the IPCT (see item for

paragraph 68). We had been advised verbally, and through email communication that this information was available, and all results were satisfactory, but no one in the IPCT or Microbiologists had seen this information at 26 April 2019.

110. At the time of the Stage 4 HAI-Scribe reviews at RHCYP, as lead nurse I was accountable for the provision of IPC clinical subject matter expertise, senior leadership and IPC oversight of a complex situation to ensure that both the Project team and the Board could be assured that any IPC risks specific to the Project had been adequately described, to extrapolate and advise on any potential learning or themes emerging from both local infection control incident management teams, but also reflecting emerging learning from the QEUH Project detailed in paragraph 40. This included aspects of water system and water quality with links to a range of unusual patient infections (as per the NHS GGC SBAR shared in confidence with me on 18 December 2018), issues relating to use of Point of Use filters on taps (impact on water flow, splashing) which had been shared with us during our management of the WGH *Pseudomonas aeruginosa* incident in March 2019, and issues with non-compliant ventilation design and performance affecting different parts of the QEUH hospital which had been highlighted through peer to peer discussions, and to some extent the HFS guidance from March 2019 on Managing the Risk of Contamination of Ventilation Systems by Fungi from Bird Droppings.

111. I was also responsible for the provision of training, support and development of the newly promoted and appointed HAI Scribe lead nurse as the professional nursing lead for the IPCT.

112. As noted above, the HAI Scribe stage 4 documents were not completed (‘signed off’). I was responsible for contributing to the Scribe process as one of several stakeholders.

113. The department specific Stage 4 Scribes for RHCYP DCN were never completely confirmed as being ‘signed off’ by the IPCT by the time the Cabinet

Secretary formally instructed NHS Lothian on 4 July 2019 that migration of patient services should not proceed.

114. The HAI-Scribe Stage 4 process is physical review of the building and relevant data or documentation with relevant stakeholders. This should be after all construction work is considered complete, a builders' clean completed and all commissioning work completed with results available. A final domestic services clean (terminal clean) may or may not be complete by the time the Stage 4 review is carried out, but will be complete by the time patient services move in.

115. The review is a combination of:
    - visual checks to assess fit and finish, integrity and quality of workmanship and materials, any potential operational issues. These checks can be very detailed (for example, no defects in hard surfaces, ceiling tiles/ceiling grids intact & flush, ensure all silicone seals robust and intact around all sinks & showers) as well as more general observations (for example, access for cleaning, placement of hand gel dispensers) and 'compliance' checks with key guidance where this can be observed
    - review of documentation/evidence to confirm commissioning & validation results are satisfactory and compliant with STHM 03-01, SHTM 04-01 etc – and that there are no clinical risks associated with performance
    - an understanding of any approved derogations - these are usually more associated with refurbishment rather than new construction – for example, non-compliant bed spacing, ability to fit fully compliant design within existing footprint
    - supporting risk assessments or procedures which set out actions to mitigate risk associated with these derogations or design limitations.

116. The HAI Stage 4 review of ventilation systems and water systems are made against the requirements of SHTM 03-01 and SHTM 04-01 respectively and not the Project contractual specification as per questions 4.26; 4.31 and 4.37 of

SHFN 30 Part B HAI Scribe Implementation strategy, Development stage 4: review of a completed project. If the design, installation, commissioning or performance of these systems does not conform to these documents, it would be expected that this was noted as formal derogation with risk assessment during Stages 2 and 3 HAI Scribe review.

117. A Stage 4 Scribe review was undertaken by the IPCT on:

- 26 April (in patient wards including oncology and critical care)
- 2 May (Outpatients)
- 17 May (Theatres & Imaging)

118. Managing the process and document control is the responsibility of the Project Manager/Project team and they are best placed to advise on the timing of the Stage 4 review once all construction and commissioning work is complete. There is always some negotiation to identify suitable dates and times to bring together the relevant stakeholders. For IPCT these requests are balanced against existing clinical and work programme priorities and seek to minimise any delay to the Project.

119. The biggest risk of the Stage 4 HAI-SCRIBE not being completed prior to handover of the build and ultimately occupation by patients is lack of information or assurance that the building is safe or suitable for occupation by staff or patients. It is important to have evidence and assurance that critical systems function effectively and within required parameters.

120. I have been referred to a note on the HAI Scribe document against section 4.26 **(A35230420 - HAI Scribe stage 4 – Inpatient wards and PICU - dated 3 May 2019 – Bundle 13 – Vol 7 – Page 107)** stating that the derogation to 4 air changes has been risk assessed and approved. The handwritten notes on the Scribe reflect verbal information and assurance provided to me during the review. Please refer to response in paragraph 121. I had no further understanding of what or where approval had been given for the reported design derogation and was not provided with any risk assessment documents.

I have been asked by the Inquiry Team why this information was accepted if no such document was provided. The verbal information provided to me is noted on the Scribe document. I had no reason to disbelieve the information provided to me by members of the Project team who had been involved in the Project over its lifetime and therefore had a detailed and explicit understanding of the key stages and decision points within the Project. I recall advising Ronnie Henderson and Dorothy Hanley in discussion at the end of the HAI Stage 4 Scribe review meeting that professionally, I could not in good faith 'sign off' these points without being provided with the evidence to support them. As evidenced by subsequent email correspondence with Dr Donald Inverarity on 29 April 2019, the components of water and ventilation in the HAI Scribe were not 'signed off'. This is further evident in my email to Ronnie Henderson on 17 May 2019, where myself and Dr Donald Inverarity were still requesting to see copies of all commissioning and validation documentation relating to both ventilation and water systems, and to understand the implications of the residual risks accepted at SA1. The HAI Scribe Stage 4 reviews remained incomplete as at July 2019 when a decision was taken to delay opening the hospital.

121. No evidence was provided to me by the Stage 4 HAI Scribe review team in relation to assurance that the reduced ac/h in general wards and the Lochranza Ward had been "risk assessed and approved". The handwritten note on the Scribe template is from verbal information provided by the Project team. As far as I'm aware, the Project team were not anticipating reduce ac/h rates in critical care areas. I assumed that the risk assessment would relate to general ward areas (i.e. a change of 6 air changes to 4 air changes) as this had been stated by Brian Currie Programme Director in his email of 14 March 2019 (see paragraph 58) and would be the air change rate indicated for general ward bed rooms and single rooms as per SHTM 03-01 Part A Version 2 (2014) Appendix 1: Recommended air-change rates. My expectation was that both Lochranza and Critical Care were achieving 10 air changes/hr in line with SHTM 03-01 Part A Version 2 (2014) Appendix 1.

122. Neither the Project team or the IPCT had sufficient information or oversight of this information to state with confidence that any hazards and risks associated with the hospital environment had been adequately mitigated.

123. To the best of my knowledge, nobody in the IPCT or the Project Team was aware at the time of the Stage 4 HAI Scribe review that the Lochranza or Critical Care design was non-compliant with SHTM 03-01.

124. All Stage 4 HAI Scribes remained incomplete by the time a decision was made to defer relocation of patient services in July 2019 (not 'signed off' by IPCT). This round of Stage 4 reviews was superseded once further remedial, design and construction work was planned and progressed.

125. The email response of 14 March 2019 from Brian Currie to our concerns noted under point 5 that some 4 bed and single rooms achieved only 4 air changes rather than 6 ac/hr as required by SHTM 03-01 Part A Version 2 (2014) Appendix 1. There was no further information provided at that time about the location of these rooms or the type of patient care that would be provided. The response made reference to a risk assessment in relation to suboptimal air change rates but I was never provided with a copy of this risk assessment, and I cannot comment on either the content or who might have contributed to this.

126. I was copied into an email thread on 18 March 2019 which contained a detailed summary of IPC involvement in the Project provided by Brian Currie on 14 March 2019. This was produced in response to a press inquiry which asked about the IPC role in the Project following reports into the QEUH Project. When I was made aware of the email, I raised concern to the IPC Head of Service and in turn the HAI Executive lead that I did not think the response was an accurate reflection of our role and that statements which implied full assurance had been made which I did not believe could be substantiated. I had discussed this with Dr Donald Inverarity and I am aware he raised concerns by separate cover to the HAI Executive lead following one of the Western General Hospital Pseudomonas incident meetings which were running concurrent to this issue.

127. In March 2019, it was my view that critical care areas required 10 ac/hr 10pa positive pressure as per SHTM 03-01 Version 2 (2014) Appendix 1.

128. In March 2019, it was my view that the Lochranza Ward, a neutropenic patient ward, required 10 ac/hr 10 pa positive pressure as per SHTM 03-01 Version 2 (2014) Appendix. Although not all patients in Lochranza would be considered neutropenic, the ventilation requirements were required to provide resilience and assurance for all patient care.

129. I was first aware that some 4 bedrooms had been accepted with 4 air changes as part of an FOI request earlier in 2018, and then subsequently that 'some 4 bed and single rooms' only achieved 4 ac/hr from Brian Currie's email thread on 18 March 2019. At this point, I had no understanding which rooms or which part of the hospital this applied to.

130. I assumed that because the derogation was from 6 ac/hr to 4 ac/hr that this applied in general ward areas (in line with the specification for general wards laid out in SHTM 03-01 Version 2 (2014) Appendix 1). It was my expectation that all of critical care would be provided with 10ac/hr with 10PA positive pressure. Therefore, any derogation in critical care I would have expected to see expressed as derogation from 10ac/hr to 4 ac/hr. I would have expected IPC input into this decision, as the implications for infection control, patient safety and occupational health exposure risks associated with sub optimal ventilation in critical care would be greater than those risks in general ward environment. These risks relate to the vulnerability of the patient population and acquisition of infection due to their underlying illness or as a consequence of their treatment, the types of colonisation or infection that patients may have in these areas, and the role of room air change rates and pressure differentials in mitigating risks to patients, staff and visitors associated with aerosol generating procedures such as intubation, tracheostomy procedures which are more frequently carried out in critical care areas.

131. Formal documentation which provided some confirmation of ventilation derogation design from 6 ac/hr to 4 ac/hr was provided to IPCT on 5 June 2019

by Janice Mackenzie in the Residual Risks Log generated at Project hand over **(A47090713 – 080519 RHCYP DCN Residual Risks – dated 08 May 2019 – Bundle 13 – Vol 7 – Page 121)**.

132. This risk log was shared in advance of the planned meeting on the same day to discuss the 'non compliances' accepted by NHS Lothian at Project handover which IPCT first learned about at Infection Control Committee on 12 April 2019 from George Curley the Director of Facilities.

133. The residual risks log notes issues about 'ventilation contamination' but in the worksheet titled deleted items there were items relating to "Bedroom ventilation pressure regime and air change rate in rooms for neutropenic patients" recording that only 7 rooms were suitable for the most vulnerable patients, and for both 4 bed ventilation and single bedrooms ventilation rates that:

> "The Board has compromised on the air change rate requirements in the SHTM 03-01 (6 ac/hr requested in the SHTM, and only 4 ac/hr being provided). There is therefore a potential reduction in the air quality, albeit well in excess of building standards. The Board has also accepted that only 14 of the 20 4 bedrooms have the correct pressure regime."

Again, given this is 6ac/hr to 4 ac/hr I would not have expected this derogation to apply to rooms in critical care, which have a starting point of 10 ac/hr.

134. There was a ventilation meeting by teleconference on Friday 28 June 2019. I cannot locate minutes of this meeting, but I have information provided to Dr Donald Inverarity and myself by Brian Currie by email on 28 June 2019 **(A47090716 – Email from Brian Currie regarding RHCYP and DCN ventilation – dated 28 June 2019 – Bundle 13 – Vol 7 – Page 126)** and my hand written notes from the meeting later that day **(A47090714 –LG Handwritten notes – dated 28 June 2019 – Bundle 13 – Vol 7 – Page 132)**. The IOM commissioning exercise had started and was initially focused on theatre ventilation and isolation rooms and issues were arising. From my written notes the main issues related to pressure cascades, air change rates,

balancing, and Ultraclean ventilation (UCV). It was agreed that, by the end of Monday, 1 July 2019, information on theatres and isolation rooms was to be made available, and if these issues were 'fixable or not' to allow a decision to made about partial or full occupation of the site. My notes also record that 'HDU not performing'. This refers to High Dependency Unit (critical care).

135. This meeting on 1 July 2019 was the first time I had received confirmation that the critical care ventilation was neither designed, nor performing to the parameters set out in SHTM 03-01 Part A Appendix 1. I cannot locate minutes of this meeting, but I have handwritten notes from the meeting, noting no derogation was provided in the original design (**A47085953 – Q119 20190701 LG Handwritten Notes – dated 01 July 2019 – Bundle 13 – Vol 7 – Page 35)**.

136. The IPCT (Dr Donald Inverarity and myself) did not have a copy of the environmental matrix or any other design or commissioning information provided at the time of the ward Stage 4 HAI Scribe review (26 April 2019). The IPCT had not yet seen any non-compliances or derogations that were accepted at Project hand over. These were due for discussion on 5 June 2019.

137. Where I am aware or was copied into correspondence about ventilation design or performance for specific areas of the RHCYP/DCN, Janette Rae and others in IPCT were consistent in advising the Project team that ventilation design and performance should align to SHTM 03-01 requirements and to seek advice from HFS architects or engineers where available guidance lacked clarity (ref to emails regarding CT Scanning rooms). The same advice and approach was adopted by Janette and other members of the IPCT with regards ventilation queries arising from other capital projects over this period (East Lothian Community Hospital, Haematology Unit refurbishment WGH). It therefore appears implausible to me 1) that anyone in the IPCT had advised or endorsed a position of non-compliant ventilation design for high-risk clinical areas, and 2) that there was any wider awareness of this within the senior IPC team.

138. Nobody from the IPCT was actively involved in the process of agreeing SA 1. It is likely that previous discussions and contributions from the IPCT (and specifically Janette Rae as the dedicated IPC project resource) in relation to the known derogations such as the provision of 4 ac/hr rather than 6 ac/hr in some single rooms were reflected by the Project Team involved in these negotiations. I would surmise that had independent water and ventilation commissioning and validation reports, the environmental matrix and details of the '81 non-conformances' discussed as part of the SA1 process been made available to the IPCT in advance of the formal handover, it is highly likely that we would have highlighted the non-conformances and potential clinical infection risks associated with these. The context in which these issues should have been viewed had changed over the lifetime of the RHCYP Project. The awareness of the IPCT and others of the complexity and scale of issues emerging from QEUH, and how this was thought to be manifesting as clinical infections in vulnerable patients was not widely available to us until the latter part of 2018, and after water and ventilation systems had already been designed and installed.

139. The only email correspondence and point of clarity relating to Lochranza ventilation escalated to me directly was in August 2016 when a question was raised about ventilation design and provision of multiple isolation rooms from a single air handling unit. Janette Rae, Dr Donald Inverarity and I all agreed this would likely be associated with some clinical infection risk and offer a lack of resilience of isolation capacity in the event of planned or unplanned AHU shut down. A short SBAR report (summarising the situation, background, assessment and recommendations) was prepared and submitted by Janette Rae and submitted on this, and the issue of CT ventilation design on 14 September 2016**(A34443762 – NHS Lothian SBAR Ventilation – dated 14 September 2016 – Bundle 13 – Vol 7 – Page 41)**. This is a standard reporting format used extensively across NHS Scotland.

140. Any confirmation of ventilation design suitability or performance would be derived from the commissioning and validation information which had been requested on numerous occasions but not provided at the time of HAI Scribe

review. This validation information was not provided until late June 2019 or early July 2019 through the IOM validation exercise.

141. At the time of the HAI Scribe review (26 April 2019) the IPCT were still waiting for information on the Residual Risk log advised at the Pan Lothian Infection Control Committee meeting on 12 April 2019. This information was not made available until the meeting on 5 June 2019.

142. None of the information received by the time of the Scribe review suggested that reduced air changes related specifically to Critical Care or Lochranza. From our perspective we expected these areas to have been designed to provide 10 ac/hr not 6 ach/hr. At the time of the HAI Scribe review, all information shared with the IPCT described a reduction in 4 bedded rooms and single rooms ventilation from 6 ac/hr to 4 ach/hr, which we assumed related to general wards only given the starting point of 6ac/hr.

Infection Prevention and Control (IPC) involvement in issues with water systems

143. I was aware from discussion with Dr Donald Inverarity and subsequently on being copied into an email thread on 18 March 2019 that water quality issues had been identified (including the presence of Legionella and *Pseudomonas aeruginosa* in some samples) in around late February 2019. This was around the time of Project hand over in terms of SA1 with post completion works still to be undertaken. I was aware that more information had been requested by Dr Donald Inverarity at this time but not been received.

144. Ronnie Henderson shared water results with us on 29 April 2019 but we requested that this be formatted to ensure that results could be viewed chronologically and to understand what action and interventions had been completed and when. A template used in the ongoing Pseudomonas incident at the Western General Hospital was provided to the Project team.

145. I had contacted the Project Team (ref email sent to Janice Mackenzie 13 May 2019) seeking information on which areas were to be defined augmented care areas and more information on the locations and intended clinical use of areas where *Pseudomonas aeruginosa* had been identified during water sampling.

146. On receipt of the Project risk log from Janice Mackenzie on 5 June 2019, IPCT saw confirmation that 'failed samples' had been returned for TVC, Pseudomonas and Legionella prior to hand over. Brian Currie provided the IPCT with the Water Sampling Results Schedule on 19 June 2019. There was email discussion between the senior management team, IPCT and Project Team in response to this information. The Board were also preparing a response to the HPS Request for NHS Scotland water testing survey at this time. There were overlapping email discussions in relation to these two issues in June 2019. The Board Water Safety Group met on 20 June but did not specifically consider these points at this time.

147. From the information provided and resulting email discussion, we were not able to clearly identify the locations where positive results had been identified as results were presented by a location reference number rather than any meaningful explanation of location and intended use. There was insufficient and incomplete information available to the IPCT and Microbiology to make any sort of informed risk assessment in relation to these results (and implications for patient safety after occupation). No information was provided in relation to remedial actions taken in response to the water testing results.

148. I summarised ongoing and unresolved concerns in relation to water in email to the Executive Management Team on 26th June 2019.

149. In the absence of robust and contemporaneous information on water quality at the time of planned patient occupation, it is my opinion that we could not provide assurance to clinical teams or the Board that the water was safe for use all patient groups, specifically those in 'augmented care areas'. There is no fixed definition of augmented care provided in SHTM 04-01. The IPCT advise the definitions provided by HPS in their 2018 Interim Guidance for Management of

Pseudomonas aeruginosa in Augmented Care document. This includes critical care units and Haemato-oncology units (therefore Lochranza ward). Following the *Pseudomonas aeruginosa* incident in DCN at the WGH in early 2019, NHS Lothian also considered Neurosurgery to be an augmented care unit. I shared this definition with Ronnie Henderson on 28 June 2019 **(A40983461 – RHCYP DCN Little France – dated 28 June 2019 – Bundle 13 – Vol 7 – Page 138)**. The definitions of augmented care areas had previously been shared with members of the Project team by email in August 2018.

150. We were aware of issues relating to Legionella*, Pseudomonas aeruginosa* and raised levels of micro-organisms (referred to as Total Viable Counts (TVC) in 1000mls of sample) in water sampling carried out between late 2018 and the first part of 2019. These samples were taken across the new building, but a lack of clarity as to where all of these positive outlets were, the actions taken in response to the findings or that additional consecutive water testing had confirmed that these water quality issues had successfully been resolved.

151. As we were already actively managing a situation where we had identified *Pseudomonas aeruginosa* in the water supply in the existing DCN building and ITU at the Western General Hospital I was particularly anxious that we had full assurance on water quality and water management prior to moving Neurosurgical patients to the new hospital. The move to the new hospital was recognised by the Incident Management Team (IMT) managing this issue as one of the 'control measures' to eliminate or mitigate risk of serious infections in this patient population.

152. There was insufficient information available on Legionella sampling therefore it was not possible to confirm that NHS Lothian met statutory compliance or if there was any risk to patients, staff or the wider public from water systems.

153. The infection risks for patients associated with exposure to water in hospital relate mostly to personal hygiene or aspects of clinical care rather than ingestion of water. They can also include risk of inhalation of Legionella through showering or water sources. Staff and the wider public may also be a risk of

exposure to Legionella from hospital water if monitoring and control measures are not robust and adequate.

154. Patients with invasive devices (vascular access devices, urinary catheters, invasive monitoring) wounds (surgical, burns), immature immune systems (for example, neonates) or any immunosuppression associated with disease or treatment (for example, oncology, cystic fibrosis, chemotherapy) are particularly vulnerable to infection.

155. There was correspondence between the Project team and IPCT in August of 2018 to advise on which areas of the new hospital would be considered 'augmented care'. This was specific to surveillance testing requirements set out in interim HPS guidance.

156. The response provided did not include DCN as an augmented care areas because the query pre-dated the *P. aeruginosa* incident in DCN in Feb 2019. One of the actions agreed by the IMT was to include DCN in the definition of an augmented care area in light of the vulnerability of the patient group and presence of invasive monitoring devices akin to those used in a critical care area.

157. The Project team supplied the IPCT with information on water sampling on 29 April 2019. This comprised a series of individual PDF reports.

158. There was subsequently some dialogue back and forwards between IPCT and Ronnie Henderson in relation to how this data were presented, and a request to understand in more detail the actual ward locations of sample (and whether these were 'augmented care'), the numerical values (the number of colony forming units in the sample) of any 'failed' outlet and any historical data relating to testing, previous positives and evidence of consecutive sampling on completion of any corrective actions taken.

159. On 19 June 2019, Brian Currie (Project Director for RHCYP/DCN) shared a spreadsheet of water data which was discussed at NHS Lothian Water Safety

Group on 20 June 2019. This group had representation from Estates, the executive Team, IPCT, Microbiology and the Authorising Engineer (Water).

160. I summarised the discussion held in response to this data in an email to Brian Currie on 27 June 2019. This set out specific questions in relation to formatting of information, the scope of sampling already completed and a request that further sampling be undertaken to provide more contemporary data. It also set out a number of actions to be taken for prospective surveillance sampling and communication with microbiology, IPCT and others to ensure any issues identified were assessed and mitigated timeously.

161. At a later date (after the opening had been delayed) the IPCT learned of the Callidus report which related to a Health & Safety review commissioned by NHS Lothian in February 2019. This report had identified concerns relating to Legionella control and made some recommendations for action.

162. Following the various communications in relation to water quality, both in person and by email, Westfield Caledonian were commissioned by NHS Lothian to carry out water sampling for *Pseudomonas aeruginosa* in augmented care areas. This took place between the 1 and 12 July 2019. Culture and reporting of water samples for Legionella takes 10 days for a final authorised result to be made available.

163. From 580 samples *Pseudomonas aeruginosa* was isolated in 56 locations, but the sampling survey did not demonstrate widespread contamination of the water system. It did highlight some contamination of parts within the water system. The findings of this report were considered by myself and Dr Donald Inverarity on the 19 July 2019 and we prepared a summary risk assessment paper for the Executive Team as part of the regular Board governance. The Authorising Engineer (Water) provided his assessment to this document on 22nd July 2019 **(A34053090 – 20190724 IPCT Response to Westfield – dated 24 July 2019 – Bundle 13 – Vol 7 – Page 144)**.

164. A report on Health and Safety compliance and assurance had also been commissioned in February of 2019 by NHS Lothian (the Callidus report) and published in May 2019. The review highlighted a number of health and safety non-conformances. This included concerns that Legionella risk assessments had not been completed and the review by Callidus in February had identified "various areas of Legionella risk" and overall, this was given a high (red) risk status in the report.

165. This report was only shared with Dr Donald Inverarity and I on 22 July 2019, but some reference had been made in passing from I think approximately mid-June 2019 onwards. This report was considered at the same meeting as the IPC review of the Westfield Caledonian report.

166. From April 2019, there was dialogue between the IPCT and Project team specifically in relation to commissioning activity and water sampling required by SHTM 04-01. For the reasons outlined above, there was insufficient information available to me or others in the IPCT to say with certainty that the hospital water system was or was not suitable for patient care.

167. In light of the ongoing IMT into infections from *Pseudomonas aeruginosa* in DCN at the Western General Hospital, we required further assurance that we were moving vulnerable patients from an area where we had both a good understanding of water quality and assurance of control measures to an area with limited understanding of water quality and limited assurance on the adequacy of control. This would have been a retrograde step in terms of patient safety for this patient group.

168. The HAI Executive Lead, Executive Medical Director, Estates Director, RHCYP Clinical Director and Programme Director, Head of Service IPC were aware of these concerns through ongoing discussion and meetings relating to RHCYP and wider IMT/water quality issues.

169. The Authorising Engineer (Water) was also aware of discussion and contributed to the advice provided to the Project team from at least 20 June 2019 onwards.

170. I have been asked to refer to an email from me to Dr Donald Inverarity, Tracey Gillies, and George Curley of 05 July 2019 **(A40986510 – Email from Lindsay Guthrie to Donald Inverarity et al advising uncomfortable to say that the water sampling passed or imply that commissioning was fully in line with the SHTM – 5 July 2019 – Bundle 7 – Vol 1, Page126).** Within the email I state that I am "a bit uncomfortable to say that the water sampling passed or imply that commissioning was fully in line with the SHTM." I communicated this in more detail as the email was a draft response to be included as part of a formal response from NHS Lothian Chief Executive to the letter received from Malcolm Wright (Chief Executive of NHS Scotland) on 4 July 2019. I was anxious to ensure that anything we were reporting was factually accurate and could be substantiated by formal documentation or through a defined process or governance structure. I did not believe that proposed statement that "assurance sampling for commission purposes has passed" to be factually accurate based on the information available to me at 5 July 2019.

171. At this time, we had had no oversight of commissioning activity as set out in SHTM 04-01 Part A section 16 (Commissioning) whether this had successfully been completed and the Authorising Engineer (Water) had not independently reviewed this. No information had been shared with me or others in the IPCT.

172. We had not yet received the results of water sampling requested by the Water Safety Group from the discussions around 19 June 2019 meeting and at meeting of 28 June 2019. Water sampling took place 1 to 12 July 2019. The information we had was not up to date and could not be used to provide assurance of water quality,

173. None of the previous sampling results had been shared contemporaneously with Microbiology or the IPCT. Where remedial work including system disinfection had been completed following positive samples, we had no information then, or at 5 July 2019, which would allow the IPCT to confirm that the actions taken were compliant with national guidance for augmented care

areas (HPS guidance), SHTM 04-01 Parts A or in line with Written Scheme of Control for Legionella.

Decision to delay opening of the Hospital.

174. The decision not to proceed with hospital opening was made by the then Cabinet Secretary on the 4 July 2019. Through attendance at the twice daily meetings held from mid June 2019 I was asked to provide a clinical IPC view on aspects of ventilation and water safety emerging from the various commissioning and validation exercises which were taking place at that time. By 1 July 2019 there was already an understanding within NHS Lothian that issues relating to ventilation in particular would almost certainly preclude the safe opening of the hospital on 9 July 2019 and that phased or partial opening was not feasible. This is because it was recognised that a paediatric hospital could not run safely without access to critical care services on the same site, and that any corrective or enhancement work undertaken within Critical Care would require the decant of patients to eliminate or mitigate any risks to patients associated with that work. This would be complex and very disruptive for patients, parents, and staff. I understand that a briefing was given to Scottish Government by the Chief Executive on 2 July 2019 to this effect. I agreed with this approach as the safest option to allow a full understanding of all defects or non-conformances and development of detailed plans to address these.

175. At the time of the decision not to open the hospital on 4 July 2019, there was insufficient information available about water quality and water safety (and specifically in relation to DCN areas) from the ongoing water sampling, and there was further work required to address defects in DCN theatre ventilation. There was also a recognition that partial occupation of the site was not desirable from a staffing and security perspective, and that any corrective works required within the paediatric areas could impact on DCN patients. For these reasons, there was consensus that it was not feasible to move DCN services at that time.

Remedial Works

176. From June 2019, I was a core member of twice daily incident calls and a core member of the Executive Steering Group which met weekly. Along with Dr Donald Inverarity, we were responsible for providing IPC advice and risk assessment relating to emerging information from the IOM reports, and then subsequently the HFS review.

177. Initially, and before the full extent of non-conformances in the critical care ventilation system were known, I contributed to an outline HAI Scribe to support what we understood at that time to be quite limited improvement work within the existing system to be undertaken after transfer of paediatric services onto site. This was drafted on 3 July 2019.

178. In conjunction with Dr Donald Inverarity, I attended the technical design workshops and provided IPC advice and assessment of design solution for critical care. With Dr Donald Inverarity, I co-authored a number of IPC risk assessment and review of external reports received (e.g. IOM, HFS) including advice on the impact of design ventilation in managing HAI risk which included paediatric critical care **(A47091309 - 20211203 NHS Lothian Infection Prevention Control Team Review of Suitability of the Performance of Redesigned Ventilation Systems in RHCYP DCN – dated 03 December 2021 – Bundle 13 – Vol 7 – Page 152)**.

179. I was an active participant in the design workshops which included scrutinising the technical design, technical conformance with SHTM 03-01, advising any clinical or IPC risks or considerations highlighted in guidance, IPC policy or emerging review from QEUH, development of HAI Scribes, completion of Stage 4 review.

180. In conjunction with Dr Donald Inverarity, I reviewed the commissioning and validation of the new system on completion and before patient services were transferred on site.

181. From 1 July 2019 onwards, I attended daily and weekly meetings with IHSL, Multiplex, NHS Lothian, and others to review and work through an action log for all ventilation remedial work for the RHCYP DCN building. This also included visual inspection of the air handling units, duct sections and plant room before and after the planned work. HFS were present during physical inspections.

182. I was at the residential PHE/HIS Engineering Aspects of Infection Control Course ('Falfield course') from Sunday 7 July 2019 until Friday 12 July 2019. My attendance at this course had been agreed and arranged earlier in the year and was not specifically related to events at the RHCYP. The rationale for attendance was partly in response to the increased focus of the importance of healthcare ventilation systems and their potential role in patient infections. This course was led by Dr Peter Hoffman of Public Health England (later consulted as an external expert by NHS Lothian) and Mr Malcolm Thomas (also later consulted by NHS Lothian as an external expert advisor). At this course, also attended by Sarah Jane Sutherland, Dr Michelle Etherson and Dr Jennifer Poyner (Microbiology Specialist Trainees) from NHS Lothian, we were able to raise queries in real time with these experts from regular communication by phone/email/text with Dr Donald Inverarity.

183. I was an active participant in the ventilation meetings in relation to high, medium, and low Value Change ventilation work and solutions for isolation room bypass arrangements, theatre ventilation, Emergency Department capacity to isolate and manage a child or young person with a high consequence infectious disease (for example Ebola).

184. I participated in meetings about Fire Remedial work, specifically where this impacted on ventilation arrangements and where HAI Scribe was required.

185. Towards the completion of all remedial work (medium and high value change, Critical care redesign, theatres) and prior to final handover in 2021, Dr Donald Inverarity and I reviewed and confirmed the ventilation design and performance (environmental matrix) for every clinical and non-clinical room in RHCYP/DCN building. This was supported by Graeme Greer, Ross Southwell, and Kelly Bain

of Mott MacDonald. The environmental matrix detailing SHTM 03-01 or CIBSE requirements, and measured performance was confirmed line by line (supply, extract, air change rate, air pressure) for all clinical and clinical support rooms (for example sluices, offices) on the site. This process took several meetings, lasting several hours over several weeks. It was a very time-consuming process and required significant concentration. Dr Donald Inverarity and I were also heavily involved in directing and supporting the NHS Lothian COVID pandemic response from early 2020 onwards. This therefore represented a significant demand on our time and impacted on other important clinically focused work. I have been asked if I consider this a realistic or appropriate use of IPC time in future projects. I do not think this is an appropriate or effective use of clinical subject matter expert time. The principal objective in this exercise was one of confirming compliant design and validation of performance against technical guidance. It did not require specific clinical infection control skill or knowledge. The input or advice of infection prevention and control specialists should only be required if derogation from design guidance is sought or where performance is not within the expected parameters. Our role in that scenario would be to advise on any clinical infection risk associated with the issue identified. However, the input of other staff would also be required as there may be other clinical or safety considerations (for example fire safety, health and safety)

186. I was involved in witnessing Helicopter test landings in 2020 to understand the potential impact and risk on ward areas (garden areas, opening windows and ventilation intake valves).

187. I was involved in all aspects of water remedial work, including ARJO bath decontamination, tap decontamination, water risk assessment. With Dr Donald Inverarity, I co-authored a number of risk assessments, papers and reports for the Executive Team and Oversight board.

188. In relation to all other issues my involvement with the design development of solutions is as the same process as above for critical care. I actively participated in: all the reviews of IOM reports; daily/weekly meetings to review Issues Log; reviewing the proposed design; advising on compliance with SHTM 03-01;

advising on clinical risk associated with design and function; witnessing commissioning and validation and Stage 4 HAI scribe prior to transfer of patient services. With Dr Donald Inverarity, I specifically, co-authored a risk assessment in relation to air change rates and pressure differentials in the Lochranza Ward.

189. I am confident that Dr Donald Inverarity and I were asked to comment on all remedial work and that our comments and advice were acted on. I am satisfied that all remedial work undertaken was fully compliant with standards and technical guidance, noting that HFS and ARHAI (previously HPS) retained oversight and input into all of these activities either directly through attendance at meetings, or through the Scottish Government Oversight Board.

Reflections on Infection Prevention and Control (IPC) involvement

190. The IPCT comprises both IPC specialist nurses (IPCN), and Consultant Microbiologists or Consultant Clinical Scientists who provide the role of Infection Control Doctor (ICD).

191. There was opportunity for IPCN involvement throughout the initial phases of the design and construction phases of the Project. The HAI Scribe lead nurse regularly attended project meetings, and site reviews, and to the best of my knowledge, this was, on the whole, a constructive and useful working relationship over this period.

192. The advice of the IPCN was sought (and provided) on a number of specific questions during design and construction.

193. I am not wholly confident that other technical or subject matter experts e.g., the Authorising Engineers, were adequately consulted to provide specialist input into aspects of both design and derogation.

194. In my view, some of the questions posed to the HAI Scribe Nurse were not commensurate with the skill, knowledge or expertise of a registered nurse. I am

confident from emails shared with me, and discussion for this and other projects that Janette Richards (latterly Rae) recognised this, and actively sought the advice of HFS Principal Architects or Engineers for technical issues in the RHCYP and other projects **(A47091311 – Email from Janette Richards to Kamil Kolodziejczyk regarding comments on Zone 2 Level 3 M&E RDD Ventilation – dated 04 June 2015 – Bundle 13 – Vol 7 – Page 156)**.

195. It is my impression that the ICD role was not explicitly considered at all stages of the Project by either the project team or others. Requests for input and advice to Consultant Microbiologists/ICDs were sporadic and often made without background information or context, which could help provide a meaningful response.

196. It is my view that some of the questions posed to the ICD would have been more readily addressed by technical/engineering experts as these relate to aspects of technical design or functionality rather than clinical risk. I am aware that the Lead ICD did suggest seeking external advice on more than one occasion.

197. I cannot say with confidence that opportunity to contribute or attend meetings equates with the opportunity to provide clinical input or advice, which was accepted by the designers, or Project team. By this I mean that in some stages of the Project, it is clear that the HAI Scribe Lead Nurse attended meetings, but it is less clear if their views or advice were always accepted and acted upon by those at the meeting. For example, this is one of the points that I highlighted to the Head of Service IPC in March 2019 in response to Brian Currie's email summarising IPC involvement in the Project. It would not be correct to equate IPC attendance at a meeting with IPCT endorsement of all actions discussed at those meetings. Please see response in paragraph 197.

198. I cannot say with confidence that advice or assessment provided by the IPCT was always documented accurately in meeting minutes or other project documentation. Please also see the email from Dr Donald Inverarity from 3 September 2019 summarising IPCT involvement in the Project specific to ventilation **(A47091306 – Email from Tracey Gillies including 6 email**

attachments related to HPS and PFS involvement in early stages of RHCYP – dated 03 September 2019 – Bundle 13 – Vol 7 – Page 160). This notes that there was a lack of clarity about the actions taken despite the documented views of the IPCT in relation to the ratio of air handling units to isolation rooms.

199. In the period up to Spring 2019, IPC input was focused solely on the practical aspects of project delivery rather than any strategic involvement with a Programme Board or other senior oversight groups.

200. I do not think there was sufficient consultation with the IPCT in the Project at the time of practical completion and Project handover. It is possible that this was because SA1 was a legal/contractual process taken for commercial reasons rather than a practical project issue which necessitated clinical IPC involvement. I have since been advised that there were significant post completion works attached to SA1 such that HAI scribe and the validation process were not possible at the time of SA1. I do not believe that the role of the IPCT is best directed towards line by line review of the Environmental Matrix in any stage of the Project. In line with sections 1.11 and 1.12 of SHFN 30 Part B October 2014, the identification of risk relies on a multi-professional team with the necessary skills and a background understanding of the principles of prevention and control of infection in the built healthcare environment. The provision of a compliant design brief and being able to demonstrate due diligence in decision making is a Project team responsibility. The IPCT have a role to play as expert advisors on aspects of clinical infection risk associated with design, and not as compliance officers to confirm that a compliant design has been achieved.

201. However, it is my view that inclusion of (consultation with) the IPCT at this stage would be in line with roles and responsibilities of the IPCT in the Project as set out in SHFN 30 Part B section 2.9. A contemporary risk assessment and input of IPCT advising on aspects of clinical risk associated with known defects or non-conformances in the RHCYP Project, the potential parallels with the QUEH Project and acknowledging the unavailability of up to date commissioning and

validation information did not take place until June 2019, some four or five months after Project handover. From an HAI Scribe stage 4 perspective (Pre-Handover check) historical information or assessments would not be considered valid if further construction, rectification or modification had subsequently taken place.

202. I am confident that the IPCT were given sufficient opportunity to be involved in the review of emerging information relating to the building and critical systems from late Spring 2019 until the building fully occupied in 2022.

203. We met on a daily, weekly and monthly basis with members of IHSL, Bouygues, external expert advisors, NHS Lothian clinical leads and Executive management. We also spoke frequently with representatives of HFS and ARHAI.

204. IPC used opportunities as much as possible, however the ability to engage in active discussion and design review, and attend meetings, during the pre-June 2019 period was to some extent limited by the capacity of one Whole Time Equivalent (WTE) nurse (Janette Rae) to support multiple capital projects (HAI Scribe Lead Adviser).

205. The HAI Scribe Lead Adviser's remit included two new hospital construction projects (East Lothian Community Hospital and RHCYP/DCN) in 2017/2018. Janette also retained a small clinical remit for infection prevention and control to ensure that she could remain current in her specialist clinical skills and knowledge and adequately meet professional revalidation requirements so her actual available time for HAI Scribe work was around 0.8 WTE. I think that support for the RHCYP project was achievable within the available capacity of the post holder. I do not think that a single post holder with 0.8 WTE capacity was sufficient to support multiple capital projects including major the construction of East Lothian Community Hospital as well as a range of other major and medium size refurbishment projects. Single post holders also represent a business resilience and continuity risk (single point of failure risk).

206. Where ICD or microbiologist input was sought, their capacity to attend meetings or respond to queries was also likely limited by the capacity in their job plans and clinical workload at the time. Reviewing project documents, architectural plans, meeting minutes, and other project documents is time consuming and requires concentration. Where specific questions or issues were raised, the IPC took time through direct discussion and email to contribute or advise. I have been asked if I think there are advantages to having project input from ICD who concurrently hold a clinical workload versus an external ICD, or one who does not have a clinical workload. The purpose (currently) of the ICD input is to provide commentary on the clinical infection risk associated with the functionality of systems within the built environment. This is achieved by applying their specialist knowledge of microbiology and the reservoirs, virulence, transmission routes for a wide range of organisms, and the presentation, diagnosis, and treatment of infection. Not all ICD are medical doctors. Some are Consultant Clinical Scientists, who are specialists in clinical diagnostics and clinical infection management but will not have held direct patient care roles. Both Consultant Microbiologists and Consultant Clinical Scientists can provide specialist clinical microbiology advice in relation to the clinical risk of infection associated with organisms which may be present in the healthcare environment.

207. However, to the best of my knowledge, environmental or Public Health microbiology is not a core component of a clinical microbiologist, or currently, the combined infection training. Environmental microbiology is a specialist area of practice in its own right, similar to Food Microbiology or Veterinary Microbiology for example. A Microbiologist with specialist training in environmental or public health microbiology may be able to offer a different and more comprehensive view on the hazards and risks associated with specific environmental organisms which may not frequently be encountered by clinical microbiologists and IPCT.

208. Currently, specific training on aspects of ventilation, water microbiology or engineering design or construction (for example) are not core components of the infection specialty training. Concurrent clinical workload is therefore not

wholly relevant to the expertise required to advise on these aspects of hospital design or function. Therefore, there could be no barrier or disadvantage to having an external Consultant Microbiologist (not ICD) who has the requisite qualifications, training, and competence to advise on aspects of infection hazard and risk associated with building or critical service design providing advice to a design and construction project. I would not view this role as materially different to that of an Authorising Engineer (Ventilation) or a mechanical ventilation design engineer contracted to provide specialist skills and input to key stages in the Project. The disadvantage of such a role may be in relation to incomplete understanding and accessing local context, contacts, systems and processes (for example laboratory records). I am not clear how a microbiologist could hold an ICD role without other clinical duties. It is my understanding that to demonstrate ongoing clinical competence/revalidation for professional registration there would have to be clinical sessions allocated in their job plans.

209. In my view, the IPCT should have been actively consulted leading up to, and at the time of Project handover in terms of SA1 in February 2019. This appears to have been a critical time in the Project where assessment of clinical and infection control risk could have been strengthened. I would advise SHTM 03-01 compliance during design and construction, however, given that the ventilation system had already been installed in February 2019, had I been consulted at this time on this specific issue, I would likely have agreed to derogation from 6 ac/hr to 4 ac/hr in general ward environments on the basis mechanical ventilation was superior to the ventilation provided in existing RHSC; scale, cost and disruption to rectify this post construction; the paucity of evidence for 6 versus 4 ac/hr and that compliant PPVL isolation rooms were provided for source and protective isolation of infectious/high risk children and young people.

210. I also think that the roles of the IPCN and ICD could have been more explicitly considered as this may have brought different, but highly complementary expertise to the Project. By this, I think that the mechanism to consult with the ICD was through the HAI Scribe Lead Nurse, rather than directly from the

Project team. A more formal recognition of the different roles that the IPCN and ICD/Microbiologist have particularly in relation to SHTM 03-01 and SHTM 04-01 would have been helpful as well as a clear and consistent approach of involving the ICD at key stages in the Project. This aligns the ethos of engaging the Infection Control Team as per SHTFN 30 Part B and with section 6.6 of SHTM 04-01 Water safety for healthcare premises Part B: Operational management and section 2.11 of SHTM 03-01 Part B: Ventilation for healthcare premises: Operational management and performance verification.

211. I think IPC involvement was valued to some extent during the Project design and construction. Where the IPC advice or approach did not concur with the wider project or clinical team position or created a perceived challenge to project cost or timeline, it is my perception that the IPC involvement was then sometimes viewed as disruptive or unhelpful and was on occasion disregarded.

212. For example, a concern was raised by the IPCT in August 2016 with regards the AHU design for isolation rooms and specifically the impact for paediatric oncology (Lochranza ward). The SBAR report produced by Janette Rae at the time outlined (correctly) the expected SHTM 03-01 specification for isolation room air change rate and pressure differential. It went on to highlight the IPCT had concerns about multiple isolation rooms in paediatric cancer services being served off a single AHU.

213. The SBAR notes the design proposal was based on cost and lack of space, and a concern raised from the construction team that “the IPCT will change their requirements”. The meeting where this issue was being considered was attended by design and project staff and the then Authorised Engineer (Ventilation).

214. The issue of technical compliance or optimal design (an AHU for each isolation room) should be considered by the technical experts and the Project team as a whole. The issue of clinical suitability and clinical infection risk is something that both the clinical team and the IPCT would specifically comment on (i.e., resilience for maintenance, impact on patient source isolation, loss of protective

isolation for vulnerable children). The design 'requirements' therefore were not specified by IPCT, they were specified by SHTM 03-01. The implications for clinical risk were:

- The SBAR suggests to me that there was a failure of both the Project and construction team to acknowledge or recognise the wider aspects of clinical risk associated with the solution.

- The SBAR makes clear that collectively; the IPCT did not find the proposal acceptable and requested this point be accurately minuted in project records having already been raised at the previous meeting.

215. Although Janette Richards (latterly Rae) was noted as in attendance at a meeting to discuss ventilation design with IHSL, Multiplex and members of the NHS Lothian Project team on 14 September 2016 (shortly after the SBAR on the Isolation Room AHU proposal was circulated) and at a follow up meeting on 3 November 2016 (**A47086951 –IHS Lothian Meeting RHSC DCN Isolation Rooms– dated 03 November 2016 – Bundle 13 – Vol 7 – Page 43)**, no contribution from her and no consideration or record of discussion on any aspect of clinical risk or risk assessment is recorded in the meetings. No other clinical staff were present at that meeting, though I note the AE for ventilation, John Reiner, was present. Janette was a confident and experienced IPC nurse who was never reticent in actively contributing to discussion or to provide challenge in a situation where she perceived there to be a clinical infection risk. Despite her regular attendance at meetings, there is limited documented evidence in minutes of her contribution on this matter.

216. A further example of this was the ongoing dialogue about Computerised Tomography (CT) scanner room air change rate specification in 2018, with clinical members of the Project team continuing to challenge the IPC view, which had already been supported by HFS in writing and shared with members of these teams.

217. Janette escalated both of these issues to myself and Dr Donald Inverarity, and we supported her position, confirming this to the Project team. Whilst this demonstrates that the local escalation, oversight and governance arrangements for the IPCT was in the whole working satisfactorily, our endorsement of Janette's advice did not necessarily influence the outcome of the discussion so not necessarily effective as part of a process to provide assurance. The CT room ventilation specification was resolved in line with HFS and IPCT advice. The advice regards provision of multiple isolation rooms from a single air handling unit was not.

218. During the latter part of 2018, and between January and early June 2019 there appeared to be a lack of understanding or willingness by the Project Team to engage effectively with the IPCT and provide information and commissioning data requested by us as in the context of the emerging concerns from QEUH and as part of project completion and 'sign off' of the HAI Stage 4 Scribe. No specific rationale was provided by the Project team for not providing or being able to provide some of this information.

219. These requests were not spurious but based on best practice or requirements of various technical documents including SHTM 04-01 and SHTM 03-01. The information requested was to evidence and provide assurance that there were no clinical or IPC risks associated with the design or construction of the hospital, particularly with reference to water and ventilation systems, and ultimately the Board could be fully assured by the Project team (including IPCT) that the building was safe and ready for occupation.

220. It was my impression that because of repeated delays in bringing the Project to completion, the Project team were perhaps frustrated by the questions and challenges we were raising and perceived these to be a possible threat and further delay to successful migration of patient services.

221. When the new HAI Scribe Lead Nurse took up post in January 2019 and requested to meet with members of the Project team to go over or update room reviews this request was met with a certain level of resistance by Janice

Mackenzie, Ronnie Henderson, and Dorothy Hanley. The Project team were adamant in discussion with Sarah Sutherland that this work was already completed and 'signed off' by Janette Rae and did not need to be repeated. No HAI Stage 4 scribes had been completed by the end of December 2018 and was advised as incomplete in discussion with Janette Rae at the time of her retiral.

222. Quite aside from the need to ensure that the IPCN with primary responsibility for the Project had opportunity to familiarise herself with the design and building, it was important that the Stage 4 HAI Scribe reflected a contemporaneous assessment of fittings, function and finish. Sarah Jane Sutherland was still within a familiarisation/development period in her new role between January and April 2019. In this period, I was very conscious of environmental hazards and risks associated with the QEUH Project, our own experience of incidents at both Western General Hospital and Royal Infirmary of Edinburgh which had a proven or potential environmental component, and the increased scrutiny on all matters relating to water, ventilation and IPC in the built environment by HPS, HFS and Scottish Government. For these reasons, Sarah Jane Sutherland worked with less autonomy in this period than Janette Rae may have done, and Dr Donald Inverarity and I took a more active role in support of Sarah and seeking information from the Project team.

223. It's not clear if the Project team recognised that ongoing construction on site over 2018 and early 2019 and action taken in response to other problems that had transpired over this time (for example the flood in 2018) impacted on the IPC assessment of risk and in being able to provide assurance/'sign off' to that effect in the HAI Scribe stage 4.

224. It is also not clear that there was recognition or acknowledgement of the wider context the IPCT and NHS Lothian found themselves at the time.

225. Issues and concerns relating to the QEUH including quality of design and construction, and possible patient infections were known to the Project team (Brian Currie provided a response to a media request in March 2019 (see

paragraph 68) re this but there appeared to be some disconnect that this should prompt actively checking and confirmation that similar issues were not likely to be found at RHCYP/DCN. Much of the information that would allow us to do this would have been contained in the commissioning data we were already requesting, and this point was reiterated by myself and Dr Donald Inverarity to individuals and collective members of the Project team several times.

226. We also highlighted through our discussions and the ongoing incidents at Western General Hospital and Royal Infirmary of Edinburgh which we were managing concurrently with input from the Executive Medical and Nurse Directors. These had highlighted that the hospital-built environment, particularly that mechanical ventilation and hospital water systems were critical aspects of a safe patient environment. Having visibility of water sampling results which were presented in a way which allowed full oversight of sampling locations, historical results and numerical values of 'failed' water tests were crucial to informing a risk assessment and immediate actions.

227. I have been asked if the Critical Care issue could have been avoided had been more involved at any particular stage of the Project. Assuming this refers to the non-compliant design to provide 4 air change/hr rather than 10ac/hr. To the best of my knowledge, the IPCT were not aware at any stage of design, construction or handover up to the point of the IOM reports were received on 2nd July 2019 that there was any non-conformance with critical care ventilation. There was regular IPC attendance at Project meetings and support provided throughout the period from 2014 until and inclusive of SA1. When asked to provide a view on ventilation design, the IPCT advice was to follow SHTM 03-01 Part A. I therefore don't think that the IPCT could have influenced this matter by further consultation or offering different advice. We were not able to influence the issue because we were not aware of it in the first place.

228. The issues in critical care appear to relate to the process for design approval, consultation, communication, and derogation rather than a lack of IPC involvement. As far as I'm aware, the Project team were not aware of the any non-conformance within critical care prior to the involvement of IOM.

229. The first time I was made aware of derogation in air change rates for 4 bedded areas from 6ac/hr to 4ach/r (which I took to mean general wards) was in a response provided to a freedom of information request passed to IPCT in April 2018 from the Project lead. At that time, I could find no other information providing background, rationale or evidence to support this derogation or records that it had been discussed with Janette Rae as the HAI Scribe lead nurse.

230. From that communication, it was my impression that the decision to proceed on with 4 air changes in 14 x multi bed wards had already been made. I am not clear what, if any, discussion had taken place with IPCT in the preceding period.

231. The only other point that IPCT were asked to comment on in general wards related to room pressure rather than air change rates for 4 bedded rooms. A need to clarify the exact location or intended clinical purpose in these areas was highlighted to the Project team, but I am not aware that this additional information was shared with IPCT.

232. The next time I was aware that 4 bed and single room ventilation was non-compliant with SHTM 03-01 in terms of 6ac/hr to 4ac/hr was in an email thread from Brian Currie in March 2019 (see paragraph 68). This was after project handover in terms of SA1 but before completion of the post completion works, HAI Scribe stage 4 reviews and patient occupation. The exact location of these 4 bed and single rooms was again not made clear to IPCT at that time but I assumed it was in general wards rather than critical care given the starting point of 6ac/hr. Please see paragraph 138 in relation to IPC involvement at SA1.

233. To the best of my knowledge there was no direct discussion with the IPCT that I was aware of, or documentation shared with us which advised that a derogation for ventilation design in Lochranza was proposed other than the issue relating to the provision of up to 5 isolation rooms from a single air handling unit as outlined above. It was our assumption that this ward would meet ventilation design specification for a ‘Neutropenic patient ward’ as per

SHTM 03-01 Part A Appendix 1 in the absence of any information provided to the contrary.

234. In all the correspondence, I was copied into, or had access to after Janette Rae retired, I am confident that the IPCT advice over the lifetime of the Project was that compliance with SHTM 03-01 Appendix 1 should be met. This is evidenced by correspondence with HPS and HFS about CT scanning rooms, and concerns raised regarding isolation room AHU provision.

235. I was not aware until 5 June 2019, when Janice Mackenzie shared the Residual Risk Log from project handover, that ventilation ("air pressure and air change rates for neutropenic patients") in Lochranza had not been provided in line with SHTM 03-01.

236. From around the summer of 2019 onwards when myself and Dr Donald Inverarity became more involved in the Project, there was more oversight and a more detailed understanding on the part of IPC of the design, condition and performance of the building systems installed there was a robust, systematic and comprehensive risk assessment of both technical issues and solutions, and the impact on patient safety and clinical care. This included but was not limited to consideration of infection control risk associated with the built environment and clinical care.

237. The scale of work required to achieve compliant and suitable critical ventilation systems would not have been achievable in a fully occupied and operational hospital.

Role of Infection Prevention and Control (IPC) in future projects

238. I have been asked how IPC involvement be improved and encouraged for future projects for the build of healthcare environments. In order to answer this question, it is important to set out the context of the current workload and workforce capacity & capability of IPCTs across NHS Scotland.

239. There are already insufficient numbers of qualified IPCN and ICD to meet the demand of existing (pre pandemic) clinical work and priorities, and the workforce has already been required to absorb significant and enduring workload associated with the healthcare-built environment. Most if not all Territorial Boards have vacancies for both IPC nurses and microbiologists.

240. The workload demand from the built environment is not solely restricted to new build projects. IPCT are required by National Infection Prevention and Control policy to lead and/or actively support incident and outbreak investigation and management relating to water quality issues, infections with potential environmental links, and any potential ‘exposure’ or near miss event. These form part of the day-to-day workload of IPCT, are frequently complex and time consuming to manage.

241. The HAI Scribe process extends to all planned and unplanned estates work from simple repairs (for example, repairing a floor, sink replacement) to extensive refurbishment or reprovision. IPCNs and ICDs are regularly involved in assessing risk and advising on mitigation and risk control relating to remedial and planned work in the healthcare-built environment. Most, but not all, of this work will be carried out in or adjacent to areas being actively used for clinical care or other critical clinical services (such as sterile instrument reprocessing). This also requires an element of ongoing ‘site’ review of control measures to provide assurance & mitigation of risk (for example, confirming presence and integrity of dust control barriers). Control measures and frequency of review correlates to the level of patient risk areas.

242. It is normal for IPCT in a large Board to have multiple HAI Scribe works in progress at any one time. This work is time consuming (high volume of work, variable complexity, ongoing follow up).

243. There is also an emerging and increasing demand from health and social care providers such as GP and Primary care providers to support both incident management and building/infrastructure improvement.

244. Concurrently, there has been the exponential & material change in the expected role of the IPCT in relation to all aspects of the built environment, specifically technical aspects of building design, water, ventilation drainage, medical gas and electrical systems over the past few years as part of normal service delivery and operational management. This workload has increased following the issues identified at the QEUH and RHCYP building projects and the creation of NHS Scotland Assure.

245. No additional resource or funding has been provided to support any new or additional IPC workload.

246. During the COVID Pandemic, and as part of wider IPC workforce review, IPCTs have been asked to pick up clinical IPC support for adult Care Homes. Additional funding and resource was provided by Scottish Government to deliver this, but there has been limited success to date in recruiting to a permanent specialist workforce.

247. The COVID pandemic has also highlighted a number of gaps across non-hospital healthcare settings and disciplines where IPC clinical support and expertise would be required or desirable. These additional demands have not been met in full and no additional resource has been identified to deliver against additional workload identified. I do not believe that the level of IPCN or ICD involvement in building projects now expected by NHS Scotland Assure, and therefore by default, territorial NHS Boards can be met from existing workforce without additional funding and resource allocation. This includes not only funding for additional posts, but also to cover additional costs associated with academic and subject specific training required to develop and demonstrate competence in this area.

248. NHS Scotland Assure advised NHS Boards on a number of occasions in 2022 at Key Stage Assurance Review (KSAR) feedback or learning events that they did not consider that a single post holder has sufficient capacity to provide IPC project support across multiple projects. They advised one dedicated WTE (or

near to) IPCN should be assigned for each project. No specific guidance has been provided on the expected ICD resource to support these types of projects. Currently KSAR reviews are only conducted in new construction or major refurbishment projects. The reference to WTE capacity required is therefore specific to this type of large scale project. KSAR workbooks do not specify the allocation of IPC resource required **(A47091308 – Quality in the Healthcare Built Environment Compliance Service– dated 02 December 2022 – Bundle 13 – Vol 7 – Page 230)**.

249. IPCT are unable to meet this expectation given the current workforce challenges as outlined above. This is a further and very significant demand on a small, and dwindling workforce. Allocation of the limited qualified IPCN and ICD resource at Board level to support building projects available means that aspects of essential clinical work will not be met.

250. NHS Scotland Assure require as part of the KSAR review process that IPCT should provide the evidence or assurance of "necessary expertise and leadership, skills, knowledge and experience" in supporting capital projects. However, no definition of the skill, knowledge or experience has been defined by either NHS Scotland Assure or NHS Education for Scotland (NES). NES published a Healthcare Built Environment Knowledge and Skills framework in 2022 **(A47091310 – NHS Preventing and reducing infection and other risks in the healthcare built environment – dated 02 December 2022 – Bundle 13 – Vol 7 – Page 248)**. I developed a local implementation plan in response to this document. NES have endorsed this as an example of good practice. The NES framework highlights that academic qualification or formal training in relevant topics alone (for example, ventilation) is not the only skill or competence required to support complex projects. It also sets out expectations for competencies in leadership, risk identification and risk management and aspects of accountability and governance.

251. Aspects of plumbing, engineering, building design and construction do not form part of undergraduate nursing or medical studies. Outside of a general awareness and understanding of mandatory policy and technical guidance,

these do not currently explicitly form part of IPC specialist postgraduate education or training. From a workforce development and resilience perspective, the priority is to have staff complete the core clinical IPC qualification and consolidate this learning into practice.

252. Therefore, the expertise, skill, leadership and experience to support complex projects cannot be provided by new or relatively inexperienced IPCNs. These skills and knowledge will take time to develop. For qualified IPCN, there will be further consolidation, development and learning required to provide sufficient capacity and resilience within Board IPC teams to support large scale or complex projects.

253. IPCN and ICDs have historically used their knowledge of microbiology, clinical procedures, healthcare processes, published evidence and peer reviewed articles to inform clinical infection risk assessment relating to the healthcare environment. Knowledge and understanding of various SHTM and other technical guidance was gained ‘on the job’ and through self-directed learning.

254. Commentary or advice relating to technical design, engineering systems or functionality has always been out of scope for the IPCT role. This was, and should continue to be a responsibility for Authorised Engineers and other suitably qualified and experienced technical experts.

255. A small number of accredited courses are available for Healthcare Engineering and Infection Control in the Built environment (which includes aspects of hospital design and water safety). Places on these courses are limited. Some are residential. All are relatively expensive (£560 to £1,800 each (excluding travel and other expenses)).

256. No additional financial uplift has been provided to NHS Boards to support continuing learning and development in this field. These additional costs have been absorbed from within existing budgets at present, often offset against staff vacancies.

257. NHS Education for Scotland (NES) have been commissioned to develop education and training resources to support IPCT but these are not due for delivery until 2024.

258. There is growing concern amongst many IPCN that the current expectation from NHS Boards, NHS Scotland Assure and Scottish Government in relation to the IPC role and the built environment conflicts with Nursing and Midwifery Council (NMC) Code of Practice in the absence of additional education training or development. The NMC code of practice requires that individuals have, and are supported to, “maintain the knowledge and skills you need for safe and effective practice”. All registered nurses must “Recognise and work within the limits of your competence”.

259. Scottish Government published an IPC workforce strategic plan in December 2022. This document highlights the existing crisis in IPC workforce capacity and sets out strategic aims to develop workforce, improve recruitment, development retention and succession planning for IPC specialists. This strategic plan does propose the creation of new non-clinical specialist posts (for example, healthcare scientists) to support healthcare built environment projects. This is an area which warrants further consideration.

260. The current focus on IPC and the expectation of the role for the built environment has been raised during staff meetings, appraisal and exit interviews as a role that IPC nurses are not comfortable to undertake as it does not readily align to their clinical or specialist training or experience, is cited as a reason for IPCNs leaving the speciality or for not wishing to pursue promoted posts.

261. At present, and following the QEUH and RHCYP, issues and inception of NHS Scotland Assure, Board IPCTs are increasingly being asked to attend lengthy meetings to review and confirm standard information or design specification in the absence of derogation from published design guidance and where there is little or no discernible impact on infection prevention and control, for example

room data sheet reviews. This has a significant impact on ability to meet other clinical workload needs.

262. Significant amount of specialist IPCT time is currently spent reinforcing information, which is already provided in extant guidance (for example SHFN 30 Part A or SHTM 04-01) and requires little or no subject matter interpretation to apply as part of a compliant design.

263. The input and expertise of Authorising Engineers and other technical or subject matter advisors on matters of technical design, specification or functionality could be more effectively utilised.

264. Basic IPC considerations could be more effectively considered in construction projects if design and project teams had better education, information, design or technical guidance, which includes many of the fundamental elements of IPC. In this way, a wider range of staff would be able to ensure that IPC requirements were already being reflected in these processes.

265. I believe that IPCTs are increasingly being used as quality control officers within projects, with an expectation of attendance at arbitrary meetings to satisfy an NHS Scotland Assure defined process.

266. More effective use of expert IPC advisors could be achieved if there was a greater focus and definition of when IPC input is rather than expecting default contribution in all aspects at all stages of the Project. IPC advisors can advise on clinical infection risks but are not necessarily best placed to advise on infection risks associated with technical aspects of design. Therefore, asking IPCN or ICD to advise or endorse a specific technical design is not commensurate with their skill knowledge or training, and therefore not the best use of their (limited) time. Questions may arise because of an absence of, or gap or conflict in, existing design or technical guidance, or as part of a necessary or desirable derogation from guidance. In these scenarios a multiprofessional risk assessment which includes specialist IPC subject matter input is required to understand potential microbiological or clinical hazards or

risks for patients, staff or the wider public. I would anticipate that IPC experts at NHS Scotland Assure could take a more active role in providing specialist advice in these types of scenarios.

267. It would also be helpful to define the roles of IPCNs and ICDs in building projects. Although these are complementary roles, these staff have different training, experience, skill, and roles, which are not always interchangeable as 'IPCT'. In many situations the input of both professionals is desirable. Nurses selecting IPC as a career option will often come to this with (and are encouraged to have) many years of post-registration clinical practice which may include providing nursing care in one or more highly specialist areas (for example critical care, theatres, acute medicine) or gaining dual registration as in both adult nursing and other branches of nursing or midwifery for example mental health, paediatric nursing). Some will come with experience of managing a ward or department which includes staff and budgetary management. Nurses will usually bring practical experience of working with a wide range of different functions and teams across the whole healthcare system (for example liaising with Estates teams to for reactive maintenance, procurement of clinical supplies, quality assuring environmental cleaning activities). Nursing staff employed as IPCNs are required to complete a specialist qualification specifically in Infection Prevention and Control (master's level) in addition to role specific training completed on the job. Medical staff will have completed foundation and core medical training, working with across a range of general or specialist clinical areas and with a wide range of other clinical disciplines (physiotherapists, pharmacists etc). They will then complete a specialty training programme in medical microbiology or combined infection training (since 2015). Specialty infection programmes focus on laboratory and clinical aspects of microbiology and infection treatment. Infection prevention and control is only one relatively small part of this programme.

NHS Scotland Assure

268. I have been asked if NHS Scotland Assure and corresponding Key Stage Assurance reviews will assist in involving IPC in new builds of healthcare environments. I think these new processes will provide limited benefit for Board level IPC teams based on the current approach.

269. The KSAR review process has primarily added a layer of external scrutiny over projects although we have been advised NHS Scotland Assure do not have a formal scrutiny function.

270. The scope of IPC 'involvement' has become too wide and lacking in definition or purpose. As outlined above, the attendance of IPC at meetings and IPC review of project documentation is now expected at all stages of the process even where there is no clearly defined need or benefit in doing so. This detracts from capacity to deliver other clinically relevant or important areas of work for Microbiology and IPC teams.

271. There appears to be limited stratification by risk of the methodology advised for projects. Whilst the scope of KSAR review is limited to new build/major construction projects at present, the methodology could in the future be applied to all capital projects– for example infrastructure work, or new health centres. The Scottish Government IPC workforce plan currently proposes an expansion of IPC remit across care homes and social care. It is not clear if other premises such as local authority education and health hubs, care homes, day centres will be expected to follow NHS Guidance or NHS Assure processes. The potential hazards and risks to patients or service users from the health or social care environments are not uniform. The need for input from IPC is not equal across all projects.

272. It is not clear why some aspects of the quality assurance or quality control of new build design or construction should focus on IPC review rather than a technical compliance review and build quality review process, that is, building control rather than infection control process.

273. I am concerned that these new processes have simply created an unrealistic workload demand on board IPCTs which is not matched with capacity or capability. In larger Boards like NHS Lothian, where there may be multiple capital projects running in parallel, there is a risk that the NHS Scotland Assure processes are in effect setting Boards up for failure from the outset if successful completion of the KSAR process is contingent on IPC input at all stages and in all projects.

274. There was no effective consultation with either the Infection Control Managers Network, ICD network or through Board Capital Planning teams or Chief Executives prior to the launch of the KSAR review. I raised this, and a number of other concerns and observations about the proposed process in an internal communication to members of the NHS Lothian Executive team on 16 March 2022 **(A47091312 – Email regarding NHS Assure key stage assurance review – dated 16 March 2022 – Bundle 13 – Vol 7 – Page 319)** and **(A47091307 – Email from Ian Graham to Lindsay Guthrie regarding NHS Assure - Key Stage Assurance review – dated 17 June 2022 – Bundle 13 – Vol 7 – Page 327)**. Since the launch of the KSAR review process, NHS Scotland Assure have run a number of engagement events. I raised the concerns outlined in my email at the events I attended. I have highlighted the current gaps in IPC training and competence my service currently has through the application of the NES Built Environment Knowledge and Skills Framework.

275. I believe that currently, there would be a greater value in NHS Scotland Assure updating or producing new and comprehensive technical and design standards for the NHS and addressing known gaps or inconsistencies in guidance. This would have a positive impact on improving safe design and may obviate the need for local risk assessment and solution generation where evidence of guidance is lacking.

276. Where there are complex technical and IPC questions, these could be answered by the NHS Scotland Assure expert advisors, and a ‘bank’ of answers maintained to ensure a consistent response on the same/similar questions

across all Health Boards. Currently, these assessments appear to sit with multiple IPC teams with varying levels of expert knowledge and experience in the built environment, so there will be variation and lack of consistency in approach at Health Board level. To date, the benefit of having expert IPC advisors within NHS Assure has yielded limited benefit for Board IPCT or Project Teams in response to questions generated by live projects.

277. I agree there is a need for more research and evidence to inform our understanding of environmental hazards in the healthcare-built environment. Many of the standards where non-compliance has created an 'infection control concern' – for example nominal derogation of 6 air changes to 4 mechanical air changes in a general ward, are not necessarily based on robust evidence or scientific data. As written, the ventilation strategy of 4 air changes (mechanical) and 2 air changes (natural) in general ward and Lochranza ward single rooms was compliant with SHTM 03-01 Part A Appendix 1. In relation to Critical Care and other high risk clinical areas, there is scientific plausibility that an increased mechanical (consistent and reliable) rate of air change rate dilution and extraction, in conjunction with the controls on directional air flow will more effectively assist the containment of transmissible infection, for example respiratory viruses, and safe management of aerosol generating procedures. The risks to patients, staff and the wider public associated with sub optimal ventilation in these settings is not uniform.

278. We are all exposed to a wide range of organisms in water, air, and the environment where we live, socialise and work every day. When these organisms are isolated in the water, air or the wider environment in healthcare buildings the clinical significance and risk associated with these findings may be uncertain. Where these organisms are isolated from clinical samples it can be challenging to establish definitively if the source exposure is from the healthcare environment or not. Many of these organisms have long incubation periods which mean that standard Healthcare Associated Infection (HAI) surveillance definitions for hospital acquisition are difficult to meaningfully apply (usually a HAI is one which presents or is diagnosed >48 hours after admission to hospital).There are no accredited laboratory sampling methodologies

available for environmental sampling, and many NHS board microbiology laboratories do not have the facilities or environmental/public health microbiology expertise to process environmental samples. Therefore, independent laboratory environmental sample results may have to be interpreted against NHS Board laboratory clinical results with caution. There is currently no clinical guidance provided on how to interpret the clinical significance of finding some/many of these organisms in water, safe parameters, or actions required should specific organisms be identified in water or other water system samples.

279. I think the definitions and criteria for where expert IPC involvement is necessary and useful needs to be stratified to define clearly where the responsibilities for non IPC staff lie in ensuring generic principles of infection prevention and control are applied to project decision making, design and construction, as regards the need for clinical IPC experts to advise on the specific aspects of hospital design, performance or maintenance which may impact on the risk of proliferation or exposure to harmful pathogens and the risk of infection transmission.

280. Priority should be given to update and address the known existing gaps and inconsistencies in technical and design guidance. This would be a role for national experts such as NHS Scotland Assure. The availability of high quality, consistent and evidence-based guidance would assist design teams, engineers, and project teams to ensure design and construction addressed and mitigated for many IPC risks.

281. Given the current challenges around IPC expert capacity and capability, there are economies of scale, which could be achieved by having NHS Scotland Assure, National Procurement, HFS and ARHAI as national advisors providing advice on a single exemplar design specification for hospital new build projects. For example, several NHS Health Boards are building new National Treatment Centres, which will all treat elective day case patients and short stay surgical patients. It appears illogical and inefficient to have each Board develop and have approved through NHS Assure KSAR review processes a safe and

compliant design and technical specification which requires the input of individual Board IPCT and different design, engineering and construction teams.

282. I am unclear why ventilation or water systems design and procurement would not be subject to national procurement assessment and contract. The design specification and performance criteria could be assessed and verified as part of a national contract award. Similarly, assessment criteria for competent designers and building contractors should be developed and provided at a national level. I am not clear what skill, knowledge or competence would be required by (or would be available from) staff at Board level to assess and endorse this level of contractor competence. As a registered nurse and clinical IPC expert, I do not believe this is within my existing skill, knowledge, or competence to advise.

Reflections

283. To the best of my knowledge, the hospital was safe to accept patients at each of its eventual phased openings. From March 2021, I considered the hospital to be safe to accept patients. This was based on the extensive and detailed review of all aspects of the built environment including critical systems (water, ventilation, electrical, drainage, fire) and the fit and finish to the standard defined in SHFN30 Part A.

284. Independent commissioning was completed, reports were shared and reviewed in considerable detail by the IPCT, clinical, project and technical advisors. HAI Scribe stage 4 reviews were completed and signed off by all core participants. The actions taken by NHS Lothian were scrutinised in detail by HPS (ARHAI), HFS and the Scottish Government's Oversight Board.

Declaration

I believe that the facts stated in this witness statement are true. I understand that this statement may form part of the evidence before the Inquiry and be published on the Inquiry's website.

Scottish Hospitals Inquiry

Witness Statement of

Stewart McKechnie

Introduction

1. My name is Stewart McKechnie. My address for the purposes of this Inquiry is c/o BTO Solicitors LLP, 48 St Vincent Street, Glasgow G2 5HS.

2. This statement has been prepared for the Scottish Hospitals Inquiry to inform them of my involvement from the stage of the Full Business Case (FBC) being submitted though construction of the New Royal Hospital for Sick Children and Young People and Department of Clinical Neurosciences in Edinburgh (RHCYP/DCN).

Professional Background

3. I have been qualified as an engineer now for over 40 years, working within mechanical and electrical engineering, however my specialism lies more towards the mechanical side. I have been a member of the Chartered Institute of Building Services Engineers (C.I.B.S.E.) for around the same length of time and a member of the Institute of Healthcare Engineering and Estate Management and Energy (IHEEM) for over 20 years. I am also registered as an Incorporated Engineer with the Council of Engineering (CEI).

4. I am employed at TÜV SÜD Ltd as a principal engineer. I previously had the title of “director” which is an engineering title within TÜV SÜD Wallace Whittle (TSWW). The term “director”, just to make clear, was used more as a seniority term, rather than inferring that I was a full director and registered as such in Companies House. The company Wallace Whittle, at the time of the RHCYP/DCN project, was owned by TÜV SÜD, but they have since had a management buyout. At the point where TÜV SÜD and Wallace Whittle parted company, I elected to remain with TÜV SÜD to assist them with various legacy

engineering issues that were ongoing at that time. Although TÜV SÜD are a huge company they do not have the same type of engineering expertise as Wallace Whittle, who were the only building services engineers that they had.

5. I worked in Wallace Whittle from 1975 until 1980 when I moved on to work with another company called Donald Smith before being invited to re-join Wallace Whittle in 1982 where I remained and progressed up the ladder to director

6. I have worked on a vast range of different types of projects, as Wallace Whittle covered quite a broad spectrum, from commercial buildings, offices, data centres, to more public sector and government work where I worked on schools and universities. I have also worked on a number of shopping/retail centres such as Buchanan Galleries and Princes Square, Glasgow and St. James Centre, Edinburgh. My work within healthcare settings has been varied as well, working on Balfour Hospital, Orkney; Craig Dunain Hospital, Inverness; Aberdeen Royal Infirmary; Queen Elizabeth University Hospital, Glasgow; Golden Jubilee Hospital, Clydebank, and Ailsa Hospital in Ayr. There will be others, but I cannot recollect them at this time. I have covered a wide range of projects, not specialising in any one area, so gaining a wide range of experience across numerous construction sectors.

Overview

7. This section seeks to give a brief recap of my roles and responsibilities as lead of the Building Services Designs during the design and construction stage of the RHCYP/DCN. I will address the following themes:

- My Role from Financial Close to Commissioning Building Services
- The Design Process
- The Reviewable Design Data (RDD) Process
- The Environmental Matrix (EM) Review Process
- Instructed Design Changes
- 4 Bed Ward Ventilation Review and Subsequent Alterations
- Site Installation Works

- Involvement in Commissioning
- Involvement with the Independent Advisor
- Rejection of the Critical Care Unit
- Opening of the RHCYP/DCN

My Role from Financial Close to Commissioning Building Services

8. I was the Building Services Design lead for the TSWW design team and as such was involved in core decisions affecting the Mechanical, Electrical and Public Health (MEP) services, timetables of information production and resource level requirements to achieve target dates for information issue, etc.

9. I am of a Mechanical Engineering background so whilst comfortable with Mechanical and Public Health Design matters, I was assisted by Senior Electrical Engineers on matters out with my specialist knowledge.

10. Following the successful achievement of Financial Close we embarked upon preparing the detailed design for all elements of the necessary Building Services designs comprising the MEP Installations and finalisation of the Environmental Matrix (EM).

11. It had been agreed by Integrated Health Solutions Ltd (IHSL) and Multiplex Construction (Europe) Limited (MPX) that all elements of the Building Services Detail Designs and EM were to be classified as Reviewable Design Data (RDD). I believe NHS Lothian (NHSL) was involved in that decision. We therefore engaged with the review team consisting of NHS Lothian (NHSL) and their advisors Mott McDonald Ltd (MML) in the RDD process managed and recorded by MPX. We engaged on the basis that our designs were to be subject to RDD and our designs always refer back to our drawings rather than the EM.)

The Design Process

12. Prior to FBC we had produced and submitted our outline design drawings which in the case of the ventilation systems confirmed the scope and strategy of the proposed ventilation systems. The ventilation drawings were outline only at this stage and still had to be fully developed. The drawings provided an indication of the areas to be mechanically ventilated which outlined the general scope of our proposals. The drawings themselves, at that time, required further development to show the finalised details of ductwork sizing, grille selection, plant selection. They would also require to be developed to show the detailed co-ordination (or interface) with other services to be installed.

13. A copy of Drawing Number WW-SZ-01-PL-524-001 **(A32479467 – WW-SZ-01-PL-524-001 - Bundle 13, Volume 6 – Page 6)** which shows a typical ventilation strategy is attached as illustrative of the outline nature of the design. A full set of strategy drawings were prepared and submitted at the time. Each one of the strategy drawings is compliant with the guidance in SHTM 03-01.

14. The RDD process is a relatively standard procedure where the designer presents their proposals for comment or approval (or both) from NHSL and their Technical Adviser. Design proposals are then revised in line with any comments before being signed off and then sent to the Contractor for preparation of their fabrication drawings.

15. At this point (financial close) we hadn't commenced our design calculations as we needed to have the Architects' BIM model. This is a 3-dimensional layout of the building which is then shared and developed with all of the designers. Upon receipt of the Architects' BIM Model we proceeded to:

    A. Calculate the airflows for each room utilising the Air Change rates as per the current Environmental Matrix (the version which formed part of the Project Agreement at financial close). We used those Air Change rates as we understood they formed part of NHSL's brief and were therefore part of the Board's Contract Requirements (BCRs)

B. Map the routings of the necessary ductwork from the rooms back to the appropriate Plantroom.
C. Calculate the system total air volumes and system resistance to allow ductwork sizing and plant selection.
D. Prepare plant schedules for grilles, fans, Air Handling Units (AHUs) etc. (Sample copies are attached).

16. Schedules of the developed Ventilation Design Information are attached to this Statement. The actual drawings and documents are contained in the Aconex system which we understand the Inquiry has access to. I have appended an index of documents which are relevant to my evidence.

17. After Completion of our Detail Design proposals the developed information was then submitted to NHSL and their advisors within the Reviewable Design Data (RDD) Process. This Process was an ongoing series of submissions, written comments, and review meetings over a number of months.

18. A list of all the submitted ventilation drawings is as follows:

- Core 2 Sheet 1 Bed Lobby Smoke Extract Ventilation System Levels 00,01 & 02
    - WW-SZ-SL-PL-524-001 **(A47045054 - WW-SZ-SL-PL-524-001 – Bundle 13, Volume 6 – Page 7)**
- Core 2 Sheet 2 Bed Lobby Smoke Extract Ventilation System Levels 03 & 04
    - WW-SZ-SL-PL-524-002 **(A47043061 - WW-SZ-SL-PL-524-002 - Bundle 13, Volume 6 – Page 8)**
- Core 3 Sheet 1 Bed Lobby Smoke Extract Ventilation System Levels 00, 01 & 02
    - WW-SZ-SL-PL-524-003 **(A47042980 - WW-SZ-SL-PL-524-003 - Bundle 13, Volume 6 – Page 9)**
- Core 3 Sheet 2 Bed Lobby Smoke Extract Ventilation System Levels 03 & 04

    - WW-SZ-SL-PL-524-004 **(A47043082 - WW-SZ-SL-PL-524-004 - Bundle 13, Volume 6 – Page 10)**
- General Ward - Ventilation Amendments Proposal
    - WW-SZ-XX-DC-XXX-010 **(A39975868 – General Ward – Ventilation Amendments Proposal – 27 July 2018 – Bundle 2 – Page 1390)**
- Intra Operative MRI Room/ Theatre Ventilation
    - WW-SZ-SL-DC-500-005 **(A47044178 - WW-SZ-SL-DC-500-005 - Bundle 13, Volume 6 – Page 18)**
- Level 02 Isolation Room Ventilation Schematic
    - WW-XX-SL-SC-524-004 **(A38137476 – 4.1.4 WW-XX-SL-SC-524-004 - Bundle 13, Volume 6 – Page 19)**
- Level 03 Isolation Room Ventilation Schematic Sheet 1 of 2
    - WW-XX-SL-SC-524-005 **(A38137478 – 4.1.5 WW-XX-SL-SC-524-005 - Bundle 13, Volume 6 – Page 20)**
- Level 03 Isolation Room Ventilation Schematic Sheet 2 of 2
    - WW-XX-SL-SC-524-006 **(A38137487 – 4.1.6 WW-XX-SL-SC-524-006 - Bundle 13 – Page 21)**
- Level B1 Ventilation Distribution
    - WW-SZ-B1-PL-524-001 **(A36636510 – 32-WW-SZ-B1-PL-524-001-FT_(A1) - Bundle 13, Volume 6 – Page 22)**
- Magnetic Resonance Imaging & Computing Tomography Ventilation, Cooling and Quench Requirements
    - WW-SZ-SL-DC-500-001 **(A36069687 – WW-SZ-SL-DC-500-001 stamped B - Bundle 13, Volume 6 – Page 46)**
- Magnetic Resonance Imaging Ventilation Schematic AHU 02-22
    - WW-SZ-SL-SC-524-008 **(A47044067 - WW-SZ-SL-SC-524-008 - Bundle 13, Volume 6 – Page 47)**
- Typical Operating Theatre Ventilation Schematic
    - WW-SZ-SL-SC-524-007 **(A38138160 – 1.1.1 WW-SZ-SL-SC-524-007 - Bundle 13, Volume 6 – Page 48)**
- Zone Z2 Level 00 Ventilation Distribution

    - WW-Z2-00-PL-524-001 **(A38137955 – 7.1.2 ww-z2-00-PL-524-001 - Bundle 13, Volume 6 – Page 49)**
- Zone Z2 Level 01 Ventilation Distribution
    - WW-Z2-01-PL-524-001 **(A38137915 – 7.1.1 WW-Z2-01-PL-524-001 - Bundle 13, Volume 6 – Page 50)**
- Zone Z2 Level 02 Ventilation Distribution
    - WW-Z2-02-PL-524-001 **(A47044134 - WW-Z2-02-PL-524-001 - Bundle 13, Volume 6 – Page 51)**
- Zone Z2 Level 03 Ventilation Distribution
    - WW-Z2-03-PL-524-001 **(A47079880 - WW-Z2-03-PL-524-001 - Bundle 13, Volume 6 – Page 52)**
- Zone Z2 Level 04 Plantroom 1 & 2 Ventilation Schematic
    - WW-Z2-SL-SC-524-001 **(A47044085 - WW-Z2-SL-SC-524-001 - Bundle 13, Volume 6 – Page 53)**
- Zone Z2 Level 04 Ventilation Plantroom 1
    - WW-Z2-04-PL-520-001 **(A36636385 – 71-WW-Z2-04-PL-520-001 (1) – Bundle 13, Volume 6 – Page 54)**
- Zone Z2 Level 04 Ventilation Plantroom 2
    - WW-Z2-04-PL-520-002 **(A36636384 – 72-WWZ2-04-PL-520-002 (1) - Bundle 13, Volume 6 – Page 55)**
- Zone Z3 Level 00 Ventilation Distribution Sheet 1 of 2
    - WW-Z3-00-PL-524-001 **(A47040357 - WW-Z3-00-PL-524-001 Bundle 13, Volume 6 – Page 56)**
- Zone Z3 Level 00 Ventilation Distribution Sheet 2 of 2
    - WW-Z3-00-PL-524-002 **(A38137938 – 7.1.3 WW-Z3-00-PL-524-002 - Bundle 13, Volume 6 – Page 57)**
- Zone Z3 Level 01 Ventilation Distribution Sheet 1 of 2
    - WW-Z3-01-PL-524-001 **(A45046667 – WW-Z3-01-PL-524-001 REV G - Bundle 13, Volume 6 – Page 58)**
- Zone Z3 Level 01 Ventilation Distribution Sheet 2 of 2
    - WW-Z3-01-PL-524-002 **(A38138200 – 1.1.3 WW-Z3-01-PL-524-002 - Bundle 13, Volume 6 – Page 59)**
- Zone Z3 Level 02 Ventilation Distribution Sheet 1 of 1

    - WW-Z3-02-PL-524-004 **(A47044076 - WW-Z3-02-PL-524-004 - Bundle 13, Volume 6 – Page 60)**
- Zone Z3 Level 02 Ventilation Plantroom Layout Sheet 1
    - WW-Z3-02-PL-520-001 **(A38138052 – 7.1.11 WW-Z3-02-PL-520-001 - Bundle 13, Volume 6 – Page 61)**
- Zone Z3 Level 02 Ventilation Plantroom Layout Sheet 2
    - WW-Z3-02-PL-520-002 **(A38137968 – 7.1.12 WW-Z3-02-PL-520-002 - Bundle 13, Volume 6 – Page 62)**
- Zone Z3 Level 02 Ventilation Plantroom Layout Sheet 3
    - WW-Z3-02-PL-520-003 **(A38137491 – 4.1.16 WW-Z3-02-PL-520-003 - Bundle 13, Volume 7 – Page 1186)**
- Zone Z3 Level 02 Ventilation Plantroom Layout Sheet 4
    - WW-Z3-02-PL-520-004 **(A38137506 – 4.1.17 WW-Z3-02-PL-520-004 - Bundle 13, Volume 6 – Page 63)**
- Zone Z3 Level 03 Ventilation Distribution Sheet 1 of 2
    - WW-Z3-03-PL-524-001 **(A33656591 – WW-Z3-03-PL-524-001 - Bundle 13, Volume 6 - Page 64)**
- Zone Z3 Level 03 Ventilation Distribution Sheet 2 of 2
    - WW-Z3-03-PL-524-002 **(A45043666 – ww-z3-03-pl-524-002 REV G - Bundle 13, Volume 6 – Page 65)**
- Zone Z3 Level 04 Plantroom Ventilation Schematic
    - WW-Z3-SL-SC-524-001 **(A47041661 - WW-Z3-SL-SC-524-001 - Bundle 13, Volume 6 – Page 66)**
- Zone Z3 Level 04 Ventilation Distribution Sheet 1 of 2
    - WW-Z3-04-PL-524-001 **(A47044143 - WW-Z3-04-PL-524-001 - Bundle 13, Volume 6 – Page 67)**
- Zone Z3 Level 04 Ventilation Distribution Sheet 2 of 2
    - WW-Z3-04-PL-524-002 **(A47044163 - WW-Z3-04-PL-524-002 - Bundle 13, Volume 6 – Page 68)**
- Zone Z3 Level 04 Ventilation Plantroom Layout
    - WW-Z3-04-PL-520-001 **(A38137522 – 4.1.18 WW-Z3-04-PL-520-001 - Bundle 13, Volume 6 – Page 69)**
- Zone Z3 Level 2 Plantroom Ventilation Schematic Sheet 1

    - WW-SZ-SL-SC-524-001 **(A47039904 - WW-SZ-SL-SC-524-001 - Bundle 13, Volume 6 – Page 70)**
- Zone Z3 Level 2 Plantroom Ventilation Schematic Sheet 2
    - WW-SZ-SL-SC-524-002 **(A47042950 - WW-SZ-SL-SC-524-002 - Bundle 13, Volume 6 – Page 71)**
- Zone Z3 Level 2 Plantroom Ventilation Schematic Sheet 3
    - WW-SZ-SL-SC-524-003 **(A47042937 - WW-SZ-SL-SC-524-003 - Bundle 13, Volume 6 – Page 72)**
- Zone Z3 Level 2 Plantroom Ventilation Schematic Sheet 4
    - WW-SZ-SL-SC-524-004 **(A47042967 - WW-SZ-SL-SC-524-004 - Bundle 13, Volume 6 - Page 73)**
- Zone Z4 Level 00 Ventilation Distribution Sheet 2 of 2
    - WW-Z4-00-PL-524-002 **(A35910398 – WW-Z4-00-PL-524-002 - Bundle 13, Volume 6 – Page 74)**
- Zone Z4 Level 00 Ventilation Distribution Sheet 1 of 2
    - WW-Z4-00-PL-524-001 **(A38137532 – 4.1.15 WW-Z4-00-PL-524-001 - Bundle 13, Volume 6 – Page 75)**
- Zone Z4 Level 01 Ventilation Distribution Sheet 1 of 2
    - WW-Z4-01-PL-524-001 **(A33656602 – WW-Z4-01-PL-524-001 - Bundle 13, Volume 6 – Page 76)**
- Zone Z4 Level 01 Ventilation Distribution Sheet 2 of 2
    - WW-Z4-01-PL-524-002 **(A47042148 - WW-Z4-01-PL-524-002 - Bundle 13, Volume 6 – Page 77)**
- Zone Z4 Level 02 Ventilation Distribution Sheet 1 of 2
    - WW-Z4-02-PL-524-001 **(A38137490 – 4.1.11 WW-Z4-02-PL-524-001 - Bundle 13, Volume 6 – Page 78)**
- Zone Z4 Level 02 Ventilation Distribution Sheet 2 of 2
    - WW-Z4-02-PL-524-002 **(A38137517 – 4.1.12 ww-z4-02-pl-524-002 - Bundle 13, Volume 6 – Page 79)**
- Zone Z4 Level 03 Ventilation Distribution Sheet 1 of 2
    - WW-Z4-03-PL-524-001 **(A33656609 – WW-Z4-03-PL-524-001 (1) - Bundle 13, Volume 6 – Page 80)**
- Zone Z4 Level 03 Ventilation Distribution Sheet 2 of 2

    - WW-Z4-03-PL-524-002 **(A33656595 – WW-Z4-03-PL-524-002 (1) - Bundle 13, Volume 6 – Page 81)**
- Zone Z4 Level 04 Ventilation Distribution Sheet 1 of 2
    - WW-Z4-04-PL-524-001 **(A47042918 - WW-Z4-04-PL-524-001 - Bundle 13, Volume 6 – Page 82)**
- Zone Z4 Level 04 Ventilation Distribution Sheet 2 of 2
    - WW-Z4-04-PL-524-002 **(A47068812 - WW-Z4-04-PL-524 -002 - Bundle 13, Volume 6 – Page 83)**

19. Those drawings relevant to the ventilation serving the critical care and haematology/oncology departments are:

- Zone Z2 Level 00 Ventilation Distribution
    - WW-Z2-00-PL-524-001 **(A38137955 – 7.1.2 ww-z2-00-pl-524-001 - Bundle 13, Volume 6 – Page 49)**
- Zone Z3 Level 00 Ventilation Distribution Sheet 1 of 2
    - WW-SZ-SL-SC-524-004 **(A47042967 - WW-SZ-SL-SC-524-004 - Bundle 13, Volume 6 – Page 73)**
- Zone Z4 Level 00 Ventilation Distribution Sheet 2 of 2
    - WW-Z4-00-PL-524-002 **(A35910398 – WW-Z4-00-PL-002 - Bundle 13, Volume 6 – Page 74)**
- Zone Z4 Level 00 Ventilation Distribution Sheet 1 of 2
    - WW-Z4-00-PL-524-001 **(A35910617 – WW-Z4-00-PL-524-001 (1) - Bundle 13, Volume 6 – Page 84)**
    - WW-Z3-00-PL-524-001 **(A36051268 – Marked Up Vent Drawings, page 2 - Bundle 13, Volume 6 – Page 85)**

20. All sleeping accommodation not treated as Isolation Rooms was provided with 4A/C as set out in the EM. Had we been asked to adopt 10 A/c then the systems would have required a redesign. We were not involved in later changes so I have no detail of those.

The Reviewable Design Data (RDD) Process

21. We are very familiar with the RDD process in both healthcare and commercial projects. The basic format is that the designer, usually (but not always) acting on behalf of a Building Contractor, submits their design proposals to the client's technical adviser for review. The technical adviser then scrutinises the proposals for their compliance with the design brief or contractor's proposals. Any comments made by the technical adviser would require to be resolved to the client team's satisfaction prior to construction.

22. This is a standard process in the building industry and a process we have had experience of on both sides of the table, as presenter and as reviewer.

23. In the normal process we would expect to review of aspects of the proposals and after issuing commentary we would only expect to revisit the queried aspects of the proposals. This would be repeated until the party approving the design was satisfied and was able to give the designs the appropriate sign off and the agreed and recognised categorisation.

24. In this instance it did not appear to work in the same way with the various reclassifications and later comments on material which had previously been approved.

25. My understanding now is that the reason for this approach was that the submissions with the EM were subject to ad hoc reviews and were reviewed in full (rather than just the unacceptable elements being reviewed). We were not aware of that approach at the time. I did offer, on at least two occasions, to provide a line-by-line review to try to move past the stalemate we were in but this was not accepted by the client team. I accept it would have been a very time-consuming process and I believe the client team did not have the resources to commit to that.

26. The RDD process required us to prepare our detailed design drawings which were then submitted to MPX for them to review. If MPX were satisfied with the

content, the drawings were then forwarded to the NHSL Team for review and classification. This was done through the Common Data Environment (CDE) or Aconex.

27. This classification consisted of attributing a status to each drawing, being either:

    A. Accepted - No Comment.
    B. Accepted - Subject to noted comments being addressed.
    C. Rejected – Revise and resubmit.

    My understanding of the NHSL review was that they checked the designs submitted met their Operational Functionality requirements which covered performance, control and maintainability of the systems.

28. These classifications were recorded by physical stamps separately provided by both NHSL and MPX. The stamps recorded the classification and were dated, scanned, and distributed via Aconex.

29. Status A or B drawings documents were then issued to the Contractor classified as “Construction Issue” to allow them to prepare their own construction drawings.

30. To aid the RDD process, we attended regular (I think they were weekly) meetings with the NHSL review team where we answered any questions they may have had about the current information being commented upon. MPX managed and recorded the outcomes of these meetings and as far as I can recall they took notes of the proceedings. The review team’s comments were captured by either accompanying emails or “marked up” copies of the submitted drawings.

31. Management of these technical submittals was formalised by use of CDE (Aconex) managed by MPX but accessible to all involved parties, this recorded drawing issue dates, recipients, status, etc.

32. Following successful submittal and categorisation of our Ventilation Design Information, the documents were then issued by MPX via the Aconex system

to their Building Services Partners, Messrs Mercury Engineering (Mercury Engineering). Upon receipt, Mercury Engineering would then have prepared their own Contractor's Installation details. Part of Mercury Engineering's Contract information issue was the preparation and submission of Technical Submissions which would have included proposed manufacturers details of Grillage, Fans, Filters and AHUs etc. This was a process managed by MPX and Mercury Engineering and the submitted information should be recorded and available via the contract Aconex account.

The Environmental Matrix (EM) Review Process

33. The review process for the EM was included within the RDD workshops with the same commenting and status stamping being applied. To my mind, the anomaly in the process was that instead of following the normal evolving designation of "A" or "B" status' and then moving to construction issues, the EM received reversals of previously agreed classifications. An example of this issue was that revision 7 of the EM was issued by us on the 19/09/2016; **(A34225612 – 2.7_0105_20161114 WW-XX-XX-DC-XXX-001 rev 07 v22 - Bundle 13, Volume 6 – Page 86)** the previously reviewed revision of this EM had received a status B. On the issue of revision 7 though, this version was now given a status C classification on the 27/10/2016 but was then given a status B on the same day despite not being updated in any way.

34. It was not entirely clear that the change in status was in respect only of additional comments made by NHSL although it seems that the "flip-flopping" on the status of the EM was to allow IHSL to both progress approved design elements whilst addressing non-compliant elements at the same time. None of the concerns raised by NHSL at this time related to non-compliance linked to air change rates or pressure regimes in critical care rooms.

35. Over the course of the project, the table below shows the summary of the status received on the EM:

date Modified	**Document No**	**Revision**	**Status**
11/02/2016	WW-XX-XX-DC-XXX-001 **(A34225512 - WW-XX-XX-DC-XXX-001 rev 01 v8 – Bundle 13, Volume 7 – Page 1187)**	01	Status C
21/04/2016	WW-XX-XX-DC-XXX-001 **(A32793987 - WW-XX-XX-DC-XXX-001 (Rev 05) - Bundle 13, Volume 6 – Page 134)**	05	Status B
27/10/2016	WW-XX-XX-DC-XXX-001 **(A34225569 - WW-XX-XX-DC-XXX-001 rev 07 v20 – Bundle 13, Volume 6 – Page 180)**	07	Status C
16/11/2016	WW-XX-XX-DC-XXX-001 **(A34225569 – 2.7_0097_20161017 WW-XX-XX-DC-XXX-001 rev 07 v20 - Bundle 13, Volume 6 – Page 180)**	07	Status C
16/11/2016	WW-XX-XX-DC-XXX-001 **(A32793988 - WW-XX-XX-DC-XXX-001 (Rev 7) – Bundle 13, Volume 6 – Page 228)**	07	Status B
20/07/2017	WW-XX-XX-DC-XXX-001 **(A32623051 - WW-XX-XX-DC-XXX-001 (Rev 9) - Bundle 13, Volume 6 – Page 276)**	09	Status B

23/11/2017	WW-XX-XX-DC-XXX-001 **(A32623055 - WW-XX-XX-DC-XXX-001 (Rev 11) – Bundle 13, Volume 6 – Page 332)**	11	Status B

36. All of this made the processing of this document, in my opinion, far more complicated than it could or should have been which led to a prolonged process which didn't align with our understanding of the purpose of the document or review process. My expectation, borne of my experience, was that the RDD would be a one shot process after Status B (or higher) was given with any further comments only being made by exception due to a change in client instructions for example in terms of room layout or use. In previous experience it was normal to have had the whole package reviewed and commented on at one time. On reflection, and in hindsight, it seems to me that things were being reviewed on an ongoing basis was due to the limited time being spent on the documents by the Technical Advisory team although that was not something I was aware of at the time. It may be that others were involved in the process but we dealt directly with NHSL and the Technical Advisors alone.

37. We would also point out that whilst we gave the document 11 revisions; these were notations to assist our internal processes. The records indicate that only five iterations were reviewed and classified by the Board. These iterations would have in some instances included alterations to suit instructed design changes.

38. Notwithstanding the apparent confusion regarding the management of the EM document there were no comments nor alterations to the core Design Figures and accordingly there were no changes made to the supply Air Change from the first to last version of the EM. The following table demonstrates this:

				Fresh Air Quantity Altered?				
Document No	Title	Revision	Date Modified	Single Bed Isolation Cubicle	Single Bed Cubicle	Open Plan Bay (4 Beds):	Open Plan Bay (3 Cots)	Single Cot Cubicle
WW-XX-XX-DC-XXX-001	Environmental Matrix	01	30/10/2014	No	No	No	No	No
WW-XX-XX-DC-XXX-001	Environmental Matrix	02	04/12/2015	No	No	No	No	No
WW-XX-XX-DC-XXX-001	Environmental Matrix	03	10/03/2016	No	No	No	No	No
WW-XX-XX-DC-XXX-001	Environmental Matrix	05	16/03/2016	No	No	No	No	No
WW-XX-XX-DC-XXX-001	Environmental Matrix	06	21/04/2016	No	No	No	No	No
WW-XX-XX-DC-XXX-001	Environmental Matrix	07	19/09/2016	No	No	No	No	No
WW-XX-XX-DC-XXX-001	Environmental Matrix	08	22/12/2016	No	No	No	No	No
WW-XX-XX-DC-XXX-001	Environmental Matrix	09	18/05/2017	No	No	No	No	No
WW-XX-XX-DC-XXX-001	Environmental Matrix	10	12/09/2017	No	No	No	No	No
WW-XX-XX-DC-XXX-001	Environmental Matrix	11	25/10/2017	No	No	No	No	No

39. Generally, the comments made by NHSL related to Operational Functionality as evidenced by the 50 comments made by NHSL on revision 2 of the EM as set out in PPP8 (paragraph 3.3.5 to 3.4.2) on the Inquiry website, after financial close.

40. Some comments on the ventilation requirements were made with reference to the SHTM guidance and some in relation to critical care rooms. We reviewed and responded to each comment made, relevant to our design, and where appropriate we amended the EM. If no comment was made by NHSL on an entry in the EM this was taken as acceptance by NHSL of that entry.

41. The core Design Figures continued to adhere to the levels advised in the initial briefed EM. From v.2 of the EM, Guidance Note 15, **(A34225378 – Environmental Matrix version 2 - Bundle 4 – Page 17, Hearing Commencing 24 April 2023)** in the text about critical care areas, it is stated "Design Criteria - SHTM 03-01 Appendix 1 for air change rates - 10 ac/hr Supply for isolation cubicles." This was an alteration added purely for clarification to align with SHTM03-01 guidance as we felt the original text was vague. There were no comments made on this text clarification at the time. It was not a Technical Change which would have required to have been highlighted. To my

mind the design for the critical care ventilation system was complete by that point.

Instructed Design Changes

42. During the contract, we received a great many instructions from MPX to amend our designs due to what appeared to be, in the main, briefing changes from NHSL.

43. To perhaps help put this into perspective we received approximately a further 30% increase to our original predicted fee value for additional Design works during the Construction Stage, which in turn obviously generated a significant additional resource requirement for my Team.

44. One of these instructed and invoiced changes involved the redesign of the ventilation system of several of the 4 Bed Wards which had been the subject of lengthy and detailed review involving NHSL; this will be explained in more detail later in this statement but the wards included Critical Care.

45. However, I would suggest that the issue of such a change order and the acceptance of additional fees related to said change order demonstrate that those involved were well aware of this redesign.

Critical Care Area Drawing Review

46. During the design process, the proposed ventilation drawing for the Critical Care area (Drawing reference - WW-Z4-01-PL-524-001) **(A33656602 – 08 WW-Z4-01-PL-524-001 - Bundle 13, Volume 6 – Page 76)** was prepared and issued through the RDD process on 02/07/2015; it subsequently received a status B on the 28/08/2015. This drawing shows the ventilation schemes for Critical Care and haematology/oncology which were submitted and signed off by NHSL.

47. It was then updated on the 01/05/2018 to include additional ductwork within the 4 Bed Wards all in line with the 4 Bed Ward Review document (attached) **(A35271103 – 4 Bed Ward Review Document – IHS00002178 - Bundle 13, Volume 6 – Page 390)**. This revision was submitted for RDD review and received a Status B from NHSL on the 08/05/2018. The document details the potential installed ventilation systems to address late comments from NHSL. It formed the basis for them to instruct alterations.

Critical Care Area Plant Reviews

48. We produced amongst our RDD pack layout drawings for the various AHUs with the units for Critical Care being detailed on Drawing WW-Z4-01-PL-524-001 (attached in Appendix) **(A33656602 – 08 WW-Z4-01-PL-524-001 - Bundle 13, Volume 6 – Page 76)** which was submitted for RDD on the 02/07/2015 and received a Status B on the 28/08/2015. The relevance of this drawing is that it shows the extent of the ventilation schemes within the Critical Care Department.

49. These units were also included in our AHU Schedule reference 04-06 (WW-XX-04-SH-524-006) **(A46720245 - WW-XX-04-SH-524-006 – Paragraph 59 (b) - Bundle 13, Volume 6 – Page 409)** which was submitted for RDD on the 10/08/2015 and several times subsequently before being given a Status A on 21/03/2017. These units were then part of Mercury Engineering's Manufacturers Technical Submission submitted on the 03/03/2017 and receiving a Status B on the 21/03/2017 **(A47045109 – Mercury Engineerings Manufacturers Technical Submission MER-XX-SL-TS-127 - Bundle 13, Volume 6 - Page 414)**.

4 Bed Ward Ventilation Review and Subsequent Alterations

50. Prior to financial close, an issue had been raised about the pressure in single rooms. As a result, the financial close EM provided for balanced pressure in single rooms but one of the RDD issues (specified in the RDD schedule of the project agreement) relating to the EM was that a detailed proposal was awaited

on bedroom ventilation to achieve balanced/negative pressure relative to the corridor.

51. The EM included in the project agreement at financial close provided for multi-bedded wards to have a positive pressure relationship to adjoining spaces, including corridors. However it was not until much later, after the Construction phase had commenced, at an advanced point, during the installation phase, by which time some of the ductwork had already been physically installed, were we advised by MPX that NHSL wished to review an alternative strategy along with its potential implications within the 4 Bed Ward units. I believe the change resulted from internal discussions at NHSL which we were not party to. I understand (from the Inquiry) that NHSL wanted to “cohort” children with similar infections together in the same rooms and that to prevent the spread of infections from those rooms it was necessary for the rooms to have a negative pressure relationship to adjoining spaces. This reasoning was not provided to us at the time either at the original briefings nor as part of the RDD process.

52. NHSL wished to explore the potential consequences involved when changing from 4 air changes within bedrooms, as set out in the EM and accepted design drawings and designed 10 air changes from the adjacent bathrooms. We were advised that as part of our review we could consider reducing the 4 A/c supply rate to 120l/s which would align with the Building Standards Vent Rate for 12 occupants.

53. This could have resulted in potentially positive pressure in the wards to the corridors if the originally designed systems were used. The potential alternative was to have a solution which achieved balanced or negative pressure to the adjacent corridor. This setup was not as easy to accommodate as it was in the single bed ward and potentially involved significant additional or amended ductwork including alterations to installed installations. The magnitude of room volume between Ward and Bathroom meant that a much higher extract rate would generally be required than was the case with the Single bedrooms This could have air quantity drawbacks potentially causing noise and user comfort

issue. A more comprehensive solution involving additional extract systems was therefore required

54. I have now had sight of risk assessments carried out by NHSL to look at the risks arising if a negative/balanced pressure arrangement was not used. I was not aware of those at the time the changes were instructed.

55. We were therefore requested to prepare reviews which looked at each and every 4 Bed Ward, including those in the Critical Care area and haematology/oncology, and prepare summaries of the potential system changes and rate their complexity if adopted.

56. This exercise included the 4 Bed Wards in the Critical Care Dept namely 1-B1-009,1-B1-031 and 1-B1-063; all of which required alterations to their existing arrangements. A typical table entry was:

> *"Retain the supply ventilation at 4ac/hr. Introduce new general extract ductwork and grille into the room to provide 4ac/hr overall. The existing general extract ductwork currently serving the room has been increased in size and another grille added to it to serve the room. This will achieve a balanced room pressure. New branch duct to be connected locally into the existing general extract ductwork main. Supply & Extract Duty 312l/s. (Equates to 31 people)".*

57. This entry was for Ward 1-B1-031, which also recorded that the "severity" of the new works was classified as medium and that ductwork for the area was already fabricated as per the original design. The reference to 31 people was an indication of the possible maximum occupancy applying the SHTM 03-01 guidance of 10l/s per person; a quantification we were asked to include within the reviews.

58. The outcome of this exercise was the change order I have referred to which was only applied to a number of NHSL selected 4-bed wards.

Site Installation Works

59. During the construction stage, we regularly visited site to attend meetings and would at the request of MPX advise on any site related issues brought to our attention.

60. The day-to-day management of the Building Services Installation activities was overseen by MPX's own dedicated site management staff and thus only involved us when deemed necessary. Site Supervision was not part of our contractual duties.

61. I believe the installation quality was also monitored by NHSL using their own in house and presumably MML operatives, but I was not involved here so can't say to what extent.

62. I would also note that Technical Submissions, generally consisting of proposed manufacturers equipment data were produced by Mercury Engineering. These Technical Submissions went through the same scrutiny, classification, and acceptance criteria by MPX and NHSL prior to their adoption.

63. I am advised (by the Inquiry) that:

- on 25.1.19, the Scottish Government wrote to NHSL seeking assurance that all critical ventilation systems were to be inspected and maintained in line with SHTM 03-01 **(A36877101 – A. Letter from Paul Gray – plant rooms and ventilation systems – 25 January - Bundle 13, Volume 6 – Page 522)**
- on 31.1.19, Wallace Weir of IHSL wrote to Brian Currie of NHSL, referring to the letter of 25.1.19 **(A42980293 – Letter from W Weir to B Currie re Plant Rooms + Ventilation Systems dated 31 January 201 - Bundle 13, Volume 6 – Page 523)**, and said "All ventilation systems have been designed, installed and commissioned in line with SHTM 03-01 as required, systems are maintained such a manner which allows handover at actual completion to meet SHTM 03/01 standards"

- on 12.2.19, Brian Currie wrote to Wallace Weir **(A40988842 – Part A 4.25 – 20190212 – Letter from NHSL To IHSL Re Assurance – 12.09.19 - Bundle 13, Volume 7 – Page 427)** seeking written assurance of inter alia that engineering systems (including ventilation) had been designed and were being installed and commissioned to meet current guidance and statutory requirements
- on 13.3.19, Wallace Weir of IHSL wrote to Brian Currie of NHSL (see bundle) **(A40988855 – Letter from W Weir to B Currie re Assurance dated 13 March 2019 - Bundle 13, Volume 6 – Page 525)** stating that the engineering systems had been designed, installed, commissioned and validated to meet the relevant project agreement standards.

64. We were not party to any of that correspondence so I cannot interpret them beyond what is set out. We had been requested to confirm that our designs were compliant with guidance (SHTM 03-01) which we did, and I am clear they were compliant.

Involvement in Commissioning

65. MPX had their own commissioning management team who controlled the commissioning process involving Independent Commissioning (IC) experts where appropriate.

66. I think it would be fair to say that we had a good working relationship with the MPX commissioning team who sought our involvement if they felt, as designers, we might be able to assist with any particular issues which arose; from memory, these were relatively few though.

Involvement with the Independent Advisor

67. I recall having some conversations with the original Independent Advisor (IA) to clarify some general design issues. That was a firm called Arcadis. The design issues queried did not concern air change rates or pressure arrangements for

rooms in Critical Care or haematology/oncology. I cannot recall having direct contact with the final appointed IA.

68. Our involvement with the final IA (which was IOM) was in the form of responses to questions raised by them in a process managed by MPX. These queries were in the form of a tracker style document which we were asked to add our comments to where appropriate. I am referring here to those schedules to which we contributed via MPX. I don't recall any of these queries requiring major alterations. I do recall MPX adopting the line of least resistance solutions to a few low consequence items. On the face of it, I could see the logic of this approach at the time in the interest of getting the installations accepted by the TA representatives.

Rejection of Critical Care Unit

69. The first indication I had that there was a potential problem in relation to the Critical Care Ward ventilation was when I received a message from MPX containing a NHSL designed alternative design to the installed and approved ventilation systems. This was (if I remember correctly) described as a compromise solution and we were asked to comment on the implications. It took the form of sketches, descriptions and air change rates. My understanding was that it had been provided to MPX and had been developed internally by the NHSL team.

70. We were not party to the first meeting held on the potential problem when it arose. We were only involved at a point after the decision was taken not to open the hospital and that was in a meeting of all parties.

71. We duly carried out and reported on this solution (see the Review of Ventilation Provisions for (B1) PICU and HDU Departments (" July 2019 report") **(A42686243 - Review of Ventilation Provisions for (B1) PICU and HDU Departments – Tuv Sud – July 2019 - Bundle 13, Volume 6 – Page 527)** however my understanding was that it was rejected by others as not acceptable, but I can't confirm who these others were.

72. Thereafter, I was invited to what I believe was the second meeting of the various parties to discuss the best way forward. That meeting took place (as referred to above) after the decision not to open the hospital, and as far as I recollect it was in late June or July 2019. At that meeting, I explained as best I could the ramifications on what NHSL appeared to now be asking for. This meeting also included a visit to the area in question where again, I tried to get over the implications of converting the 4 Bed Ward areas to pressurised spaces. I have never been provided with the minutes of that meeting, if indeed any were taken.

73. The outcome of this meeting was that the July 2019 report I had prepared on our interpretation of the SHTM Guidance was to be submitted to HFS along with a similar explanation of NHSL's position to allow HFS to compare.

74. We duly did this but to date have never received a response. Incidentally, to hopefully assist the Inquiry we have prepared and submitted a complementary report reviewing every guidance document I could find available at that time and their guidance regarding ventilation in critical care departments. That report is dated April 2022 and is entitled "Critical Care Department Briefing Review" **(A42686242 - Critical Care Department Briefing Review – Tuv Sud – April 2022 - Bundle 13, Volume 6 – Page 542)**. In summary, we couldn't find anything which supported the comments made at that time to the effect that 10 A/c and 10 Pa positive pressure should have been provided throughout Critical care and not restricted to the Isolation Rooms . Both documents have previously been made available to the Inquiry. We also requested details of similar solutions applied to other Scottish Hospitals, again nothing has been forthcoming.

75. We are not aware of +10 A/c per hour and +10PA pressure being applied to critical care rooms in other Scottish Hospitals although as indicated we have asked for that information.

76. What has transpired is that the latest revision to SHTM 03-01 now gives specific guidance on this type of accommodation **(A32353809 – SHTM 03-01 Part A dated 1 February 2014 - Bundle 1 – Page 2490)**. This guidance did not exist at the time of the RHCYP/DCN. In my opinion, this would support our view that

the criticism of the Critical Care Department Ventilation stated as being non-compliant with the then current version of SHTM03-01 was unfounded and based on opinion rather than technical guidance. The current SHTM 03-01 does now include the specific guidance on 4 bed wards which demonstrates that at the time, this guidance was missing such that the criticisms made of the design were made with no technical background and thus could only be termed "opinion".

Eventual Opening of the hospital

77. We were asked to redesign the ventilation within the Critical Care area to the new briefed criteria which we would have been keen to do as it would have allowed us to complete what was a significant landmark project for myself and my team. However, we couldn't accept the proposed wording of the instruction as it required an admission that the initial accepted design had shortcomings which we didn't agree with. The wording used stated that the design was to be in compliance with SHTM03-01. Our original design already complied with the then current version of SHTM03-01 and to accept the wording used in the instruction would have been a tacit acceptance that our solution was incorrect. We therefore suggested amendments along the line of "generally in compliance with the guidance of SHTM03-01" which were rejected by NHSL. who refused to amend their wording. We were keen to proceed in a less adversarial manner but this was not acceptable to NHSL.

78. I don't have details of the eventual design solution however I do understand that significant air sealing of the building occurred, which I had previously brought to NHSL's attention as being required to maintain the positive pressure arrangement, along with other significant works.

79. In my opinion, if the design had originally been to provide pressurised spaces then works other than simply ventilation installations would have been required, which I believe has now proven to be the case.

80. I would suggest it may assist the Inquiry if full details of the works subsequently undertaken by NHSL could be made available to all parties.

Appendices

81. We have attached the following information which will hopefully assist the Inquiry when reviewing this statement:

- Sample Pre FBC Ventilation Strategy:
  - WW-SZ-01-PL-524-001 (First Floor Ventilation Strategy) **(A36636512 – 28 – WW-SZ-01-PL-524-001-FT_A0 - Bundle 13, Volume 6 – Page 564)**
- Sample RDD process Ventilation Drawing
  - WW-SZ-B1-PL-524-001 (Level B1 Ventilation Distribution) **(A36636510 – 32 – WW-SZ-B1-PL-524-001-FT_(A1) - Bundle 13, Volume 6 – Page 22)**
- Air Handling Schematic Drawing:
  - WW-SZ-SL-SC-524-001 (Zone Z3 Level 2 Plantroom Ventilation Schematic Sheet 1) **(A46720202 - WW-SZ-SL-SC-524-001 – Paragraph 59 (d) - Bundle 13, Volume 6 – Page 565)**
- Sample grille schedule:
  - WW-Z4-03-SH-524-005 (Zone 4-2 Level 03 Schedule of Extract Grilles) **(A46720322 - WW-Z4-03-SH-524-005 – Paragraph 59 (a) - Bundle 13, Volume 6 – Page 566)**
- Sample Air Handling Unit Schedule:
  - WW-XX-04-SH-524-006 (Schedule of Air Handling Unit 04-06) **(A46720245 - WW-XX-04-SH-524-006 – Paragraph 59 (b) - Bundle 13, Volume 6 – Page 409)**
- Typical Air handling Unit drawing for Critical Care department:
  - TBC **(A47045130 – Mercury Engineerings Manufacturers Technical Submission MER-XX-SL-TS-127 – AHU 04-07 and AHU 04-09 H8.1 - Bundle 13, Volume 6 – Page 569)**

Declaration

82. I believe that the facts stated in this witness statement are true. I understand that this statement may form part of the evidence before the Inquiry and be published on the Inquiry's website.

Scottish Hospitals Inquiry

Witness Statement of

Timothy Paul Davison

Professional Background

1. My full name is Timothy Paul Davison. I am currently retired but previously held the role of Chief Executive of NHS Lothian from May 2012 until August 2020.

2. I hold a B.A. (Honours) degree in History from University of Stirling (1983); a Diploma in Health Services Management from the Institute of Health Services Management (1986); a Master of Business Administration (MBA) from University of Glasgow (1991); and a Master of Public Health (MPH) from University of Glasgow (1997).

3. I joined the National Health Service (NHS) as a graduate management trainee in 1983 and worked for the NHS for 37 years before retiring in August 2020. I spent all of my career in the NHS in Scotland working in Forth Valley, Greater Glasgow, Lanarkshire and Lothian Health Board areas. I was the Chief Executive of three NHS trusts in Glasgow between 1994 and 2005. I was Chief Executive of NHS Lanarkshire from 2005 until 2012, and then I was Chief Executive of NHS Lothian from 2012 until 2020 until I retired.

4. I was off work due to serious illness and major surgery for two periods of time between July 2016 until January 2017, and April 2018 until September 2018. During both periods, my deputy chief executive Jim Crombie was the acting chief executive and also the acting accountable officer.

Role as Chief Executive of Lothian Health Board

5. The role of Chief Executive of NHS Lothian had a number of dimensions. The first dimension was to provide leadership to the Board and its staff. The second dimension was to be the accountable officer directly to the Scottish

Parliament. Accountable Officers are personally accountable to Scottish Parliament, through the Chief Executive/Director General for NHS Scotland. This is a personal responsibility for the propriety and regularity of the public finances for the health board and ensures that the resources of the health board are used economically, efficiently and effectively. The Accountable Officer role is set out in the Scottish Public Finance Manual and its annexes, and Section 14 of the Public Finance and Accountability (Scotland) Act 2000. The third dimension was to play a strong regional role within the east of Scotland. From 2017, I was appointed by the Scottish Government as Implementation Lead for the South East of Scotland Region for the implementation of the Scottish Government's health and social care delivery plan within the three Health Board areas of Borders, Fife, and Lothian. There was also a fourth dimension, which was a national role. Most of the chief executives of health boards also undertook a leadership role on a number of national initiatives. Most recently, I was a member of the National Planning Board, and I chaired for a number of years the Reshaping Care for Older People Programme Board, which was responsible for redeveloping services for older people in Scotland.

6. The chief executive role principally involved developing the Board's strategic aims, strategic vision, corporate objectives, the organisation's values and being responsible for delivering those, and specifically overseeing and agreeing the Board's annual operating plan with the Scottish Government, which included the key objectives and milestones that we were required to meet. The role would also involve liaising with the Chief Executive / Director General for NHS Scotland, Scottish Government's Chief Operating Officer and all of the directors within the Scottish Government's Health Directorates.

7. In relation to the Royal Hospital for Children and Young People / Department of Clinical Neurosciences (RHCYP/ DCN) project, my role was to make sure that the project was appropriately resourced, that it had appropriate governance and reporting arrangements, that it had good leadership, which included executive leadership, senior responsible officer, project owner, resourcing, project team, and clear escalation arrangements, both within the Board and to

the Scottish Government and with the Scottish Futures Trust. Also, as Chief Executive I was the line manager for the executive directors. Two of my most senior and experienced executive leads worked on this project during my 8 years in Lothian - Susan Goldsmith as Director of Finance, who was also the Senior Responsible Officer (SRO) for the project from 2012 to 2015; and Jim Crombie, my Deputy Chief Executive, who was SRO from 2015 until 2020. As their line manager, I was setting their personal objectives and making sure that this project was properly reflected in their personal annual performance plans for appraisal and review.

8. I reorganised the executive team after I was appointed to the role of Chief Executive for NHS Lothian in 2012. There was a perception that the executive directors of the health board were too remote from the management of the acute hospitals division and didn't have sufficient knowledge of the day-to-day management issues to intervene effectively. Within a few months of my arrival, I decided to merge the management team for acute hospitals with the Board's corporate management team to create a greater sense of cohesion and team working between the board's executive directors and the senior staff in the acute hospitals. As part of this change, I removed the role of Chief Operating Officer for the acute hospitals division and divided the role between my Medical Director and Nurse Director who took on responsibilities for scheduled acute care and unscheduled acute care respectively. As a result, Susan Goldsmith was appointed SRO for the Project in 2012 and she reported directly to me in that role, but also as the executive Director of Finance and the executive director who was responsible for our overall capital programme across the entirety of our capital investment projects.

9. Susan's role was principally around contracts and finance, therefore it was appropriate once financial close had been achieved on the project in 2015, for Jim Crombie to become the SRO which he held right through to my retirement in 2020. This is because the SRO role would become more focused on a process around clinical engagement, operational engagement, and eventually the commissioning of the project. Both Jim Crombie and Susan Goldsmith reported directly to me, and after Susan stepped down as SRO, she remained

heavily involved in the project working alongside Jim to provide support and expertise and to allow us to continue to benefit from her deep knowledge of the project and its history. Although Jim was the SRO from 2015, Susan remained responsible for contracts and financial engagement, which was particularly appropriate when we were in dispute with Integrated Health Services Lothian Limited (IHSL) (Project Co under the Project Agreement). Our Director of Capital Planning and Projects, Iain Graham, who was heavily involved in the Project from a commercial aspect, reported directly to Susan.

10. In relation to the governance and leadership arrangements on the project, I have been asked by the Inquiry what steps I took to ensure that I was meeting the requirements of the project. The steps were fairly conventional. As Chief Executive in all of the organisations I previously worked in, I was responsible for delivering very significant capital investment programmes. We invested close to £700 million in the time that I was managing NHS Lothian, and simultaneously with this project, two other major projects, the Royal Edinburgh Hospital Phase 1, which involved capital investment of circa £60 or £70 million, and the East Lothian Community Hospital, which was a £70 million project. All of those projects required to have governance arrangements as required by the Scottish Government and detailed in Scottish Capital Investment Manual (SCIM) and as set out in NHS Lothian's standing Financial Instructions and scheme of delegation.

11. For a project of the size of RHCYP/DCN, it was really important that we were clear about governance arrangements for the board of NHS Lothian and its committee structure. For this particular project this included the delegation of oversight authority to the Finance and Resources Committee, the creation of the Project Board, the creation of the project team, and the appointment of external technical, legal and financial advisors. This project architecture was already in place when I was appointed to NHS Lothian in 2012 and I considered it to be appropriate.

12. I have been asked to detail my support structure as Chief Executive. Within NHS Lothian the Chairman and the Chief Executive's office had two

administrative staff who supported us, and we had a more senior administrative support on top of that, who fulfilled a head of office function for the Chairman and the Chief Executive. Beyond that, my team was essentially executive directors. These were the Finance Director, Medical Director, Nurse Director, Public Health Director, HR Director, Planning Director, Primary Care Director and the Chief Officer of the acute hospitals division and subsequently, from 2017, my Deputy Chief Executive. I also had the Directors of each of the four Integration Joint Boards / Health and Social Care Partnerships from Edinburgh, East Lothian, Midlothian, and West Lothian, who reported jointly to me as Chief Executive of NHS Lothian, but also to the Chief Executives of the four councils for which they were established.

13. I have been asked by the Inquiry the extent of my involvement during the various stages of the RHCYP/DCN project. My role was pretty consistent up until 1 July 2019. Up until that date, I was not heavily involved in the detail of the project. My responsibility, as described above, was to make sure that it was appropriately resourced and supported and led, but I was not directly involved in any of the detailed negotiations or discussions with IHSL or external parties such as the Scottish Futures Trust other than as one step removed through briefings from and discussions with Susan Goldsmith and Jim Crombie. My role was principally either in a governance context as participating in the Finance and Resources Committee and in the Board itself, and through directly line managing, appraising and supporting Susan Goldsmith and Jim Crombie.

14. The NHS Lothian Board delegated governance oversight of the Project to the Finance and Resources Committee. The Finance and Resources Committee reported formally to the NHS Lothian Board and any material issues, whether for decision or for consideration and information, were frequently reported formally to the full NHS Lothian Board by the Chair of the Finance and Resources Committee (a non-executive member of the board) and/or by the Director of Finance and SRO. As a general rule, all Project issues would be taken to the Finance and Resources Committee (as per the delegated authority) unless there were material issues that impacted the delivery of the

Project, its timescales and its cost which required the full NHS Lothian Board to be informed and where appropriate directly involved in scrutiny and decision making. This happened frequently during the lifetime of the project.

15. As my office was next door to the offices of both Jim Crombie and Susan Goldsmith, we would see each other on a daily basis, and I was frequently and fully briefed by them throughout the life of the project on all of the major issues that arose. There was informal opportunity for me to be briefed as issues were emerging and there were also formal opportunities through our management team meetings, whether corporate management team meetings or through one-to-one meetings that I would have with my directors. Brief informal team meetings were held every morning, along with formal monthly meetings of the Corporate Management Team. I was kept informed of any substantial issues that they may have concerns about, or that they felt they were likely to require to escalate through the governance arrangements.

16. With a project this size and, bearing in mind this was one of a number of projects that we were developing at the same time, not every problem would be escalated, but there was a lot of concern internally within NHS Lothian and at Scottish Government level about delays and cost escalation with the RHCYP/DCN project. There were a lot of issues that arose which required to be addressed, and there was judgement applied by my executive directors about on what they believed should be escalated and if they were escalating something to the committee, they would generally talk to me about it in advance.

17. From 2 July 2019 and for the rest of that week, in particular, I was heavily involved in the detail and, in fact, by circumstances which were unfortunate, I was the only senior executive around for the whole period from 2 to 5 July that week. Susan Goldsmith was on annual leave and had just gone off on holiday. My deputy Jim Crombie had just gone off on sick leave and was off for a significant and extended period beyond which was unrelated to this project.

18. Also, at that time Tracey Gillies (Medical Director) was there for the first day but then had booked time off for a family graduation. Unfortunately, Alex

McMahon (Nursing Director) had a family bereavement and was on compassionate leave at the time. I would have been drawn into developments because of the seriousness of the issue at stake but due to the above circumstances, I had to take a more hands-on role than I would normally have been required to because my senior team were largely depleted. I had plenty of people to support me, but those particular key players were not around for the whole of that week.

Ventilation Assurance

19. I have been shown the following document by the Inquiry, (**A35270542 – Letter from DG Health and Social Care and CE NHSSScotland to NHS CEs setting out a set of action about an ongoing incident (Cryptococcus infections in QEUH – 25 January 2019 – Bundle 4 – Page 8)** and asked for my reaction on receiving this letter. I was aware of the publicity surrounding the Glasgow project in the media, a lot of it was focusing on pigeons on the roof and pigeon's droppings in plant rooms. In fact, three of the four bullet points within the letter are about plant rooms and only the fourth one is about ventilation systems. I thought the letter referred to existing facilities and facilities in the process of construction. Health Facilities Scotland (HFS) (Gordon James) subsequent correspondence confirmed that to be the case. I remember it coming in, and then making sure that it was delegated through Susan or Jim, and through the Project Board and project team. Jim was the SRO at this point in January 2019 and it would be looked at in detail by the executive directors and by the project team and a response would be drafted.

20. Although delegated to Jim, I believe it was Iain Graham, Director of Capital Planning and Projects, who would be likely to pull together the response, and he reported directly to Susan Goldsmith. It probably should be worth stating that in the NHS, matrix management is as important as direct line management, and it is common that someone might report to one director but be working also in support of other directors. Iain Graham had a series of dotted lines as well as straight lines, so the straight line was to Susan, but there was also a dotted line to a number of others, including Jim. The response

to the Scottish Government by all Health Boards would have been co-ordinated by Gordon James at HFS.

21. NHS Lothian responded to Gordon James' follow up letter **(A41293071 – Three letters relating to assurances regarding the delivery of the RHSC and DCN project, dated 01 April 2019, 12 February 2019 and 13 March 2019 – Bundle 4 – Page 228, Page 244 and Page 246)** which was signed by Iain Graham but would have been drafted and reviewed by the directors who formed part of the Project Team. The letter was based on the confirmation NHS Lothian received from IHSL that the hospital had been built according to standards and in accordance with the Project Agreement.

22. Had the letter been inadequate or incomplete in some way, or if any of the senior staff involved had concerns about our ability to respond with the appropriate level of assurance, I would have anticipated that would have been raised with me and it was not. It was a fairly straightforward response and had I been concerned about the response, I would have raised my concern, because I did look at it and read it. I believe that the letter drafted by Iain did provide assurance on the four areas that the Scottish Government had set out.

23. I think the letter was fairly explanatory and tried to describe that this was a different project from the Glasgow project. It was not a capital funded project, and we did not design the building, nor did we have a relationship directly with the builder of the hospital. This was a Non-Profit Distribution (NPD) style design and build so we were one step, if not two steps, removed from the project.

24. NHS Lothian were placing reliance on IHSL and the Independent Tester (Arcadis) to ensure compliance. This is inherent in the NPD model of procurement. The Health Board had no contractual obligation or indeed right to monitor or inspect the works during the construction phase to ensure compliance. The Independent tester, Arcadis, had a role in the construction phase, including attending monthly site progress meetings, undertaking regular

inspections of the Works, identifying any work that was non-compliant and reporting on completion status of the project.

25. As noted above, I took reassurance from Mr Weir's confirmation of compliance with SHTM 03-01 in early 2019. On 31.1.19, Wallace Weir of IHSL wrote to Brian Currie (**A43103366 – IHS Lothian letter re compliance with SHTM dated 31 January 2019 – Bundle 13, Volume 7 – Page 425)** with (inter alia) confirmation that *"All ventilation systems have been designed, installed and commissioned in line with SHTM 03-01 as required, systems are maintained in such a manner which allows handover at actual completion to meet SHTM 03/01 standards"*.

26. On 12.2.19, Mr Currie wrote to Mr Weir (**A40988842 – Letter from NHSL to IHSL re assurance – 12 February 2019 – Bundle 13, Volume 7 – Page 427)** seeking written assurance on various matters, including that engineering systems had been designed and were being installed and commissioned to meet current guidance; that the engineering systems had been commissioned, validated and set to work to ensure safety, quality and compliance; and that the systems to be handed over at actual completion met the specified requirements and are safe and effective.

27. On 13.3.19, Mr Weir wrote to Mr Currie in slightly different terms to his letter of 31.1.19, (Mr Weir's letter of 13.3.19 is enclosed with Mr Graham's letter to Mr James of 1.4.19) **(A41293071 – Three letters relating to assurances regarding the delivery of the RHSC and DCN project, dated 01 April 2019, 12 February 2019 and 13 March 2019 – Bundle 4 – Page 228, Page 244 and Page 246)** confirming inter alia that the engineering systems had been designed/installed/commissioned/validated in accordance with the Project Agreement. At that time, the Project Agreement had been amended by SA1.

28. Mr Weir's letters were an appropriate description of the fact that, as advised by NHS Lothian's advisers, we had a Project Agreement that covered the issues and that we had Board Construction Requirements that were absolutely clear about the need to adhere to SHTM 03-01, subject to any agreed derogations. In hindsight, it may have been helpful to specifically mention the ventilation

derogations from SHTM 03-01 that had been agreed as part of the Supplemental Agreement (SA1) which could have prompted further scrutiny. and revealed the problem that later emerged in 2019. That said, NHS Lothian had already taken and relied on technical advice from Mott Macdonald Ltd (MML) in relation to the SA1 technical schedule, so the scrutiny of any agreed derogations had in effect already happened and we were receiving assurance that the ventilation had been designed/installed/commissioned/validated in line with what we thought we had agreed to. It is of course key to note that, at the time, NHS Lothian did not consider that it had agreed to derogations to 4ACH to critical care.

29. Even if the letters had listed the derogations, the overall outcome would have remained the same because NHS Lothian were not aware that the derogations to 4ACH for single rooms and multi-bedded rooms as set out in SA1 had also been applied by IHSL to single rooms and multi-bed rooms in critical care. The fact remained that IHSL had designed and installed a ventilation system by 2016/17 that was incapable of providing 10 air changes an hour to most of the rooms in critical care, and this failure to comply had been compounded by human error in including multi-bedded rooms in critical care in the derogation to 4ACH.

Period between January 2019 and July 2019

Settlement Agreement 1 (SA1)

30. I have been asked by the Inquiry if I had any involvement in the signing off on the SA1. I did, both in my capacity as a member of the Finance and Resources Committee and a member of the full NHS Lothian Board, but also as the line manager of Susan Goldsmith and Jim Crombie who discussed the issues that were being proposed to our governance structures with me in advance.

31. Before SA1 was agreed, NHS Lothian and IHSL were in a long-standing dispute regarding air pressure in four bedded bays together with other outstanding construction issues. In order to avoid court action and progress the completion of the construction of the hospital, both parties agreed to enter into

SA1. At this time NHS Lothian were told that IHSL were close to liquidation as there was no cash flow to meet the cost of servicing the debt arrangements under the NPD structure. SA1 included agreement on the outstanding works along with the commencement of capital payments to inject cash flow to IHSL.

32. I was aware of the severity of the concerns around the potential failure of the project and the potentially catastrophic level of further unlimited delay and uncertainty for the project's completion if IHSL collapsed. The full board of NHS Lothian and Finance & Resources Committee received reports updating on the progress with negotiations and seeking approval to enter into SA1. I was not part of the discussions on the technical matters of SA1 as this was being advanced by the Project Team along with advice from our technical advisers, MML. As discussed below, I was aware that the SA1 involved derogations from national standards and guidance but I was not aware that included derogations to rooms in critical care.

33. With regards updates to Scottish Government the interaction with them was principally through Susan Goldsmith or with Jim Crombie but mainly with Susan, who was leading on the contractual issues. There was very direct engagement between Susan and the Scottish Government, especially Alan Morrison and the wider capital team in the Scottish Government, and with the Scottish Futures Trust (SFT). Susan briefed me on her interactions with SFT and Scottish Government, so I was very confident that the engagement with the Scottish Government and with SFT was working appropriately. We were responsible for the project, the contract was with us, and our accountability was to the Scottish Government through the Board. I would expect SFT to raise issues either with us or with the Board if they felt they weren't being properly addressed.

34. I was aware that Jim Crombie had raised a number of issues with IHSL, and they responded, and that there was a lot of what I would describe as "noise in the system". There was concern that the project might slip. We had agreed to commission the hospital at the same time as the outstanding works were being completed, which I think was probably a mistake in retrospect, but we were

very keen to try and get the hospital open before the winter. Had we not agreed to SA1, there was a real risk of IHSL becoming insolvent and collapsing, in which case the project would have come to a halt. SA1 was not ideal but it was the best option available to us to keep the project alive and deliver certainty about project completion.

35. I had never been involved with an NPD project, and no one else in Scotland had in relation to a health building. Whilst I was Chief Executive of NHS Lanarkshire, I was responsible for the operational management of two large PPP hospitals at Wishaw General and Hairmyres Hospital. Therefore, I had an understanding on how the Project Agreement should work once it got to the operational phase. NHS Lothian's NPD project was the first of its type, and the last, but for such significant ongoing works to be done at the same time as the hospital was being commissioned, meant by its very nature that the validation of systems was going to be done at the last minute. In hindsight, I think that was a mistake but, I would caveat that mistake by saying that even if we had done that more conventionally, e.g. staged it so that the ongoing works were done and then commissioning thereafter, we still would have found that the ventilation was inadequate. It's just that we would have found out about the ventilation issue with more time before the planned opening. As it was, we found out a week before the hospital was planned to open.

36. I have been asked by the Inquiry if I had been advised of the ventilation issues before Jim Crombie had issued the letter to IHSL (Jim Crombie to Wallace Weir of 7.6.19 **(A41293059 – Letter from Jim Crombie to Wallace Weir on concerns about the progress of the Post Completion Works, Outstanding Work and Snagging Matters dated 7 June 2019 - Bundle 13, Volume 4 – Page 6).** I really cannot recall the detail but, I would imagine that I would have been aware through informal briefing. SA1 had around 80 items of issues on it; that there were numerous issues that were still being worked through and resolved was not a surprise to me. At that point, there was a confidence that we would be able to resolve the issues, and IHSL's response to Jim Crombie's letter was fairly reassuring.

Derogations in Settlement Agreement 1 ("SA1")

37. Up until 1 July 2019, NHS Lothian believed the Project Agreement and the published guidance were one and the same thing in relation to the application of SHTM 03-01 to critical care. Indeed, there was an independent tester (Arcadis) who had signed off on the commissioning of the ventilation systems and provided a Certificate of Practical Completion to NHS Lothian entering SA1. I think it would have been reasonable for the independent tester to at least query the ventilation arrangements for critical care as being materially non-compliant with published guidance during that process. He did not.

38. I understand there was a technical schedule to SA1, which set out all of the issues that had arisen during the project and the agreed resolutions, including in relation to derogations for ventilation, but I was not aware of the detail of the technical schedule at the time it was drafted.

39. By the time SA1 had been agreed; it was a reflection of what IHSL had already designed and installed; and NHS Lothian thought it was a reflection of what they thought had agreed to IHSL designing and installing. During the construction period, there had been three issues in relation to ventilation: (i) pressure regimes for multi-bed wards; (ii) a derogation from 6ACH to 4ACH for single bedrooms; and (iii) derogations for Lochranza which was the haemato-oncology ward. I was aware of the first two issues during construction but I cannot recall whether I was aware of the issues re Lochranza.

Pressure Regime

40. I was aware that there had been derogations agreed in SA1 in relation to the pressure regimes for multi-bed wards. Air change rates were not discussed as far as I'm aware. The clinicians' major concern was to allow patients with the same infectious diseases to be cohorted appropriately. The reason for having balanced or negative pressure in a multi-bed room is to prevent airborne pathogens leaking out from that room in to the corridor where it can reach other vulnerable patients. IHSL and Multiplex disagreed and this led to months of protracted correspondence and a threatened court action in relation to

whether NHS Lothian or IHSL had the final say on what should be delivered. This goes to the heart of the dispute and problem with NPD, which was that NHS Lothian didn't design this hospital. There was a reference design but, in terms of the contract, IHSL were responsible for reviewing and delivering a design and build that was compliant with Guidance, subject to any proposed and agreed derogations from Guidance.

41. This dispute was ultimately resolved and was included in the SA1 technical schedule to reflect that 14 of the 20 multi-bedded rooms would have balanced pressure and, in addition, 4ACH. Unfortunately, what was not flagged or picked up by anyone at that time was that, in relation to the multi-bed rooms in critical care, this was in fact a deviation from SHTM 03-01 which required balanced pressure and 10 ACH.

<u>6ACH to 4ACH</u>

42. Even before we had signed off SA1, from around May 2018 onwards IHSL were desperate for us to agree a derogation from six air changes to four air changes. However, this derogation was never mentioned in the context of critical care, which would require a derogation from 10ACH. We now know that they had already installed a system that could not achieve 6ACH, let alone 10ACH, so of course they were desperate to get us to agree derogations and it was arguably not in their interest to specifically flag that they considered that included critical care.

43. I also understand from evidence heard at prior Hearings of the Public Inquiry that the M&E designers, TUV SUD, considered that it was only isolation cubicles in critical care that require to have 10ACH, and that all other rooms would have a starting point of 6ACH, so in their mind what they delivered in critical care was in fact compliant with Guidance.

44. From what I know now, the ventilation issue had already been baked in to the building as IHSL had designed and built the hospital to 4ACH. IHSL had only ever intended the isolation rooms in critical care to have 10ACH. This non-

compliance was not flagged by IHSL or ever proposed as a derogation from Guidance and was missed by NHS Lothian and MML.

45. I understand that, in terms of NHS Lothian's Clinical Output Specification, Multiplex were informed that all the rooms within clinical care had to be interchangeable with each other and compliant with Guidance. All 24 beds had to be able to be at the level of critical care. There were plenty of opportunities for IHSL, Mulitplex, TUV SUD and MML to raise this as an issue and for the independent tester, Arcadis, to flag that the air changes are not what is required in terms of the Guidance. The independent tester seems to have accepted that the agreed position was for 4 ACH. I honestly don't know how there can be five or six parties who could and should have identified this much earlier in the process and didn't.

Lochranza

46. I cannot recall being involved in any discussion before 1 July 2019 about derogations affecting Lochranza. I only became aware of this issue subsequently as part of the second Supplementary Agreement (SA2) which documented the remedial and improvement works. I assume I was not aware of the Lochranza derogations because they were not considered to be an area of dispute and had been agreed by our Project Team and the senior clinicians in that unit. I believe had there been a problem, it would have been escalated to me. It wasn't, but I was aware of the derogations more generally, and I was aware that Glasgow had also agreed derogations as part of their building.

Commissioning and Validation

47. I was not aware of specific concerns being raised by IPC in particular about the commissioning data available but was aware of a more general acceptance by the project team and my senior directors that we required to bring in another independent tester, IOM, as part of the validation process to give us final assurance that the move could go ahead as planned.

48. We were anticipating that the IOM testing would reveal adequate responses, and it did for the vast majority of the hospital. It was this specific issue of the Critical Care unit that was raised. I think our understanding at this time was our Project Agreement had been clear, our construction requirements had been clear. IHSL had fairly recently written directly to us to confirm that they had implemented SHTM 03-01 (Wallace Weir's letter of 31.1.19) **(A43103366 – IHS Lothian letter re compliance with SHTM dated 31 January 2019 – Bundle 13, Volume 7 – Page 425)**. My senior team involved directly in the project were all clear that critical care was a 24-bedded ward as detailed in the Clinical Output Specification, it wasn't just four isolation rooms. As far as we understood it IHSL had never proposed a derogation from 10ACH for single or multi-bed rooms in critical care.

01 July 2019 - Discovery of Critical Care issue

49. I have been asked by the Inquiry of my recollection of an email sent by Tracey Gillies **(A41020535 - Email thread regarding water quality and ventilation issues - 1 July 2019 – Bundle 13, Volume 4 – Page 10)** regarding the testing conducted on the water quality and ventilation. I was aware that IOM had been commissioned to undertake pre-occupation testing of the new hospital as part of validation but I was not part of the appointment process. On the Friday evening, 28 June 2019, Susan Goldsmith had also made me aware that there were a number of issues that the IOM testing had flagged that were causing concern.

50. There were particular concerns about whether the theatres were delivering the right results. Now, at that time, I was aware that IOM had not yet fully tested every area, and so there was some uncertainty about whether the tests were accurate, whether they were fully comprehensive or whether they were partial and, of course, whether the readings that were being shown could be remedied if there was a problem. I believe that Susan was heading off on holiday the following week so had phoned me on Friday evening to brief me on a few issues, which included the IOM findings especially in relation to theatres.

51. The email on Monday followed what Susan had briefed me on the Friday evening. I knew that Tracey Gillies and Alex McMahon were going to be meeting with IOM and the project team that day and I would be briefed later in the day as to the outcome.

52. At that point, I would still have been anticipating that we could resolve these issues although it was going to be very close to the wire. That evening (Mon 01 July 2019) I received a further email from Tracey Gillies **(A41263213 - Email thread regarding RHCYP critical care ventilation issues - 1 July 2019 – Bundle 13, Volume 4 – Page 16)**, where she highlighted her concerns following the further testing of the ventilation by IOM. I don't recall opening that email on the Monday as I had probably stopped looking at emails by this time. I would have picked it up first thing on Tuesday morning and I phoned Tracey immediately, who appraised me of the situation. Following this conversation, I then arranged an emergency meeting for that morning.

53. I cannot remember whether I was aware from a conversation with Tracey Gillies on Tuesday 2 July or from Susan Goldsmith on the Friday but I was aware that even if all the theatres had not been able to pass their IOM checking, we were hoping to have at least two theatres for DCN and two theatres for the RHCYP ready and commissionable for the week ahead, with an expectation that the others would follow on track for any work that required to be done. I was very concerned because I had been fully anticipating that we would resolve the issues, however Tracey's message was pretty clear that this was unlikely to be resolved quickly.

54. I have been asked by the Inquiry what my reaction would be if individuals within the Health Board were aware of the Critical Care issue before I was informed. I would be very surprised and disappointed if someone had known about this and had been sitting on it. I should have been made aware as soon as the issue became apparent, and I believe that is what happened. I was made aware of the issue on Monday evening (01 July 2019) by Tracey Gillies and I escalated that to the Scottish Government on the Tuesday morning (02 July 2019).

55. I did become aware in the days that followed the Critical Care issues being brought to my attention that the Project Team had first been alerted on 24 June 2019 by IOM that there may be issues and that they were trying to understand the results, whether or not they were accurate and comprehensive. I also understand that the main focus that week had been on theatres. I think that was a reasonable approach.

56. I would also comment that it would not have made any material difference. If Brian Currie had escalated the IOM findings to Susan Goldsmith and Alex McMahon about Critical Care on 24 June and they had escalated it to me, then I would have known that there was a potential issue a week earlier. My understanding is that at that time they were unclear as to the severity or otherwise of the issue, which is why they did not escalate it, and were undertaking investigations to clarify the position. So escalating what was at the time a potential issue would not have made much difference and would not have changed the materiality of it. We would have been exactly where we were on 1 July, just I would have known there may be a potential issue a week earlier. The Cabinet Secretary in her statement to Parliament acknowledged that it was NHS Lothian's validation process and appointment of IOM that found the problem, no one else found the problem, but her concern was that it was found so close to the opening. The materiality of another week in the knowledge of a potential issue would have made no difference because we did not have confirmation as to the severity of the issue until 1 July.

57. I agree with the Cabinet Secretary that it was very late in the day to be finding this out. This was because we had agreed to commission the building at the same time as IHSL were completing the outstanding works as agreed in SA1. This resulted in the final validation of the ventilation system being conducted close to the opening because NHS Lothian had to wait until all the outstanding works were complete and the hospital was clean before the validation checks could begin. It was only through the validation process and instruction of IOM the issue was identified and escalated, but the issue was baked in as early as 2016/2017 and we really should have known about the proposed derogations for critical care then, but the issue was never flagged.

2 July 2019

Emergency Meeting

58. Within an hour or two of having seen Tracey's email on 2 July 2019 (email dated 1 July 2019) **(A41263213 - Email thread regarding RHCYP critical care ventilation issues - 1 July 2019 – Bundle 13, Volume 4 – Page 16)**, I convened and chaired an emergency meeting with the team. There were a number of people present at (or who had dialled in to) the emergency meeting. These included Susan Goldsmith, Iain Graham, Brian Currie, Dr Donald Inverarity, Tracey Gillies, Eddie Doyle (Associate Medical Director), Jackie Campbell (Chief Officer of Acute Hospitals), and Fiona Mitchell (Director for Women's and Children's Services).

59. It was important that I was appraised of just how serious this was, what could be done, whether the situation was retrievable and what options were available to us. It became very clear from the emergency meeting that it was very likely we would need to postpone the move to the new hospital.

60. I wanted some clarity on whether what the IOM testing was showing us was complete and accurate and if there were permanent or interim solutions available. This included questions about whether the existing plant and the existing ducting could be powerful enough to deliver 10ACH or if additional air handling units were required.

61. The discussion was along the lines of here we have a brand-new hospital and we were expecting 10ACH; we need 10ACH; and we wouldn't have agreed a derogation from 10ACH to 4ACH, knowingly or wittingly, and therefore we would not be able to move in with it being below 10ACH, unless we were confident that we could have a plan that would get us to 10ACH. We discussed things like whether there was an interim fix achievable; whether an interim fix could be done safely once we'd already moved in; how long a permanent fix would take to resolve; and if we were going to have to delay, how long it would take.

62. Discussions included issues such as a potential change of ducting; whether roof tiles would need to be taken down; what noise disruption would there be; what about dust and debris; and could it be done without a loss of operational capacity. It was our view that if the ducting was going to require changing, then it would have to be done in each of the rooms, and we would not be able to use those rooms while the work was being done. As a minimum, rooms were going to have to be closed off to allow the work to be done, and that would result in a loss of operational capacity. We could not afford to lose capacity as the RHSC was part of a national network of critical care in Scotland, in conjunction with Glasgow in particular.

63. One of the outcomes of the meeting was that those in attendance would engage with their appropriate counterparts to get answers to the questions discussed. For example, those within Infection Control would speak to HFS and HPS and those in the project team would speak to Multiplex and IHSL. We would reconvene later that afternoon and see where we had got to.

64. It became clear at that meeting that we needed to make a decision by the following day, which gave us a maximum of two working days to reach a decision because the move, albeit of administrative staff and associated equipment only, was going to start on Friday 5 July and the emergency department was due to be commissioned and opened by the following Tuesday, 9 July. My view was if this is going to be stopped, it needs to be stopped by the following day. We recognised that we might be having to make a decision with incomplete information, but we couldn’t not make a decision.

65. My recollection was there was an interim conclusion that it was highly likely that we would have to postpone some or all of the move. We had not yet reached that decision but it was clear that this was not something that we were going to be happily resolving by the end of the day, hence my escalation of the issue.

Escalation to Scottish Government

66. After the meeting I immediately phoned Malcolm Wright's office (Chief Executive NHS Scotland/Director General for Health and Social Care) and asked for an appointment to speak to Malcolm urgently that day. It was arranged that we would speak on the phone at 1pm. I briefed my chairman, Brian Houston, and he sat in with me on the telephone call with Malcolm Wright and John Connaghan.

67. The conversation with Malcolm Wright and John Connaghan was very constructive, professional, and detailed. They listened to my briefing, which described the situation, and that we were pretty clear now that the ventilation system was inadequate and could not deliver the 10 ACH without further work and we were considering our options.

68. I talked through all of the issues that we were addressing and questions we were trying to get answered. During the conversation I recall John Connaghan asking about moving in and then decanting critical care. I explained this would be difficult to achieve due to the absence of appropriate decant space adjacent to the new hospital and that a temporary modular unit decant solution would also be an expensive and lengthy process, based on my knowledge of the length it time it had taken to plan, receive the necessary consent, purchase and install a recent modular solution for additional space for the Emergency department at the Royal Infirmary of Edinburgh.

69. I was aware that there was unlikely to be a quick fix, but I also remember John Connaghan asking a question in relation to the potential for a partial move of services not reliant on critical care recognising that we were planning to move the DCN from the Western General, which was not reliant upon Critical Care at RHSC.

70. We were also looking to move the Child and Adolescent Mental Health Services (CAMHS) from the Royal Edinburgh Hospital, which is not reliant on Critical Care, and we had a whole raft of paediatric services from RHSC, such as community health services, outpatient services, ambulatory care services,

that could move in because they were not reliant on in-patient beds or theatres or an emergency department. I thought that discussion was practical, pragmatic, constructive, and we agreed that we would reconvene by phone later that day, which happened to be in the evening when I had more information.

71. I have been asked by the Inquiry if there was any indication given at that time from either John Connaghan or Malcolm Wright that the ultimate decision regarding how matters were going to proceed would be taken by the Scottish Government or was the indication that it would be the Lothian Health Board who decided what was going to happen. I don't think that was explicitly said to me at that time. I think it was very clear the following day though, on 3 July 2019, when we had a further meeting with John Connaghan **(A35827798 - Draft meeting note (1400hrs) on Commissioning and Ventilation issues at RHCYP/DCN - 3 July 2019 – Bundle 7, Volume 1 (of 3) – Page 57)** .

72. Later on in the day of 2 July, I asked our legal adviser to clarify the detail in SA1 of the rooms that had been included in the derogation to 4ACH and learnt that arguably the rooms in critical care had been included in the SA1 technical schedule. I called a meeting of all key internal colleagues and our external legal adviser and technical adviser in the subsequent few days to begin to understand how the critical care rooms had arguably been included in the derogations. It was clear that multi-bed rooms had been included because the drawings referred to included 4 bedrooms located in critical care. As above, we had wanted multi-bed rooms to have balanced pressure but were unaware that was a derogation from Guidance in relation to multi-bedrooms in critical care. It was not clear that the derogation for single bedrooms from 6ACH to 4ACH expressly applied to single rooms in critical care. However, given the error in the Environmental Matrix it was arguable that it did.

73. The priority work agreed with Scottish Government was to get the ventilation issue resolved and get the new hospital opened as quickly as possible, rather than get too distracted by investigation as to how it had happened. The KPMG review of governance arrangements and the Grant Thornton Report eventually overtook the investigative process.

Communications

74. I have been asked about a briefing note sent by email by Judith MacKay, NHS Lothian's Communication Director **(A35827755 – Email from Judith McKay (NHS Lothian) to Chief Executive et al attaching a Comms Handling Plan - 3 July 2019 - Bundle 7, Volume 1 (of 3) – Page 70).** The briefing (**Page 71**) summarised the internal discussion held during the course of day on Tuesday 2 July 2019. It was a snapshot of what was known as that time and it evolved through the course of the next few days where a clearer understanding of the issues developed.

75. Judith Mackay had also drafted a briefing (SBAR) regarding the emerging Critical care issue which included potential options. This was emailed to myself, Malcolm Wright and Alan Morrison. It was forwarded on to the Cabinet Secretary and John Connaghan by Alan Morrison **(A35184277 - Email from Alan Morrison to Rowena Roche et al attaching a RHCYP brief – 25 July 2019 – Bundle 7, Volume 1 (of 3) – Page 36)**.

76. This was the beginnings of agreeing communications strategies about what was likely to happen in the next day or two between Judith and her comms team. The way that Scottish Government works is that they have departments that deal directly with functions of boards, so not everything from government comes through the chief executive. The finance directorates would be speaking directly to the finance director, the performance people would be speaking directly to the acute hospitals people, etc. I would have asked Judith to make sure that she was pulling together communications lines and agreeing them with the communication team at Scottish Government, and I know that Judith would have been in very regular dialogue with them as this was emerging.

3 July 2019

HFS/HPS meeting

77. I dialled into a meeting on the morning of 3 July 2019, with Alan Morrison, Eddie McLaughlan, and Ian Storrar from HFS, Lisa Ritchie from HPS and Iain Graham and Jackie Campbell from Lothian Health Board. The minutes of that meeting are within **(A35827794 - Email forwarded by Iain Graham – Bundle 13, Volume 4 – Page 1326)**. It was a helpful meeting in that it was intensely pragmatic and practical. I remember outlining our current understanding of the situation, the fact that we were uncertain about how long it would take to fix this problem, the impact that it was likely to have in terms of noise and air pollution, and how much of the facility we would have to close down in order to do any remedial work. The focus was on RHCYP rather than the DCN.

78. The feedback from HFS and HPS was to consider whether we had a contingency plan for what would happen if we moved in but could not fix it adequately, could not decant it adequately and would the lose operational capacity. I told them we did not have a contingency plan and were unlikely to have one developed within the next six hours. We continued to discuss the situation and all came to the conclusion that the move was too risky. We did discuss the condition of the RHSC at Sciennes and, had there been a view that Sciennes was unsafe or that DCN was unsafe, then that would have been a stronger driver to move. However, the clinical view that was clearly expressed to me by Eddie Doyle, Associate Medical Director, supported by Tracey Gillies, Medical Director, was that remaining at Sciennes was a low-risk option **(A41292981 – Sec21_B_00001857 – Bundle 13, Volume 4 – Page 20)**. The current site was a safe environment, a known environment, and we would be moving from a safe and known environment into an unknown environment in terms of not knowing how the fix could be achieved.

79. I was aware that the site at Sciennes had no mechanical ventilation, but safety is a very multi-dimensional concept: air changes is one issue, air pressure another, but there are others such as appropriately trained staff and having the right number of staff, clinical supervision and procedures.

80. Staff and patient safety is a much more rounded multi-dimensional concept than just ventilation. The ventilation is one component, but the view was that Sciennes was safe and therefore there wasn't an immediate patient or staff safety pressure that said we must move.

81. Separately, at the DCN we had more concerns because of the Pseudomonas risk but, again, the view was that Pseudomonas is something that occurs in old hospital buildings but was being managed with appropriate Infection Control measures that we were implementing. Our principal priority in all of this was how do we ensure the safety of our patients and staff? The conclusion was it was too uncertain to move the critical care unit, there was no contingency plan, there were too many unknowns.

82. We discussed what a phased move in could look like. It would have taken subsequent engagement with clinicians to plan it, because we'd never thought about moving in on a phased basis, but we felt that it was at least feasible that we could move some parts of paediatric services. These could be big volume services like outpatients, community child health services, ambulatory care services, possibly even some forms of day surgery could potentially have gone on. We also could have moved in elements of CAMHS and the Inpatient Unit eventually and our view was we could, and should, proceed with moving DCN in.

83. There were issues about clinical adjacencies for DCN, about fire evacuation, about catering. There were issues about anaesthetic rotas because DCN was part of the adult critical care service but, paediatric theatres also had anaesthetic junior medical staffing, and so there were issues that if the totality of DCN and paediatrics were not moving in, we had to consider whether that gave us enough anaesthetic cover across all of the rotas, from the junior to the most senior. Because we would not be moving everything in we would have had to dislocate Critical Care cover from the Western General to move into the Royal Infirmary.

84. At the meeting with HFS (Eddie McLaughlin and Ian Storrar) and HPS (Lisa Ritchie) there was an agreement that Critical Care could not move in, or should not move in, however it was not HFS and HPS call to make. They would be giving me their advice, but we were managing the service. There was definitely agreement that we should not proceed with Critical Care and therefore should not proceed with the other interdependent services although I don't think we discussed that with them as our discussion was principally around Critical Care and we came away from that meeting all on the same page. I have been asked by the Inquiry if the consensus of not moving was in relation to the Critical care unit alone or the entire hospital. At this point in time it was for the Critical Care unit alone. I think there was a feeling that the other ventilation issues could be remediable in time and would not have prevented the move. The issue with Critical Care was the clinical interdependencies meant that if the critical care move was delayed, then we would also have to delay the move for the Emergency Department, all paediatric in patient services and most theatre work. It is very much like the pieces of a jigsaw, once you've said Critical Care is not able to move, then all paediatric inpatient services, would have had to stay at the RHSC, unlike DCN, which was to be supported by adult critical care at the Royal Infirmary of Edinburgh

85. In summary, there were issues that still had to be resolved but our thinking was that we could have proceeded with a phased move if the Cabinet Secretary was agreeable to that. We would need to go away and start engaging with all of our clinicians to put together a phased plan, which would still have involved an element of delay to the planned opening. Had the Cabinet Secretary agreed with my recommendation that we come forward with a re-phased plan, we would have spent the next two or three weeks developing that plan, having those discussions, and deciding what we could move and when.

<u>Internal meeting</u>

86. At one o'clock on 3 July 2019 I reconvened my group and we had a meeting. At the start of the meeting, we did not have a firm view. It was clear in people's minds what the options were and the pros and cons of each of the options, but

we were aware we needed to make a recommendation in terms of NHS Lothian's preferred option to Scottish Government, to be discussed with the Scottish Government at a meeting scheduled for later on that day.

87. We identified four potential options as possible routes forward and the minutes of that meeting **(A41292981 – Sec21_B_00001857 – Bundle 13, Volume 4 – Page 17)** summarise how these options were reached. In summary, there were four options available:

- *"Continue with the planned move and attempt to deliver a permanent fix for the ventilation problem while the Critical Care Unit remained open.*
- *Continue with the planned move of all services and then decant Critical Care into a modular build unit to allow the optimum solution to be delivered in an empty environment.*
- *Defer moving into the new building altogether.*
- *Re-phase the timing of the move into the building to allow a phased occupation over the next few weeks and months."*

88. The fourth option was NHS Lothian's preferred option. As detailed earlier, my initial view was that NHS Lothian would be making the decision of which option we went with because we were running the project but by the meeting at one o'clock on 3 July, I was articulating to my team that the Scottish Government would be making the decision. I can only assume that John Connaghan had said that to me when he phoned me on the evening of the 2 July, but I don't recall the exact conversation. I presume that he informed me that the Cabinet Secretary has been briefed and she wanted to make the decision and it was agreed to reconvene at a meeting with Scottish Government at 2pm on 3 July.

89. I was fairly pragmatic about this decision as Health Boards only exist as a vehicle for the government to run the Health Service. The government had a very low bar about ministerial intervention in the Health Service. Since the Scottish Government came to power in 2007, there had been a far more

micromanaged approach to the Health Service from government than had previously existed under other regimes.

90. There was also a presumption against the centralisation of clinical services from multiple hospital sites to a single or fewer sites, such as centralising emergency departments on fewer sites. So even fairly low scale decisions that would previously have been made by Health Boards were now reserved for ministers to decide upon because of the presumption against centralisation. For the Scottish Government to want to micromanage and take control of a highly public problem would not have been a surprise to me.

Meeting with Scottish Government at 2pm

91. At two o'clock on 3 July a number of individuals left the meeting and John Connaghan and Suzanne Hart then joined us from Scottish Government. I believe Suzanne had a role in communications for Scottish Government. We were also joined by Alan Morrison who dialled in to the meeting. John was very clear at the start of the meeting that the Cabinet Secretary was going to make the decision on the way forward and would be briefed following this meeting. I was therefore being asked for my advice on what I thought the options were, what my appraisal of the options was, and what my advice would be about how to proceed. I recommended the fourth option detailed above, i.e. that we re-phase the timing of the move into the building to allow a phased occupation over the next few weeks and months.

92. During this meeting John Connaghan did ask whether there were any other issues that could emerge or was it just the Critical care unit that was the extent of the position. I believe Malcolm Wright had also posed that same question to me. At that time, I was confident that there were no other issues and that was my response to John Connaghan. It was the Critical Care issue that was causing the problem, and that there was nothing else of materiality that would stop the move, and that was our honest opinion. I have been asked by the Inquiry if I recall John Connaghan being told about the derogations

implemented in the Lochranza Ward, which is where the Haematology and Oncology unit was located. I don't think we discussed that at all at this meeting.

93. Another issue raised by John Connaghan during the meeting was the development of a communications plan. At the end of that meeting, John asked me to set out my understanding of the issues in writing, the options we had considered, my appraisal of the options and my advice about the preferred options as we had discussed during the meeting. In other words, he was comfortable with the preferred option that I had described. I was anticipating that he would be briefing the Cabinet Secretary that he had met with NHS Lothian and that our proposal is reasonable. He didn't say he was going to do that, and he wouldn't because, at the end of the day, his advice to ministers is confidential, but he didn't suggest any opposition to it. I assumed because of that, that he was generally supportive of our position, but I also am long enough in the tooth to know that ministers don't always accept advice from colleagues or from civil servants, and he had made clear the Cabinet Secretary would make the decision and therefore that decision might not be in line with what we were recommending. That was a fully possible outcome.

94. I anticipated that he would be briefing the Cabinet Secretary, and that Judith Mackay would be working on the communications plan on that basis. At that time, my understanding and my expectation was that, although the Cabinet Secretary was making the decision, we were still responsible for the contract and the service therefore NHS Lothian would be leading on communicating both internally with our own staff and also externally. It was my belief that the Scottish Government would be supportive of this position and that was my expectation until the evening of the 3rd July, when the position changed.

95. Following the meeting with Scottish Government, as requested, I sent an email to Malcolm Wright and John Connaghan **(A41020529 – RHCYP_DCN Commissioning ventilation – Bundle 13, Volume 3 – Page 1141)**, which outlined the four options that NHS Lothian had considered and our preferred option of re-phasing the timing of the move into the building to allow a phased occupation over the next few weeks and months.

96. This was my assessment, having taken advice from the range of people, which included my chairman, HFS, HPS, my clinical colleagues, the senior colleagues within NHS Lothian and my discussions with John Connaghan. However, this never went to the Finance and Resources Committee or the NHS Lothian Board, because there was not enough time. This was my assessment as NHS Lothian's Chief Executive, in the time available.

97. I have been asked by the Inquiry if John Connaghan agreed that the actions and preferred option was authorised on behalf of Scottish Government. I don't think that was the case. I don't think he was in a position to agree or not with NHS Lothian's preferred option, because he had told us that the Cabinet Secretary would make the final decision. He will have been reserving his view for advising the Cabinet Secretary and advice to ministers is confidential.

98. If the Cabinet Secretary had agreed with our preferred option, NHS Lothian would have immediately put in place rapid engagement with the senior clinicians and managers of those services to ask if / when the services were able to move. Outpatient services and DCN would likely have taken priority and been one of the first to move. I have been asked by the Inquiry if the outpatient services and DCN would have moved on 9 July as planned. It would have been premature to have made that assumption. However, there was more of an expectation that DCN could and should move because it was largely ring-fenced and supported by adult critical care from the main adult critical care unit in the existing Royal Infirmary of Edinburgh.

<u>Communications</u>

99. At this time, we were also putting together a communications plan as we were anticipating having to go public the following morning with whatever the Cabinet Secretary would decide upon. I was liaising with Judith Mackay from our Communications team, who was desperately trying to pull communication lines together based on what was being discussed at the meeting. In retrospect, the lines were a bit ahead of themselves.

100. On the evening of 3 July, I was in touch with John Connaghan and Malcolm Wright, and I believe both had seen the communications plan Judith had pulled together by this point, when he told me that the Cabinet Secretary wanted to lead on the communications. The Cabinet Secretary did not want me speaking to the press or to staff until her lines had been agreed and she led them, so there would be no meetings with staff. As part of Judith's communications plan, she had a timeline for when things had to be done, people told, which is seen in **(A35827755 – Email from Judith McKay (NHS Lothian) to Chief Executive et al attaching a Comms Handling Plan - 3 July 2019 - Bundle 7, Volume 1 (of 3) – Page 71)**, but the message was that we had to wait until the Cabinet Secretary had agreed her lines. With the news that the Scottish Government would now lead on communications, I emailed Judith and advised her of the change and that things were being taken out of our hands. This is seen in my email to Judith at 2132 hours, 3 July **(A35827759 – Email from Tim Davison (CE) TO Judith MacKay et al advising timings for opening of RHCYP is too soon – 3 July 2019 – Bundle 7, Volume 1 (of 3) – Page 73).**

101. If I had been sitting in front of the press the following morning, as had been planned, I would have been saying what Fiona Mitchell, Director of Operations, had said, not what Judith had written down. I would have said that by the end of the week there would be a clearer understanding of the potential phasing of non-critical function moves and the numbers of staff involved. I would have been conveying that we had a problem, that we can't move in without fixing it because we can't move critical care and therefore a number of other services will also not be moving in. I would have been clear that we would work with clinicians to put together a re-phasing plan in the next few weeks/months. Even though Judith had the communications plan it was not set in stone, it was her trying to keep a pace with a rapidly changing environment. Communication lines can change and evolve.

102. I have been asked by the Inquiry if I had not had the conversation with John Connaghan and Malcom Wright on 3 July would the communications plan drafted by Judith have been released the next morning. I don't believe it would have.

103. I sent an email out telling staff that the timings were too early, and we would need to reassess them when we knew the government's position **(A35827759 – Email from Tim Davison (CE) TO Judith MacKay et al advising timings for opening of RHCYP is too soon - 3 July 2019 – Bundle 7, Volume 1 (of 3) – Page 73)**.

104. Confusingly, the cabinet secretary's subsequent statement to Parliament talked about a re-phased move and NHS Lothian being asked to come forward with plans for a re-phased move.

04 July 2019

105. On 4 July 2019 we were awaiting the announcement from the Cabinet Secretary. At that time I had no indication from the Scottish Government that option four for a re-phased plan (NHS Lothian's preferred option) was not agreeable and that the move was to be halted in its entirety. I was aware that the Cabinet Secretary was going to make an announcement on 4 July 2019, but we did not know what she was going to say. We were expecting to hear it from about eleven o'clock, and we kept phoning the Scottish Government and we kept being told it would be there in an hour. We were expecting it by lunchtime, and I think it came at about 4.30 in the afternoon eventually, so it was much later than expected.

106. At the RHSC at Sciennes, Fiona Mitchell and her team had organised staff briefings because people knew there was a problem because we were having all these urgent meetings. We literally had staff walking along the corridor to go into a boardroom to be updated, only for us to inform them that we had no update yet. We were waiting for the announcement and staff started hearing things and very quickly knew that there was something going on. When the Cabinet Secretary made her announcement that afternoon staff had already picked up that this was a big problem.

107. We had an expectation that we would be told of the Cabinet Secretary's decision before it went public but that didn't happen.

108. Later that evening I received a letter from Malcolm Wright **(A35827763 – Letter from Malcolm Wright to Tim Davison confirming that the Cabinet Secretary has taken the decision – 4 July 2019 – Bundle 7, Volume 1 (of 3) – Page 79)**, which I believe was the first written confirmation that the move was to be halted in its entirety. I don't think my reaction was anything other than it was the Cabinet Secretary's decision. She had made it clear she wanted to make the decision. There was a bit of a nuance between whether we have a phased move or whether we pause the whole thing and have a re-phased move subsequently, with the latter being ultimately what happened. Malcom Wright's letter also says that any re-sequencing of the move would only occur once the Scottish Government had received clearance that all technical standards had been met including lessons learned from the commissioning of the new Queen Elizabeth building. At this time, I was not aware of the lesson learnt for the Queen Elizabeth hospital nor the full extent of the issues at the hospital.

109. Within the letter, Malcom Wright notes that the decision was made following further information that emerged over the course of yesterday and last night (3 July). I have been asked by the Inquiry if I know what further information Malcolm was referring to. I don't particularly know what other information he was referring to other than the detail that had been discussed between myself and John Connaghan at the meeting held at 2pm on 3 July.

05 July 2019

110. On the morning of 5 July 2019, I chaired an internal meeting and the letter I had received from Malcom Wright **(A35827763 – Letter from Malcolm Wright to Tim Davison confirming that the Cabinet Secretary has taken the decision – 4 July 2019 – Bundle 7, Volume 1 (of 3) – Page 79)** was used as an agenda for the meeting. The minutes of this meeting are within (**A35827762 – Draft note of meeting on RHCYP/DCN Commissioning and Ventilation – 5 July 2019 – Bundle 7, Volume 1 (of 3) - Page 90)**. We were looking to address the actions that Malcolm had raised in the letter, which included transport for patients, telephone helpline and communications with patients.

The Cabinet Secretary's decision also led to the Scottish Government advising NHS Lothian that they would now be handling all communications.

111. I was surprised at that decision and thought it was unnecessary, unrealistic, and practically almost impossible. I thought at the time that it was because they wanted to have absolute control of the public messaging about the issue and I assumed this was part of the Scottish Government's tendency to micro manage and demonstrated a lack of confidence and trust in NHS Lothian's senior leadership team. I and my Communications Director did communicate this to Scottish Government but their view persisted. We were in a position where we were being instructed that we couldn't say or write anything to brief staff, without it having been prior approved by the Scottish Government. Because things were moving quickly, there were things that we wanted to say that had operational impact or that people needed to know, that were taking hours and hours, if not days, to be turned around by Scottish Government. By the time they were approved, they were out of date and the world had moved on again, which inevitably led to informal communications being relayed out to staff. I was irritated by this and surprised by it. I thought it showed a lack of trust that was unjustified. We had not done or said anything that was inappropriate and nor would we have intended to.

112. The letter from Malcom Wright also sought assurance that there were no other material specification deficiencies in the new building. I was by now aware of the issues within the Lochranza ward, but these were under an agreed derogation, and would not have stopped the move going ahead. We were not aware of any other issue that would have caused the hospital to have been delayed, and had the Critical Care issue not been identified, we would have moved in.

113. It is not accurate to say that we didn't think there were any issues. There were lots of issues, and HFS and HPS came up with a raft of issues but, none of them in our view were sufficient to have merited on their own a delay to the move, unlike the issues in Critical Care.

114. These were all issues that we believed could have been remedied while we were occupying the building and during the course of normal maintenance. We have a massive real estate in NHS Lothian, including some very modern buildings and some very old buildings, and doing major capital works within our buildings while continuing to provide services was not unusual for us. We were of the view that critical care was the only 'show stopper' issue that caused the delay, and it remains my view.

115. I have been asked by the Inquiry if the issues that were emerging at the Queen Elizabeth University Hospital were perhaps influencing some of the views held around the differentiation between what is a material deficiency, which would delay opening a hospital, and those which could be remedied when a hospital was occupied. I don't know if I can answer that, I think the only direct link that I could see was around Lochranza because learning was appearing from Glasgow. The RHCYP/DCN had already been designed and largely completed as issues arising from the Glasgow project came to light.

116. At the internal meeting on 5 July a decision was taken to set up an Incident Management Team (IMT), which later became the Executive Steering Group, with the first meeting held on 8 July 2019. When something of significance with consequences happens, an adverse event, an IMT will be set up and it's often around infection control, and this became very much about infection control and safety. An IMT is about pulling together the appropriate people with the appropriate expertise and the appropriate authority to go through a standard procedure, which is to identify the problem, the background issues, proposed actions and what happens next. The problem in this context was twofold: (1) how can we move to the new hospital; and (2) how do we sustain services in the existing sites.

117. Firstly, how do we identify a solution for Critical Care, who is going to design and complete the remedial works and how much is it going to cost. We also had to identify how long it would take to complete the remedial works, the appropriate standards etc.

118. Secondly, both the RHSC building at Sciennes, and the DCN building at the Western General had their problems, but we invested money in continuing to improve facilities to the extent that we could. We invested about £4 million across both sites, trying to improve the environment and installing new wet rooms and showers in DCN around the Pseudomonas issue. The politicians had made their decision, they were doing all the communicating, but we were still running the services and we needed to come up with a fix. I believe we were addressing those issues appropriately and, while it would have been better to have been able to move into a brand-new hospital, we believed that we were managing those two sites appropriately, given the circumstances. We were not feeling that there was an unacceptable level of risk, rather we were aware that there was risk but the risk was being appropriately managed.

119. Following the internal meeting I responded to Malcom Wright's letter by way of email, providing an update on where we were with transport, helpline and our communications plan for staff and patients **(A35827764 – Email from Tim Davison to DGHSC Update on Transport, Telephone Helpline, Direct Communication to individual patients and Communications - 5 July 2019 – Bundle 7, Volume 1 (of 3) – Page 96)**.

6 & 7 July 2019

120. The weekend of 6 and 7 July 2019 followed with a number of meetings with Scottish Government. I was only able to attend the meeting on Sunday 7 July. A summary of those meetings is within **(A40988309 - Email from Tracey Gillies to Alex McMahon RHCYP/DCN Weekend Teleconference – includes topics discussed at the RHCYP.DCN weekend Teleconference – ventilation is covered - 7 July 2019 – Bundle 7, Volume 1 (of 3) – Page 149)**. My recollection from that time is that we were very much still communicating throughout that weekend, through texts, emails, or phone calls. The communication lines were open and fluid.

121. During these meetings Brian Currie, Project Director for RHCYP/DCN, was asked to explain what happened between the period of him being aware of a potential issue within Critical Care on the 24 June, and to the matter being escalated to the senior leadership team on 1 July. This is highlighted in **(A40987561 – Email from Brian Currie to Alex McMahon et al with an attachment on clinical risk assessments. Also provides reasons for derogation - 7 July 2019 – Bundle 7, Volume 1 (of 3) – Page 155)**.

122. I have been asked by the Inquiry if I was satisfied with the explanation that I was given for the delay in escalating matters to the senior leadership team. I wasn't very satisfied with anything at this point. I was hugely shocked and embarrassed by the whole thing. I couldn't believe that we had arrived at this situation. One of my responsibilities as Chief Executive was to make sure that the Project was appropriately led and resourced, and I thought it was appropriately led and resourced. We had plenty of people who should and could have picked this issue up during the Project, so I was very surprised that it hadn't been identified until such a late stage in the Project. As the subsequent Grant Thornton report at paragraph 47 **(A32512442 - Grant Thornton Report – NHS Lothian Internal Audit Report – Report for the Audit and Risk Committee 31 July 2020 and the NHS Lothian Board 12 August 2020 - Bundle 10, Page 11)** (see paragraph 158 below) described there were a number of 'missed opportunities' to identify the critical care ventilation problem: 'These opportunities were not identified by the clinical director for the project, the Project Director, the project team, the technical advisers, those parties involved in reference design, Project Co including Multiplex and the Independent Tester. Collectively the error was missed by all parties.'

123. Brian Currie confirmed that from 24 June he and members of the Project Team had been investigating and addressing the emerging IOM reports and that was why the critical care issue had not been escalated earlier than 1 July. There had been a history of problems with this project, and their initial view was this was another issue to identify and seek a solution for. There was the letter from Jim Crombie to IHSL a month or two earlier with a list of issues (**A41293059 –**

Letter from Jim Crombie to Wallace Weir on concerns about the progress of the Post Completion Works, Outstanding Work and Snagging Matters – 7 June 2019 – Bundle 5 – Page 101).

124. I can imagine at one level Brian was thinking this was just one more issue to resolve. I can understand that context but, in retrospect, I am also surprised that critical care wasn't raised as an issue straight away because, until that point, air change rates were never raised as an issue and all the discussions had been around air pressures.

125. I was surprised that compliance issues in the critical care design had never been picked up until IOM did their testing. I still find it astonishing that no one in the project team, the project director, the Project Board, the technical advisors, IHSL or Multiplex ever raised it at any point during the Project, and I was not really accepting of any of it at that time.

126. I was not satisfied with the explanation given and I pressed for an answer at a meeting the following week but no one could explain why we had collectively missed that IHSL had installed a ventilation system with 4 air change per hour in critical care. I kept being told that air change rates in critical care were never discussed or identified as an issue. All of the debate about ventilation had been focused on air pressure regimes and temperature but not air change rates. Maybe it was simply being overwhelmed by masses of data and not being able to see the wood for the trees but neither the KPMG or Grant Thornton (see paragraphs 151 and 152) investigations really got to the bottom of why air change rates had not been identified as a major problem.

Site Visit

127. On 9 July 2019 the Cabinet Secretary, Malcolm Wright, and Catherine Calderwood (Chief Medical Officer), carried out a site visit to the RHSC at Sciennes, where they met the Chair, Brian Houston and me. I recall this meeting as being extremely frosty. The Cabinet Secretary opened it in a way that expressed her dissatisfaction with the whole situation with the

RHCYP/DCN and threw the ball to us to say something in response. My chairman started by saying how sorry we were that it had happened and how shocked we had been about it, and he invited me to brief her on our understanding of what had happened and why, and what we were doing about it.

128. However, because I had been briefing John Connaghan and Malcolm Wright and others about everything that was happening, and they had already briefed her, she knew pretty much everything there was to know. She was dismissive of what I was telling her and just kept saying, "I know all that''. So, the meeting didn't really go well, and then she expressed her view that it was the Board's failure and in particular a failure of governance. I believed that it was premature for the Cabinet Secretary to have come to that conclusion which appeared to ignore the roles and responsibilities of all parties involved in the project including our technical advisors, IHSL and Multiplex. KPMG's review of governance carried out subsequently confirmed that appropriate governance systems were in place and that they operated as they were designed to do.

129. The Cabinet Secretary had arranged the visit to meet my staff, but had deliberately excluded us from the walkaround, which was unusual. The Cabinet Secretary had recently visited our services on a couple of occasions, and those visits would had been hosted by me or by one of my senior team, and we accompanied the Cabinet Secretary as she walked around and talked to staff. The fact that she was excluding us, so it was the local team managing the hospital who were showing her around, rather than the leadership of the Board was irregular, and I was disappointed by that.

Executive Steering Group

130. I have been asked by the Inquiry what the IMT achieved. The IMT became the Executive Steering Group (ESG). The ESG was a forum which brought together all of our key internal, managerial, advisory and clinical people to try and come up with the fix to the problem, to assess the HFS/HPS reviews. The ESG terms of reference state **(A41348347 - RHCYP and DCN Exec Steering**

Group Terms of reference - 23 August 2019 – Bundle 13, Volume 4 – Page 88).

'To provide a forum for NHS Lothian executive management to consider all business relating to responding to and addressing the delay to the Royal Hospital for Children & Young People and Department of Clinical Neurosciences.

The work of the executive steering group will inform what NHS Lothian executive management provides to and responds to:

- *The Scottish Government Oversight Board: Royal Hospital for Children & Young People, Department of Clinical Neurosciences and Child & Adolescent Mental Health Services (Oversight Board).*
- *The NHS Lothian Finance & Resources Committee.*
- *The NHS Lothian Healthcare Governance Committee*
- *Lothian NHS Board.*

The Royal Hospital for Children & Young People and Department of Clinical Neurosciences Programme Board will address issues relating to communicating with staff and managing contingency arrangements in the period until it has been confirmed when the transfer of services will occur.

Once the Scottish Government Oversight Board has confirmed that the transfer of services can occur, the Royal Hospital for Children & Young People, Department of Clinical Neurosciences Programme Board will resume responsibility for the planning and management of the transfer. At this point the executive steering group will cease to meet.'

131. The ESG coordinated all of the work that was being done to try and identify solutions to the problem. It allowed us an opportunity to discuss things that were then being fed into the Scottish Government's Oversight Board and to discuss decisions that had come out of the Oversight Board and work out how

best to deal with them. Even with the Oversight Board, NHS Lothian were party to the contract with IHSL, and subsequently for the remedial work, therefore NHS Lothian were the party legally responsible for the resolution we were effectively doing most of the work.

132. Along with coordinating all of that the work, the ESG was providing a conduit between NHS Lothian Board and Scottish Government's Oversight Board, and also between NHS Lothian's executive team, the Project Team and all the advisors. We could then link as required into the Finance and Resources Committee, or the NHS Lothian Board, or to the corporate management team as required. It was a method of synthesising, pulling together and overseeing, both up and down, between the Oversight Board and others to monitor what was going on.

133. The ESG was largely chaired by Professor Alex McMahon (Nurse Director), or by Susan Goldsmith (Director of Finance), or Tracey Gillies (Medical Director) in Alex's absence.

134. I attended the ESG meetings as I felt very responsible for the whole thing, and I wanted to support my team, and felt that particularly with Jim Crombie being off for months on sick leave, that I should continue to be very directly supporting my team and I did.

Design Development of Solution

135. I have been asked by the Inquiry for my thoughts on how the design development should have progressed and the development of the solution. I was clear that we needed to have HFS and HPS, the Oversight Board and ultimately the Cabinet Secretary signing off along the way and that, unless they'd signed it off, we were not going to move forward. I think there was a nervousness on my behalf that perhaps not everyone was learning the lessons as quickly as I thought they should be and that all solutions needed to be approved

136. My concern was that we'd had huge problems with IHSL and with Multiplex, and that continued. We had difficulties in getting IHSL to design and deliver the remedial ventilation works. IHSL would not agree to the high value change under the Project Agreement without significant indemnities. This was also the case with IHSL's supply chain partners, Multiplex (Construction Contractor) and Bouygues (FM Contractor). Eventually IHSL managed to get their supply chain sorted out, but only by bringing in a new contractor, Imtech, to the process instead of Multiplex. I was not involved in the detailed discussion or negotiation around that but was aware of it due to my position on the Executive Steering Group. Susan Goldsmith led the commercial discussions with IHSL along with support from Iain Graham, Mary Morgan (Senior Programme Director appointed by the Scottish Government) and Peter Reekie from SFT.

Escalation to Level 3

137. On 12 July 2019 I received a letter from Malcolm Wright (Director-General of Health and Social Care and the Chief Executive of NHS Scotland) informing me that Lothian Health Board had been escalated to Level 3 of the NHS Board Performance Escalation Framework **(A41263551 – Letter to Tim Davison, copying in Brian Houston, from Malcolm Wright - 12 July 2019 – Bundle 7, Volume 1 (of 3) – Page 339)**. I have been asked by the Inquiry my thoughts on why the Board was escalated.

138. I was surprised that we were escalated and surprised at the timing of the escalation. There were a number of health boards which had been escalated before us including Tayside, Ayrshire and Arran, Forth Valley, Borders, and Highland, so the fact that the NHS in Scotland was facing major performance challenges was not unknown. However, all of the issues that were escalated we had been raising with Scottish Government for a number of years, so we knew where the problems lay, and the main problem in NHS Lothian was a lack of capacity. The growth in demand for our services had exceeded the growth in our capacity to respond for many years.

139. We had the lowest target per capita funding in Scotland, and we never actually achieved parity with our target funding so we were hit by a double whammy of below average target funding and also below parity allocations. NHS Scotland uses a resource allocation framework based on weightings designed to reflect need. Some health boards have a target allocation greater than the average allocation per capita and some have a target allocation that is at the average or below it. NHS Lothian had the lowest (along with Grampian) target allocation per capita for all of my time there – our target allocation was circa 90% of the Scottish average target allocation. The formula is recalculated each year based on population changes and this results in some boards moving further away from parity or nearer to parity depending on whether their share of the total population has grown or fallen. NHS Lothian had the fastest growing population share in Scotland and this meant that our annual funding allocation failed to keep pace with our population growth and so we never actually achieved our target allocation despite receiving additional funds each year to keep us within 1% of our target allocation. We were usually £7m or more adrift from parity in absolute terms. Over time, this compounding of below average target funding combined with below-target allocations left the board with a serious imbalance between demand and capacity and contributed significantly to the pressures that our services experienced with inadequate capacity which led to the escalation for waiting times, delayed discharges, mental health services etc. All boards experienced these pressures to some extent or another but I felt that Lothian was starting from a relative low base of below average target funding which in itself was never fully provided by the Scottish Government.

140. We expressed our concerns about a lack of capacity to the Scottish Government throughout my time in NHS Lothian. I was brought into NHS Lothian by the Scottish Government because of a waiting times scandal that was all about Lothian masking the extent of the problem that it had in meeting waiting times. They had been struggling with waiting times for probably 20 years, and we had been raising the need to not only at least receive our full target allocation but also to get ahead of the allocation each year to anticipate

the forecast growth in our population. We wanted to get ahead of the population curve and not constantly be trying to catch up with it.

141. We made that case because we felt that it was our duty to raise that on behalf of our population but, the Scottish Government, in my view, became irritated by us stating our view about that, and their preferred view appeared to be to just regard our performance challenges as being reflective of poor management and that we should just get on and sort it out. So, there was always a bit of a tension between us because of that.

142. I believe our performance on most of the areas that we were being escalated on had significantly improved compared to 12 months previously. The scheduled care activity was ahead of the trajectory we had agreed with government about where we needed to be. Our unscheduled care performance, which was around the four hours emergency access standard was significantly better than a year previously – up to 93% and our delayed discharge performance became in line with all-Scotland performance through a combination of our numbers reducing and numbers in other boards increasing. We had 101 delayed discharges fewer in July 2019, compared to the previous year. We were not suggesting that we didn't have major performance and capacity challenges, we did, but I was surprised at the escalation given Malcolm's letter itself acknowledged improvements in performance in several areas.

143. I think there was a view in Scottish Government that escalation could be seen as a positive thing, that a health board was being given additional support. I can tell you that health boards didn't regard it like that and we regarded it as being punitive and undermining.

144. I was also surprised that NHS Lothian was being escalated, yet Glasgow wasn't because Glasgow and Lothian are by far and away the biggest health boards in population terms and Glasgow was equally, if not more, challenged by performance in a number of these areas. That felt odd to me, not only was it odd that they escalated Lothian, but it was odd that they escalated us and not Glasgow. Glasgow was subsequently escalated as well, and we ended up with

something like three-quarters of the Scottish population being served by health boards under escalation.

145. The Scottish Government had justified the escalation on the basis of the cumulative impact of our issues, together with the significant work required to complete the move of the new RHCYP/DCN. They felt that this would place significant pressure on the leadership capacity of NHS Lothian. The situation with RHCYP/DCN was ultimately handled and resolved.There were lots of issues to manage and we managed them, and I don't believe that escalation was required, and I was surprised at the timing of it.

146. The practical consequences of the escalation was that it essentially creates a focus and a very regular and in-depth scrutiny between the Scottish Government and me, personally, with my executive team, on coming up with plans to address the problems and hopefully progress towards achieving them. There were weekly meetings where we would go to the Scottish Government and account for what we were doing with regard to delayed discharges and four hours' waiting times and cancer treatment. The escalation gives it a focus, not that we wouldn't have had that focus anyway, but nevertheless, it gives it a focus.

147. It also provided us with some additional resource to appoint two or three senior people to come and help us with these issues, so that was not unhelpful. As it happened, a designated Scottish Government director was appointed to oversee the escalation, and John Connaghan was appointed as the director, and he was very helpful and very constructive. I didn't like being escalated and I didn't think we needed to be but he undertook that role very constructively and positively and we did improve up until the COVID pandemic. Most of the services covered by escalation had already been improving compared to the previous year prior to escalation and so this was a continued trend of improvement post escalation.

148. Although I was surprised and disappointed to have been escalated, I was a professional Chief Executive, and I responded to it professionally. We wanted things to improve and we responded professionally. It is not good to be under

special measures, and the press caricature of that is that management is underperforming. I still think that NHS Lothian does not have enough capacity to deal with its population. It needs more beds, more diagnostic capacity, and it needs a greatly improved social care infrastructure.

Escalation to Level 4

149. The escalation to level 4 was for RHCYP/DCN Project only. I felt this was different because the Cabinet Secretary had in effect taken personal control of the decision making and appointed an Oversight Board **(A41231071 – Attached Malcolm Wright letter – 13 September 2019 – Bundle 13, Volume 4 – Page 90)**. So my view was that for the Project, we were in effect already at escalation 4 before it was formalised as it already been implemented on 2 July or 3 July when the Cabinet Secretary said that she was making all the communication decisions and all of the subsequent decisions about when and how the hospital was occupied. Whereas the escalation to level 3 for services had come as more of a surprise.

150. The Oversight Board became necessary because the Cabinet Secretary had escalated us to Level 4 for the RHCYP/DCN Project. The Cabinet Secretary was making the decisions and therefore required her civil servants to be directly involved.

151. The escalation to Level 4 for the RHCYP/DCN led to the appointment of Mary Morgan as Senior Programme Director by the Scottish Government. I assumed that the Scottish Government had lost confidence in me and our team's ability to deliver the Project, and that they wanted to bring in fresh eyes and no baggage associated with the Project. I don't think it's fair that the Cabinet Secretary should have lost confidence in us, but I think it's fair that thinking bringing in some fresh eyes and some additional experienced project management capacity would be helpful. Mary Morgan was appointed, and she did do a good job and was very professional with us.

152. We would speak frequently, and she integrated into our team well and we treated her with respect and professionalism, so there was no resistance from

NHS Lothian. (The DCN/RCHYP Project Governance schematic dated 17 October 2019) **(A41348350 – Sec21 B 00005010 - Bundle 13, Volume 4 – Page 93)**. Even though we were not happy with the situation we found ourselves in, the bottom line is we wanted to fix the problem, we wanted to open the hospital, and Mary was going to help us achieve that. So, we welcomed her and she worked well with us and was very helpful.

153. Mary Morgan's role as the Senior Programme Director was to report directly to the Oversight Board but NHS Lothian remained legally and contractually in charge of the Project. I was still the accountable officer. Even though the decision-making for that particular Project had been removed from me, I was still accountable for what the Health Board was approving, in terms of the spending of public money. If the Oversight Board agreed to do something that I thought was a misuse of public funds, I would have intervened but that eventuality did not occur.

Reports

NSS Reports

154. After the identification of the issue in critical care, the Scottish Government commissioned reports from NSS (the NSS Reports) to review the water, ventilation, drainage and plumbing systems at RHCYP/DCN (**A41213257 – Part B 5.6-20190909 NSS Audit Report – Bundle 13, Volume 4 – Page 95)**.

155. I have been asked by the Inquiry for my thoughts on the findings of the NSS reports. I had no personal involvement in any of their work as they were working at a technical level and working very much with our technical people, however, I think it was generally helpful having HFS/HPS/NSS involved. I do think that they were introducing things that perhaps went beyond what we thought was strictly necessary, e.g., the fire prevention matters, which were improvements rather than remedying defects and we had already received a fire certificate for the building.

156. Although there were a lot of issues that we needed to look at and there was work to do, there was nothing that jumped out from the NSS Reports that suggested that there was another game changer other than Critical Care.

KPMG Report

157. NSS commissioned KPMG to independently establish the facts around the decision to delay the move to the Hospital and review the governance arrangements (the 'KPMG Report') **(A32512397 – KPMG Report – Independent Assessment of Governance Arrangements – 9 September 2019 – Bundle 13, Volume 3 – Page 1153).** As part of the evidence gathering for the KPMG Report, KPMG spoke with a number of parties along with individuals from NHS Lothian. I was involved as I was personally interviewed at length at least twice by KPMG. Their report was an uncomfortable read because we shouldn't have been where we were, but I thought they described what had happened and how it had happened very accurately and helpfully.

Grant Thornton Report

158. NHS Lothian commissioned Grant Thornton to conduct a review of the governance and internal controls over the RHCYP/DCN Project (the 'Grant Thornton Report') **(A32512442 - Grant Thornton Report – NHS Lothian Internal Audit Report – Report for the Audit and Risk Committee 31 July 2020 and the NHS Lothian Board 12 August 2020 - Bundle 10, Page 11).** I met the author of the Grant Thornton Report several times. I was present at Finance and Resources Committee when the report was presented in various draft stages. I do agree with the report and its findings. I was on leave from 24 June 2019 until my retirement in August and so I missed the presentation of the final version and was not around for its implementation.

Media Interest

159. Up until the point that I had retired both STV and BBC sought an interview with me, along with a few newspapers. Before speaking to the media, I had to clear it with Scottish Government. I was interviewed by The Scotsman and the

Evening News and by STV and the BBC, both of which were shown on their television news programmes.

160. I was grilled intensively about the RHCYP/DCN, and kept getting asked, “Are you going to resign because of this?” My answer at the time was, “Well, not right now I’m not. Right now, my focus is on supporting my team and trying to get the thing fixed.” That was my view.

161. Ideally, I wanted to be there to see the hospital open. In the event I retired a few weeks before the first phase of the move took place, but I was confident that the hospital was going to open as planned. There were lots of other reasons and personal reasons why I wanted to retire, but I stayed for a year after the debacle of 1 July 2019 to oversee and support my leadership team. What eventually happened in August 2020 was what we had discussed as our preferred option on 2 July 2019, i.e fixing the problem and moving in, in a phased way. It took longer and it cost more than I would have liked, but it happened. The hospital is a great hospital and it is doing a good job.

Reflections

162. I have been asked by the Inquiry if I felt that the Scottish Government’s position that DCN and other services could not move until NSS had carried out their review caused an unnecessary delay in the transfer of those services. I think that’s very difficult for me to answer. The patient risk at DCN was being managed and I can understand why Scottish Government took that decision, as there were lots of uncertainties and unknowns at the time. It would appear that the Scottish Government did not want any more shocks and wanted all I’s dotted, and T’s crossed before we occupied the building.

163. I think that it was a legitimate decision and that’s what I said at the time. It wasn’t my preferred option, and I would have gone with moving DCN earlier and I believe most of my team would have moved DCN earlier. The word “unnecessary” is a subjective word because it’s a fact that it caused a delay. The government obviously thought that it was a necessary delay to give them confidence in the opening of the hospital.

164. I have been asked by the Inquiry what critical factor I think led to the Critical Care issue going unnoticed until days before the planned opening date. There were a number of critical factors but the fact that the Critical Care Unit comprised lots of different room types that were also provided elsewhere in the hospital seem to confuse people and lead to different interpretations of Guidance. The Critical Care Unit had four bed bays, but there were other four bed bays in the hospital. The Critical Care Unit had single rooms, but there were lots of single rooms elsewhere within the hospital. It was only the Critical Care and Haematology that had the isolation rooms, there was a much smaller number of that type of rooms. I think if someone had been able to literally put a red line around the Critical Care Unit and said, "The 24 beds in this room, just for the avoidance of doubt, are all to be at 10 air changes an hour with a negative or balanced pressure regime," that could have prevented the problem from happening.

165. There were 11 revisions of the environmental matrix and there was one revision in which the guidance note which stipulated all of critical care needed 10 ACH was changed by IHSL so that it was applicable to "isolation rooms only." If that change by IHSL had been flagged to NHS Lothian and MML then NHS Lothian could have clarified that they wanted all rooms in critical care to have 10 ACH, as per the guidance note. So, that was the seminal point at which someone involved in the project both internal and external should have said, "There's a contradiction here." If that had been raised, then the problem would have been avoided because we could have dealt with it.

166. Another opportunity was at the point that the derogations were agreed and someone could have said, "Are you sure about this derogation to 4ACH and negative pressure in multi-bed rooms in critical care, do you know that's a derogation to guidance?" and we'd have said, "Of course we're not sure." We then would still have had to spend the £11.6 million, and it would have taken months to resolve, but at least we would have known about it at that point rather than waiting months later. So, I think if you had a magic wand, you

would change those things. But as I stated earlier I agree with KPMG and Grant Thornton Reports that it was a collective failure.

167. I also think the relationship between the built environment and the infection control agenda, whether that be water systems or ventilation, needs to be elevated in a way that it is almost ring-fenced so that regardless of what a project agreement might say or a contractual negotiation might say, these are the de minimis requirements that we must not breach. That would be helpful.

168. Regrettably, humans make mistakes, and the KPMG report, I thought, was quite helpful in saying there was no evidence of malice, there was no evidence of criminality or wrongdoing. There were lots of people involved in this project who should and could have at least questioned why the environmental matrix kept changing. To think that Multiplex, who had just built a billion-pound hospital in Glasgow, would think that our critical care unit included just four isolation rooms at 10 ACH is more than surprising and, at the very least, they should have clarified this with us. Yes, they arguably secured some derogations for critical care in SA1, but they had designed and installed the ventilation system in critical care years before SA1 was agreed.

169. I hugely regret the issue with RHCYP/DCN and regret the delays and the cost of it. However, in the interest of fairness and to assist with learning, I believe it should be recognised that our project was by no means unique in running in to delays and cost overruns. There has been a history of significant problems with large scale capital investment public infrastructure projects in Scotland and the costs of our project look relatively small compared to many others. It does make me think that there may be lessons more broadly about running these big projects that extend beyond our own project.

170. I have been asked by the Inquiry what actions I consider would have mitigated the risk of the ventilation issue within Critical Care leading to a blanket delay of opening the whole build. From what I know now, I think if we hadn't used the reference design and had just stuck with the Board's Construction Requirements (BCRs), which were clear about complying with SHTM 03-01,

that would have helped. The reference design allowed a confusion that I think could have been avoided.

171. I still think there was plenty of opportunity for people to have highlighted that the Guidance states there should be 10 ACH whereas your reference design says something else. At the very least, someone should have flagged that contradiction and asked NHS Lothian to confirm what air change rate was required. One of the reasons for using a reference design was to illustrate the clinical adjacencies which had been so time-consumingly agreed with senior clinicians and that was important, but perhaps we should not have included any technical documentation whatsoever to avoid any dubiety. Maybe doing so blurred the lines between our previous design responsibility and the new design responsibility and design risk transferred to the project company.

172. I think if we had properly risk-assessed the shift from a capital-funded project to a private finance project, which was a design and build where the transfer of risk around the design was to be handed over to the company delivering the project, I think that may have helped. We did obtain advice from our technical advisors as to the use of the reference design and our procurement options but NHS Lothian had a very limited time to update and produce the outline business case for the joint project and proceed to procurement in a short timescale as required under the funding conditions. This resulted in limited time to prepare a thoughtful risk assessment of the change in procurement methodology.

173. I also think it would have been helpful for us to have had a better independent assessment of the consequences of our agreed derogations on technical guidelines and requirements, such as SHTMs, before the derogations were finally agreed. This advice could (and should) have been provided via our technical advisors, MML, or an independent body such as HFS could have been consulted. Even if that had happened in 2018/2019, we wouldn't have avoided the problem, because the problem was already implemented. IHSL had already designed and installed a ventilation system that could only deliver four air changes. Nevertheless, we would have found out about it sooner.

174. I think there's another action that might have helped, and there was some talk of it before I retired, which is that for complex projects like this it would be helpful to have as a nationally organised resource, a cadre of senior, experienced people to lead the most complex and larger scale projects on behalf of health boards. I have been a Chief Executive in five organisations, operating in that role for 26 years, and have been responsible for hundreds of millions of pounds of capital investment projects, but I had never been responsible for a project as complex as this, nor with a financial, contractual and legal framework like this.

175. I have been asked by the Inquiry how satisfied I was with how Lothian Health Board handled matters following discovery of the Critical Care issue. I think it was handled very well and very professionally. Nothing should diminish how shocked and sorry we were that this happened. None of us took it lightly. Although I have said that financially the consequences of this were much smaller than lots of other capital projects in Scotland that have gone wrong, that is not in any way to diminish that I wish that this had not happened. I really am sorry, I regret it deeply, but mistakes happen. The Edinburgh trams happened, the Scottish Parliament building happened, the Aberdeen bypass happened, the ferries are happening and so, therefore, as public sector organisations and as human beings, we have clearly the capacity to make mistakes and often have problems with these big capital projects.

Declaration

176. I believe that the facts stated in this witness statement are true. I understand that this statement may form part of the evidence before the Inquiry and be published on the Inquiry's website.

SCOTTISH HOSPITALS INQUIRY

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Witness Statements

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