SCOTTISH HOSPITALS INQUIRY

Closing Statement by

Counsel to the Inquiry

in respect of

The Queen Elizabeth University Hospital and Royal Hospital for Children

Following the 'Glasgow 4' hearings

from 13 May to 10 October 2025

Table of Contents

1. CHAPTER 1: INTRODUCTION

1. These are the Closing Submissions from Counsel to the Inquiry in respect of the Queen Elizabeth University/Royal Hospital for Children ("the QEUH/RHC"). In respect of the QEUH/RHC the Inquiry has heard 29 weeks of evidence (20 weeks of that since 19 August 2024), has heard either in person, or by statement from 186 witnesses, and the Inquiry Team has produced 128 bundles of evidence along with six Provisional Position Papers (PPPs) that relate to the QEUH/RHC.[1]

1.1 The remit and terms of reference

2. The essence of the task set for the Inquiry is captured in the second paragraph of the Remit -

> "The Inquiry will determine how issues relating to adequacy of ventilation, water contamination and other matters adversely impacting on patient safety and care occurred; if these issues could have been prevented; the impacts of these issues on patients and their families; and whether the buildings provide a suitable environment for the delivery of safe, effective person-centred care."

3. The thirteen specific terms of reference arise from the existence of such issues. They should be viewed as arising out of the essential task of understanding what those issues were, whether they impacted on patient safety and care, impacted on patients and their families and resulted in buildings that, to any extent, did not provide a suitable environment for the delivery of safe, effective, person-centred care.

4. We acknowledge that we were not the first Counsel to the Inquiry Team appointed. As we noted in our Closing Statement following the Glasgow 3 Hearing,[2] we continue to place considerable reliance on the Closing Submissions of Counsel to the Inquiry from Glasgow I and II. No Core Participants have challenged the presentation within both documents of

[1] PPP 5 - History of Infection Concern; PPP 11 - Potentially Deficient Features of the water system of the QEUH/RHC; PPP 12 - Potentially Deficient Features of the ventilation system of the QEUH/RHC; PPP 13 - Procurement History and Building Contract; PPP 14 - QEUH and RHC Isolation Rooms and PPP 15 - Governance.
[2] CTI Closing Statement, Glasgow 3, Page 4, Para 13.

materially accurate summaries of the evidence heard (even if some Core Participants reserved their position as to the factual accuracy of the evidence).

5. These final written submissions are designed to draw together our analysis of all the evidence, and propose how the Chair should fulfil the Remit and all Terms of Reference of the Inquiry, by an analysis of the issues and underlying concepts, a narrative of events from the selection of the site for the new SGH through to the close of evidence of this Inquiry, and finally a series of chapters which weigh the evidence, resolve inconsistencies and draw necessary inferences in order to reach conclusions about

    a. the procurement, construction, operation of the QEUH/RHC,

    b. how NHS GGC responded to the emergence of concerns about patient safety arising from building systems of the hospitals,

    c. The extent to which the deficiencies in the water and ventilation systems have adversely impacted on patient safety and care. and

    d. the extent to which NHS GGC has remedied any deficiencies in the building and learned from the events that have taken place in respect of procurement, management, IPC practice, HAI reporting and the encouragement of whistleblowing.

6. Chapter 9 of these submissions sets out succinct conclusions in respect of each of the Terms of Reference, reached by consideration of the evidence available to the Inquiry and the analysis of its consequences.

7. The reader should presume that, unless stated otherwise, we remain of the views and continue to make the submissions, set out in the Closing Statement we produced following the Glasgow 3 hearing. We have sought to set out clearly where our position has developed.

8. The six PPPs continue to provide a detailed narrative of the specific issues covered by them, but as a consequence of further evidence and the resulting evolution of our understanding, our current approach to the provisional conclusions contained within those PPPs can be found at the following locations in this closing statement:

PPP 5	Chapter 5
PPP 11, 12 and 14	Chapter 6 and 8
PPP 13	Chapter 9

9. At various points, we address issues already considered in the Interim Report, particularly Chapters 5, 8, 10 and 11, but unless specifically stated it is not our submission that the Chair should change his conclusions therein.

1.2 The nature of our investigations

10. The NHS GGC Closing Statement following Glasgow 3 did not contain a detailed review of the evidence. This was justified by the argument that it was impractical and disproportionate to respond to our Closing Statement, because of its length, and because the production of hearing bundles and witness statements, close to and during the hearing, prejudiced NHS GGC and undermined their ability to propose questions by Rule 9[3].

11. A public inquiry is an inquisitorial process. It would not be practical, and would certainly involve unnecessary cost, for the Inquiry Team to ingather and consider all relevant documents, ask all the questions of relevant witnesses in the statement-taking process, collate documents into bundles that include all that is relevant and excludes what turns out to be irrelevant, before issuing all that material to CPs' legal teams and only then commencing a hearing process. Such a procedure would take far too long and would be entirely inconsistent with the nature of the inquisitorial process.

12. We investigated the issues engaged by the Remit and Terms of Reference in an iterative process. Documents would suggest questions, answers to those questions would suggest further documents, which in in turn would suggest further questions. The nature of that process means that there are questions that were not asked of witnesses who gave evidence in Glasgow 3 because the issues arose, for example, at Glasgow 4, Part 3. In some cases, we have

[3] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 41, Para 21.

gone back to witnesses who gave evidence in earlier sessions with supplementary questionnaires, but that process cannot be comprehensive. It is therefore worth remembering (as noted in the Vale of Leven Hospital Inquiry report[4]) that the warning letter process exists. As Lord MacLean put it:

> "The whole purpose of the warning letter process is to give notice to individuals and organisations of potential criticism, so that they have the opportunity of making an appropriate response to that proposed criticism. The warning letter process itself ensures fairness for anyone who may be criticised,"

13. Consequently, when witnesses produced contemporary and relevant emails, and other documents in response to questions asked during the statement-taking process, the Inquiry Team needed to bundle them. Similarly, when our preparation for a witness's evidence suggested that it would be relevant to put documentation recovered from NHS GGC or others to that witness, we needed to bundle those documents.

14. We are fully aware that our Closing Statement following Glasgow 3 was long, at 785 pages, but would submit that its very length was a consequence of the need to understand the evidence we had heard over the twelve weeks of Glasgow 3 as well as the evidence heard during Glasgow 1 and Glasgow 2. Of that Closing Statement, 475 pages comprised summaries of witnesses' evidence,[5] and a narrative developed from that evidence together with consideration of documents in hearing bundles[6].

15. Since 19 December 2024 we have had eleven months to absorb the evidence from Glasgow 3, to ask further questions, read further documents and carry out a broad range of investigations through the subsequent three hearings. As a consequence, in our submission, this Closing Statement is more focused.

1.3 The Glasgow 4 Hearings

16. It had been intended to conclude the Inquiry with five weeks of evidence in April and May 2025. Due to the desire of NHS GGC that the Inquiry hear the evidence of the HAD authors, we revised that timetable. The opportunity was

[4] Bundle 53, Volume 1, Document 2, Page 258.
[5] CTI Closing Statement, Glasgow 3, Chapter 3, Pages 27-174 and Chapter 8.2, Pages 729-736.
[6] CTI Closing Statement, Glasgow 3, Chapter 5, Pages 195-520.

taken to obtain more evidence, to lead more witnesses and to understand more about the procurement, design, construction and governance of the new SGH Project.

1.3.1 Glasgow 4, Part 1: 20 to 30 May 2025

17. The purpose of this hearing was to hear the evidence of the members of the NHS GGC Project Team, and the contractors and consultants engaged in the procurement, design and construction of the QEUH/RHC. This was the first time that Terms of Reference 2, 3A-C, 5 and 6 were the primary focus of a hearing in respect of QEUH/RHC.

1.3.2 Glasgow 4, Part 2: 19 to 20 August 2025

18. The purpose of this hearing was to consider the report of Professor Peter Hawkey, Dr Samir Agrawal and Dr Lydia Drumright, in respect of the evidence of risk of infection from the water and ventilation systems at the QEUH/RHC ("the HAD Report")[7]. The primary issue was whether there was, in fact, an exceedance of infections in QEUH/RHC in the period 2016 to 2019. The hearing also heard further evidence on the assessment and management of the issue of risk, by considering a report prepared by Dr Mumford (as a consequence of representations made in the Closing Statements on behalf of the Scottish Ministers and NHS NSS after the Glasgow 3 hearing).

1.3.3 Glasgow 4, Part 3: 16 September to 10 October 2025

19. The purpose of this hearing was to hear the evidence of the remaining witnesses necessary to conclude the Inquiry in respect of the QEUH/RHC, in respect of the following issues:

    a. The role of NHS GGC staff, board members and advisors in procurement, design and construction of the hospital.

    b. The role of the Scottish Government in the procurement, design and construction of the hospital.

    c. The perspective of the Chief Executives and senior managers on:

[7] Bundle 44, Volume 1, Document 1, Page 5.

i. the emergence of issues about the building, the IPC team and infections after opening in 2015, 2016 and 2017,

ii. the response to the water incident and subsequent concerns about the building, infections and IPC team in 2018 and 2019,

iii. the management of risk within NHS GGC and in particular use of the corporate risk register, and

iv. whistleblowing.

d. The role of the Scottish Government and the Oversight Board in taking actions to remedy defects, improve practice and the extent to which they have been adequate and effective.

e. The extent to which lessons have been learned from the experience between 2015 to 2020 regarding the processes and practices of reporting healthcare associated infections within QEUH, and the encouragement of whistleblowing.

1.4 Witnesses

20. During the 29 weeks of evidence relating to the QEUH/RHC, the Inquiry has heard either in person, or by statement, from 186 witnesses. To prevent this Closing Statement from becoming unwieldy, we have not provided a detailed list of all the witnesses and their roles in the events that are the subject of this Inquiry. However, when a witness is mentioned for the first time, we provide a brief note of their role.

1.4.1 Witnesses unavailable to the Inquiry

21. Eight potentially key witnesses: Mr David Loudon, Mr Peter Moir, Ms Heather Griffin, Mr James Guthrie, Dr John Hood, Professor Brian Jones, Mr Ian Storrer and Witness 7 were ultimately not available to give evidence and the reasons for this are discussed in this section.

Mr David Loudon

22. Mr Loudon served in senior leadership roles at NHS Greater Glasgow and Clyde from 2013 to 2018, overseeing facilities, capital planning, property, and

procurement. His expertise in hospital infrastructure and major capital projects led the Inquiry to seek his evidence.

23. Engagement began in early 2022, with Mr Loudon engaging well, supported by the Central Legal Office ('CLO'). Questionnaires were issued by the Inquiry to Mr Loudon in April and December 2024. The CLO submitted Mr Loudon's draft response in January 2025, with the Inquiry sending clarification questions to Mr Loudon via the CLO in late February. Mr Loudon sought a face-to-face interview with the Inquiry, with legal representatives being present to address the clarification questions. A meeting was scheduled for 5 March 2025. On 4 March 2025 the CLO contacted the Inquiry seeking to postpone the interview due to Mr Loudon's ill health.

24. On 12 March 2025 the CLO informed the Inquiry that on medical advice, Mr Loudon was unable to continue participating at that time. The Inquiry was also advised that Mr Loudon remained willing to assist and might be able to do so at a later stage, but at this point there were efforts being made to obtain a letter of soul and conscience for Mr Loudon. The Inquiry offered the CLO a 10-day engagement break for Mr Loudon, to see whether this would benefit his health. On 8 April 2025, the CLO advised the Inquiry Team that on medical advice, Mr Loudon would be obtaining a soul and conscience letter and would be unable to participate in Glasgow 4 Part 1 hearings. It was reiterated that Mr Loudon was keen to assist the Inquiry in future, if his health permitted. On 24 April 2025, the CLO advised the Inquiry that Mr Loudon was seeking independent representation from Livingstone Brown Solicitors. Mr Loudon's solicitor then provided a soul and conscience letter dated 30 April 2025. The content of the letter must remain confidential; however, it was reiterated within that he wished to give evidence at a later stage.

25. On 23 May 2025, the Inquiry informed Mr Loudon's solicitor that his draft statement would be published as unsigned and incomplete, subject to update should Mr Loudon become fit to engage. In July 2025, the Inquiry asked Mr Loudon's solicitor whether he could give evidence in Glasgow 4, Part 3 hearings, but his condition remained unchanged, therefore he was unable to give evidence.

26. On 23 July 2025, the Inquiry contacted Mr Loudon's solicitor to ascertain whether Mr Loudon was in a position to sign off on what he was able to complete in respect of his written statement, subject to the caveat that he has been unable to progress it further[8]. On 14 August 2025, Mr Loudon's solicitor advised that he was unhappy with the statement as drafted in January 2025 and was not willing to sign it off. On 22 August 2025, the Inquiry provided the statement intended for publication with a caveat that it was not endorsed by Mr Loudon and was prepared before Part 1 hearings, meaning it might lack relevant documents. The statement was published in September 2025 in Witness Statements - Volume 4 (External Version)[9].

Mr Peter Moir

27. Mr Moir joined the Queen Elizabeth University Hospital Project Team in 2007 as the Major Projects Manager, progressing in 2010 to the Deputy Project Director. These posts carried significant responsibility in relation to the design and construction of the project. The Inquiry therefore took the view that it would be desirable for Mr Moir to give evidence.

28. Between January and March 2024, the Inquiry endeavoured to engaged Mr Moir. The CLO were assisting in respect of Mr Moir. It became known to the Inquiry in or around March 2024 that Mr Moir was unwell. The Inquiry had communications with the CLO and on 28 June received a letter of soul and conscience in respect of Mr Moir dated 12 June confirming that he would not be able to participate in the Inquiry. The Inquiry accepted the letter and accordingly, Mr Moir did not give evidence or produce a statement. Subsequently, on 19 November 2025 the CLO advised the Inquiry that Mr Moir had passed away earlier that month.

Ms Heather Griffin

29. In 2005, Ms Griffin was seconded as Project Manager to support the Outline Business Case (“OBC”) for the QEUH and remained with the project through to completion of patient migration in 2015. Given her position as Project manager of direct experience of the planning, delivery and operational launch

[8] Glasgow 4, Part 1 - Witness Statements, Volume 3, David Loudon, Document 8, Page 240.
[9] Glasgow 4, Part 3 - Witness Statements, Volume 4, David Loudon, Document 6, Page 451.

of the adult hospital, the Inquiry Team sought to engage Ms Griffin to give evidence.

30. The Inquiry wrote to Ms Griffin on 8 and 16 January and 4 February 2025, seeking her engagement. The Inquiry received a letter from Ms Griffin's GP, dated 3 February 2025 which sought to excuse her as an Inquiry witness. On 27 February the Inquiry contacted the CLO who were providing legal support to Ms Griffin, seeking a letter of soul and conscience if the Inquiry was being asked to excuse her as a witness.

31. On 19 March 2025, in lieu of a letter of soul and conscience, the Inquiry proposed to arrange an interview with Ms Griffin to obtain her statement at a time and in circumstances most comfortable for her. On 28 March, the CLO advised Ms Griffin would work through her questionnaire herself. On 6 May 2025, the Inquiry received Ms Griffin's final, signed off statement which was produced at Hearing Commencing 13 May 2025 - Witness Statements - Volume 3[10].

32. On 7 May 2025, the Inquiry received a soul and conscience letter dated 30 April 2025 in relation to Ms Griffin. The Inquiry accepted the letter and consequently, Ms Griffin was not required to give evidence.

33. On 24 September 2025, following oral evidence at the Glasgow 4, Part 3 hearings, supplementary questions prepared by the Inquiry were issued to the CLO for Ms Griffin to complete. On 30 October 2025, Ms Griffin returned a statement via the CLO responding to the supplementary questionnaire, this was signed off by Ms Griffin on 5 November 2025. This statement was produced in November 2025 in Witness Statements - Volume 8[11].

Mr James Guthrie

34. Mr Guthrie was a senior engineer at the Queen Elizabeth University Hospital and the Royal Hospital for Children between 2012 and 2017. He was a trained Authorised Person for ventilation and *Legionella*. He subsequently served as an estate manager at another hospital, returning to the QEUH/RHC in 2019 as

[10] Glasgow 4 Part 1 - Witness Statements, Volume 3, Heather Griffin, Document 9, Page 282.
[11] Glasgow 4, Part 3 - Witness Statements, Volume 8, Heather Griffin, Document 1.

an operational estates manager. Given his role at QEUH/ RHC, the Inquiry Team considered it appropriate to contact Mr Guthrie to give evidence.

35. After an initial engagement letter in April 2024, Mr Guthrie contacted the Inquiry team by email on 5 June 2024. He advised the Inquiry of a significant ongoing health matter. The Inquiry offered Mr Guthrie time for recovery, with Mr Guthrie indicating that he hoped to be in position to assist in due course. On 9 October 2024 Mr Guthrie contacted the Inquiry to advise his treatment was ongoing, providing a letter of soul and conscience dated 24 September 2024. The Inquiry accepted the letter, thus Mr Guthrie was not required to give evidence.

Dr John Hood

36. Dr Hood is a retired Consultant Microbiologist within NHS GGC. It seems clear that one of the ventilation experts available to NHS GGC was Dr (latterly Professor) John Hood. Dr Teresa Inkster considered him a "go-to" person for ventilation matters due to his experience building the Beatson[12]. Mr Thomas Walsh described Dr Hood as "the Board's ventilation expert"[13]. Ms Jane Grant described Dr Hood as an "international expert"[14]. He was the chair of the Cryptococcus sub-group, which was established in 2019, and the principal author of the Report of the Cryptococcus Incident Management Team Expert Advisory Sub-Group dated 5 April 2022[15].

37. In July 2023, the Inquiry wrote to Dr Hood requesting his engagement. The CLO were providing support to Dr Hood. Around January 2024 the CLO advised the Inquiry that Dr Hood was unwell. On 27 February 2024, the CLO advised the Inquiry Team that Dr Hood would unlikely be fit to appear as a witness, and that they advised that he obtain a letter of soul and conscience. On 3 May 2024, the Inquiry received a letter of soul and conscience in relation to Dr Hood. That letter was accepted and Dr Hood's engagement with the Inquiry was excused.

[12] Transcript, Dr Teresa Inkster, 1 October 2024, Pages 8-9, Columns 11 and 14.
[13] Transcript, Thomas Walsh, 13 September 2024, Page 17, Column 29.
[14] Transcript, Jane Grant, 24 September 2025, Page 17, Column 29.
[15] Bundle 6, Document 39, Page 1115.

Professor Brian Jones

38. Professor Jones was the head of Microbiology Service within Greater Glasgow and Clyde from 2012 until his retirement in November 2019.

39. On 18 March 2022, the Inquiry contacted Professor Jones seeking his engagement. Professor Jones responded advising that he was happy to assist the Inquiry. The Inquiry maintained contact during 2022 and 2023. In March 2023, Professor Jones was advised that he would not be required to give oral evidence at the Glasgow 2 hearing scheduled for June 2023, but that the Inquiry would be in contact regarding his written statement.

40. In September 2023 the Inquiry returned the draft statement and clarification questions to the CLO, who were supporting Professor Jones, for review. The CLO explained that due to various commitments Professor Jones could not begin his review until mid-November 2023.

41. On 11 June 2024 the CLO returned Professor Jones' revised draft statement to the Inquiry. It had been reduced substantially from the 2023 version. Later that month, the Inquiry advised the CLO that they had further questions for Professor Jones but learned that he was disengaging from the process and would not be responding to any further questions. He subsequently obtained representation through the Medical and Dental Defence Union (MDDUS). On 28 June 2024, the Inquiry notified MDDUS of its intention to issue a Section 21 notice requiring completion of the witness statement and supplementary questions.

42. On 17 July 2024, MDDUS advised that Professor Jones' statement with supplementary questions would be submitted by close of business. The statement was signed off by Professor Jones on 20 July 2024 and was produced in Hearing Commencing 19 August 2024 - Witness Bundle - Week Commencing 26 August 2024 - Volume 2[16].

43. The Inquiry anticipated receiving a letter of soul and conscience by the week beginning on 29 July 2024 and therefore did not issue a citation. When the letter of soul and conscience letter was not received by 5 August 2024, the

[16] Glasgow 3 - Witness Statements, Volume 2, Professor Brian Jones, Document 15, Page 567.

Inquiry sought an update and on 6 August advised Professor Jones' solicitor that he was scheduled to appear as a witness in the August 2024 hearings. A letter of soul and conscience was subsequently received dated 8 August 2024. The Inquiry accepted the letter, and Professor Jones was not required to give oral evidence.

Mr Ian Storrar

44. Mr Storrar was the Head of Engineering in Health Facilities Scotland from November 2018 until February 2021. He has extensive experience of ventilation systems within commercial, industrial and healthcare settings, and was involved in the development of SHTM 03-01: Ventilation for Healthcare Premises.

45. Mr Storrar was initially engaged by the Inquiry in or around March 2022 in respect of his involvement with the Edinburgh hospital. On 8 April 2022, the Inquiry sent an email citation to attend to give oral evidence to the Inquiry to the CLO on behalf of NSS, who were providing support to Mr Storrar. That day the Inquiry were advised that Mr Storrar was very unwell and was signed off by his doctor. Subsequently, the Inquiry received a letter of soul and conscience dated 26 April 2022.

46. On 21 December 2023, the CLO on behalf of NSS, provided the Inquiry with a further soul and conscience letter dated 12 December 2023. The Inquiry accepted the letter and consequently, Mr Storrar was not required to give evidence or produce a statement. Core Participants were advised prior to the Edinburgh III hearings that Mr Storrar would not be providing a statement.

47. On 30 August 2024, the CLO on behalf of NSS, provided the Inquiry with a further soul and conscience letter dated 23 August 2024. The Inquiry accepted the letter and consequently, Mr Storrar was not required to give evidence.

Witness 7

48. This witness is subject to a restriction order. Initially Witness 7 was happy to assist the Inquiry and an introductory call was arranged for 21 April 2022. After an interview with Inquiry staff on 7 September 2022, a draft witness statement was to be produced, and Witness 7 was advised that they may be cited to

give oral evidence. On 29 July 2024, Witness 7 was cited to provide oral evidence to the Inquiry in the Glasgow 3 hearing. Witness 7's solicitor made an application for a Restriction Order under Section 19 of the Inquiries (Scotland) Act 2005, the details of which remain confidential. On 19 August 2024, the Chair granted the Restriction Order. Consequently, Witness 7 was not required to provide oral evidence to the Inquiry. As a consequence of the Restriction Order, it is not possible to refer to the draft statement.

1.4.2 The Inquiry's appointed Experts

49. In paragraphs 35 to 45 of the NHS GGC Closing Statement following Glasgow 3, they critiqued the experts appointed by the Inquiry on four grounds:

    a. That Dr Walker and Ms Dempster are not sufficiently independent and that accordingly their evidence should be disregarded[17].

    b. That Mr Poplett and Mr Bennet cannot comment on "infection risk, and critically infection management, in a hospital, which is multifactorial"[18].

    c. That there are particular problems with the substance of the opinion evidence advanced by Mr Mookerjee[19].

    d. That the issues with Mr Mookerjee's evidence must have an impact on the opinion evidence advanced by Dr Mumford and Ms Dempster[20].

50. The third and fourth criticisms are addressed in Chapter 4 of these submissions, but we address the first two here. They deal with the question of whether Dr Walker, Ms Dempster, Mr Poplett and Mr Bennet should not be treated as expert witnesses on the grounds of either lack of independence or lack of relevant expertise.

51. It has long been recognised that, because of the terms of the Inquiries Act 2005, the rules of evidence developed in criminal and civil proceedings do not

[17] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Pages 46-47, Para 35.
[18] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 47, Para 38.
[19] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Pages 47-49, Paras 39-43.
[20] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Pages 48-49, Para 42.

in general terms, apply to inquiries[21]. In our submission, this applies to the specific rules around the admission of opinion evidence of expert witnesses. The general approach to the receipt of expert evidence that we proposed in section 1.5 of our closing statement from Glasgow 3[22] requires to be considered. If, as is not challenged by NHS GGC, the Inquiry should hear and take account of the opinion evidence of persons of skill or expertise who were involved with the events that are the focus of this Inquiry, and may well be argued to not be fully independent, (such as Dr Tom Makin, Dr Susanne Lee, Professor Alistair Leonard, Professor Stephanie Dancer, Professor Craig Williams, Dr Teresa Inkster, Dr Christine Peters, Dr Penelope Redding, Mr Mathhew Lambert, Mr Jim Leiper, Mr David Watson, Mr Tim Wafer, Mr Peter Hoffman, Mr Edward McLaughlan, Ms Annette Rankin, Ms Laura Imrie, Ms Susan Dodd, Ms Sandra Devine, Dr Iain Kennedy and Mr Kerr Clarkson) then there is no reason why it should reject - on the grounds of potential conflict of interest - the evidence of Dr Walker and Ms Dempster, especially when their connection to other persons is limited and is disclosed.

52. NHS GGC submit that, "Ms Dempster did work in the CNR which is critical of NHS GGC and finds a link between infections and the building"[23]. Putting aside for a moment the evidence of Professor Brown[24] and Professor Gardner that NHS GGC fully accepted the conclusions of the CNR based on the categorisation of the “possible/probable” or “more likely”[25], the evidence of Ms Dempster was, that she did not take part in the meetings of the CNR Expert panel that discussed each individual infection and reached a conclusion[26]. The Closing Statement on behalf of NHS GGC ignores that evidence. It remains our submission that Ms Dempster has disclosed the extent of her connection to the CNR, that she was not involved in reaching its conclusions, and that no conflict of interest arises.

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[21] Jason Beer QC, *Public Inquiries* (Oxford University Press 2011), Page 230.
[22] CTI Closing Statement, Glasgow 3, Pages 5-8.
[23] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 47, Para 36.
[24] Transcript, Professor John Brown, 3 October 2025, Page 64, Column 124.
[25] Transcript, Professor Jann Gardner, 9 October 2025, Page 86, Column 167.
[26] Transcript, Linda Dempster, 12 November 2024, Page 10, Column 15 and described in some detail in CTI Closing Statement, Glasgow 3, Page 666, Para 459.

53. According to NHS GGC, Dr Walker is "connected with Dr Inkster" and therefore the Inquiry should have found an alternative "independent expert"[27]. The NHS GGC submission exaggerates the extent of any connection. They have published papers together[28], but have never met[29]. Many experts in this Inquiry have published papers together, including Dr Walker and Professor Hawkey, who gave unprompted vouching of Dr Walker's expertise in the state and operation of water systems over his own, in part because of their work together on a paper[30]. It should be also noted that large parts of Dr Walker's evidence are consistent with the approaches taken by other skilled and expert witnesses, including Dr Lee, and Dr Makin, as described in some detail in Section 7.1 of our Closing Statement following Glasgow 3. He comes with the approval of the principal expert witness promoted by NHS GGC, Professor Hawkey. It remains our submission that, in respect of Dr Walker, no conflict of interest arises because of a "connection" with Dr Inkster.

54. In respect of Mr Poplett and Mr Bennett, NHS GGC challenge the extent of their expertise by placing a focus on what they say is their lack of expertise in a clinical environment, thereby preventing comment on "infection risk, and critically infection management, in a hospital, which is multifactorial". This submission is not developed. It seems uncontroversial that infection risk management in hospitals involves a wide range of disciplines (including microbiologists, ICDs, ICNs, engineers and persons skilled in the design and management of these systems) and that was the approach we took in Sections 7.1 and 7.2 of our Closing Statement following Glasgow 3.

55. The primary issue in the NHS GGC submission in respect of Mr Poplett, is that he does not give evidence about infection management or, directly, infection risk, in the way that NHS GGC superficially characterise it.

56. In respect of the water system, his evidence was limited to his view on the risk posed to patients, primarily by the “completely unacceptable” level of defects

[27] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 47, Para 36.
[28] Bundle 21, Volume 1, Document 5, Page 341.
[29] Transcript, Dr Teresa Inkster, 2 October 2025, Page 106, Column 207 and described in some detail in CTI Closing Statement, Glasgow 3, Page 550, Paras 75-76.
[30] Transcript, Professor Peter Hawkey, 27 August 2025, Page 17, Column 30.

identified in the 2015 DMA Canyon L8 Risk Assessment in a newly built system[31]. NHS GGC staff have advanced the position that any risks that might have been posed by the domestic water system of the QEUH, of the sort described by the 2015 and 2017 DMA Canyon L8 Risk Assessments, have been addressed by fitting the chlorine dioxide dosing system, a major programme of maintenance and the greatest volume of regular water testing of any hospital in Great Britain. They cite, in support of that position, the reports of their appointed Authorising Engineer (Water), Mr Dennis Kelly. If Mr Kelly has sufficient expertise to give an opinion on the reduction of risk posed by the domestic water system of the QEUH, then so can Mr Poplett.

57. In respect of the ventilation system, Mr Poplett did challenge Mr Hoffman's views on the significance of air change rates, but then both are experts in hospital ventilation systems and not clinicians. It should also be noted that NHS GGC staff routinely quote Mr Hoffman (sometimes out of context[32]), without rejecting his views on the grounds that he lacks expertise in a clinical environment. Mr Poplett did give evidence on whether the ventilation systems in specialist ventilation wards (2A, 4B and 4C) were suitable for the cohort of patients[33]. That is what ventilation experts do; examples include Mr Thomas, Mr Hoffman, Mr Lambert, Mr McKechnie and Mr Pardy. Whilst NHS GGC generously promote Mr Hoffman to the status of Professor, he is not an academic, but an engineer. In respect of the assessment of risk, Mr Poplett was careful, and his evidence that “a lower air change rate, a lower dilution rate, and the presence of sources which can encourage proliferation would be detrimental in a clinical setting”[34] is clearly not outwith the scope of expertise of an expert in hospital ventilation systems.

58. In respect of Mr Bennet, it is submitted that he has not given evidence about infection management or, directly, infection risk in the way that NHS GGC characterise without any specification. It is our submission that Mr Bennett was careful to remain within the scope of his experience and expertise, and

[31] CTI Closing Statement, Glasgow 3, Page 578, Paras 191-193.
[32] A good example is Glasgow 4, Part 3 - Witness Statements, Volume 4, Jane Grant, Document 1, Page 72, Question 59; and Transcript, Jane Grant, 23 September 2025, Page 48, Column 92.
[33] CTI Closing Statement, Glasgow 3, Page 592, Para 237.
[34] Transcript, Andrew Poplett, 7 November 2024, Page 6, Column 7.

that his views on risk[35] should, like that of Mr Poplett and others, be considered in conjunction with the opinions of others, to enable the Chair to reach a view on the risks posed by the potentially deficient features. In respect of *Cryptococcus* and the report of the Cryptococcus Expert Working Group[36], Mr Bennett's entire career has focused on the airborne transmission of infection and its prevention; principally at Porton Down[37]. He is clearly an expert in that field. However, in his work for the Inquiry on *Cryptococcus*, his conclusion[38] does not amount to an assessment of infection risk, rather it reflects the opinion that, had the two patients who died been accommodated in HEPA filtered positive pressure rooms, it would have been possible to exclude a connection to the hospital environment. They were not, and it was therefore not possible to exclude that connection. The NHS GGC attack on Mr Bennett's expertise has no merit.

1.4.3 Expert evidence on whistleblowing

59. The past thirty years has seen a succession of inquiries into failures of NHS organisations to respond to concerns about patient safety issues raised by their own staff. These include: the Bristol Royal Infirmary Inquiry (1984-1995), the Mid Staffordshire NHS Foundation Trust Inquiries (2005-2009), the Vale of Leven Hospital Inquiry (2009-2014), the Infected Blood Inquiry (2017-2022), the Ockenden Review (2022), The Thirlwall Inquiry (currently underway) and the Freedom to Speak Up Review (2015).

60. As the March 2025 review by the Committee on Standards in Public Life "Recognising and responding to early warning signs in public sector bodies"[39] notes, it not hard to find common themes among a range of scandals in public life - a failure to listen to and act on concerns raised, a failure to learn lessons from similar incidents, and a failure to identify and share emerging risks.

61. In light of the amount of material available we proposed to the Chair that the Inquiry obtain a report from Sir Robert Francis, the Chair of the Mid

[35] As summarised in CTI Closing Statement, Glasgow 3, Page 599, Paras 256-261.
[36] CTI Closing Statement, Glasgow 3, Page 601, Paras 262-281.
[37] Bundle 21, Volume 1, Document 9, Page 740.
[38] Bundle 21, Volume 1, Document 9, Page 762.
[39] Bundle 51, Volume 1, Document 76, Page 803.

Staffordshire NHS Foundation Trust Inquiries, to focus the issues on whistleblowing and corporate culture by providing an accessible resource for us and the Chair, summarising the key themes and answering three questions:

a. How can an external observer or investigator tell if an NHS Board or Trust has a problem within its organisation related to the encouragement of reporting by staff of patient safety concerns?

b. What principles should be followed by an NHS Board or Trust that wishes to create an effective system in which such concerns can be raised?

c. From all of the work undertaken by you, what are the most effective changes that can be made by NHS Board or Trust to create an effective system in which such concerns can be raised?

62. It was not for Sir Robert to reach conclusions on any of the Terms of Reference. That is a matter for the Chair. However, we took the view that his report would be of considerably less utility if produced in a vacuum. He needed to know something about the events at the QEUH/RHC from the perspective of the whistleblowers and Dr Inkster. As the Chair has yet to reach a determination, Sir Robert was supplied with a scenario drafted by Counsel to the Inquiry and based on the CTI Closing Statement following Glasgow 3.

63. It was explained to Sir Robert that the scenario attempted to summarise events that took place between 2015 and 2024, as a number of clinicians within NHS GGC sought to raise concerns about infections they saw as linked to the water and ventilation systems of the QEUH and also about the operation of the IPC team within the NHS GGC in general and the QEUH in particular. Some less significant events were omitted and the amount of detail that was provided drops off the further events were from attempts made by Dr Inkster, Dr Peters and Dr Redding to draw attention to their concerns.

64. The report of Sir Robert Francis was produced in the summer of 2025[40], and a Direction 5 process was run for it.[41]

[40] Bundle 51, Volumes 1, Document 1, Page 3.
[41] Bundle 51, Volumes 2 and 3.

1.4.4 Supplementary Statement of Louise Slorance

65. Mrs Slorance had previously produced two statements and had given oral evidence. After the oral hearings had concluded she produced a further Statement[42]. We have bundled that Statement and released it to Core Participants with other statements. It is, however, our view that it is more in the nature of a submission and the Chair should consider it as such.

1.4.5 Supplementary Statement of Alan Seabourne

66. Mr Seabourne produced a Supplementary Statement on 4 November 2025, well after the oral evidence had closed. In that statement he set out material much of which was not included either in his Witness Statement signed off by him on 16 April 2025 or in his oral evidence given to the Inquiry on 29 May 2025. He makes suggestions for specified additional witnesses which were not made on behalf of NHS GGC (or any other party), nor were Rule 9 questions formulated by any party to the Inquiry relating to many points he makes. To that extent the Supplementary Statement was not of great assistance to the Inquiry. Where possible we have taken account of some of his points when reaching our conclusions.

1.5 Events at the QEUH/RHC in context

67. It is important to see the events that are the subject of this Inquiry in the context of the long-term development of national IPC practice, the scale of NHS GGC as a whole and its Acute Services Strategy, and the conclusions and recommendations of the Vale of Leven Hospital Inquiry ("VOLHI").

1.5.1 The development of national IPC practice

68. There has been a long history of the creation of national standards for infection prevention and control. In 1998 the “Scottish Infection Manual” was clear that infection control should be at the heart of hospital management. In 2001 the Carey Report into “Managing the Risk of Healthcare Associated

[42] Glasgow 4, Part 3 - Witness Statements, Volume 8, Louise Slorance, Supplementary Witness Statement, Document 5, Page 51.

Infection in NHS Scotland" was published. It recommended that NHS Scotland should promote a culture which encourages openness and the sharing of information on risk[43]. In 2001 a ministerial commitment to reducing the burden of disease and avoidable illness caused by HAI resulted in the production of the Watt Group Report[44]. That report made many recommendations, but two are particularly relevant. One related to Scottish Health Facilities Note 30 as a source of good IPC practice for new builds and refurbishment projects, and the second ultimately gave rise to the National Infection and Prevention and Control Manual.

69. The Watt Group Report concluded that the "The Scottish Health Facilities Note 30 should be used as a first point of reference on Infection Control on new builds and refurbishment projects", and recommended:

> 16(b) That the NHS in Scotland develops, as a matter of urgency, standards relating to new builds and refurbishment projects incorporating, where necessary, the Scottish Health Facilities Note 30 guidance as best practice and requires Trusts to produce action plans for compliance with Note 30[45]

70. By the time the OBC for the new SGH was approved, a new version of SHFN 30 had been produced in 2007[46], and in due course it was listed in 'NHS Mandatory Documentation' in the Employer's Requirements ("the ERs") for the new hospital[47].

71. Secondly, the former Chief Nursing Officer for Scotland, Fiona McQueen,[48] and the Current Director of NHS NSS, Julie Critchley,[49] explained it was a recommendation of the Watt Group Report that gave rise to the current system of reporting of HAIs and HCAIs contained in the NICPM[50]. That was:

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[43] Bundle 53, Volume 1, Document 2, Chapter 7, Page 324.
[44] Glasgow 4, Part 3 - Witness Statements, Volume 2, Fiona McQueen, Document 4, Page 77, Para 15; Bundle 52 Volume 1, Document 32, Page 352.
[45] Bundle 52, Volume 1, Document 32, Page 372.
[46] Edinburgh 3, Bundle 13, Volume 3, Document 16, Page 553.
[47] Bundle 46, Volume 3, Document 1, Page 5-29, Clause 5.1.2.
[48] Glasgow 4, Part 3 - Witness Statements, Volume 2, Fiona McQueen, Document 4, Page 75, Paras 13-21.
[49] Glasgow 4, Part 3 - Witness Statements, Volume 4, Julie Critchley, Document 4, Question 9, Pages 220-222.
[50] Bundle 27, Volume 4, Document 16, Page 178.

30. That a classification system for infection outbreaks/episodes be drawn up and used by all key players as "common currency" in deciding the actions and communications required in a given infection incident (A framework (Infection Control Risk Matrix) is set out in detail in Appendix E), and that clear policies are developed, using this system, which identify all the key individuals involved in communications about outbreaks of different severity.

72. Since 2001, policy and guidance relating to reporting of HCAI incidents and risks across NHS Scotland has been shaped by these and other reviews[51]. It was the recommendations from these reviews, along with evidence-based guidance and international standards for HCAI reduction, that has informed the development of the current NICPM, and it should come as no surprise to any IPC clinician or manager, HAI Lead or senior board official.

1.5.2 NHS GGC and its Acute Services Strategy

73. The QEUH/RHC was officially opened by Her Majesty the Queen on 3 July 2015. That event represented the realisation of the most significant part of NHS GGC's Acute Services Strategy, which had begun 2002. It should be acknowledged that, whilst the nature and operation of the water and ventilation systems of that hospital lie at the heart of the focus of this Inquiry, the decisions and processes that resulted in the procurement of the new Southern General Hospital (which became the QEUH/RHC) within the Acute Services Strategy, involved a much larger array of decisions and events that are of substantially greater extent and complexity.

74. Similarly, as was frequently observed by its Chief Executives[52], NHS GGC was, and remains, a very large organisation with a budget in the billions, tens of thousands of staff and responsibility for the delivery of health care for 1.5 million people. They have argued that criticisms of the decision making and governance of the procurement of the QEUH/RHC, or the decision making and governance of the emergence of issues with its water and ventilation

[51] Glasgow 4, Part 3 - Witness Statements, Volume 4, Julie Critchley, Document 4, Question 9, Pages 220-222.
[52] Transcript, Robert Calderwood, 30 September 2025, Page 11, Column 18; Glasgow 4, Part 3 - Witness Statements, Volume 4, Document 1, Jane Grant, Page 6; Transcript, Professor Jann Gardner, 9 October 2025, Page 29, Column 53.

systems, must be seen in the context of a much larger set of challenges that faced NHS GGC as a whole over the period from the inception of the new SGH to the present day.

75. In our submission there are two responses to that. The first is that systems of governance and management for an organisation of that size should be designed to ensure that its Chief Executive, Corporate Management Team and Board fulfil their statutory duties in terms of the National Health Services (Scotland) Act 1978. The second is that, whilst in any organisation (however well run), there can and will be cases where information about harmful events is not reported to the right people, or where those people fail to act, where such failures to discover, to question and to act occur repeatedly, it is legitimate to consider that the governance and management of the organisation might well not be adequate or effective - and where responsibility for that lies.

1.5.3 The Vale of Leven Hospital Inquiry

76. The procurement, design and construction of the QEUH/RHC took place broadly in parallel with emergence of concerns about *Clostridium difficile* infections at the Vale of Leven Hospital ("VOLH") from 1 January 2007, and the subsequent VOLHI, which was formally set up on 1 October 2009 and held hearings in 2010, 2011 and 2012. By the time the VOLHI Report was published in November 2014[53], NHS GGC had been responsible for the VOLH for more than eight years (since NHS Argyll and Clyde had been dissolved on 1 April 2006[54]). It is our view that the conclusions of the VOLHI Report form part of the context for the events that are the subject of this Inquiry. Note should be taken of certain key findings of the VOLHI that:

    a. It is important that managers ask questions rather than exist within "a management culture that relied on being told of problems rather than actively seeking assurance about what is in fact happening"[55].

[53] Bundle 51, Volume 1, Document 2, Page 595.
[54] The National Health Service (Constitution of Health Boards) (Scotland) Amendment Order 2006, SSI 2006/32 (Scot L) (entered into force 1 April 2006), The National Health Service (Constitution of Health Boards) (Scotland) Amendment Order 2006; Bundle 51, Volume 1, Document 2, Page 346.
[55] Bundle 51, Volume 1, Document 2, Chapter 1, Page 238.

b. "Any system of exception reporting depends upon individuals recognising and reporting exceptional events. Under this system, therefore, if staff at a lower level do not recognise or report an exceptional event, senior management do not become aware of it unless there are other systems to inform them of the event and of the earlier failure to report. It becomes critical, therefore, that at senior level there is assurance that the system is working and that patients are not being exposed to unnecessary risk"[56].

c. Dysfunctional arrangements for IPC can result in a failure to identify the extent of problems with HAIs and HCAIs[57].

d. The response of NHS GGC to emerging evidence of failures to identify and address the *Clostridium difficile* outbreak at the VOLH included specific actions to use the Acute Infection Control Committee, Board Infection Control Committee and Clinical Governance Committee to provide for a more effective focus on IPC Issues[58] and the creation of an "overarching infection control risk register" monitored by the AICC to manage IPC risk[59] as part of an acceptance of The risk management of HAI: A Methodology for NHS Scotland[60].

77. A number of key NHS GGC staff involved in the events that are the subject of this Inquiry, were involved in the events at VOLH, gave evidence to the VOLHI and were the subject of comments in the VOLHI report. The implications of this will be discussed in Chapter 8.

1.6 Criticism of individuals and organisations

78. Term of Reference 3E invites the Chair to consider “Whether failures in the operation of systems were a result of failures on the part of individuals or organisations tasked with specific functions”. In our submission, the Chair should not be restricted to identifying individuals and organisations who have responsibility (whether shared or not) for the failures of key building systems

[56] Bundle 51, Volume 1, Document 2, Chapter 15, Section 15.8, Page 522.
[57] Bundle 51, Volume 1, Document 2, Chapter 1, Page 236.
[58] Bundle 51, Volume 1, Document 2, Chapter 10, Section 10.8, Page 379.
[59] Bundle 51, Volume 1, Document 2, Chapter 15, Section 15.1, Page 493.
[60] The Scottish Government, *The risk management of HAI: A Methodology for NHS Scotland* (24 November 2008) https://www.gov.scot/publications/risk-management-hai-methodology-nhsscotland/.

but should also identify individuals and organisations who have contributed to other failures and wrongdoing engaged by the whole Remit and Terms of Reference.

79. There has been some reaction - mainly from NHS GGC - to the criticism made of individuals in our Closing Statement from Glasgow 3. Some of our criticism related to the way witnesses gave evidence or the quality of their evidence. This was often claimed to be a question of memory. That a witness, either deliberately or through lack of memory, was not particularly helpful to the fact-finding exercise, does not necessarily mean that they have a responsibility for any failures and wrongdoing identified in the discharge of the Remit and Terms of Reference of the Inquiry. We acknowledge that.

80. On the other hand, in our submission, the Inquiry should criticise individuals who can be shown to have direct responsibility for particular decisions or failures to act. Account should be taken of the relative experience of the individual involved, whether they were trained or experienced for the task they faced, and the amount of resource allocated by their employer to support them, but to do otherwise would remove any sense of personal responsibility for actions which may well have had substantial impact on patients and the hospital itself and runs the risk of undermining the need (as recognised in TOR 13) of ensuring that past mistakes are not repeated.

81. In general, we have attempted to mirror the approach of the VOLHI to the identification of individuals and the allocation of responsibility. We have done so for reasons of fairness, because many events at the heart of our investigation took place at the same time as the events investigated by that inquiry, and many of the same organisations, and some individuals, involved in these events were involved in that Inquiry, have been referred to in it and have experience of having their actions considered and criticised by it.

2. CHAPTER 2: THE DEVELOPMENT OF THE NHS GGC POSITION

82. A notable feature of this Inquiry is how the position of NHS GGC on key issues has changed since the Inquiry was established. NHS GGC's latest position may have been crystallised in the evidence of the current Chief Executive, Professor Jan Gardner, on 9 October 2025. The approach she took, and that she asserts NHS GGC now takes, is significantly different from that set out in its previous submissions to this Inquiry. This Chapter explores that metamorphosis in respect of two key issues:

a. the extent to which deficiencies in the water and ventilation systems have adversely impacted on patient safety and care, and

b. the attitude of NHS GGC to Dr Peters, Dr Redding and Dr Inkster, and the encouragement of whistleblowing.

2.1 Development of approach of NHS GGC to infection link

83. On the face of it, the position of NHS GGC, in its Opening Statement of 6 September 2021, was one of open enquiry. It stated that:

> "… it has been a matter of the utmost concern to NHS GGC that, since both the QEUH and RHC opened to the admission of patients in 2015, certain issues have come to light which may have adversely impacted on the specific needs of some patients, including the young and very vulnerable."

84. They informed the Inquiry that NHS GGC:

> "… is determined to ensure that the issues which have required to be addressed in both hospitals do not arise in any other future NHS infrastructure project, and it will provide all the assistance that it can to the Inquiry to enable it to fulfil its vitally important remit."

85. NHS GGC did not express a public view at that stage as to whether the "issues have come to light which may have adversely impacted on the specific needs of some patients, including the young and very vulnerable," might have actually had such an impact.

86. However, this was not the first time NHS GGC had addressed this issue in a public statement. Less than six months before, on 22 March 2021, NHS GGC

had responded to the final report of the Oversight Board and the CNR Overview Report, with an unreserved apology to those whose infection episodes were judged by the CNR Expert Panel to be possibly or probably linked to the hospital environment[61], and also informed the public that:

> "Whilst it has not been possible to provide conclusive answers to these questions, significant action has been taken to mitigate the risk of infection from the environment. As soon as we recognised the potential risks with the water supply in 2018, we took action." [62]

87. However, as the then Chief Executive, Ms Grant, explained in Glasgow 4, Part 3, at the time NHS GGC issued that statement it was at Level 4 of the NHS Scotland Support and Intervention Framework, and to some extent its freedom of action was constrained[63].

2.1.1 Closing Statement following Glasgow 1

88. On 15 December 2021, after the Glasgow 1 hearing, NHS GGC provided the Inquiry with a Closing Statement[64]. This developed the Board's position. The Glasgow 1 hearing had heard from families and patients and had been informally described as a "perceptions hearing". NHS GGC responded robustly to the criticisms and concerns raised by those patients and families. Senior Counsel for NHS GGC submitted that:

> "… until such time as the Inquiry has had the opportunity to consider evidence from witnesses appropriately qualified to express an opinion about these issues, and to respond to the evidence which has been led it would, in my submission, be inappropriate to do other than to treat the evidence that has been heard as raising important concerns which require to be investigated further."

89. The submission was accompanied by an open letter written by Senior Clinical Leaders of the Queen Elizabeth University Hospital to the First Minister and the Cabinet Secretary for Health and Social Care on 30 November 2021[65]. The first author of the letter was the then Medical Director Dr Armstrong, and

[61] Bundle 25, Document 61, Page 1260.
[62] Bundle 25, Document 61, Page 1260.
[63] Transcript, Jane Grant, 24 September 2025, Page 49, Column 94 and Page 58, Column 112.
[64] Glasgow 1- NHS Greater Glasgow and Clyde Closing statement, 15 December 2021.
[65] Bundle 27, Volume 11, Document 3, Page 18.

its principal focus was a response to what was described as the way that "the integrity of our staff has been repeatedly called into question". However, the letter also referred to "unfounded criticism of … the safety of our hospitals".

2.1.2 First NHS GGC Positioning Paper

90. A year later, on 14 December 2022, NHS GGC provided a first Positioning Paper to the Inquiry. The principal focus was a defence against any suggestion that there had been a 'cover up', and a critique of actions of the 'whistleblowers' and of Dr Inkster. That aspect of the paper is discussed in the next section of this chapter, but the paper did address the "alleged link between infection suffered by certain patients and the hospital environment". This developed the approach in the Closing Statement following Glasgow I. For the first time the NHS GGC position was that:

> Irrespective of the basis for the perception held by witnesses it is not accepted that there is any causal connection between infection suffered by any patient and the hospital environment save [the 2019 *Mycobacterium Chelonae* case], and in one case of *cupriavidus* in 2016[66].

91. The Positioning Paper identified four reports in support of this proposition. These were:

    a. Report of the Cryptococcus Incident Management Team Expert Advisory Sub-Group Dated 05 April 2022; [67]

    b. PAG 19/2/2018; [68]

    c. Report of Professor Alistair Leanord; [69] and

    d. Report of Professor Tom Evans[70]

92. This position is - to say the least - significantly different from the conclusions of the CNR Expert Panel. As far as we can ascertain, no steps were taken by NHS GGC to inform any of the parents, or the patients whose cases had been

[66] Bundle 25, Document 62, Page 1270.
[67] Bundle 6, Document 39, Page 1115.
[68] A42362222 - Bundle 52, Volume 1, Document 3, Page 56.
[69] Bundle 6, Document 40, Page 1195.
[70] Bundle 8, Document 44, Page 223, Document 45, Page 230 and Document 46, Page 239.

considered by the CNR, of this change of position.

93. By the time this first Positioning Paper was supplied to the Inquiry NHS GGC had instructed the HAD Report[71].

2.1.3 The second NHS GGC Positioning Paper

94. The 5 April 2023 Positioning Paper focuses primarily on infection link. The position taken is clear:

> "3. It is the position of NHS GGC that the built environment of the QEUH did not, on a proper reading of the available evidence, expose patients to any increased risk to their health, safety or wellbeing. Further, with the exception of two discrete cases of paediatric infection, there is no evidence before the Inquiry to properly suggest a link between infections suffered and anything arising from the built environment."[72]

Evidence of an increased rate of infections

95. The paper submits that there is no evidence to demonstrate any increased rate of infections within QEUH from micro-organisms related to the built environment. It sets out a complete rejection of the idea that there was any greater rate of infections at the QEUH/RHC than any other NHS Board:

> "45. None of these comparison exercises indicate that, during the period with which the Inquiry is concerned, there was an increased rate of overall infection, or of infection from micro-organisms related to the built environment at the QEUH or RHC. Indeed, the ARHAI comparisons with other health boards found that infection rates at the QEUH and RHC are as good, if not better, than those of other NHS boards. The NHS GGC Director of IPC, Sandra Devine, has collated the information from the varying sources of these indicators, which is attached to this Paper at Appendix 1. Considering the patient population served by both hospitals, a very reasonable inference may be drawn from these findings that the

[71] See letters of instruction dated 21 November 2022: Bundle 44, Volume 1, Document 3, Page 234 and Document 4, Page 239.
[72] Bundle 25, Document 10, Page 3.

built environment at the QEUH and RHC was not in an unsafe state during the period with which the Inquiry is concerned and, in fact, continues to be safe."

96. The evidence produced for this assertion was the appendix authored by Ms Devine. The purpose of that appendix was discussed with Ms Devine when she gave evidence[73], but the document itself describes its aim as:

> "… to describe what indicators we have that can provide some assurance that patient outcomes on this campus were as expected or in some instances better than expected. Although not as definitive as we would wish for, these indicators are used across NHS Scotland and could be considered collectively as a proxy for whole system performance. Certainly, at the very least, it places QEUH/RHC performance in terms of patient outcomes within the context of NHS Scotland as a whole."[74]

97. The first proposition advanced was that NHS GGC may have higher rates of healthcare associated infections in part in consequence of the fact that:

> Patients from Greater Glasgow are more socially deprived and therefore have poorer health outcomes due to factors such as smoking, alcohol, drug use etc. compared to the population.

98. Quite how that is relevant to rates of infection amongst paediatric haemato-oncology patients drawn from the whole of Scotland is not explained.

99. The second proposition advanced is that the National Point Prevalence Survey of Healthcare Associated Infection (HAI) & Antimicrobial Prescribing (AMP) 2016, the progress in meeting national Annual Operational Plan (AOP) targets, and the results of ARHAI reviews for numbers of cases of *Staphylococcus aureus* and *Clostridium difficile*, all showed real progress and to some extent lower rates than other boards. Given that these are not the infections that were at issue amongst paediatric haemato-oncology patients, it is not clear how relevant it is to the issue facing the Inquiry.

100. The third discrete evidence source was the Report from the Cryptococcus Incident Management Team Expert Advisory Sub-Group[75]. No mention is

[73] Transcript, Sandra Devine, 3 October 2024, Pages 81-84, Columns 161-168.
[74] Bundle 25, Document 10, Page 364.
[75] Bundle 6, Document 39, Page 1115.

made of the decision of NHS NSS not to associate itself with the conclusions of this report. In light of recent developments in respect of potential failure to report *Cryptococcus* infections to ARHAI, the statement that, "There have been no cases before or since 2019", may turn out to be of significance.

Reliance on Whole Genome Sequencing ("WGS")

101. The second Positioning Paper develops the argument that the absence of close connection between infections and samples can, via WGS, prove the absence of an environmental connection between infections and the environment. The paper[76] explains that, save in the two discrete cases to which reference had already been made, it would be difficult to conclude with any degree of confidence that an infection was causally linked to the built environment: in fact, quite the contrary. This submission clearly seeks to build on the WGS work by Professor Leanord presented to Professor Wilcox of the CNR[77], and asserts that the work carried out by Professor Leanord, Mr Brown and Professor Evans used "a considerably more extensive data set than was available at the time of the Case Note Review" to "indicate that there is, in fact, a more limited degree of genetic diversity within an individual hospital than might be expected to be seen in the community". It should be noted that no additional samples were produced for WGS analysis for the period prior to the commencement of intensive water testing in December 2018 (as described by Dr Chaput)[78]. The new samples post-dated the commencement of chlorine dioxide dosing of the domestic water system.

102. This second Positioning Paper then urges the rejection of the conclusions of the CNR Expert Panel primarily in the following terms:

> 62 Finally, although the Case Note Review reaches conclusions as to the likelihood that infections were linked to the hospital environment, the Case Note Review does not define the criteria used to categorise the cases in relation to likelihood.[1] In the absence of such definition, it is difficult to attach any weight to the conclusions reached by the Review, in particular when taken together with the

[76] Bundle 25, Document 10, Page 345.
[77] Transcript, Professor Mark Wilcox, 29 October 2024, Page 55, Column 105.
[78] Bundle 18, Volume 1, Document 2, Page 13.

other observations and criticisms which have already been made elsewhere in this Paper.[2]

103. The two footnotes are of some significance.

> [1] These are not provided in the Case Note Review Overview Report. As NHS GGC does not have access to the individual reports for each case it is unknown whether these are provided for in those. Furthermore, the conclusions reached by the Case Note Review appear to be based on the subjective opinion of the authors (see p.56) and this opinion is heavily caveated (e.g. “it is not possible to state this with certainty” and “Neither phenomena prove that some of the bacteraemia had hospital environment sources, but the observations are consistent with this hypothesis”).
>
> [2] NHS GGC has provided separately a detailed response to the Case Note Review, which was submitted to the Inquiry in response to RFI 1 on 1 March 2021.

104. The substance of the document referred to in the second footnote [2] is contained within the CNR Expert Panel Rebuttal document[79]. The paper fails to acknowledge that NHS GGC had always known that it would not have access to the individual CNR reports for each case.

105. The conclusion of the paper is not that the balance of the evidence suggested the absence of an infection link, but the rather more definitive absence of any evidence in that:

> "…there is no evidence to demonstrate any increased rate of infections within QEUH from micro-organisms related to the built environment. When looked at properly and scientifically, the evidence demonstrates that the QEUH and RHC campus provides a safe environment for its patients."

2.1.4 Response of the Inquiry Team

106. In part as a consequence of the approach taken by NHS GGC, Counsel to the Inquiry developed Key Question 4, in order to structure its assessment of whether the potentially deficient features of the water and ventilation systems of the QEUH/RHC have adversely impacted on patient safety and care and

[79] Bundle 25, Document 5, Page 157.

whether the hospital has provided, and now provides, a suitable environment for the delivery of safe, effective person-centred care[80]. The question became:

> (4) Is there a link, and if so in what way and to what extent, between patient infections and identified unsafe features of the water and ventilation systems?

107. The Inquiry's appointed experts then sought to answer this question. It is our submission that had NHS GGC accepted (or continued to accept) the conclusions of the CNR on infection link, then this section of the Inquiry's work might well have taken considerably less time.

2.1.5 The HAD Report

108. Whilst, in the first half of 2024, the Inquiry Team were aware that NHS GGC might be instructing a further expert report or reports, the full scope of the HAD Report came as some surprise when it was produced in July 2024. In its Closing Statement following the Glasgow 3 hearing, NHS GGC submitted that:

> … That report concludes, taking a multifactorial approach, that the QEUH/ RHC did not, and does not, pose an increased infection risk. The authors also found no evidence of any link between the built environment and any cases of infection. This is precisely the opposite conclusion to that reached by the Inquiry's experts and the one advanced, and commended to the chair, in the closing submissions.[81]

109. The HAD Report was in due course received by the Inquiry. By the spring of 2025, the NHS GGC position had advanced to contain two principal propositions:

    a. There was an incontrovertible epidemiological study that showed that there was no real difference between the rate of infection amongst paediatric haemato-oncology patients at the RHC and at Yorkhill before the move, and in respect of the adult haemato-oncology patients the rates of infections were comparable to those in other Glasgow hospitals where similar patients had been and are now located, and

[80] Scottish Hospitals Inquiry, Remit and Terms of Reference.
[81] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Pages 43-44.

b. Professor Hawkey and his colleagues wished to advance the proposition that, in the absence of a close WGS link between patient samples and other patient samples or the environment, it was not possible to conclude that there was a connection between infections and the environment.

110. There is a question of the extent to which there is an inconsistency between the reasons for the instruction of the HAD Report set out in letters of instruction to Professor Hawkey and Dr Agrawal of 21 November 2021[82] and the explanation given nearly five years later by Professor Gardner for the instruction of the HAD Report. She explained it:

> "was [a] reasonable and prudent commission as preparation for onward proceedings. I think it was asking the Inquiry to test but it was meant to be around technical assurance of that relative risk. I don't think it was to undermine. That's my own interpretation. I don't think it was in any way to undermine the points around possibility or probability set out in the Case Note Review."[83]

2.1.6 NHS GGC Supplementary Closing Submission 26 June 2025

111. At the procedural hearing on 11 March 2025, the Chair requested that Counsel for NHS GGC provide a supplementary submission addressing the questions set out in Inquiry Direction 9 paragraphs 2.1-2.3. This was done,[84] and in that submission the Board maintained its position that that our conclusions and the findings that we submitted that the Chair should make on the evidence heard by that point were unsound, based on incomplete factual evidence and flawed expert evidence.

112. NHS GGC maintained its position that, with the exception of two discrete cases of paediatric infection in 2016 and 2019, NHS GGC did not accept any suggestion that there was any direct transmission link between the built environment and any infection suffered by a patient within the QEUH[85].

113. In support of that position the NHS GGC submitted that there was a need to

[82] Bundle 44, Volume 1, Document 3, Page 234 and Document 4, Page 239.
[83] Transcript, Professor Jann Gardner, 9 October 2025, Page 87, Column 169.
[84] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 11, Page 198.
[85] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 11, Page 205.

compare the QEUH/RHC with other hospitals, and that the conclusion of the Inquiry's appointed experts that rates of infections at QEUH/RHC were higher than at comparator hospitals was "plainly flawed". It was submitted that:

> "41. The HAD report concludes, using a comparative analysis, that the QEUH did not, and does not, pose an increased infection risk. The authors also found no evidence of any link between the built environment and any cases of infection. This is the opposite conclusion to that reached by the Inquiry's experts and the one advanced, and commended to the chair, in the closing submissions. The reasons for that conclusion, and the divergence between the authors of the HAD Report and the Inquiry's expert panel, must be addressed in Glasgow IV."[86]

114. The submission, dated 26 June 2025, also addressed the CNR and set out a very clear rejection of the conclusions of the CNR. It was submitted that:

> "… It is not accepted by NHSGGC that anything contained in the Case Note Review can properly justify any adverse inference about the safety of the water, drainage or ventilation systems at the QEUH. NHSGGC has challenged the methodology of the Case Note Review and the basis upon which it reached its findings in a number of respects. That challenge is supported by the HAD Report. It should be noted that the Case Note Review did not provide any comparative data on infection rates. …"[87]

115. We respond to these submissions in Chapter 4.

2.2 The attitude of NHS GGC to Dr Peters, Dr Redding and Dr Inkster

116. The question of what weight the Inquiry should give to the evidence of Dr Peters, Dr Redding and Dr Inkster, and whether the Inquiry should criticise their conduct, did not arise in the Opening Statement for NHS GGC. Hints of what was to come might be seen in the Closing Statement following Glasgow I, in the NHS GGC reaction to evidence of patients and family members. That position changed radically in the first Positioning Paper.

2.2.1 First NHS GGC Positioning Paper

[86] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 11, Page 208.
[87] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 11, Page 208.

117. When the first NHS GGC Positioning Paper was produced in December 2022, Dr Peters and Dr Inkster were both still employees of NHS GGC. Dr Inkster did not fully leave for NHS NSS until September 2023, and Dr Peters remains in post as an NHS GGC Consultant Microbiologist.

118. At this date no statements by Dr Peters, Dr Redding or Dr Inkster had been published or circulated by the Inquiry, but all three had participated in the 20 June 2020 BBC documentary, "Secrets of Scotland's Superhospital". In any event, NHS GGC elected to critique these doctors in its Positioning Paper. At paragraph 11, after explaining the Board's concern about allegations of a "cover up", the paper states:

> It does also require to be stated, albeit with regret, that the extraordinary challenges faced by the Board in the period post 2015 were significantly exacerbated by the conduct of "whistleblowers" whose various actions appeared to have been designed to undermine their colleagues, and the steps being taken collectively to ensure the safety and welfare of patients and, in consequence, undermined the crucial bond of trust between the hospital and its patients; this particular issue is considered at paragraph 69 below.

119. In its final paragraph the paper sets out a long list of complaints about the conduct of these three Consultant Microbiologists. These are listed in paragraph 69[88]. The fact that they were made may well have relevance to the question of the extent to which NHS GGC can be said to encourage disclosures of failures of performance or inadequacies of systems which might have an impact on patient care and patient outcomes, as specified in TOR 4. Some of the criticisms were advanced in considerable detail and were ultimately put to those criticised. Three further parts of the paper stand out:

120. The first is an accusation that it was the position of Dr Inkster that, at a time that she was NHS GGC Lead ICD, she had been told to lie to Professor Cuddihy[89]. This is advanced on the basis of Dr Deighan's review,[90] and precedes Dr Inkster's statement. Accordingly, we took evidence from Dr

[88] Bundle 25, Document 62, Page 1282.
[89] Bundle 25, Document 62, Page 1274.
[90] Bundle 27, Volume 6, Document 6, Page 91.

Deighan about his review[91]. It appears that this allegation comes from a summary of an interview, of Dr Inkster, carried out by others, on 6 January 2020. Dr Inkster denied saying what is reported in the summary[92].

121. The second is that Dr Inkster (then NHS GGC Lead ICD) misled parents of a child about the source of a *Serratia marcescens* infection in September 2018[93]. In our Closing Statement following Glasgow 3, we demonstrated this accusation was baseless, by reference to unredacted IMT Minutes (which NHS GGC must have had access to when the Positioning Paper was instructed[94]).

122. There is a non-specific implication that these "whistleblowers" were in some way behind "an unauthorised and inaccurate leak to the media … in breach of patient confidentiality", in respect of *Cryptococcus* in ward 6A[95]. No evidence has ever been advanced in support of this.

2.2.2 Response of the Counsel to the Inquiry Team

123. Given that NHS GGC had advanced the proposition that, "the actions of “whistleblowers” undermined the efforts taken to manage infection control and protect patient safety and welfare"[96], we considered it appropriate to take time to investigate these concerns. We asked questions of Dr Peters, Dr Redding and Dr Inkster about some of them, and they answered those questions in their extensive statements. All three were ultimately granted the status of Core Participants, in part because of the criticisms being advanced against them by NHS GGC.

2.2.3 Closing Statement by NHS GGC, 31 January 2025

124. In its Closing Statement following Glasgow 3 NHS GGC advanced a criticism of our approach to the evidence, particularly in respect of the view we proposed should be taken of the evidence of Dr Peters, Dr Redding and Dr Inkster, and the issues we had with some evidence of others advancing a

[91] CTI Closing Statement, Glasgow 3, Page 110, Section 3.5, Paras 355-363.
[92] Transcript, Dr Teresa Inkster, 2 October 2024, Pages 69-70, Columns 133-135.
[93] Bundle 25, Document 62, Page 1280.
[94] CTI Closing Statement, Glasgow 3, Page 383, Section 5.2, Para 596.
[95] Bundle 25, Document 62, Page 1280.
[96] Bundle 25, Document 62, Page 1282.

contrary position.

125. NHS GGC complained of what it characterised as "severe shortcomings in the approach adopted by Counsel to the Inquiry"[97], which was described as "a partisan approach, advancing the interests of certain individuals, to the detriment of NHS GGC and, more importantly, the public interest"[98]. In submissions in support of that proposition, NHS GGC appear to take the view that the questioning of certain witnesses was not fair or balanced[99], or was conducted in a partisan manner using disproportionate, and adversarial, cross examination in a manner inconsistent with the approach towards other witnesses[100].

126. NHS GGC was legally represented throughout the Glasgow 3 hearing, and at no time during the hearing were these serious criticisms raised with us, or with the Chair. In addition, the opportunity to make an informal or formal Rule 9 application to ask specific questions that might be seen as addressing any such concerns was not taken. Such concerns should have been raised at the time to enable us to explain our approach and, if appropriate, to adjust it.

127. Whilst taken in isolation it is correct that, "it is not in the public interest that unguarded and serious allegations are made without an evidential basis"; that it is "unfair to a patient, or their families ... to have an unjustified fear that the hospital was, and remains, 'unsafe'"[101]; that "adverse comment about the 'safety' of the hospital … requires to be based on robust and tested evidence, not on the perceptions of certain individuals with incomplete knowledge of events and flawed expert opinion"[102], in the absence of specification these submissions on behalf of NHS GGC amount to rhetoric, to which it is difficult

[97] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 37, Para 9.
[98] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 40, Para 17.
[99] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 37-38, Paras 11-13.
[100] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 39, Para 16.
[101] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 38, Para 14.
[102] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 40, Para 19.

to respond.

128. Paragraph 20 complains of the nature of criticism made of NHS GGC's staff in our Closing Statement and asserts that "NHS GGC must ensure that its staff are not subject to unjustified criticism". No specification is provided. It is submitted that, "it is inherently unlikely that professionals tasked with the care of highly vulnerable children, whether medical or estates, place their reputation, or the reputation of the organisation they work for, above their patients' interests", and that there should be a presumption against such an allegation, and that it "ought to take compelling and cogent evidence to prove such an allegation". We will return to that proposition later in this chapter.

129. It is then argued that the written submissions amount to a prosecution of NHS GGC, largely by reference to our analysis of whether the hospital was unsafe[103]. In light of submissions by Scottish Government and NHS NSS, we have reviewed our approach to whether the buildings provide a suitable environment for the delivery of safe, effective person-centred care. Our further developed submissions can be found in Chapter 3, and then in Chapter 9 in respect of the relevant Terms of Reference.

130. In respect of the questioning of witnesses, it must be remembered that many of our questions were asked because of specific requests by Counsel for other CPs in the informal Rule 9 process. NHS GGC have chosen to take advantage of this opportunity on some occasions and so have CPs whose perspective of events are significantly different, verging on diametrically opposed, to that of NHS GGC as advanced in its Positioning Papers. It is quite likely that many questions that have so aggravated the Board have been proposed by other CPs to investigate areas they are concerned about and to support submissions that they wish to make. As a result of this issue being raised in January 2025, we have since adopted a practice of signalling questions that arise from these informal Rule 9 representations that appear controversial, with the introduction "I have been asked to ask you…" or something similar.

[103] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 42, Para 23.

131. We acknowledge that there were some witnesses that we pressed hard for responses, to the extent of using closed and even leading questions. In our submission that was appropriate where witnesses had failed to answer questions sent to them in their witness questionnaire, set out a position that appeared to be contradicted by written material, or failed to answer more open questions. Again, without specification and this issue being raised at the time, it is difficult to be more specific.

132. NHS GGC suggest that we based our questioning on the Case Notes Review and the evidence of Dr Inkster, Dr Peters and Dr Redding and that we had not considered the documentation provided to the Inquiry by NHS GGC[104]. We were a new Counsel team, but when we arrived there were eight hearing document bundles. By the end of the Glasgow 3 hearing there were a further 51 hearing document bundles most either instructed by us, or containing material supplied by witnesses and reviewed by us, along with colleagues in the legal team, before being included. Our approach in the Glasgow 3 hearing was to find out what had happened after the handover of the hospital on 26 January 2015, as concerns about the water and ventilation issues emerged, and as infections that had the potential to be connected to those issues were identified. We could understand the NHS GGC position from their Positioning Papers[105], had countervailing positions in the statements of Dr Inkster, Dr Peters and Dr Redding, and also those of parents such as Professor Cuddihy, who had clear and specific concerns that seemed to require investigation.

133. We constructed a chronology to support our preparation, and sought to connect SBARs, Minutes, emails and other records to the events as they emerged. We reject the suggestion that there was not an evidential basis for our questions. We considered the documents and bundled those we thought relevant. Again, without specification and this issue being raised at the time, it is difficult to be more specific in response.

134. We reject the accusation that in our approach to the evidence we have acted in a prosecutorial manner, been partisan, or been anything other than fair and

[104] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 42, Para 25.
[105] Bundle 25, Document 10, Page 345 and Document 62, Page 1262.

balanced.

135. Paragraphs 31 to 34 of the NHS GGC submission begins to engage with our submission on what weight to give the evidence of Dr Inkster, Dr Peters and Dr Redding on one hand and Dr Armstrong, Professor Leanord, Professor Steele, Mr Walsh, Professor Williams, Dr de Caestecker, Dr Crighton, Dr Stewart and Ms Devine on the other. The heart of the critique is in paragraph 32, where it was submitted that our approach to the evidence, firstly, favoured the evidence of Dr Inkster, Dr Peters and Dr Redding, and secondly:

> "… belittles the evidence of NHSGGC's witnesses and suggests that personal attacks were put above patient safety. It will be recalled that NHS GGC's witnesses emphasised that IMTs were difficult. They were investigating fast moving situations and required to react quickly. A failure to engage constructively hampered that process. A change of IMT chair was required and that was actioned. That was due to patient safety and the wider interests of the patient cohort, not some personal grievance. With hindsight, it was accepted by a number of witnesses that the process could have been managed differently."

2.2.4 NHS GGC Supplementary Closing Submission 26 June 2025

136. The NHS GGC supplementary submission of 26 June 2025[106] contained a section addressing Drs Inkster, Peters and Redding[107]. The position of NHS GGC evolved, as it was now emphasised that NHS GGC does not invite the Chair to entirely disregard their evidence or that they were wholly incredible or unreliable. The role of Dr Inkster as Chair of the IMTs was acknowledged, but her status as Lead ICD for NHS GGC from 2016-2019 remains overlooked. NHS GGC observed that Drs Inkster, Peters and Redding were not present at all events and that they were not involved in every decision. The submission in respect of those doctors was summed up as:

> 55. CTI criticises NHSGGC's witnesses as being motivated by self-interest, or worse, organisational interest, which is strongly denied. It also ought to be recognised that Drs Inkster, Redding and Peters each feel deeply personally

[106] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 11, Page 198.
[107] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 11, Page 211-212, Paras 53-57.

aggrieved by events. It is submitted that their evidence ought to be seen in that light; that is not acknowledged at all in the written submissions. This does not result in their evidence being entirely incredible or unreliable, but ought to be taken into account in the balance of assessing their evidence against other witnesses. Their account should not, and cannot, be treated as precisely what occurred. NHSGGC invites the Chair to have regard to the issues outlined in response to Direction 9, paragraph 2.2 in assessing the totality of the evidence. [108]

137. It was again submitted that we focused unnecessarily on the removal of Dr Inkster as IMT Chair on 20 August 2019, and the issues around that decision "should not detract from the need for a proper functioning IMT to investigate a serious, unprecedented and fast-moving situation"[109].

2.3 What is the position of NHS GGC now?

138. In light of Professor Gardner's evidence on 9 October 2025, it is unclear what the corporate position of NHS GGC is now. It is submitted that NHS GGC would be providing, "all the assistance that it can to the Inquiry to enable it to fulfil its vitally important remit" (to quote from its opening statement) if, in its Closing Statement, NHS GGC could furnish the Inquiry with answers to the following questions:

a. Does NHS GGC now accept that there was, in fact, an exceedance in the rate of environmentally relevant BSI amongst paediatric haemato-oncology patients in the RHC in the period 2016 to 2020?

b. Does the NHS GGC position remain that there is no causal connection between infections suffered by any patient and the hospital environment, other than in the 2019 case of *Mycobacterium Chelonae* in Ward 6A and in one case of *Cupriavidus* in 2016?

c. Does NHS GGC accept both the conclusions and recommendations of the CNR Overview Report?

d. Does NHS GGC accept that it is more likely than not that a material

[108] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 11, Page 212, Para 55.
[109] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 11, Page 212, Para 57.

proportion of the additional environmentally relevant BSI in the paediatric haemato-oncology population between 2016 and 2020 had a connection to the state of the hospital water system?

e. Does NHS GGC maintain its specific criticisms of its former Lead ICD, Dr Inkster, in paragraphs 40-41 and 63-64 of its December 2019 Positioning Paper?

139. Does NHS GGC maintain the criticisms of the 'whistleblowers' set out in paragraph 69[110] of its December 2019 Positioning Paper?

a. To what extent does NHS GGC still advance either of its two Positioning Papers as submissions to the Inquiry?

[110] Bundle 25, Document 62, Page 1282.

3. CHAPTER 3 - 'SAFE, EFFECTIVE, PERSON-CENTRED CARE'

140. The remit of the Inquiry requires an examination of "whether the buildings provide a suitable environment for the delivery of safe, effective person-centred care". TOR 1 and the Remit specifically raise the issue of the "adequacy of ventilation, water contamination and other matters adversely impacting on patient safety and care". TOR 7 requires the Inquiry to examine the extent to which actions to remedy such defects have been adequate and effective. The Inquiry needs to understand and explain what is meant by the concepts of 'safe, effective person-centred care' and of 'safety', and the extent to which any aspects of the hospital buildings and their management might be said to have not been 'safe', to have had an impact on 'patient safety', or even to be 'unsafe'.

141. In our Closing Statement following the Glasgow 3 hearing, we sought to answer four Key Questions which were set out in Direction 5. Three of these questions sought to understand what is meant by 'unsafe,' on the basis that an unsafe system is one that "presented an additional risk of avoidable infection to patients"[111], and one that was not now unsafe as one that now presented "no additional avoidable risk of infection"[112]. No distinction was intended by the two different framings. We asked whether additional avoidable risks of infection arose from a potentially deficient feature of either the water or ventilation system and, if they did, concluded that as a result, that system was 'unsafe'.

142. In the Glasgow 3 hearing, the Inquiry's experts and other skilled witnesses were encouraged to approach their assessment of the safety of the hospital environment in responding to the first three Key Questions by considering whether there was an additional avoidable risk of infection. Whilst this approach has the advantage of simplicity it requires to be revisited because of two developments.

143. Paragraph 14.4 of the Interim Report states:

[111] Scottish Hospitals Inquiry, Direction 5, Key Questions 1 & 2, Page 2.
[112] Scottish Hospitals Inquiry, Direction 5, Key Question 3, Page 2.

> "The evidence before the Inquiry indicated that safety is not a binary issue. Rather, there is a sliding scale of risk from safe to unsafe, which can be influenced by many factors. SHTM 03-01 sets out recommended parameters for the outputs of ventilation systems which reflects a general consensus about what is required in order to create an acceptable level of patient safety. These are consistent with parameters set in other countries. A departure from such recommendations, taken in isolation, has the potential to increase risk. However, other control measures can be introduced to make a space that does not have ventilation compliant with SHTM 03-01 sufficiently safe for the patients being treated there. For example, the Sick Kids had no mechanical ventilation but nevertheless provided a safe environment in which to treat patients."

144. In addition, the Closing Statements following Glasgow 3 from NHS GGC, NHS NSS and Scottish Government contained criticisms of the approach previously taken.

145. NHS GGC submitted that the measure of safety applied was unclear, that the proposed answers did not meet the necessary standard of proof and amounted to unguarded and serious allegations made without an evidential basis. They also argued that such adverse comment about the "safety" of the hospital is likely to significantly undermine public confidence in the hospital, such that patients may no longer want to be treated there. NHS GGC went on to submit that our approach was to analyse certain features in the abstract, and ask what risk they posed, without considering mitigation.[113]

146. The Scottish Ministers expressed the view that the crucial point is that safety exists in the round - not just from the risk that may be present but also from the ways in which it is mitigated or controlled. Furthermore, they submitted that the conclusion in respect of air change rates in general wards was not based on sufficient evidence or assessment of an expert.[114]

147. NHS NSS proposed that the Inquiry consider an independent review of more detailed technical information, including current action plans in relation to water and ventilation audits, planned preventative maintenance and reactive

[113] Glasgow 3 - Core Participants' Closing Submissions, NHS Greater Glasgow & Clyde, Document 11, Page 42.
[114] Glasgow 3 - Core Participants' Closing Submissions, The Scottish Ministers, Document 5, Page 64.

maintenance activities, and critical ventilation systems annual validation reports in accordance with SHTM.[115]

148. After further consideration, the Inquiry Team took two steps. Firstly, technical reports in the general form of Authorising Engineer Audits ("AE Audits") were instructed in respect of each of the water and ventilation systems of the hospital from Mr Andrew Poplett, and secondly, we obtained a report from Dr Mumford on the practice of risk management, with a view to providing a more developed analysis of what is meant by the concepts of 'safe' and 'safety', how concepts of safety relate to concepts of risk, and the extent to which avoidable risks can have an impact on 'patient safety' or even be 'unsafe'.

3.1 Mr Poplett's Audits

149. In the Glasgow 3 hearing we heard evidence from Mr Kelly about the role of the Authorising Engineer and the nature and scope of an AE Audit[116]. We concluded that the proposal by NHS NSS for an independent review would best be addressed by instructing separate industry standard AE Audits of the current state of management of each of the domestic water system and the ventilation system at the QEUH/RHC.

150. As the Inquiries Act 2005 does not give a power to the Chair to require NHS GGC to permit such an audit to take place, permission was sought from NHS GGC. They agreed that Inquiry Expert, Mr Andrew Poplett, be provided with access and information to enable him to carry out two separate AE Audits at the QEUH/RHC; one for the domestic water system and one for the ventilation system. These were carried out in July 2025[117]. The conclusions of the audits are discussed in detail in Chapter 7, whilst the consequences of those conclusions are considered under TOR 7 in Chapter 9.

[115] Glasgow 3 - Core Participants' Closing Submissions, The Scottish Ministers, Document 8, Page 148.
[116] Transcript, Dennis Kelly, 27 August 2024, Pages 62-68, Columns 120-131.
[117] Bundle 53, Document 3, Page 14 in respect of the domestic water system; Bundle 53, Document 4, Page 40 in respect of the ventilation system.

3.2 Concepts

3.2.1 Patient-Centred Care

151. Whilst the idea of patient-centred care has a long history, in 2010 the Healthcare Quality Strategy for NHS Scotland described it as “Mutually beneficial partnerships between patients, their families, and those delivering healthcare services which respect individual needs and values, and which demonstrate compassion, continuity, clear communication and shared decision making”[118].

152. In 2015, the Chief Medical Officer for Scotland reiterated the vital importance of a person-centred ethos, describing the need to "deliver healthcare that focuses on true value to the patient"; the need to "place collaborative, relational decision-making and planning at the heart of our system" and the absolute imperative "to be focusing completely and relentlessly on what matters most to the people who look to us for care, support and treatment"[119].

3.2.2 Scottish Government Standards

153. In compliance with section 50 of the Public Services Reform (Scotland) Act 2010, in 2018 the Scottish Government issued the Health and Social Care Standards: My Support, My Life,[120] which sets out Health and Social Care Standards that reflect the centrality of the patient experience. Those standards contain headline outcomes which are defined as:

    1: I experience high quality care and support that is right for me.

    2: I am fully involved in all decisions about my care and support.

    3: I have confidence in the people who support and care for me.

    4: I have confidence in the organisation providing my care and support.

[118] Bundle 52, Volume 1, Document 13, Page 147.
[119] Scottish Government, *Person-centred care: guidance for non-executive directors* (15 February 2016), https://www.gov.scot/publications/person-centred-care-non-executive-directors/.
[120] Scottish Government, *Health and Social Care Standards: my support, my life* (9 June 2017), https://www.gov.scot/publications/health-social-care-standards-support-life/.

5: I experience a high-quality environment if the organisation provides the premises.

154. The fourth and fifth headline outcomes seem particularly relevant to the situation faced by patients in the QEUH/RHC. We see them reflected in paragraph 3 of Dr Mumford's report on risk management[121].

3.2.3 Safe

155. Given the concerns expressed about the Inquiry Team's definition of 'unsafe', and its use in Key Questions 1, 2 and 3, it is important to understand the basis of our definition of 'unsafe'. These concerns do not seem to apply to discussions of whether a building system can be said to be "safer" or "less safe". That approach is illustrated by the important evidence of Professor Humphreys in the Edinburgh 1 hearing which commenced on 12 May 2022. When discussing air change rates in general terms, he explained:

> So, the greater the air change is, the greater dilution you have, reducing the number of contaminants in the air and therefore the safer it is.

156. The concern expressed appears to be whether it is possible to say that a building system can be said to be "safe" or "unsafe". However, it is notable that NHS Scotland's Healthcare Quality Strategy has three Quality Ambitions designed to make NHS Scotland a 'world leader in Healthcare Quality'. These are 'Person Centred', 'Safe' and 'Effective'. Safe is defined in a way that appears consistent with the way it was defined in Key Questions 1, 2 and 3:

> “There will be no avoidable injury or harm to people from healthcare they receive, and an appropriate, clean and safe environment will be provided for the delivery of healthcare services at all times.”[122]

157. And defines one of the quality ambitions for NHS Scotland as:

> "Safe: avoiding injuries to patients from healthcare that is intended to help them."[123]

[121] Bundle 44, Volume 6, Document, Page 5.
[122] Bundle 52, Volume 1, Document 13, Page 147.
[123] Bundle 52, Volume 1, Document 13, Page 150.

158. When pressed on this issue in Glasgow 4, Part 2, Dr Mumford explained that the formulation in Key Questions 1, 2 and 3, and the use of the word “avoidable", is not enough to be able to determine safety or unsafety as it effectively amounts to a consideration of one half of the calculation[124].

3.3 The Assessment and Management of Risk

159. The Inquiry has heard a large amount of evidence about how risks arising from deficient features of the water contamination or an inadequacy of ventilation, have the potential that a particular patient or group of patients may contract an infection through contact with an infectious dose of microorganisms.

160. In order to properly apply that evidence to the question of the extent to which any aspects of the hospital buildings and their management might be said to have not been ‘safe’, or to have had an impact on ‘patient safety’ or even to have been ‘unsafe,’ it is necessary to understand and apply the conventional forms of risk management as they are applied in the public sector in Scotland.

161. Before doing this, we must remember that, at the QEUH/RHC, such an assessment must consider particular groups of patients, because of the very different levels of vulnerability which are to be found in the patient population, particularly for the immunocompromised. We must also acknowledge that an individual patient or cohort of patients may benefit from protective factors which reduce the possibility of an infection being contracted and that these may be introduced by deliberate policy. Such a policy or factors must be considered in the assessment of the overall risk, but it remains a question whether such management can be said to reduce risk of harm to the point where the particular deficient feature can no longer be said to adversely impact on patient safety and care.

3.3.1 Management of Risk

162. The UK Government Orange Book, Management of Risk, sets out five core principles that require to be applied as part of a risk management

[124] Transcript, Dr Sara Mumford, 29 August 2025, Page 25, Columns 45-46.

framework[125]. They are:

A. Risk management shall be an essential part of governance and leadership, and fundamental to how the organisation is directed, managed and controlled at all levels.
B. Risk management shall be an integral part of all organisational activities to support decision-making in achieving objectives.
C. Risk management shall be collaborative and informed by the best available information and expertise.
D. Risk management processes shall be structured to include:
    a. risk identification and assessment to determine and prioritise how the risks should be managed;
    b. the selection, design and implementation of risk treatment options that support achievement of intended outcomes and manage risks to an acceptable level;
    c. the design and operation of integrated, insightful and informative risk monitoring; and
    d. timely, accurate and useful risk reporting to enhance the quality of decision-making and to support management and oversight bodies in meeting their responsibilities.
E. Risk management shall be continually improved through learning and experience.

163. It is important to acknowledge that identifying risks or even assessing risks is not enough. One way to express the need for action is the 4 Ts: Treat, Tolerate, Terminate or Transfer the risk which express the need to act to reduce the likelihood of the risk occurring, to minimise its harmful impact if it happens or (in some cases) to accept the existence of the risk[126].

164. To create a safe environment a healthcare organisation such as NHS GGC needs to apply these principles to a continuously developing and learning process of identifying risks and applying appropriate mitigation as part of a risk management process[127]. Various characterisations of this process exist

[125] Bundle 44, Volume 6, Document 11, Page 138.
[126] Institute of Risk Management, *Risk management for charities: Getting started Guide*, Version 2. irm-getting-started-v20-flyer.pdf.
[127] Bundle 44, Volume 6, Document 1, Page 5.

but all require such a process to involve:

a. Identification of hazards by recognizing anything that could cause harm, such as equipment, procedures, or environmental factors.

b. Management having primary ownership, responsibility and accountability for identifying, assessing and managing risks.

c. Determination of specific individuals or groups that could be affected by the identified hazards, including staff, patients, and visitors.

d. Articulating or evaluating identified risks to those individuals and groups by considering both the likelihood and severity of harm, by use of a risk matrix to produce a risk score of the seriousness of the outcome. The risk score is likely to differ across different groups of patients and will likely be higher for neonates and the immunocompromised.

Consequence	Likelihood: Rare 1	Unlikely 2	Possible 3	Likely 4	Almost certain 5
5 Severe	Medium 5	High 10	Very high 15	Extreme 20	Extreme 25
4 Major	Medium 4	Medium 8	High 12	Very high 16	Extreme 20
3 Moderate	Low 3	Medium 6	Medium 9	High 12	Very high 15
2 Minor	Very low 2	Low 4	Medium 6	Medium 8	High 10
1 Minimal	Very low 1	Very low 2	Low 3	Medium 4	Medium 5

Figure 1: Example risk matrix[128]

e. Once a risk score has been identified, it is then necessary to assess what measures can be implemented (sometimes known as a 'risk treatment') to reduce the risk to an acceptable level, consistent with the risk appetite of the organisation undertaking the assessment and the appropriate risk tolerance for the particular cohorts of patients in question.

[128] NHS England, *Principles for assessing and managing risks across integrated care systems* (4 Dec 2024), https://www.england.nhs.uk/long-read/principles-for-assessing-and-managing-risks-across-integrated-care-systems/#key-principles-for-assessing-risks-across-integrated-care-systems.

f. The measures to reduce risk are conventionally seen as falling in a Hierarchy of Controls from eliminating the hazard, substituting it with a safer alternative, implementing engineering controls, administrative controls through to providing personal protective equipment (PPE).

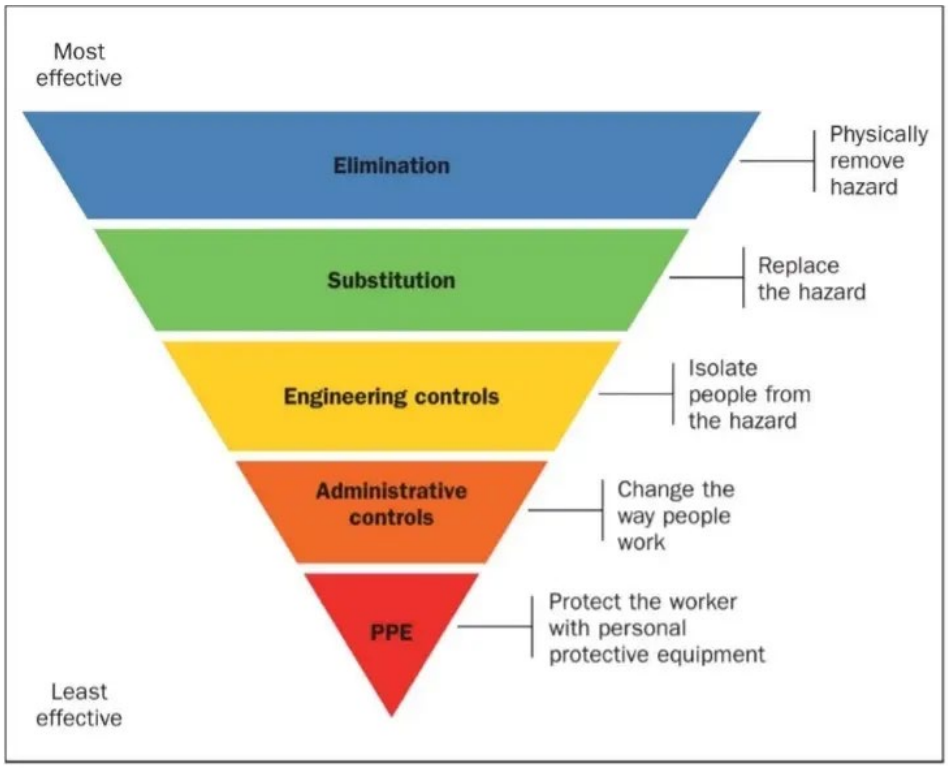

Figure 2: Hierarchy of Controls[129]

g. There is then a need to record the significant findings including hazards, risk assessments and control measures forming a record, a risk register, for accountability and future reference. A risk register is a structured document, often in the form of a spreadsheet or database, that lists identified risks and their associated details.

165. The existence of key risks requires to be reported upwards in the organisation through managerial and supervisory controls to ensure compliance and to confirm that actions to reduce risks to a level acceptable to the risk owner or management are undertaken. In NHS GGC, this involves a layered structure of risk registers, with the Corporate Risk Register forming the top layer and

[129] National Institute of Occupational Safety and Health, *About Hierarchy of Controls* (10 April 2024), https://www.cdc.gov/niosh/hierarchy-of-controls/about/index.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fniosh%2Ftopics%2Fhierarchy%2Fdefault.html via the Northern Ireland Regional Infection Prevention and Control Manual, *Hierarchy of Controls,* https://www.niinfectioncontrolmanual.net/hierarchy-of-controls/.

reported to the Board itself[130].

166. Finally, risk assessment and management is not a static process, and the risk owners within the organisation and its senior leaders will need to review and update the risk assessment regularly, especially after incidents or changes in procedures, ensuring its continuing effectiveness and relevance.

3.3.2 Examples of controls

167. Dr Mumford produced a non-exhaustive list, in which she allocated mitigation undertaken at the QEUH/RHC to layers within the Hierarchy of Controls[131]. It is proposed that this is a more complete list.

Elimination.

168. Examples of elimination of risk might include implementation of chlorine dioxide dosing of the water system[132], correct operation of temperature controls as thermal disinfectant within the water system, replacement taps and wash hand basins in Ward 2A/2B.

169. Dr Mumford was of the view that portable HEPA filters in ward 6A were an elimination measure, but it was the evidence of Mr Poplett that these cannot be easily validated for performance,[133] and that he was unable to find evidence for the effectiveness of ceiling-mounted, HEPA filtered scrubbers in the ceiling of Ward 4C[134].

Substitution

170. Dr Mumford was of the view that no substitutions were possible, but it might be thought that switching the Adult BMT patients from Ward 4B back to the Beatson in July 2015 constituted a substitution of the ventilation system used to supply air to those patients.

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[130] See in redacted form Bundle 45, which contains the NHS GGC Corporate Risk Register from 2009 to 2024.
[131] Bundle 44, Volume 6, Document 1, Page 7.
[132] It should be noted that Dr Lee's evidence in her Statement was that: "*Effective biocide dosing does not remove biofilm - but keeps patients safe when target temperature are not reached by mopping up free floating bacteria/microorganisms that can break away from biofilm*" (Glasgow 3 - Witness Statements, Volume 4, Dr Susanne Lee, Document 2, Page 39).
[133] Transcript, Andrew Poplett, 7 November 2024, Page 26, Column 48.
[134] Bundle 21, Volume 1, Document 7, Page 572, Para 10.16.

Engineering controls

171. Upgrades to the ventilation system, integrating HEPA filters and increased ACH on ward 2A/2B, implementation of point of use filters on taps in various wards, upgrades to the rooms on 2A/2B, including sealed ceilings to enable positive pressure, and removal of chilled beams.

Administrative controls

172. Ensuring staff used alcohol hand sanitiser after hand washing. Ensuring that planned preventative maintenance is carried out in a timely manner. We would add the various patient placement policies covering the Infectious Diseases Wards as an example of administrative controls, along with the temporary prescription of prophylactic antibiotics in the Schiehallion Unit in 2018 and 2019.

Personal Protective Equipment ('PPE')

173. The incident with the facemask, Dr Peters and the RSV virus in December 2015[135] would be an example of PPE being deployed to protect staff from a potential HAI. In her evidence, Dr Mumford suggested ensuring close adherence to Infection Prevention and Control policies as an example of this form of control.

3.3.3 Different patient groups, different risks

174. There is a consensus amongst witnesses that certain patient groups are more vulnerable than others, to infections that have the potential to be transmitted via the hospitals water systems or through airborne particles. Such groups have been identified as including:

    a. Paediatric haemato-oncology patients, particularly, but not exclusively, those receiving bone marrow transplants.

    b. Adult haemato-oncology patients receiving bone marrow transplants.

    c. Other adult haemato-oncology patients.

[135] CTI Closing Statement, Glasgow 3, Chapter 5, Page 262, Paras 204-206.

d. Patients who are, at any particular time, neutropenic.

e. Neonates.

f. Cystic Fibrosis patients.

175. There has also been evidence to remind the Inquiry that, at times, some of these patients may spend significant amounts of time outside the hospital, at home and in public places and that vulnerability to infections for these patient groups will vary over time. The Inquiry is also aware that, whilst many patients who are vulnerable to infections that have the potential to be transmitted via the hospitals water systems or through airborne particles, can receive prophylactic anti-microbial medication to reduce risk of infection, not all can.

176. Dr Mumford explained[136] that risk tolerance can be further refined to different cohorts of patients, with neonates and immunocompromised children inherently being more susceptible to adverse events than other paediatric patients, and adult BMT and immunosuppressed patients being more at risk than other adults. It was her opinion that risk tolerance should be lowest in respect of the most vulnerable patients.

3.3.4 The NHS GGC approach

177. In contrast with the conventional approach to risk management, NHS GGC invite a retrospective judgement. In other words, to determine whether the hospital was or is unsafe, it is necessary to establish what happened rather than concentrating on the possibility of what might have happened at the time. NHS GGC has provided the Inquiry with its second Positioning Paper 2, dated 5 April 2023[137], which includes at paragraph 23:

> "What is assumed, is that the Inquiry seeks to determine whether it is accepted that the built environment of the hospital was 'unsafe' in the sense that there existed at the relevant time systemic or widespread issues relating to the built environment which, as a consequence, resulted in an increased level of exposure to micro-organisms, and manifested in an increased rate of infections from environmental micro-organisms found in the built environment. Given the remit of

[136] Bundle 44, Volume 6, Document 1, Page 8.
[137] Bundle 25, Document 10, Page 345.

the Inquiry to explore the extent to which ventilation and water issues impacted adversely on patient safety, these issues are the principal focus in considering the question of whether the built environment was “unsafe” in the sense that we understand the term to be meant.”

178. Thus, for NHS GGC, it seems that a risk has to be systemic or at least widespread, and that risk must be demonstrated to have actually manifested in an increased rate of infections from environmental micro-organisms found in the built environment, before the existence of that risk can be taken into account in determining whether that environment is unsafe.

179. The second Positioning Paper develops the stance taken by NHS GGC in the first Position Paper dated 14 December 2022[138]. It argues that, on a proper reading of the available evidence, the built environment of the QEUH did not, expose patients to any increased risk to their health, safety or wellbeing. Further, except for two discrete cases of paediatric infection, there was said to be no evidence before the Inquiry to properly suggest a link between infections suffered and anything arising from the built environment. It was then submitted that there was no evidence to demonstrate any increased rate of infections within the QEUH/RHC from microorganisms related to the built environment.

180. We note that the appropriate risk registers with entries which show that these were the NHS GGC approach to risk have not been produced.

3.3.5 Risk and Safety

181. In her evidence in Glasgow 4, Part 2, Dr Mumford described her experience in clinical risk management, including roles as Director of Infection Control and Chief Medical Officer. She emphasised a structured approach to risk: identifying hazards, scoring risks using a matrix, implementing mitigations, and reviewing outcomes. Dr Mumford emphasised how the practice of medicine has changed from a time when 'doctor knew best' to a more dynamic and patient-centred practice which prioritised patient safety and

[138] Bundle 25, Document 62, Page 1262.

informed consent[139]. In her report Dr Mumford explained that the way that an organisation responds to a risk (by recognition, acceptance and mitigation), together with the risk management and governance structure, are key to determining the level of safety[140]. In her conclusion she explained that:

> 32. No healthcare organisation is without risk. In order to determine whether the hospital is now safe for patients, the management of risk within the organisation should be examined. The risk management must be robust with active management and monitoring of the water and ventilation systems, monitoring of infection rates, responsive to any anomalous findings and, more crucially, responsive to concerns raised at all levels from ward to Board with a learning and just culture.

182. Dr Mumford explained that the risk management process involves identifying a hazard, and then the risk register pulls through to what is an actual risk, how it will manifest, what control measures to implement and then gives a risk score. The risk must be reviewed to check if the risk score is going down. A hazard cannot be identified unless the hazard is firstly recognised to exist[141].

183. She acknowledged that a risk register can give a false sense of security and that adding something to a risk register is not enough; it must be managed actively with real thought given to understanding the consequences for the patient if the risk is realised[142].

3.4 Conclusions

184. There has been a substantial amount of evidence that an environment, or an activity conducted in that environment, may not be risk-free but may nevertheless be regarded as safe. In most spheres of human activity, some degree of risk is likely to be unavoidable or, if avoidable, avoidable only by virtue of expenditure of cost and effort which may be disproportionate to the magnitude of the risk which is sought to be avoided. Risk falls to be assessed (and then managed) by reference to a combination of the possibility or probability of harm eventuating, and the severity of the consequences if it

[139] Transcript, Dr Sara Mumford, 29 August 2025, Page 14, Column 24.
[140] Bundle 44, Volume 6, Document 1, Page 10.
[141] Transcript, Dr Sara Mumford, 29 August 2025, Page 17, Column 29.
[142] Transcript, Dr Sara Mumford, 29 August 2025, Page 21, Column 38.

does. The higher the probability and the greater the severity, the more material the risk; the lower the probability and the lesser the severity, the less material the risk. Safety does not require an absence of risk. Rather, it requires a level of risk, which, having regard to the level of its materiality, is acceptable to the decision maker.

185. Whilst the above is true, risk assessment and risk management is not optional. A health board should identify harms, assess risks, select management and mitigation and should do so in a manner consistent with well-established principles of risk management. It is insufficient to simply list steps taken to manage risk (such as use of single rooms, prophylaxis, PPE, air filtration, air pressure differential, limiting access to patients, staff vaccination, cleaning regime, screening, testing and monitoring[143]) if there has not actually been a risk assessment process.

186. If it is the case that NHS GGC did not properly commission, validate, manage or risk assess the domestic water system and ventilation systems of the QEUH/RHC, then that failure would give rise to unknown risks and would render the use of parts of the hospital for certain groups of patients unsuitable for the delivery of safe, effective person-centred care - simply because of that failure to consider these risks. Similarly, if NHS GGC has failed to assess the risks that a particular building system poses or posed then it is quite possible that the same principles would apply.

187. Once an effort is made to assess risk, the issue becomes more complex. The operation of a 'five-by-five' risk matrix will produce an assessment of risks ranging from 'Very Low' to 'Extreme'. The Remit and Terms of Reference of this Inquiry are not phrased by reference to risk assessments by this model. Instead, the Inquiry is required to consider "whether the hospital buildings provide a suitable environment for the delivery of safe, effective person-centred care" and to consider whether building systems "adversely impact… on patient safety and care".

188. It is our submission that it is reasonable to consider that a particular building

[143] List taken from Para 2.3.3 of the NHS GGC Written Statement in support of the application that the Inquiry receive the HAD Report, 20 February 2025.

system in the QEUH/RHC does not provide a suitable environment for the delivery of safe, effective person-centred care or systems or adversely impacts on patient safety and care if at any of the following circumstances apply:

a. If no attempt has been made to apply the risk management framework described above and to evaluate the level of risk posed to patients exposed to that building system[144].

b. If there is evidence to support the conclusion that, in respect of an identified hazard linked to that system, the likelihood and consequence of an identified harm occurring would give rise to a high or extreme risk to a particular patient group, and there has been no mitigation to reduce that risk to an agreed acceptable level.

c. If, in that second circumstance, mitigation put in place to reduce that risk to an appropriate acceptable level has in general been applied, but there is evidence that it has not been applied consistently, or would not be effective in all cases, for reasons that could reasonably be anticipated.

189. There has to be a real question of what weight to give to submissions made on behalf of NHS GGC, that risks from building systems that are not compliant with relevant statutory regulation and other applicable recommendations, guidance and good practice do not exist, or are not as severe as others would say, when NHS GGC has not carried out a risk assessment of that system.

190. In respect of the key question as to whether any part of the hospital or building system is 'unsafe,' then it is our submission that if, once risks have been assessed and controls identified and implemented, then if the risks remain high or extreme, or if there is some doubt about whether the controls are effective, it would be appropriate to describe that part of the hospital or building system as 'unsafe'. If risks are medium/moderate or lower, then it may well be that the risks are acceptable, however, if risk management principles are to be followed, determining whether that risk is acceptable must require an assessment of what is the acceptable level of risk, given the outcomes or

[144] This is consistent with the approach of Dr Agrawal to the use of a ward with an unvalidated ventilation system: Transcript, Dr Samir Agrawal, 22 August 2025, Page 106, Column 208.

purpose that are intended for the parts of the hospital so impacted.

4. CHAPTER 4 - IS THERE A LINK BETWEEN PATIENT INFECTIONS AND POTENTIALLY DEFICIENT FEATURES OF THE WATER AND VENTILATION SYSTEMS?

191. Key Question 4 is how the Inquiry has, to date, sought to understand whether the potentially deficient features of the water and ventilation systems of the QEUH/RHC have adversely impacted on patient safety and care and whether the hospital has provided, and now provides, a suitable environment for the delivery of safe, effective person-centred care[145]. The question was:

> (4) Is there a link, and if so in what way and to what extent, between patient infections and identified unsafe features of the water and ventilation systems?

192. The question is addressed in sections 7.3 and 7.4 of the CTI Closing Statement following Glasgow 3. In light of the discussion of risk management, what it means to say that something is unsafe, and what is meant by 'a suitable environment for the delivery of safe, effective person-centred care' in Chapter 6, it is necessary to adjust Key Question 4 to read:

> Is there a link, and if so, in what way and to what extent, between patient infections and potentially deficient features of the water and ventilation systems?

193. As explained in our Opening Note[146], the primary purpose of the Glasgow 4, Part 2, hearing was to consider the HAD Report[147] and to determine whether there was in fact an exceedance of infections in QEUH/RHC in the period 2016 to 2019.

194. As already discussed, the HAD Report was instructed by NHS GGC in November 2022 and was produced to the Inquiry in July 2024. In its Closing Statement following the Glasgow 3 hearing, NHS GGC submitted that:

> … That report concludes, taking a multifactorial approach, that the QEUH/ RHC did not, and does not, pose an increased infection risk. The authors also found no evidence of any link between the built environment and any cases of infection. This is precisely the opposite conclusion to that reached by the Inquiry's experts

[145] Scottish Hospitals Inquiry - Remit and Terms of Reference.
[146] Bundle 44, Volume 7, Document 1, Page 3.
[147] Bundle 44, Volume 1, Document 1, Page 5.

and the one advanced, and commended to the chair, in the closing submissions.[148]

195. We now test that submission.

4.1 Key Question 4 at the close of the Glasgow 3 hearing

196. Sections 7.3 and 7.4 of our Closing Statement following the Glasgow 3 hearing, we set out our submissions on Key Question 4 at that time. We began by considering the descriptive epidemiology in Section 7.3 and then reaching a view on Key Question 4.

197. Paragraph 432 summarised our understanding of what conclusion could be reached from the descriptive epidemiology as follows:

> 432. It is submitted that it is of significance that when attention is paid to what these eight reports and presentations are saying about rates of positive blood cultures or infections rates in broadly similar groupings of bacteria are described as Environmental, Environmental with enteric or match the case definition for the 'Water Incident' IMT there is a common theme. That is:
>
> ● Rates of Gram-negative environmental infections start low after the move to the RHC.
>
> ● Initially rates either do not grow or grow slowly until some point in 2016.
>
> ● From the middle of 2016 we see an increase to a new higher level in 2017 and 2018.
>
> ● There are some signs of reduction in infection rates in 2018 that may be related to successful intervention on CLABSI rates of infection or a consequence of interventions such as the Ward 2A decant, POUFs and the fitting of Chlorine Dioxide dosing.

4.2 The consideration of the HAD Report by the Inquiry

198. The HAD Report was originally instructed by NHS GGC in November 2022, and the letters of instruction to its authors are produced in Bundle 44, Volume

[148] Glasgow 3, Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 43, Para 26.

1[149] data supplied by NHS GGC to the authors of the HAD Report was supplied to the Inquiry at the end of March 2025[150].

4.2.1 The structure of the HAD Report

199. The HAD Report is divided into an Executive Summary and eight substantive chapters.

200. Chapter 1 introduces the report and ends with a specific reference to the work of the Case Note Review Expert Panel ("the CNR").

a. Chapter 2 is a description of what micro-organisms are, under reference to how they are named, what is meant by an outbreak and the potential for Blood Stream Infection (BSI) to have its source in the patient's gut.

b. Chapter 3 is entitled "Clinical significance and epidemiology of the most common groups of presumed environmental bacteria selected for inclusion by the CNR". The chapter describes what are presented as the characteristics of bacteria considered in the CNR Overview Report, listed by order and genus, particularly under reference to their potential as endogenous rather than exogenous sources of infection, or alternatively having a source in another colonised patient or staff member. This, it would appear, questions the appropriateness of the criteria used to define the cohort which was subject to the CNR. This section also appears to argue that some of the bacteria infections considered by the CNR (including *Klebsiella spp.*, *Serratia marcescens*, *Citrobacter Stenotrophomonas* and *Pseudomonas*) are not properly environmental infections but tend to come from other colonised patients.

c. Chapter 4 is a methodological critique of the work of the CNR.

d. Chapter 5 focuses on the question of whether it is correct to say that there was "widespread contamination" of the water system and its consequences. It does not address the actual observed condition of the water system of the QEUH/RHC at any stage. It explains that where there is an increased risk of infection due to water contamination one does not

[149] Bundle 44, Volume 1, Documents 3, 4 and 5, Pages 234-245.
[150] Bundle 44, Volume 1, Document 2, Page 224.

usually see an increase in infection rates across the whole of a hospital population, rather, when there is an occurrence of nosocomial infection invariably one sees local rises in particular physical locations or among particular groups of patients.

e. Chapter 6 addresses the issue of the potential for infection risk from an "inadequate or insufficient" ventilation system in generality. It does not address the specific features of the ventilation system of the different parts of the QEUH/RHC. At section 6.1.3 the authors observe that the risk of infection arising from an inadequate or insufficient ventilation system would not be equal across all patient populations. Within a large hospital serving many types of patients, the impact would be greatest in patients with the greatest degree of immunocompromise, either because of their underlying medical condition, the treatment they are receiving or both. Therefore, any increase in infection rates due to airborne transmissible diseases would be most visible in these patients, and one of the highest-risk populations is the group of patients with haematological, and other, cancers undergoing intensive chemotherapy and/or haematopoietic stem cell transplants (HSCT). The principles of ventilation systems were extensively covered by the Inquiry in its hearing in respect of Edinburgh in May 2022.The Chair has reached conclusions on this subject in Chapter 5 of the Interim Report.[151]

f. Chapter 7 is the largest part of the report and describes itself as an analysis of infection rates and data from QEUH & RHC. It has three parts:

    i. 7.1 Considers whether water testing results are consistent with there being 'widespread contamination' by reference to *P. aeruginosa* testing results.

    ii. 7.2 Is a detailed epidemiological review of BSI suffered by both adult and paediatric haemato-oncology patients using data supplied by NHS GGC.

[151] Scottish Hospitals Inquiry Interim Report - The Royal Hospital for Children and Young People and Department of Clinical Neuroscience, Edinburgh, 3 March 2025.

iii. 7.3 Focuses solely on WGS.

g. Section 7.2 is further subdivided into four sections (albeit that the numbering sequences for the subsections has broken down). There are, for example two sections 7.2.3[152], two sections 7.2.6[153] and no section 7.2.4). The four sections appear to cover:

h. The incidence of 'environmentally relevant' species from available NHS GGC BSI data, for adults from 2013 to 2023 and for children from 2005 to 2022. These 'environmentally relevant' BSI are listed in Tables 5A -9[154] for adult haemato-oncology patients and Tables 11A-14[155] for paediatric haemato-oncology patients.

i. Methods for analysing NHS GGC bacteraemia data.

ii. Bloodstream infections in adult haemato-oncology patients in NHS GGC, January 2013-2023.

iii. Bacteraemia in paediatric haemato-oncology patients in NHS GGC, 2003 to 2022.

i. Chapter 8 is a study of the numbers of *Aspergillus* infections in the haemato-oncology population of the QEUH/RHC and in predecessor units in Glasgow, back to 2013 for adult patients and 2005 for paediatric patients. In response to a request by the Inquiry Team, Dr Agrawal provided his calculations for this Chapter. These had not previously included in the HAD Report[156].

j. The balance of the HAD Report is a list of tables and figures (Chapter 9), References (Chapter 10), a declaration by the authors (Chapter 11) and details of the authors (Chapter 12).

4.2.2 The HAD Report and the Case Note Review

201. The letters of instruction to Dr Agrawal and Professor Hawkey explain that

[152] Bundle 44, Volume 1, Document 1, Pages 69, 73.
[153] Bundle 44, Volume 1, Document 1, Pages 84, 92.
[154] Bundle 44, Volume 1, Document 1, Pages 76-83.
[155] Bundle 44, Volume 1, Document 1, Pages 97-110.
[156] Bundle 44, Volume 2, Document 13, Page 107.

there have been "extensive investigations, both by NHS GGC, and by external bodies (such as HPS/ARHAI and the CNR)"[157]. In those letters there is no specific instruction to critique the CNR or any other earlier review. However, at the end of the final paragraph of the Introduction to the HAD Report the authors explain:

> "A significant reliance appears to have been placed on the Queen Elizabeth University Hospital and Royal Hospital for Children Case Note Review Overview Report (Stevens, Evans and Wilcox, 2021) (CNR) in relation to whether the built environment at the QEUH and RHC posed an increased risk of infection. However, we do not consider that the CNR is of assistance in determining this for the reasons set out below."

202. At this point, note should be taken of our earlier submission[158] the use which the Inquiry should make of the conclusions of the CNR, in circumstances where patient specific records, the tableau timeline and the individual assessments and conclusions for each infection were not available to the Inquiry. It continues to be our position that the Chair should:

    a. Take full account of the expert opinions and assessments of the members of CNR Expert Panel, expressed collectively in the Overview Report and individually in their statements and oral evidence on all matters, except in respect of their core conclusions on infection link.

    b. Not use the CNR Expert Panel's core conclusions on infection link as an initial factor in reaching an initial conclusion on Key Question 4. The Chair should first reach his own reasoned conclusion on that question, using all the other evidence before him, and then, once he has reached a provisional conclusion, compare his answer and his reasons for it with those of the CNR Expert Panel as, in essence, a cross check as to his conclusions.

203. Perhaps surprisingly NHS GGC did not comment on this proposed approach in its Closing Statement following Glasgow 3.

[157] Bundle 44, Volume 1, Documents 3 and 4, Pages 235 and 240.
[158] CTI Closing Statement, Glasgow 3, Page 119, Paras 412-424.

4.2.3 Investigation by the Inquiry Team

204. Once the decision was made to receive the HAD Report, the instruction of its authors by NHS GGC was novated to the Scottish Hospitals Inquiry, and HAD Questionnaire 1 was sent to the HAD Authors. The principal focus of the questionnaire was to understand the scope of the HAD Report, by reference to what its authors understood to be their remit and the material they had in fact reviewed. Their response to Questionnaire 1 is produced[159], but it ultimately became clear that the HAD Authors had seen very little of the material available to, and considered in earlier hearings, by the Inquiry, which concerned the nature of any "widespread contamination" of the hospital water system, investigations made of that issue by IMTs and Estates including the Water Technical Group ("the WTG"), any other investigations by NHS GGC and HPS/ARHAI, or how it might be said that features of the ventilation system of the hospital were inadequate or insufficient for patients[160].

205. Given the overt criticism of the CNR Expert Panel in the HAD Report, and at the suggestion of the Scottish Government[161], an approach was made to the members of the CNR Expert Panel (Gaynor Evans, Professor Wilcox and Professor Stevens) to invite them to respond to the criticism of their work within the HAD Report. They were given a wide instruction to take the opportunity to respond to any issues within the HAD Report that they felt required a response. A specific request was also given to Professor Wilcox to include within the response a further discussion on the use of WGS in the HAD Report, particularly at section 7.3. The response of the CNR Expert panel was produced to Core Participants in June 2025[162], along with papers referred to within it[163].

206. The Inquiry had not previously examined the similarities and differences between infection rates in the QEUH and other hospitals in NHS GGC and in

[159] Bundle 44, Volume 2, Document 1, Page 12.
[160] To adopt the language of the Appendix to each of the letters of instruction to Professor Hawkey and Dr Agrawal.
[161] Bundle 54, Document 3, Page 12, Para 6.
[162] Bundle 44, Volume 2, Document 15, Page 120.
[163] Bundle 44, Volume 2, Documents 16-44, Pages 207-684.

particular at Yorkhill, beyond what is contained in the 2019 HPS Reviews[164]. In light of the significant interest taken by the HAD Report in rates of BSIs amongst paediatric haemato-oncology patients at Yorkhill, the Inquiry Team obtained statements from clinicians who might have been expected to have direct experience of the incidence of such infections at Yorkhill, but who, despite the availability of the Rule 9 procedure, were not asked about this when they gave evidence in earlier hearings of the Inquiry. Most of these "Consequential Witnesses" gave evidence in Glasgow 4, Part 2 by written statement only. Three; Professor Gibson, Annette Rankin and Kathleen Harvey Wood gave evidence in person.

207. Dr Mumford was asked to prepare a report for the Inquiry on the whole HAD report, on the validity of its methodology and conclusions from a Microbiology and IPC perspective[165]. Dr Mumford and Mr Mookerjee were also asked to prepare a Joint Report for the Inquiry reviewing the methodology and conclusions of the HAD Report in respect of *Aspergillus* infections[166]. Mr Mookerjee was also asked to prepare a report for the Inquiry reviewing the methodology and conclusions for Chapter 7[167].

208. As parts of Chapter 7 of the HAD Report covers similar ground to the four HPS Reports produced in 2019, the Inquiry Team asked NSS whether the NSS data scientists or epidemiologists involved in the production of those reports could produce a commentary reviewing the methodology and conclusions for Chapter 7. A report (dated 28 May 2025) was prepared by Ms Shona Cairns[168]. Ms Cairns later saw Dr Agrawal's calculation documents for Chapter 8 and provided a supplementary review on 20 June 2025[169].

209. The views of the HAD Authors appear to have changed, it would seem largely in response to seeing the commentary of Ms Cairns on BSI Incidence Rates and the 2019 HPS Reviews[170], but also in response to the work of Mr Mookerjee and Dr Mumford on *Aspergillus* Incidence Rates. As a result, the

[164] Bundle 7, Documents 5, 6 and 7, Pages 194-285.
[165] Bundle 44, Volume 2, Document 48, Page 739.
[166] Bundle 44, Volume 2, Document 81, Page 1282.
[167] Bundle 44, Volume 2, Document 79, Page 1255.
[168] Bundle 44, Volume 2, Document 45, Page 685.
[169] Bundle 44, Volume 3, Document 5, Page 222.
[170] Bundle 7, Documents 5, 6 and 7, Pages 194-285.

area of apparent disagreement between the HAD Authors, and those invited by the Inquiry Team to review the HAD Report, narrowed substantially as the Glasgow 4, Part 2 hearing approached.

4.2.4 Further work by the HAD Authors

210. The Inquiry Team considered that the HAD Authors should be given the opportunity to respond to the five reports described above, and they did so on 20 July 2025 in a response document ("the HAD Response document")[171] produced along with their response to HAD Questionnaire 2[172].

211. The Inquiry Team also considered that discussion of the inferences that could be drawn from the analyses in the HAD Report, the various responses, and the epidemiological reports and studies already considered in the Glasgow 3 hearing would be assisted by the provision of an agreed set of charts that would set out the rates and trends of infections over various periods at both Yorkhill and RHC (and that it might be possible for Dr Drumright and Mr Mookerjee to agree on incident rates, trends and best fit lines). To that end, Counsel to the Inquiry consulted separately with Mr Mookerjee and Dr Drumright, and they were directed to jointly consider a series of questions and, if possible, to reach an agreed position on those questions[173]. Whilst they did not entirely agree on answers to the questions asked, it does appear that their discussions were productive, and that they showed a considerable amount of agreement in further reports produced just before the Glasgow 4, Part 2 hearing[174].

4.3 The approach of the authors of the HAD Report

212. The HAD Report was instructed by NHS GGC "in order for the CLO to provide legal advice to NHS GGC in respect of the police investigation, for the Inquiry and NHS GGC's defence to the civil claims."[175] In the course of evidence, we sought to understand how the scope of these instructions impacted on the

[171] Bundle 44, Volume 5, Document 2, Page 20.
[172] Bundle 44, Volume 5, Document 1, Page 4.
[173] Bundle 44, Volume 7, Document 7, Page 216.
[174] Bundle 44, Volume 7, Document 3 and 4, Pages 37, 51.
[175] Bundle 44, Volume 1, Document 3, 4 and 5, Pages 234, 238 and 244.

terms of the HAD Report and the development of the opinions of its authors.

4.3.1 The instructions given to the HAD Authors by NHS GGC

213. The heart of each letter of instruction to Professor Hawkey and to Dr Agrawal is the Appendix. This was of a relatively narrow scope when compared to the scope of the work done by Dr Mumford, Ms Dempster, Dr Walker, Mr Poplett, Mr Bennett and Mr Mookerjee. The HAD Authors did not consider material that would have told them what had happened at the QEUH/RHC, or the extent of any perceived failings of the water or ventilation systems of the hospital or the investigations carried out by NHS GGC staff, consultants instructed by NHS GGC, HPS/ARHAI or HFS. The HAD Authors did have access to two key reports which sought to narrate aspects of the events at the QEUH/RHC from the start of 2015. These were:

214. The report by Dr Chaput, Microbiological testing of water and environmental samples from the Queen Elizabeth University Hospital (Adults) and Royal Hospital for Children, 2015-2020, Overview of sample numbers and test result; 3 March 2023[176] - and related presentations[177], and

215. The HPS December 2018 report, Summary of Incident and Findings of the NHS Greater Glasgow and Clyde: Queen Elizabeth University Hospital/Royal Hospital for Children water contamination incident and recommendations for NHS Scotland ("the HPS December 2018 Summary").[178]

216. Dr Drumright explained that she and her colleagues had understood from those instructing them that there was a belief that water was causing all or a huge amount of the infections[179].

4.3.2 The material considered by the HAD Authors

217. Neither Dr Drumright nor Dr Agrawal read, and Professor Hawkey only "glanced at", the HPS December 2018 Summary, despite it specifically being drawn to their attention in their letters of instruction[180]. The HAD Authors did

[176] Bundle 18, Volume 1, Document 2, Page 13.
[177] Bundle 18, Volume 2, Document 117, 118, 119 and 120, Pages 1030, 1040, 1063 and 1073.
[178] Bundle 18, Volume 1, Document 11, Page 819.
[179] Transcript, Dr Lydia Drumright, 21 August 2025, Page 84, Columns 183, 184.
[180] Bundle 44, Volume 1, Documents 3 and 4, Pages 237 and 243, Item (3) and the footnote ‘1’.

not take account of (and their attention was not drawn to by NHS GGC) the many other reports and investigations that were produced by NHS GGC and NHS NSS in the years following the handover of the hospital,[181] and which have been considered by many of the witnesses who have given evidence to the Inquiry.

218. Dr Agrawal saw this approach as "agnostic" and data driven[182]. Professor Hawkey explained that not considering information about what had taken place was an attempt to avoid "prejudice" and explained he could interpret microbiology at high-level without needing to know the circumstances.[183] He did not think that they should necessarily have challenged the adequacy of the remit. Dr Drumright explained that by not knowing all this additional information she felt she could opine unencumbered by bias.[184] The undoubted difficulty with the approach taken by the HAD Authors is that it likely rendered the conclusions reached in the HAD Report as provisional, pending being exposed to further material. This is precisely what happened.

4.3.3 Patient groups considered by the HAD Authors

219. The HAD Authors elected to calculate the BSI incidence rates and *Aspergillus* incidence rates for both adult and paediatric haemato-oncology patients. This is the point where the lack of understanding that the HAD Authors had - of the movement of patients and interventions by NHS GGC during the Water Incident, or of changes to the ventilation system in Ward 4B - had the greatest impact[185]. The HAD Authors looked at three groups of adult patients from January 2013 to June 2023 and do not appear to have understood the extent of their potential exposure to what the letter of instruction describes as "'widespread contamination of the hospital water system" or a ventilation system that was "inadequate or insufficient for patients"[186]. These three

[181] The specific list of reports was put to the HAD Authors in Question 10 of Questionnaire 1 - Bundle 44, Volume 2, Document 1, Page 24.
[182] Transcript, Dr Samir Agrawal, 22 August 2025, Page 43, Column 81.
[183] Transcript, Professor Peter Hawkey, 27 August 2025, Page 18, Column 32.
[184] Transcript, Dr Lydia Drumright, 21 August 2025, Page 93, Columns 181-182.
[185] Transcript, Shona Cairns, 20 August 2025, Pages 23-26, Columns 41-48.
[186] To quote from the Appendix to the letters of instruction to Dr Agrawal and Professor Hawkey (Bundle 44, Volume 1, Documents 3 and 4, Pages 237 and 242).

groups were[187]:

a. **Adult haemato-oncology patients in North Sector ("North"): These** patients had no exposure to the water or ventilation systems of the QEUH.

b. **Adult haemato-oncology patients in South Sector ("South"):** Prior to May 2015 these patients were accommodated in Ward 24 of the old SGH. They then moved to Ward 4C in the QEUH and were exposed to the same water as the rest of the patients in that hospital. Ward 4C also had the same 2.5-3 Air Changes per Hour (“ACH”) ventilation system, without HEPA filtration, as the rest of the general wards. Ward 24 was in fact not (as had been thought) sealed and did not have HEPA filtration and positive pressure[188].

c. **Adult BMT patients ("BMT"):** These were accommodated at the Beatson until the end of May 2015, briefly in Ward 4B for five weeks, and then were back at the Beatson until June 2018 when they returned to the upgraded Ward 4B, at a point when POUFs were on taps in high-risk areas.

220. The position is, although the HAD Authors did not realise it, that:

a. In respect of potential "'widespread contamination of the hospital water system" only the South group was exposed to the QEUH water system for more than a very short period, as the BMT group were returned to Ward 4B after POUFs went on in response to the Water Incident.

b. In respect of a ventilation system that was potentially "inadequate or insufficient for patients", apart from the short period in 2015, the BMT group was never exposed to an 'as built' ventilation system, and whilst the South group was exposed to an 'as built' general ward ventilation system, the ventilation system prior to the handover and move, also lacked HEPA filtration and positive pressure.[189] There was therefore no significant change in the ventilation system they experienced.

221. Ms Cairns suggested there was a problem in finding a suitable comparator

[187] Bundle 44, Volume 1, Document 1, Page 69.
[188] Glasgow 2 - Witness Statements, Dr Alistair Hart, Document 8, Page 432, Para 97.
[189] Bundle 23, Document 22, Page 220; Bundle 21, Volume 1, Document 8, Page 687, Para 8.19.

group for the new hospital to try to demonstrate a link between infection rates and water. Adult BMT patients would be a poor indicator as their only exposure to untreated QEUH water was for a short five-week period in 2015[190]. While 'South Sector' patients (4C) would be a better comparator, however, using 'before' and 'after' figures for them would raise the problem of trying to directly compare QEUH and Yorkhill[191]. Thus, the best way to run a comparison would be by using QEUH itself as the control, and by comparing BSI incidence rate figures from 'before' and 'after' interventions[192]. We have been able to do that for the children but not for the adults.

222. It is therefore difficult to see how an analysis of the incidence rates of BSIs and *Aspergillus* in adult haemato-oncology patients could help the understanding of the impact of potential "widespread contamination of the hospital water system" or a ventilation system that was "inadequate or insufficient for patients" on infection rates. Neither the North, nor BMT groups were exposed to either, and whilst the South group would have been exposed to the potential "widespread contamination of the hospital water system", its ventilation system remained non-compliant with SHTM 03-01 for the whole period.

223. For these reasons our focus was on the BSI incidence rates constructed by the HAD Authors for paediatric haemato-oncology patients, rather than on the results of the exercise carried out for adult haemato-oncology patients.

4.3.4 Dr Lydia Drumright

224. Dr Drumright is a Research Assistant Professor at the School of Nursing, University of Washington. She is an epidemiologist and health informatician, with a background in innovative use of collected health data, among other subjects. She has worked with NHS England on health data systems, and her principal research interests include epidemiological problems and bloodstream infections. She had previously worked with Dr Agrawal[193].

[190] Transcript, Shona Cairns, 20 August 2025, Page 23, Column 42.
[191] Transcript, Shona Cairns, 20 August 2025, Page 24, Column 44.
[192] Transcript, Shona Cairns, 20 August 2025, Page 25, Column 45.
[193] Bundle 44, Volume 1, Document 1, Page 196.

225. Her main responsibility within the HAD Report was section 7.2. She described the question being answered by it was, "if we look at the data and we look at the patterns of infection, could that be explained by contaminated water?". She accepted that this had been done without reading the HPS December 2018 Summary, despite it being identified in the Appendix to the letters of instruction[194]. She suggested that this might help with objectivity in interpreting the data, but at the expense of not knowing what was happening in the wider circumstances[195].

226. Dr Drumright accepted that section 7.2 did not contain tables of occupied bed days for the children, coding or calculations, and that this had been an error brought about by assuming that data had been shared by CLO, which in fact had not been the case[196]. In response to issues raised by Ms Cairns about the inclusion criteria, definitions and choice of numerators and denominators,[197] she accepted that for the children, the analysis was in respect of the haemato-oncology patient population, rather than Schiehallion Unit patients only[198]. She was surprised that Ms Cairns had been able to work from Healthcare Scotland bed day data, whereas she had been asked to work with data given to her by NHS GGC via its solicitors[199].

227. Her priority was to construct models with as large a dataset as possible, on the basis that larger data sets confer more analytical power to identify trends, and to separate noise from signal in the data[200]. As part of that exercise, she calculated bed day denominators for three early years in the Yorkhill unit (2005-2008) where no such data existed, by assuming that those numbers would be the same as in the subsequent three-year period (2008-2011). She did not declare this in her report. She did not consider that this approach would be likely to affect trend identification, although she accepted that she ought to have also identified and shown calculations based on the data

[194] Bundle 18, Volume 1, Document 11, Page 819; Transcript, Dr Lydia Drumright, 21 August 2025, Page 8, Column 11.
[195] Transcript, Dr Lydia Drumright, 21 August 2025, Pages 14-16, Columns 24-27.
[196] Transcript, Dr Lydia Drumright, 21 August 2025, Page 13, Column 22.
[197] Transcript, Dr Lydia Drumright, 21 August 2025, Page 16, Columns 27-28.
[198] Transcript, Dr Lydia Drumright, 21 August 2025, Page 16, Column 28.
[199] Transcript, Dr Lydia Drumright, 21 August 2025, Page 20, Column 35.
[200] Transcript, Dr Lydia Drumright, 21 August 2025, Pages 35-36, Columns 66-67.

without those imputed years[201].

Bacteraemia in paediatric adult-oncology patients

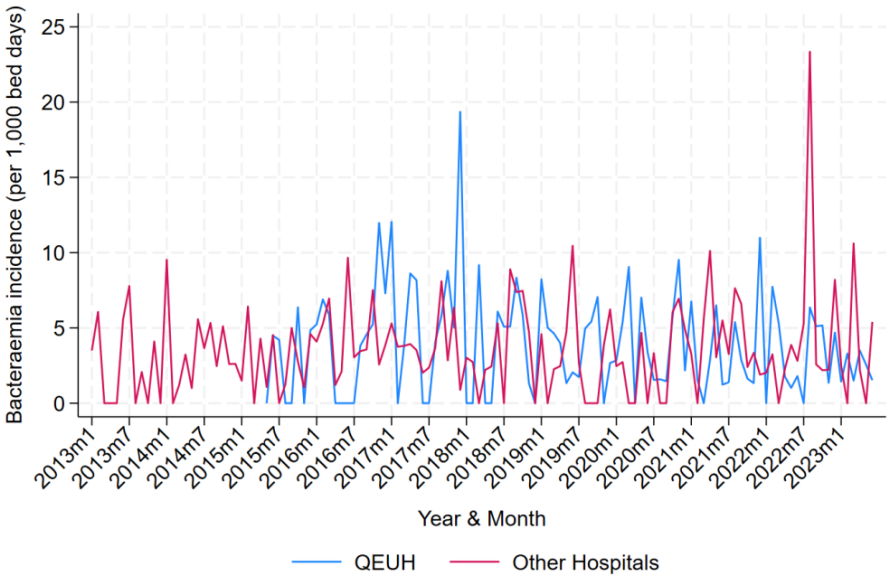

Figure 6: Incidence of bacteraemia from organisms that could be environmentally transmitted by QEUH vs other NHS GGC hospitals with adjusted denominators based on Table 4

228. The review of rates of environmentally relevant BSI in adult patients does appear to be impacted by the lack of exposure to the water system, but the 'true spike' in the rate of these BSI at the QEUH in early 2018[202] was put to Dr Drumright for her opinion.

229. She was of the view that this spike (a) would not be caused by a microorganism that might reside in the environment unless there was an outbreak from a common source and (b) would not be caused by gut translocation[203]. Ms Cairns took that view and explained that if these spikes appear in data at an IMT then questions would be asked[204]. As this spike sits at the time of the water incident, its existence falls to be considered with the other data later in this chapter.

Bacteraemia in paediatric haemato-oncology patients

230. Dr Drumright's analysis of the paediatric haemato-oncology BSI data resulted

[201] Transcript, Dr Lydia Drumright, 21 August 2025, Pages 33-34, Columns 62-64.
[202] Bundle 44, Volume 1, Document 1, Section 7.2.2 and Figure 6, Pages 73-75.
[203] Transcript, Dr Lydia Drumright, 21 August 2025, Pages 28-29, Columns 51-53.
[204] Transcript, Shona Cairns, 20 August 2025, Pages 44-45, Columns 84-86.

in two key charts in the HAD Report. The first, Figure 21[205], set out linear trends for organisms with no environmental relevance which was considered to show "a very slightly decreasing pattern of BSI at Yorkhill … and a much more steeply decreasing pattern of BSI at QEUH".

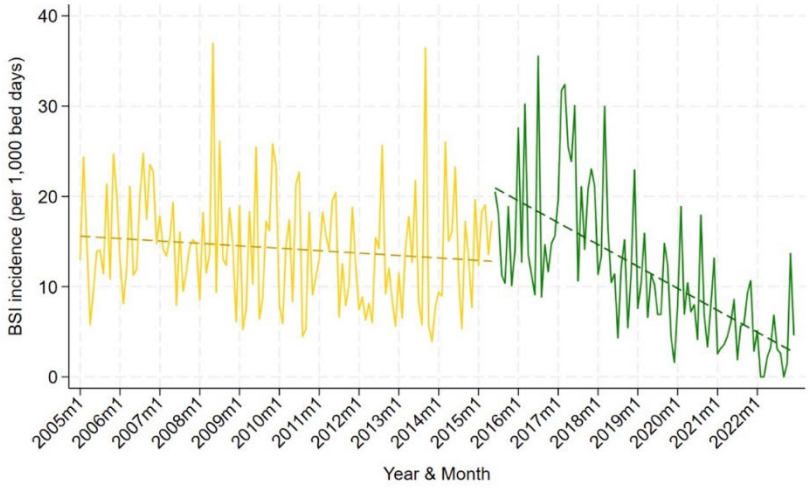

Figure 21: Bloodstream infections attributable to organisms with no environmental relevance at Yorkhill and QEUH with a fitted line showing change over time

231. The second, Figure 22[206], sets out linear trends for environmentally relevant BSIs with linear trend lines showing bloodstream infections on downward trajectories for both hospitals[207].

[205] Bundle 44, Volume 1, Document 1, Page 117.
[206] Bundle 44, Volume 1, Document 1, Page 118.
[207] Bundle 44, Volume 1, Document 1, Page 117, Figure 21.

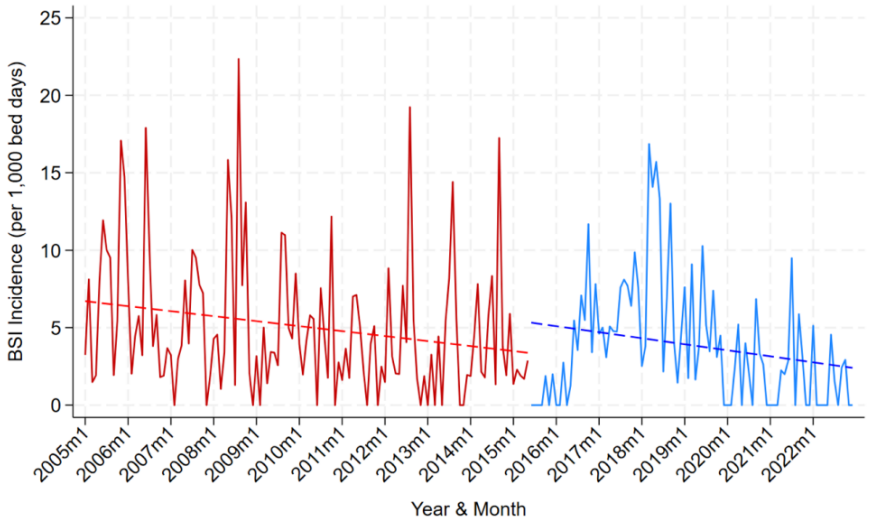

Figure 22: Bloodstream infections attributable to organisms with environmentally relevant at Yorkhill and QEUH with a fitted line showing change over time

232. In respect of Figure 22, Dr Drumright accepted the challenge from a comment made by Ms Cairns that "linear trend lines may not show what we want to see,"[208] and then applied a generalised additive model ('GAM') to the same data set[209], which involved combining multiple models and produced a clear signal[210]. She considered the trend lines identified by the GAM to be statistically significant. The GAM model was more effective than the linear models deployed by Mr Mookerjee, because a linear model has difficulty reflecting 'zero' data points (which are largely absent during the peak period). It should be noted that Dr Drumright had applied linear models in her work in section 7.2 of the HAD Report, so this was a criticism that applied equally to her own initial work.

233. This developed analysis was produced in the HAD Response Document. When applied to the Environmentally Relevant BSIs presented earlier in Figure 22 of the HAD Report, the developed GAM model produced Figure 2. F.3[211]. This chart includes shaded areas to show confidence intervals[212]. The HAD Authors explained that, for paediatric haematology-oncology patients,

[208] Bundle 44, Volume 2, Document 45, Page 700, Paras. 3.5.1-3.5.4; Transcript, Shona Cairns, 20 August 2025, Page 32, Columns 59-60.
[209] Transcript, Dr Lydia Drumright, 21 August 2025, Page 43, Columns 81-82.
[210] Bundle 44, Volume 5, Document 2, Pages 50-51, Figure 2.F.3 for environmentally relevant BSIs and Figure 2.F.4 for non-environmental relevant BSIs.
[211] Bundle 44, Volume 5, Document 2, Page 50.
[212] For an explanation see Transcript, Shona Cairns, 20 August 2025, Page 35, Columns 65-66.

the overall trend in environmental BSIs over the whole period (the blue line) indicated a significant reduction over the whole period from 2005 to 2022. The smooth component (the red line), however, indicates deviations. In around March 2014 the incidence rate begins to drop lower than the overall trend, but then begins to turn upward in around September 2015, and steadily increases to well above the trend until around January 2018 after which it changes (at a point which is approximate[213]) and rapidly drops to below the long term trend line at the end of 2020[214].

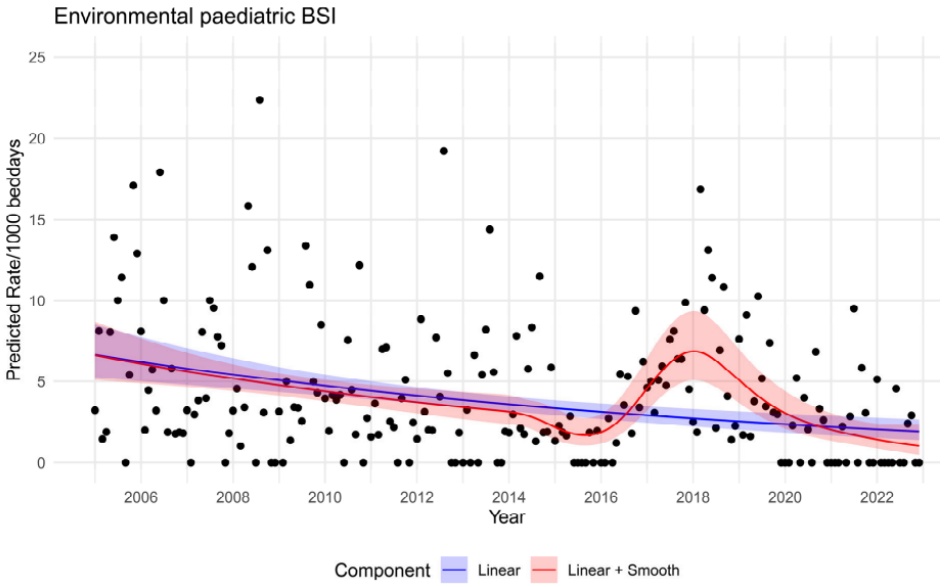

Figure 2.F.3: GAM fit for linear (blue line) and smooth (red line) components against incidence rates (black dots) for BSI incidence rates attributed to environmental microorganisms among paediatric haematology-oncology patients in Yorkhill (Jan 2005-April 2015) and RHC at QEUH (May 2015-Dec 2025) - year tick marks are placed at Jan of that year)

234. When the developed GAM was applied to the BSIs identified as having no environmental relevance in Figure 21 of the HAD Report, it produced the results presented in Figure 2.F.4[215]. The HAD Authors explained that the overall trend in non-environmental BSIs was similar to that of the environmental BSIs, with a temporary increase in cases above the overall trend. However, unlike the environmental BSIs, this increase does not demonstrate a dip before the observed increase. The increase began earlier,

[213] Ms Shona Cairns also agreed that the dates are approximate: Transcript, Shona Cairns, 20 August 2025, Page 36, Column 67.
[214] Bundle 44, Volume 5, Document 2, Page 50, Paras 2.F.12-2.F.14.
[215] Bundle 44, Volume 5, Document 2, Page 51.

in August 2013 (before the move to QEUH), peaked earlier in March 2017 and then dipped below the overall trend sooner (around February 2020).

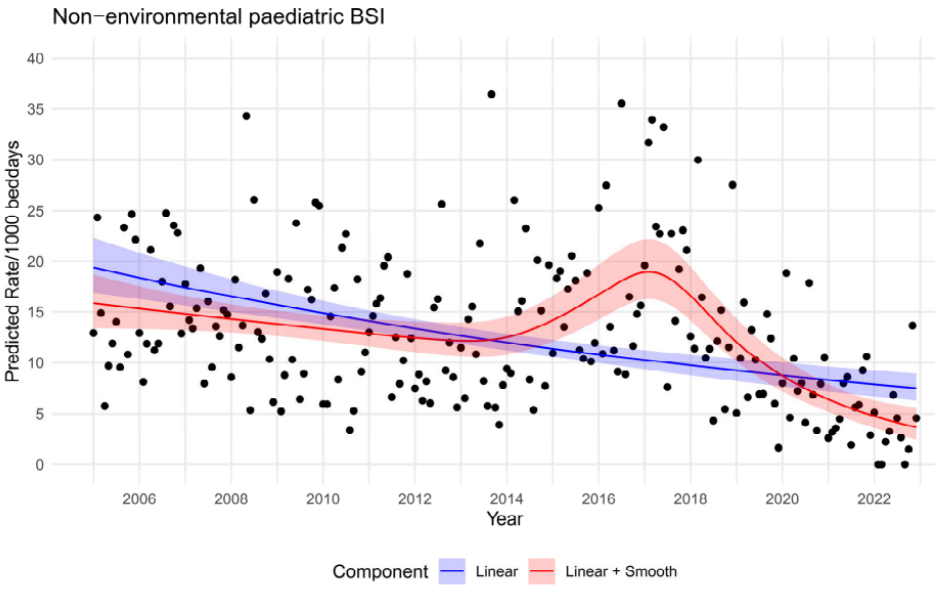

Figure 2.F.4: GAM fit for linear (blue line) and smooth (red line) components against incidence rates (black dots) for BSI attributed to non-environmental microorganisms among paediatric haematology-oncology patients in Yorkhill (Jan 2005-April 2015) and RHC at QEUH (May 2015-Dec 2025) - year tick marks are placed at Jan of that year)

235. In the HAD Response Document, Dr Drumright also sought to use statistical methods to understand when there were changes in the trends of BSI incidence rates[216]. This method took no account of events on the ground, including known interventions. It is notable that, for the rates of environmentally relevant paediatric BSI, there is both a step up in the incidence of infections in September 2016 and a step down in September 2019[217] and the beginning of a sequence of steps down in the rates of non-environmental paediatric BSI from early 2018[218].

236. Following her meeting with Mr Mookerjee, Dr Drumright produced further charts for shorter periods at the request of Counsel to the Inquiry[219], which she adopted as part of her evidence. For BSIs amongst the paediatric haemato-oncology patients, she was asked to look at three periods: January 2008 to May 2015 at Yorkhill, June 2015 to September 2018 at RHC and

[216] Bundle 44, Volume 5, Document 2, Pages 52-53.
[217] Bundle 44, Volume 5, Document 2, Page 52, Para 2.F.20, Figure 2.F.5.
[218] Bundle 44, Volume 5, Document 2, Page 52, Figure 2.F.6.
[219] Bundle 44, Volume 7, Documents 4,5 and 6, Pages 51, 143, and 191.

October 2018 to February 2022 at RHC. The divisions between these three periods were (a) the move to the new hospital and (b) the return of the Schiehallion Unit to the refitted Wards 2A and 2B. Dr Drumright did caution that examining shorter periods of time imposes both, a relationship on the data and also reduces the number of data points, but when pressed on the fact that she had considered the two hospitals separately in Figures 21 and 22 in the HAD Report, she accepted that this was a way that could be done[220].

237. For the environmentally relevant BSIs, and as result of carrying out this exercise, Dr Drumright concluded that:

238. For the January 2008 to May 2015 period at Yorkhill, whilst there was no statistically significant trend using the short period, it was her opinion that using her whole data set (including imputed denominator for 2007, 2008 and 2009) there was probably a linear significant downward trend in the rate of BSI[221] at Yorkhill.

239. For the June 2015 to September 2018 period at RHC there was a definite, statistically significant, non-linear increase in the rate of BSI with some 'wobble' in that increase[222].

240. For the October 2018 to February 2022 period at RHC, Dr Drumright was concerned that the shortness of this period meant that the GAM was missing a downward trend in this period that was visible in Figure 2. F.3[223].

241. Dr Drumright also calculated a GAM for the whole period at RHC from June 2015 to February 2022, which she saw as consistent with what was described for Figure 2. F.3[224].

[220] Transcript, Dr Lydia Drumright, 21 August 2025, Pages 52, 53, 57 and 58, Columns 99-101 and 110-112.
[221] Bundle 44, Volume 7, Document 4, Page 57, Para 2.3.2 and Figure 2.4; Transcript, Dr Lydia Drumright, 21 August 2025, Page 55, 56, Columns 106-108.
[222] Bundle 44, Volume 7, Document 4, Page 58, Para 2.4.2 and Figure 2.5; Transcript, Dr Lydia Drumright, 21 August 2025, Pages 56, 57, Columns 108-109.
[223] Bundle 44, Volume 7, Document 4, Page 59, Para 2.5.2 and Figure 2.6; Transcript, Dr Lydia Drumright, 21 August 2025, Transcript, Pages 57, Columns 109-110.
[224] Bundle 44, Volume 7, Document 4, Page 60, Para 2.5.2 and Figure 2.7; Transcript, Dr Lydia Drumright, 21 August 2025, Pages 57, 58, Columns 110-112.

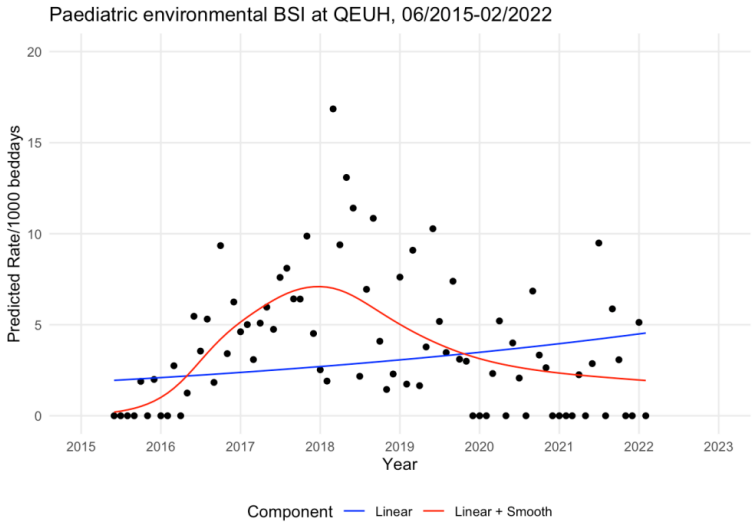

Figure 2.7. GAM model of incidence rates of environmental BSI per 1,000 bed days among paediatric haematology-oncology patients from *June 2015 to February 2022*

242. Ms Cairns broadly agreed with this analysis, except that she was prepared to give weight to the red (linear+smooth) GAM component in Figure 2.5 and was keen to encourage the reader not to focus too closely on specific dates and to look at the trends. As she put it in oral evidence:

> "Despite being cut down and there being less data within the model, which reduces the power of the model, we are still seeing a significant, increasing, non-linear trend in the data, but there are limitations with that that I've talked about, and it is a very simple model." [225]

243. The 'dip' in the incidence rate for environmental BSIs in Figure 2.F.3 from March 2014 required consideration, as it starts approximately fourteen months before the move to the QEUH/RHC. Dr Drumright accepted that the dip could represent a genuine effect or could instead be an artefact of the modelling process[226], and when it was put to her that there are many months with zero BSIs at RHC in 2015 to 2016, and that the dip is just following what it sees in the data, she appears to have accepted that[227]. Dr Drumright also considered it important that no such dip is seen in the non-environmental BSI incidence rates shown in Figure 2.F.4, where a rise in infections can be clearly observed

[225] Transcript, Shona Cairns, 20 August 2025, Pages 37-40, Columns 69-75.
[226] Transcript, Dr Lydia Drumright, 21 August 2025, Pages 45-46, Columns 85-88.
[227] Transcript, Dr Lydia Drumright, 21 August 2025, Page 50, Column 96.

beginning earlier at Yorkhill[228].

244. In Section 7.2.10 of the HAD Report the HAD Authors explained:

> Among paediatric haemato-oncology patients, we see an ~2-fold decrease in incidence and cases of bacteraemia attributed to environmentally relevant microorganisms following transfer of services from Yorkhill to QEUH; lower incidence at QEUH was statistically significant.[229]

245. In evidence Dr Drumright revised that to:

> Among paediatric haemato-oncology patients, we see an ~2 fold decrease in incidence and cases of bacteraemia attributed to environmentally relevant microorganisms, but from about March 2016 through to January 2018 there was a definite increase in cases for an acute period of time and then there's a decrease from 2018 to a fairly low level by August 2020[230].

Consideration of potential causes

246. Dr Drumright encouraged testing the 'contaminated water' hypothesis against a number of alternative 'counterfactuals', to see if the latter might have explained the results set out in the Figures 2.F.3 and 2.F.4 in the HAD Response Document. In her view, these counterfactuals included line care at the hospital, nursing behaviour and care issues, the teamworking environment, potential contamination of samples and the use of antibiotics[231]. It should be noted that until details were provided to her with HAD Questionnaire 2, Dr Drumright was unaware of the works of the CLABSI group that began work in the Schiehallion Unit in May 2017[232], and the interventions undertaken in response to the Water Incident[233] (although she had subsequently understood these in broad terms[234]). Dr Drumright was also unaware of the significant criticisms of IPC Practice made by the CNR Expert

[228] Transcript, Dr Lydia Drumright, 21 August 2025, Page 51, Column 97.
[229] Bundle 44, Volume 1, Document 1, Page 199.
[230] Transcript, Dr Lydia Drumright, 21 August 2025, Pages 74-75, Columns 143-145.
[231] Transcript, Dr Lydia Drumright, 21 August 2025, Pages 10-11, 61-62, Columns 16-17 and 118-119.
[232] Glasgow 2, Witness Statements, Jennifer Rodgers, Document 9, Pages 309-315, Paras 86-110; Bundle 27, Volume 13, Document 13, Pages 77-78; Bundle 44, Volume 5, Document 1, Page 18, Question 49.
[233] Bundle 44, Volume 5, Document 1, Page 18, Question 50.
[234] Transcript, Dr Lydia Drumright, 21 August 2025, Page 63, Column 122.

Panel in the CNR Overview Report[235]. This must reduce the extent to which Dr Drumright's opinion evidence on these 'counterfactuals' can be said to be definitive.

247. It was Dr Drumright's opinion that:

Some change in the rate of BSIs could be expected from the move to the new hospital in summer 2015[236].

248. A substantial part of the increase in non-environmental BSIs could be attributable to issues with line handling within the hospital, although such issues could also have contributed in part, to the increase observed in environmental BSIs[237].

249. If a hospital is experiencing care-related issues, an increase would likely first be seen in non-environmental BSIs, because it is so much easier to get a bloodstream infection from a non-environmental micro-organism, and that the incidence rate would come down first if you manage the problem[238].

250. It is unlikely that line care, nursing practice and care issues were responsible for 100% of the non-environmental and environmental BSIs at RHC[239].

251. If there was an issue with contamination of samples, its impact on the rate of BSIs would not change over time, provided the issue causing greater contamination (such as staffing levels or staff training) did not change. She also considered this to be the most unlikely scenario[240].

252. In respect of the impact of the use of antibiotics she deferred to Dr Agrawal, but stated that she would expect to see a connection in time between prophylactic antibiotic use and a rash of new cases of certain environmental BSIs, and to assess this, one would need to find out what was actually being prescribed over particular periods in particular patient cohorts[241].

253. The interventions following the Water Incident from March 2018 would, if

[235] Bundle 6, Document 38, Chapter 8, Page 1058.
[236] Transcript, Dr Lydia Drumright, 21 August 2025, Page 70, Column 136.
[237] Transcript, Dr Lydia Drumright, 21 August 2025, Page 71, Column 137.
[238] Transcript, Dr Lydia Drumright, 21 August 2025, Page 62, Column 120.
[239] Transcript, Dr Lydia Drumright, 21 August 2025, Page 66, Column 128.
[240] Transcript, Dr Lydia Drumright, 21 August 2021, Page 61, Column 117.
[241] Transcript, Dr Lydia Drumright, 21 August 2021, Pages 61-62, Columns 118-119.

successful, be expected to produce broadly the trend seen in her charts for environmental BSIs[242].

254. If there was something wrong with the water, and micro-organisms from it were entering patients and causing bloodstream infections, one would probably see a small increase that goes up over time. This rise would likely lag behind the initial onset by several months, depending on the mechanisms of these micro-organisms[243].

255. There was limited biological plausibility that water alone could cause this entire increase in environmental BSI, because an unknown proportion come from outside the hospital[244], but Dr Drumright considered it probable that some of the cases had an environmental connection[245].

256. It would not be the case that none of the BSIs were potentially attributable to the water, as there was evidence of growth in taps and similar sources, and so it is probable or at least possible, that in some cases, that is where they picked up that microorganism[246].

257. When asked about the proportion of BSIs that the CNR considered more likely than not to have a connection to the environment, and the NHS GGC position that only two of the cases had such a connection, Dr Drumright agreed that Figures 2.F.3 and 2.F.4 were consistent with the CLABSI having an impact on non-environmental cases, the water having an impact to some degree - possibly on around a third of cases - and that what gets brought in from outside also has an impact[247].

258. The HAD Report contains a considerable amount of clustering analysis, and this is contrasted with the qualitative analysis of the CNR[248]. Dr Drumright seemed sceptical about the value of qualitative analysis and root cause analysis and had concerns about the idea of clusters at all[249]. In the summer

[242] Transcript, Dr Lydia Drumright, 21 August 2021, Pages 63-64, Columns 122-124.
[243] Transcript, Dr Lydia Drumright, 21 August 2021, Page 65, Column 125.
[244] Transcript, Dr Lydia Drumright, 21 August 2021, Page 67, Column 130.
[245] Transcript, Dr Lydia Drumright, 21 August 2021, Page 95, Columns 185-186.
[246] Transcript, Dr Lydia Drumright, 21 August 2021, Page 95, Column 186.
[247] Transcript, Dr Lydia Drumright, 21 August 2021, Page 72, Column 139.
[248] Bundle 44, Volume 1, Document 1, Page 17.
[249] Transcript, Dr Lydia Drumright, 21 August 2021, Page 75, Column 146.

of 2025, she carried out an entirely new statistical exercise to look for clustering and runs[250] even though she had not read the CNR Overview Report. When pressed about this, Dr Drumright explained that she was not involved in criticising the CNR[251], and that she did not think that any of the HAD Authors believed that some cases cannot be attributed to the environment[252]. Given how late this statistical exercise arrived it is difficult for the Inquiry to make any practical use of it.

Incidence of *Aspergillus*

259. In respect of *Aspergillus*, Dr Drumright was clear that, after all her analysis[253] and that of Mr Mookerjee[254], there is no statistically significant difference in the rate of infections for the paediatric haemato-oncology patients at Yorkhill compared to the rate for that same cohort at RHC.[255] In his evidence Mr Mookerjee did not disagree. A similar conclusion had already been reached for the adult haemato-oncology patients, albeit they were hardly exposed to the unmodified ventilation systems of the QEUH or ventilation systems that differed from what they had previously been exposed to. In many ways these conclusions confirm the earlier decision of the Inquiry Team, advised by Dr Mumford, that it was not going to be useful to investigate *Aspergillus* rates at QEUH/RHC, as the numbers of cases were always going to be too small for statistical analysis.

How to approach the assessment of association

260. When asked about Bradford Hill, and assessing whether there was an association or connection between events and infections, Dr Drumright accepted that you cannot prove a connection with epidemiology, but that you can give a strong indication or a weak indication[256]. Without WGS you cannot prove a connection. She explained that we only have retrospective data, that the data quality is not ideal and so it is very difficult to say that there is the

[250] Bundle 44, Volume 5, Document 2, Page 54, Paras 2G.1-2G.16.
[251] Transcript, Dr Lydia Drumright, 21 August 2021, Page 76, Columns 147-148.
[252] Transcript, Dr Lydia Drumright, 21 August 2021, Page 78, Column 152.
[253] Bundle 44, Volume 5, Document 2, Chapter 5, Pages 63-78; Bundle 44, Volume 7, Document 4, Pages 52-56, Paras 2.1.1-2.2.4.
[254] Bundle 44, Volume 2, Document 79, Page 1255; Bundle 44, Volume 7, Document 3, Pages 40-43.
[255] Transcript, Dr Lydia Drumright, 21 August 2021, Page 96, Column 187.
[256] Transcript, Dr Lydia Drumright, 21 August 2025, Page 96, Column 187.

cause of these infections. However, if everything keeps pointing in the same direction, and this is a very Bradford Hill kind of concept, that suggests that it is more likely that that is true.[257]

Discussion of the work of Dr Drumright

261. The significance of Dr Drumright's evidence lies in the iterative process by which her identification of the peaks in environmental and non-environmental BSIs in the period 2016-2020 emerged. There were serious questions (as identified by Ms Cairns) around Figures 21 and 22 in the HAD Report, which sought to identify a linear trend when that work was carried out without knowledge of the circumstances surrounding the hospitals (whilst being instructed by NHS GGC, who were clearly in a position to ensure that she was aware of those circumstances). Although Dr Drumright defended the approach of working from BSI data-only, in order to avoid bias[258], she and the other HAD Authors were hindered by not being informed of significant events around the move to QEUH and the subsequent investigations and interventions that followed. Once properly appraised, and with the benefit of knowledge of the approach taken by others, Dr Drumright was able to refine her models and arrive at a clear identification of a peak in environmentally relevant BSIs in paediatric haemato-oncology patients at QEUH/RHC in late 2018 or early 2019.

4.3.5 Professor Hawkey

262. Professor Hawkey is a distinguished bacteriologist, microbiologist and infection control clinician. He is currently Emeritus Professor of Clinical and Public Health Bacteriology at the University of Birmingham and serves as the remote-working Consultant Microbiologist and Lead Infection Control Doctor for NHS Shetland[259].

263. He explained that, within the HAD Report, he had principal responsibility for Chapters 1 to 5 and Sections 7.1 and 7.3 of Chapter 7. He deferred to Dr Drumright in respect of all aspects of interpretation of epidemiology and to Dr

[257] Transcript, Dr Lydia Drumright, 21 August 2025, Page 96, Column 188.
[258] Transcript, Dr Lydia Drumright, 21 August 2025, Page 8, Column 12.
[259] Bundle 44, Volume 1, Document 1, Page 153.

Agrawal in respect of ventilation issues, *Aspergillus* or the practice of haematology and oncology[260]. He had no issue with Dr Agrawal's lack of experience in paediatric haematology and oncology[261].

264. The Professor had never visited the QEUH/RHC and accepted that he had not familiarised himself with the water system or the hospital[262]. He did not have expertise in the management of water systems and explained he would defer to Dr Walker in this area, with whom he had co-authored a joint paper[263]. As one of the key questions asked, and seemingly answered, in the HAD Report was "what would be the expected findings that would demonstrate that there is “widespread contamination” of the water system", Professor Hawkey was asked about the first paragraph of Section 5.3.2[264] of the HAD Report and why it states that:

> "It has hopefully become clear from the explanation above when a water system is a source of environmental contamination and when there is spread to vulnerable patients it is generally not the whole system which has a high bacterial load. It is rather specific outlets such as tap outlets and sink traps which can be heavily colonised and therefore represent a potential source for spread to patients."[265]

265. He explained that his understanding arose in part because, according to the data he had reviewed (Dr Chaput's report[266]), there was no *Pseudomonas* in their water supply at all[267]. He also explained that he proceeded on the basis that whatever took place was not dissimilar[268]. When he was taken to the Minutes of the WTG meeting on 13 April 2018 and 20 April 2018[269], he began to ask questions about whether tests had been carried out in water tanks. It was clear he did not know that tests had been carried out in those tanks and did not have a detailed understanding of those investigations[270].

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[260] Transcript, Professor Peter Hawkey, 27 August 2025, Page 6, Columns 7-8.
[261] Transcript, Professor Peter Hawkey, 27 August 2025, Page 9, Column 14.
[262] Transcript, Professor Peter Hawkey, 27 August 2025, Page 17, Column 30.
[263] Transcript, Professor Peter Hawkey, 27 August 2025, Page 17, Column 30.
[264] Bundle 44, Volume 1, Document 1, Page 49.
[265] Transcript, Professor Peter Hawkey, 27 August 2025, Page 25, Column 45.
[266] Bundle 18, Volume 1, Document 2, Page 13.
[267] Transcript, Professor Peter Hawkey, 27 August 2025, Page 21, Column 38.
[268] Transcript, Professor Peter Hawkey, 27 August 2025, Page 16, Column 28.
[269] Bundle 10, Documents 2 and 3, Pages 9 and 14.
[270] Transcript, Professor Peter Hawkey, 27 August 2025, Page 26, Column 48.

266. Professor Hawkey contributed to the HAD Report without familiarising himself with the scale of the alleged "widespread contamination" of the water system. This significantly limits the value of his opinion evidence. He appears to have assumed that, when a water system is a source of environmental contamination, it is generally not the whole system which has a high bacterial load, whereas this was precisely what those investigating in April 2018 considered to have happened[271]. The Inquiry has already heard evidence from a range of experienced and expert microbiologists who have taken the time to attempt to understand what microorganisms were being found in the water system and how it was being managed. These include Dr Susanne Lee, Dr Tom Makin and Dr Jimmy Walker[272]. Their evidence should be preferred over that of Professor Hawkey about the meaning of what was found. Much of Professor Hawkey's evidence relied on reference to individual papers that looked at particular outbreaks or investigations in other hospitals or on anecdotal references to events from his long and busy career. When he wrote the HAD Report, he knew virtually nothing about what had happened in the water system of the QEUH in 2015 to 2019.

267. A similar issue arises with his opinions on the issue of the potential impact of anti-microbial prescribing on the population of micro-organisms in the patients and the hospital. Professor Hawkey was pressed about the information he had access to in order to support the views he expressed in Chapter 4[273] and Section 5.4.3[274] of the HAD Report (but also widely elsewhere), that selective pressure from Meropenem could result in an increase of *Stenotrophomonas maltophilia* BSIs - because all isolates are resistant to this antibiotic and there was a worldwide shortage of Piperacillin/Tazobactam in 2017/2018 which resulted in many units switching to carbapenem antibiotics. Professor Gibson's evidence - that there was no such shortage affecting the Schiehallion Unit[275] - was put to him along with the contemporary investigation by Ms

[271] Transcript, Professor Peter Hawkey, 27 August 2025, Pages 24-27, Columns 44-50.
[272] Discussed in detail in the CTI Closing Statement following Glasgow 3; Transcript, Dr James Walker, 6 November 2025, Pages 77-78, 84-85, Columns 150-151, 164-166; Transcript, Dr Thomas Makin, 27 August 2024, Pages 8, 46, Columns 11-12, 86; Transcript, Dr Susanne Lee, 10 September 2024, Pages 61, 68, 75, 78-81; Columns 117, 132, 145-146, 152-158.
[273] Bundle 44, Volume 1, Document 1, Page 45.
[274] Bundle 44, Volume 1, Document 1, Page 47.
[275] Transcript, Professor Brenda Gibson, 19 August 2025, Page 16, Column 28.

Harvey-Wood, Dr Peters and Ms Gourley in October 2018[276] which considered this issue. He accepted that, other than copies of prescribing policies,[277] he had not considered any evidence of actual practice in the Schiehallion Unit[278]. His opinion, clearly driven by his expertise and experience suggesting that this issue should be investigated, does not actually amount to evidence that anti-microbial resistance drove BSIs incidence rates in the Schiehallion Unit or elsewhere in the QEUH/RHC. Evidence of those involved at the time, or who have considered the evidence as part of retrospective investigation, should be preferred on this issue.

268. The most significant aspect to which Professor Hawkey's evidence relates is the value of WGS, and the extent to which the Inquiry should require confirmation that samples are genetically identical or closely related before determining that there is a link between them for the purpose of answering Key Question 4 (and whether the absence of such confirmation rules out any environmental connection). Whilst the HAD Report clearly did advance this view[279], Professor Hawkey's ultimate position was that, whilst WGS can show a link of close relationship between samples, it cannot be used to exclude a source for yielding a strain which does not match[280]. That said, where close connections were not found - for example in the *Stenotrophomonas maltophilia* and *Enterobacter* samples examined by Professor Evans - he was clear that this is a factor that must be taken into account[281].

269. Professor Hawkey explained, that at the QEUH/RHC he was not disputing that an environmental source was causing infections, or that there was undoubtedly an increase; but that a reasonable figure may be 20% of the environmentally relevant BSI, rather than 31% - this being, presumably, a reference to the conclusions of the CNR Expert Panel[282]. Professor Hawkey went on to accept that his analysis with the other HAD Authors is not

[276] Bundle 19, Document 19, Pages 161, 162, and 167.
[277] Bundle 44, Volume 1, Documents 9-37, Pages 304-647.
[278] Transcript, Professor Peter Hawkey, 27 August 2025, Page 51, Column 98.
[279] Bundle 44, Volume 1, Document 1, Executive Summary, Page 7, Para 12; Pages 40-45; and Section 7.3, Page 119.
[280] Transcript, Professor Peter Hawkey, 27 August 2025, Pages 53, 63, Columns 102,122.
[281] Transcript, Professor Peter Hawkey, 27 August 2025, Pages 63-64, Columns 122-123.
[282] Transcript, Professor Peter Hawkey, 27 August 2025, Page 67, Column 130.

necessarily inconsistent with the conclusions of the CNR[283]. This would appear to be a significant change of position from the HAD Report and materially undermines the position taken by NHS GGC in its April 2023 Positioning Paper[284].

270. Professor Hawkey deferred to Dr Drumright on all aspects of the analysis of data and statistics[285]. He welcomed the development of the analysis of infection rates for BSI at the QEUH/RHC in the HAD Response document and now accepts that there is a peak in the incidence rate for environmentally relevant BSIs in January 2018, after which it drops rapidly below the long-term trend in 2020[286]. The 'counterfactuals' discussed by Dr Drumright were put to him, and he described in detail the challenges to nursing posed by single rooms[287].

271. Professor Hawkey explained that the analysis done in the HAD Response Document had:

> "…changed our view, certainly my view, of the sort of situation, because it demonstrates this clear peak in around about 2018 or so, and there's something going on there. And it doesn't just affect the environmental organisms, but it affects other organisms as well, so that's why, when we discussed this amongst ourselves and-- we were quite excited by it, actually, because it puts a different perspective which you can't get from the reports we'd seen. We felt we'd found something interesting and novel…"[288]

272. He was asked why he and his colleagues had not noted the same peak in Figure 22 of the HAD Report, to which he responded that Dr Drumright had then said that it was not significant[289]. This was not a particularly convincing explanation.

273. In his opinion, the Inquiry would have to take a view on the evidence, and as the evidence was not clear, it would have to look for what is the most plausible

[283] Transcript, Professor Peter Hawkey, 27 August 2025, Page 69, Columns 133-134.
[284] Bundle 25, Document 10, Page 345.
[285] Transcript, Professor Peter Hawkey, 27 August 2025, Page 10, Columns 15-16.
[286] Transcript, Professor Peter Hawkey, 27 August 2025, Pages 48-49, Columns 92-94; Bundle 44, Volume 5, Document 2, Page 50, Figure 2.F.3, Paras. 2F.12-13.
[287] Transcript, Professor Peter Hawkey, 27 August 2025, Page 80, Column 155.
[288] Transcript, Professor Peter Hawkey, 27 August 2025, Page 82, Column 159.
[289] Transcript, Professor Peter Hawkey, 27 August 2025, Pages 83-84, Columns 161-163.

explanation. He considered it likely that there would be more than one explanation for the infections now seen by the HAD Authors[290].

4.3.6 Dr Samir Agrawal

274. Dr Agrawal is an experienced haematologist. He is a Senior Lecturer and Honorary Consultant in Haematology at Queen Mary University Medical and Dental School, London and Barts Health NHS Trust. He has a particular interest and expertise in managing infections in adult haematology patients[291].

275. Dr Agrawal explained that in the HAD Report, he was the principal author for most of Chapter 6 and all of Chapter 8[292]. He felt he could speak to Chapter 7.2 in respect of the interpretation of BSI incidence rates[293].

276. Despite his undoubted expertise in the field of adult haematology and the management of infection risk for that group of patients, the Inquiry should accept the concern expressed by the CNR Expert Panel that none of the HAD Authors had experience in 'paediatric' haemato-oncology[294]. The Inquiry should proceed on the basis that, unlike Professor Stevens and Professor Gibson, Dr Agrawal is not an expert in the risk of infection to paediatric haemato-oncology patients[295]. Hence, it should disregard his evidence that he would absolutely expect to see a signal of infections in the data for both children and adults if there was an environmental cause for some of those infections.

277. Dr Agrawal discussed the risks of anti-microbial resistance arising from prescribing policies[296]. He clearly has a vast amount of experience in this field in the haematology unit at Barts, but like Professor Hawkey, he had not considered evidence of actual events in 2017, 2018 and 2019 in the Schiehallion Unit when giving an opinion on the extent to which anti-microbial prescribing might have influenced infection levels. His evidence can help the Inquiry understand this complex field but cannot assist the inquiry in

[290] Transcript, Professor Peter Hawkey, 27 August 2025, Page 89, Column 173.
[291] Transcript, Dr Samir Agrawal, 22 August 2025, Page 29, Column 53.
[292] Transcript, Dr Samir Agrawal, 22 August 2025, Page 44, Column 84.
[293] Transcript, Dr Samir Agrawal, 22 August 2025, Page 45, Column 86.
[294] Bundle 44, Volume 2, Document 15, Page 145.
[295] Transcript, Dr Samir Agrawal, 22 August 2025, Page 45, Column 86.
[296] Transcript, Dr Samir Agrawal, 22 August 2025, Page 56, Column 108.

understanding whether anti-microbial prescribing actually had an impact at the QEUH/RHC. His evidence does not support the conclusion that the prescription of Ciprofloxacin or Carbapenem antibiotics was the cause of material numbers of BSIs in Schiehallion Unit patients.

278. When it came to ventilation and Chapter 6, Dr Agrawal had very little knowledge of the actual ventilation systems in place at the QEUH/RHC (other than Ward 4C in the context of his 2021 report, produced for other proceedings[297]). He had not visited the hospital. He did not know that adult BMT patients benefited from some HEPA filtration and pressure differentiation following their return to Ward 4B at QEUH in June 2018[298]. That must reduce the value of his conclusions that arise from consideration of the BSI incidence rates for the Adult BMT Group. Other than during the short period in June and July 2015, adult BMT patients at the QEUH have always had HEPA filtration in their rooms, relatively high air-change rates in the ward as a whole (albeit not at the 10 ACH set out in SHTM 03-01) and a pressure differential to the rest of the hospital.

279. His opinion that it would be unsafe - due to the unknown nature of any risk - to open a new ward that had a ventilation system that had not been validated, is of assistance to the Inquiry. When pressed on this, he explained that he would be unhappy about an unvalidated space, because he would not know if the HEPA filtration was working or if the ventilation system was pushing pathogens in[299]. He saw this as a precautionary response, noting that where there is a clinical need to move, it becomes a question of balancing risks, and risk from a unit can be mitigated[300].

280. When asked about the value of dilution of air by higher air change rates, he had great difficulty accepting the approach advanced by Dr Mumford and Mr Mookerjee[301] due to, as he saw it, a lack of research[302]. He clearly shares the views of Mr Hoffman that larger particles - such as those produced by water

[297] Bundle 44, Volume 5, Document 3, Page 103.
[298] Transcript, Dr Samir Agrawal, 22 August 2025, Page 68, Column 132.
[299] Transcript, Dr Samir Agrawal, 22 August 2025, Page 106, Column 208.
[300] Transcript, Dr Samir Agrawal, 22 August 2025, Page 107, Column 209.
[301] Bundle 44, Volume 2, Document 81, Page 1285.
[302] Bundle 44, Volume 5, Document 2, Pages 63-65, Paras 5A.2 to 5A.10.

falling into drains - “will fall out of the air reasonably promptly within a few seconds to a minute or two” and “don't need special ventilation systems to dilute and remove them. They will disappear because of their own weight. They will fall under gravity”[303]. However, he did agree when the Chair put to him that a system that conforms to SHTM 03-01 can reduce airborne transmission due to presence of HEPA filtration and positive pressure[304].

281. Some weight will have to be given to his evidence that, as he understands it, the equivalent haematology patient cohort to those accommodated in Ward 4C are, in his unit, accommodated in a mixture of positively pressured lobbied isolation rooms with HEPA filtration and open bays without pressure differentiation or HEPA filtration, and are sometimes cared for on general wards[305]. However, the fact that his unit operates a radically different anti-microbial prescribing policy for these patients compared with NHS GGC, must slightly reduce the effect of his evidence that the inequalities of the low air change rate in Ward 4C do not, if mitigation is carried out, give rise to a material increase in the risk of airborne infection.

282. Dr Agrawal had carried out a significant study to create a data set for the numbers of *Aspergillus* infections in adult and paediatric haemato-oncology patients at the QEUH/RHC. Whilst NHS NSS has criticised his methodology[306], his approach was practical and, as he explained, involved applying the three internationally recognised criteria for invasive fungal disease. He accepted that this might inflate the number of cases, but this was deliberate, as he would rather have more than fewer, especially when consideration is given to how difficult it is in the first place to identify a positive case of *Aspergillus*[307]. His view is that, despite the views of NHS NSS, a formal de-duplication exercise for *Aspergillus* could not be done for those infections, given the nature of this invasive fungal disease and how (unlike with BSIs) a successful treatment does not necessarily mean a patient

[303] Transcript, Peter Hoffman, 26 September 2024, Page 22, Column 39.
[304] Transcript, Dr Samir Agrawal, 22 August 2025, Page 81, Column 157.
[305] Transcript, Dr Samir Agrawal, 22 August 2025, Page 81, Column 158.
[306] Bundle 44, Volume 2, Document 45, Page 702; Transcript, Shona Cairns, 20 August 2025, Page 46, Column 87.
[307] Transcript, Dr Samir Agrawal, 22 August 2025, Page 96, Columns 187-188.

becomes free of *Aspergillus*[308].

283. It seems clear (as discussed in the context of the evidence of Dr Drumright) that there is no statistically significant difference in the rate of infections for the paediatric haemato-oncology patients at Yorkhill, compared to the rate for that same cohort at RHC. Dr Agrawal could not say that there was an increase associated with the move to the new hospital, and the work by Dr Drumright and Mr Mookerjee analysing his data is supportive of a very slow rate of increase over time - probably due to factors outside the hospital, or possibly child vulnerability[309].

284. When pressed about the criticism of the CNR in the HAD Report, to the effect that the HAD Authors did not consider that the CNR is of assistance[310], he explained that he felt a comparison between the HAD Report and the CNR was "slightly misguided"[311].

285. When asked about the new findings of the HAD Authors in Figure 2.F.3, Paras. 2.F.12-13 of the HAD Response document,[312] he appeared to exclude counterfactuals around contamination from the laboratory and deferred to Professor Hawkey on the impact of antibiotic use. When asked whether the pattern seen in Figure 2.F.3 from 2016 to 2020 was potentially connected to water, Dr Agrawal's stated that it is inconceivable that the explanation for infections seen is not a combination of different sources, with the vast majority (70+%) being exogenous[313].

4.4 Relevant evidence of others in Glasgow 4, Part 2

286. The witness list for Glasgow 4, Part 2 was prepared when it was anticipated (based on the terms of the HAD Report) that the HAD Authors were making a robust critique of the CNR, were arguing that environmental BSI rates amongst paediatric haemato-oncology patients were lower at RHC than at Yorkhill, and that the absence of a close connection by WGS between

[308] Transcript, Dr Samir Agrawal, 22 August 2025, Page 99, Column 194.
[309] Transcript, Dr Samir Agrawal, 22 August 2025, Pages 105-106, Columns 206-207
[310] Bundle 44, Volume 1, Document 1, Page 17.
[311] Transcript, Dr Samir Agrawal, 22 August 2025, Page 109, Column 213.
[312] Bundle 44, Volume 5, Document 2, Page 50.
[313] Transcript, Dr Samir Agrawal, 22 August 2025, Page 113-117, Columns 222-229.

samples from patients or the environment 'proved' that there was no connection between these BSIs and the environment. The development of the position of the HAD Authors (both in oral evidence and in the HAD Response Document[314]) reduced the significance of the remaining witnesses in Glasgow 4, Part 2.

4.4.1 The Consequential Witnesses

287. These witnesses were approached primarily because the HAD Report had concluded that the incidence of environmentally relevant BSIs amongst paediatric haemato-oncology patients at RHC was lower than at Yorkhill,[315] and this had not been put to clinicians who worked at Yorkhill and gave evidence during Glasgow 2 and Glasgow 3 hearings. Further, there was no record of concerns about the incidence of environmentally relevant BSIs at Yorkhill in the Minutes of the AICC and BICC Committee papers that we could recover from 2009-2015[316].

Professor Gibson

288. Professor Gibson was involved in establishing the Schiehallion Unit at Yorkhill in 1996, the core idea being to separate vulnerable immuno-compromised paediatric patients from the general paediatric population as a means of reducing their exposure to infection[317]. The cohort treated was the same at QEUH as at Yorkhill[318]. She spoke to general inherent difficulties in dealing with child patients, and in the need for flexibility in approach[319]. A particular feature in paediatric care is the intensity of treatment due to their greater ability to withstand it than in adult patients, but which brough the consequence of increased vulnerability[320].

289. Professor Gibson described the Yorkhill Schiehallion Unit as:

[314] Bundle 44, Volume 5, Document 2, Page 20.
[315] Bundle 44, Volume 1, Document 1, Page 119.
[316] See Bundle 42, Volume 1.
[317] Transcript, Professor Brenda Gibson, 19 August 2025, Pages 4-5, Columns 4-5.
[318] Transcript, Professor Brenda Gibson, 19 August 2025, Page 30, Column 55.
[319] Transcript, Professor Brenda Gibson, 19 August 2025, Pages 9-10, Columns 14-16.
[320] Transcript, Professor Brenda Gibson, 19 August 2025, Page 11, Column 18.

"a standalone contained unit. It was composed of an inpatient ward and an outpatient day care unit. The ward was cubicalised with the exception of, I think, two two-bedded bays … it was a ward that you could stand at one end and see exactly what was happening down the other end, so it wasn't the [race] track that you have discussed or described at the new hospital. The corridors were HEPA filtered. It had a double-door access. The transplant unit was at the far end of it, so it was quite isolated from the other cubicles. It had facilities for the entire team, so it had a pharmacy which initially had an aseptic element to it, which did disappear over time. It had a classroom, it had office space for the medical staff, it had office space for the social workers, for outreach nurses, for our data managers. It was a self-contained unit."[321]

290. She could not recall any serious environmental concerns having arisen during her time at Yorkhill, beyond occasional kitchen closures as a result of Rotavirus or Norovirus, which she described as 'inevitable'. She could not recall any IMT or PAG processes[322]. Fungal and gastro-enteritis cases arose from time to time, but it was difficult to know whether they should be attributed to environment[323].

291. By contrast, upon moving to QEUH her impression was of an increase in environmental organisms and positive blood cultures. She did not accept indications that the move had resulted in a three-fold decrease in infection rates - rather, her impression matched the curve visible from the HAD results, being an increase from 2017 until a falling off after 2018[324].

292. She was able to explain why the references in the HAD Yorkhill Schiehallion data were in places to wards not part of that Unit, as the Unit at times 'boarded out' surplus patients to other wards, or simply because the patients may have needed to be elsewhere for surgery[325].

Annette Rankin

293. Ms Rankin became Head of Nursing for the Infection Control Acute Sector at

[321] Transcript, Professor Brenda Gibson, 19 August 2025, Page 19, Column 34.
[322] Transcript, Professor Brenda Gibson, 19 August 2025, Page 6, Columns 7-8.
[323] Transcript, Professor Brenda Gibson, 19 August 2025, Page 26, Column 48.
[324] Transcript, Professor Brenda Gibson, 19 August 2025, Pages 7-8, Columns 9-12.
[325] Transcript, Professor Brenda Gibson, 19 August 2025, Page 24, Column 44.

NHS GGC in 2006, covering Yorkhill among her areas[326].

294. She also did not accept that infection rates were higher at Yorkhill. In addition, the organisms being seen at QEUH, such as *Cupriavidus*, *Achromobacter* and *Burkholderia*, were not ones which she had come across before the new hospital. This was particularly acute in 2018, and she recalled that nobody in the clinical team spoke of having experienced them before[327]. She emphasised the significance of seeing a range of different organisms, which she considered more important than focusing on whether the sheer numbers were high[328].

295. She emphasised the importance of many samples being polyclonal - a single sample containing multiple organisms - which indicated an environmental source because the likelihood of multiple organisms spreading via a person-to-person route was low. This was new; there had been no national reporting to that effect from anywhere[329].

296. She recalled only one significant incident from her time at Yorkhill, being a 'one-off' paediatric intensive care incident involving *Pseudomonas*. There had been no unusual organisms involved[330].

297. She too agreed with the shape in the HAD graphs of a rise in 2016 before declining and falling away to 2022. This matched what she saw in the clinical presentation[331]. The 2018 incident was one where clinical staff were expressing that this was something which nobody had seen before[332].

298. Since refurbishment incidents have significantly reduced[333].

Ms Harvey-Wood

299. Ms Harvey-Wood gave evidence in Glasgow 3. She was a Principal Clinical Scientist in Paediatric Microbiology and worked at Yorkhill for 32 years. She

[326] Transcript, Annette Rankin, 19 August 2025, Page 48, Column 92.
[327] Transcript, Annette Rankin, 19 August 2025, Pages 50-52, Columns 95-99.
[328] Transcript, Annette Rankin, 19 August 2025, Page 52, Column 100.
[329] Transcript, Annette Rankin, 19 August 2025, Page 55, Columns 105-106.
[330] Transcript, Annette Rankin, 19 August 2025, Page 57, Column 109.
[331] Transcript, Annette Rankin, 19 August 2025, Page 60, Column 116.
[332] Transcript, Annette Rankin, 19 August 2025, Page 64, Column 124.
[333] Transcript, Annette Rankin, 19 August 2025, Page 65, Column 125.

does not accept that things were worse in terms of environmental bacteraemia cases at Yorkhill compared to the RHC. She drew particular attention to an aspect of Figure 2.F.3, which is the absence of months with zero environmentally relevant infections between early 2016 and before 2020[334]. She explained that all hospitals do have environmental infections, but the difference at the QEUH was the diversity and the complexity of the infections observed. They did see infections from time to time in the environment at Yorkhill, but clinically they did not have the same concern[335].

300. Ms Harvey-Wood provided a detailed explanation of her Report with Dr Peters from October 2019[336], and of their work on antibiotic resistance, but she gave evidence before it became clear that Dr Agrawal and Professor Hawkey had not seen any evidence to support their statements about the influence that antibiotic prescribing might have had on infections[337].

301. In respect of the opinion evidence of Dr Drumright, she disputed the 'counterfactual' that infections might be attributable to a lab not working or to non-processing of samples, as it was expressed in ignorance of practices at the lab, and Dr Drumright had not visited the lab[338].

Dr Dermot Murphy

302. Dr Murphy was not available to the Inquiry for the Glasgow 4, Part 2 hearing as his work has taken him outwith the United Kingdom, but in his statement for the Glasgow 2 hearing, he was clear that not only were they seeing environmental Gram-negative line infections in the Schiehallion Unit at RCH, but the high numbers and preponderance of environmental organisms was not what had been seen at Yorkhill[339].

Dr Andrew Murray

303. In preparation for Dr Davidson's evidence on 9 October 2025, we noted Dr Murray's December 2019 external review of prescribing in Haemato-oncology

[334] Transcript, Kathleen Harvey-Wood, 22 August 2025, Pages 6-7, Columns 8-9.
[335] Transcript, Kathleen Harvey-Wood, 22 August 2025, Page 11, Column 17.
[336] Bundle 19, Document 19, Page 143.
[337] Transcript, Kathleen Harvey-Wood, 22 August 2025, Pages 14-21, Columns 23-38.
[338] Transcript, Kathleen Harvey-Wood, 22 August 2025, Page 26, Columns 47-48.
[339] Glasgow 2, Witness Statements, Dr Dermot Murphy, Document 17, Page 880, Para 199.

patients[340]. Dr Murray was a statement-only witness for Glasgow 2,[341] who was commissioned by the Oversight Board to review the use of prophylactic medicines at the QEUH/RHC. It is quite clear, from his statement and SBAR, that neither he nor the clinicians he interviewed saw the prescription of anti-microbials as driving infection numbers.

4.4.2 Ms Shona Cairns

304. Shona Cairns is a Consultant Healthcare Scientist/Epidemiologist at Antimicrobial Resistance and Healthcare Associated Infection Scotland ('ARHAI'), leading in the Healthcare Associated Infection Surveillance and Epidemiology ('HCAISE') programme, which is responsible for statistical epidemiological data analysis, including analysis of data to support NHS Boards and review of case notes. She was part of the team that produced the HPS Review of NHS GGC paediatric haemato-oncology data from October 2019[342] [343]. Ms Cairns spoke to her 28 May 2025 review of the HAD Report, [344] supplementary review of Dr Agrawal's calculation documents for Chapter 8 dated 20 June 2025[345] and her further paper of 17 July 2025[346].

305. Ms Cairns corrected a misconception on the part of the Counsel to the Inquiry that had been identified by NHS NSS in their Closing Statement following Glasgow 3[347] i.e., that we had misunderstood[348] the basis of the average rate of BSIs per 1,000 occupied bed days. In fact, the HPS Review of NHS GG&C paediatric haemato-oncology data Report of October 2019 used the average of the rate in Yorkhill before the move to the RHC as its baseline.[349] Dr Mumford explained that she had not appreciated this either and that the charts generally show a rise in infections away from the baseline at Yorkhill[350]. This

[340] Bundle 6, Document 2, Page 10.
[341] Glasgow 2, Witness Statements, Dr Andrew Murray, Document 10, Page 524.
[342] Transcript, Shona Cairns, 20 August 2025, Pages 4-5, Columns 4-5.
[343] Bundle 7, Document 6, Page 214.
[344] Bundle 44, Volume 2, Document 45, Page 685.
[345] Bundle 44, Volume 3, Document 5, Page 222.
[346] Bundle 44, Volume 8, Document 1, Page 3.
[347] Glasgow 3 - Core Participants Closing Submissions, NHS National Services Scotland, Document 8, Para 29, Page 156.
[348] CTI Closing Statement, Glasgow 3, Chapter 7, Page 622, Para 339.
[349] Transcript, Shona Cairns, 20 August 2025, Page 7, Column 10; Transcript, Laura Imrie, 6 September 2024, Page 21, Column 38.
[350] Transcript, Dr Sara Mumford, 29 August 2025, Page 62, Column 120.

has some significant implications, and these are discussed in the final section of this chapter.

306. Ms Cairns' view of the epidemiological analysis in the HAD Report, and the subsequent work by its authors, can be summarised as:

307. She was concerned that the definitions of adult and paediatric patient groups were unclear and did not actually match the hospital in issue,[351] although this issue was later resolved to her satisfaction[352]. In the end, her concern was that the patient group being considered was the patients of certain named consultants rather than patients in particular wards[353]. Mr Mookerjee had had the same problem.

308. She had concerns as to whether the occupied bed day data used by the HAD Authors (for paediatric patients from 2013-2022) matched the national activity data supplied by NHS GGC to Public Health Scotland which was subsequently used by HPS in their 2019 Reviews and by Dr Kennedy in his reviews. Ms Cairns noted that there was considerable variation in the differences between months, which raised issues about whether there is a consistency around these bed days[354].

309. The imputation of additional bed day data for 2005-2007 for the paediatric patients relied on an assumption that bed days had not changed. This was not necessary, as data from 2008 to 2014 at Yorkhill were readily available, and as such imputation could skew that end of the data set either upward or downward[355]. She contrasted this approach with that of Mr Mookerjee, who had attempted to match bloodstream infections with separate bed day/admission data for the ward[356].

310. Whilst Ms Cairns had concerns about the definition of the environmentally relevant and non-environmentally relevant groups of microorganisms in the

[351] Bundle 44, Volume 5, Document 2, Page 32.
[352] Transcript, Shona Cairns, 20 August 2025, Page 20, Column 35; Bundle 44, Volume 5, Document 2, Page 32.
[353] Transcript, Shona Cairns, 20 August 2025, Page 22, Columns 39.
[354] Transcript, Shona Cairns, 20 August 2025, Pages 26-29, Columns 48-54; Bundle 44, Volume 8, Document 1, Page 20.
[355] Transcript, Shona Cairns, 20 August 2025, Pages 30-31, Columns 55-58.
[356] Transcript, Shona Cairns, 20 August 2025, Page 22, Column 39.

HAD Report[357], when it came to making a comparison between the various epidemiological reports, Ms Cairns concluded that the Environmental and Enteric Group used by HPS[358] came closest to - and was broadly comparable with - the environmentally relevant group used by the HAD Authors. She considered it similar to the list used by the CNR Expert Panel, but different from that used by Dr Kennedy. Although she noted that comparing the number of infections across the reports would give rise to an issue of comparability, she did consider it useful to compare similar trends between the various reports[359]. This view appears to be broadly consistent with that of Dr Mumford, Mr Mookerjee and Dr Drumright.

311. In respect of Mr Mookerjee's work, Ms Cairns expressed concern about his attempt at water positivity correlation, primarily due to the low number of water tests carried out at QEUH prior to 2017[360], but she did find his final chart on the day he gave evidence really helpful,[361] as his 'Overall Schiehallion Rate per 1000 admissions' shows that by looking at the shapes rather than the number the comparator institutions have a fairly stable trend, but in the Schiehallion unit there is an increase with a peak in 2017 and then a downward trend.[362]

312. Ms Cairns disagreed with the initial approach taken in Figures 21 and 22 of the HAD Report, which sought to plot a linear best fit line to varied data[363], on the basis that trends were the important output[364]. She felt that the model used was too simplistic to allow conclusions to be drawn. Accordingly, she disagreed with the presentation of linear trend lines for both, Yorkhill, and QEUH in the HAD Report[365], as, in her view, there was no identifiable trend in the Yorkhill data[366].

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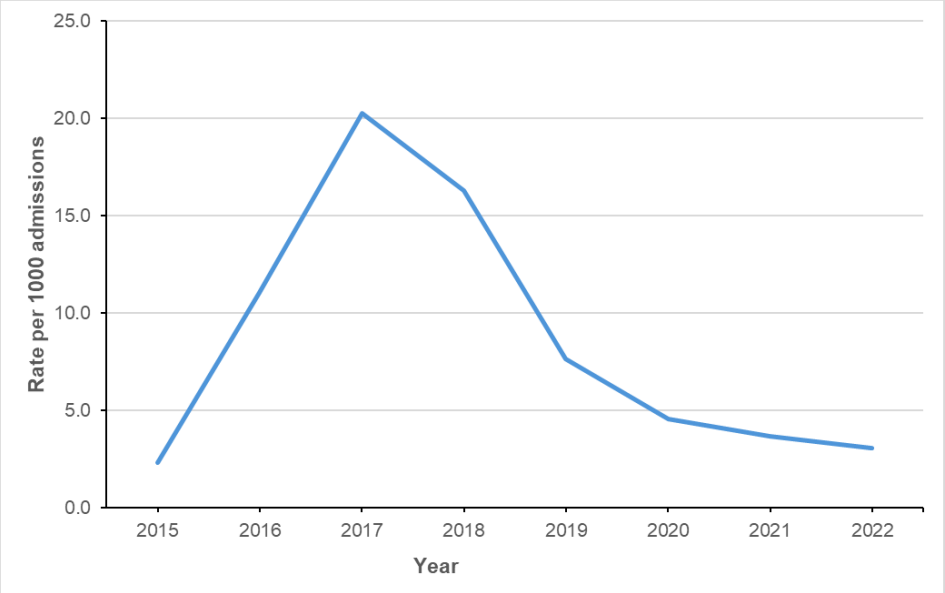
[357] Bundle 44, Volume 2, Document 45, Page 689, Section 3.1.
[358] Bundle 7, Document 6, Page 219.
[359] Transcript, Shona Cairns, 20 August 2025, Pages 16-18, Columns 27-31.
[360] Transcript, Shona Cairns, 20 August 2025, Page 11, Column 17.
[361] Bundle 27, Volume 18, Document 1, Page 3.
[362] Transcript, Shona Cairns, 20 August 2025, Pages 11-12, Columns 17-20.
[363] Transcript, Shona Cairns, 20 August 2025, Page 32, Column 59; Bundle 44, Volume 1, Document 1, Page 118.
[364] Transcript, Shona Cairns, 20 August 2025, Page 36, Column 67.
[365] Bundle 44, Volume 1, Document 1, Page 118.
[366] Transcript, Shona Cairns, 20 August 2025, Pages 34, 37, Columns 63, 70.

313. She approved of the splitting of the data into three periods for assessing trends, as done jointly in the exercise carried out by Mr Mookerjee and Dr Drumright. The availability of clinical information justified this method[367], which showed a rapid increase in 2016 and a slowing in 2017, which was the key point to take from the HAD report[368]. This view was supported by the trends in other reports[369].

314. Ms Cairns' overall conclusion was that in the first year after the move, there was a lower infection rate, followed by this period from mid-2016 to maybe 2019, where there was this period of an increased rate of infection followed by a decrease after that[370].

315. After Ms Cairns gave evidence, Dr Chaput provided a more detailed critique of the approach taken by Mr Mookerjee, who then responded to Dr Chaput's criticisms. After the close of Glasgow 4, Part 2 the Inquiry Team gave Ms Cairns the opportunity to comment on Mr Mookerjee's final comments. Her team at NHS NSS reviewed his calculations, raised some concerns, and recalculated. A review was produced[371]. Their calculation produced a chart (Figure 1. Rate of BSI per 1000 admissions in NHSGGC, 2015-2022) which is produced here.

[367] Transcript, Shona Cairns, 20 August 2025, Page 36, Column 68.
[368] Transcript, Shona Cairns, 20 August 2025, Page 39, Columns 73-74.
[369] Transcript, Shona Cairns, 20 August 2025, Page 43, Column 81.
[370] Transcript, Shona Cairns, 20 August 2025, Page 43, Column 81.
[371] Bundle 44, Volume 9, Document 6, Page 58.



316. For reasons that might be described as a restatement of the approach previously advanced by NHS NSS in response to Mr Mookerjee's first report,[372] she continues to maintain that comparing the NHSGGC rate with those of comparator organisations is not a valid way to calculate and interpret the rate ratio, instead suggesting that it emphasises that:

> "In this analysis, the increase and subsequent decrease following the implementation of control measures in the rate of infection in NHSGGC has been described across several reports that have been considered as evidence in the Inquiry."

4.4.3 Professor Mike Stevens

317. Professor Stevens gave evidence in Glasgow 3. On returning, he adopted the rebuttal document he had prepared with Ms Evans and Professor Wilcox[373]. He reminded the Inquiry that in its work, the CNR assessed infection risks holistically, considering individual patient circumstances[374]; that routes of transmission are complex and multifactorial[375], and that attribution of infection sources is based on clinical judgment rather than absolute certainty[376]. He

[372] As discussed in CTI Closing Statement following Glasgow 3, Page 623, Section 7.3, Paras. 336-338.
[373] Bundle 44, Volume 2, Document 15, Page 120.
[374] Transcript, Professor Mike Stevens, 28 August 2025, Page 7, Column 9.
[375] Transcript, Professor Mike Stevens, 28 August 2025, Page 5, Column 5.
[376] Transcript, Professor Mike Stevens, 28 August 2025, Page 6, Column 7.

explained that the CNR had concluded that approximately 30% of infections were likely linked to the hospital environment.[377] However, endogenous (patient-origin) infections were also acknowledged[378].

318. It was his opinion that the HAD Report had been selective in its use of data and had a lack of consideration for individual patient risk[379]. He reminded the Inquiry of the difficulties that the CNR suffered from lack of access to comprehensive databases[380].

319. In the context of the observation in the CNR Rebuttal Document at para 4.2, that none of the HAD Authors has experience in paediatric haematology/ oncology[381], Professor Stevens emphasized the need for contextual expertise in paediatric oncology and reminded the Inquiry that paediatric haemato-oncology patients are a unique population with different treatment protocols and vulnerabilities who need tailored approaches[382]. Children are not small adults - they have different vulnerabilities and treatment protocols[383].

320. In light of the issues being raised by Professor Hawkey and Dr Agrawal and the CNR Expert Panel having access to medical notes, Professor Stevens was asked about the prescribing of Meropenem and Ciprofloxacin. He explained that they found no strong evidence linking Meropenem[384] and Ciprofloxacin's antibiotic use to environmental infections. In his view the hypothesis remains unproven[385].

321. Professor Stevens described the CNR Expert Panel's attempt to apply the clustering criteria of the HAD Report[386] to their own (CNR's) data[387]. Whilst interesting, and potentially something that formed a part of the process by which the views of the HAD Authors had evolved, he noted that this work had

[377] Transcript, Professor Mike Stevens, 28 August 2025, Page 13, Column 22.
[378] Transcript, Professor Mike Stevens, 28 August 2025, Page 15, Column 25.
[379] Transcript, Professor Mike Stevens, 28 August 2025, Pages 7 and 21, Columns 9 and 37.
[380] Transcript, Professor Mike Stevens, 28 August 2025, Page 31, Column 57.
[381] Bundle 44, Volume 2, Document 15, Page 145.
[382] Transcript, Professor Mike Stevens, 28 August 2025, Pages 21-22, Columns 38-39.
[383] Transcript, Professor Mike Stevens, 28 August 2025, Page 22, Column 40.
[384] Transcript, Professor Mike Stevens, 28 August 2025, Page 26, Column 47.
[385] Transcript, Professor Mike Stevens, 28 August 2025, Page 60, Column 115.
[386] See Table 3, Bundle 44, Volume 1, Document 1, Page 68.
[387] Bundle 44, Volume 2, Document 15, Page 176.

since been overtaken by the HAD Authors' recognition of a peak in the incidence rate for environmentally relevant BSIs in January 2018, followed by a rapid decline below the long-term trend in 2020[388] and as a result did not require further consideration.

322. When Dr Drumright's counterfactuals and alternative explanations were put to Professor Stevens, he explained that, in his view, factors such as line care, nursing behaviour, antibiotic prescribing, and lab handling, did not sufficiently explain the observed infection patterns, and that no strong alternative explanation was found to contradict the environmental hypothesis[389]. He credited the impact of the CLABSI Quality Improvement Group for the reduction in the non-environmental BSIs, but stated that the change in the environmental BSIs resulted from the work undertaken on the water supply and the relocation of patients[390].

4.4.4 Professor Mark Wilcox

323. Professor Wilcox was asked to answer a short questionnaire that addressed issues raised by NHS GGC in their Direction 5 response to the CNR Rebuttal Document[391]. That generally related to his understanding of the WGS material, or to the extent of water sampling at the hospital considered by the HAD Authors and made available to him by the Inquiry. Whilst he provided a robust response to some of these issues, and made certain concessions on others, this did not alter the conclusion of the CNR about the shortcomings in the WGS carried out on samples retained at the QEUH/RHC[392]. However significant these challenges and the response were at the time when they were made, they are now rendered irrelevant by Professor Hawkey's concession that, whilst WGS can show a link of close relationship between samples, it cannot be used to exclude a source for yielding a strain which does not match[393].

[388] Transcript, Professor Peter Hawkey, 27 August 2025, Pages 48-49, Columns 92-92, and Bundle 44, Volume 5, Document 2, Page 50, Figure 2.F.3, Paras. 2.F.12-13.
[389] Transcript, Professor Mike Stevens, 28 August 2025, Pages 57-60, Columns 110-116.
[390] Transcript, Professor Mike Stevens, 28 August 2025, Page 48, Column 92.
[391] Bundle 44, Volume 3, Document 1, Page 3.
[392] Glasgow 4, Part 2, Witness Statements, Volume 3, Professor Mark Wilcox, Document 1, Page 3.
[393] Transcript, Professor Peter Hawkey, 27 August 2025, Pages 53 and 62, Columns 102 and 122.

4.4.5 Dr Dominique Chaput

324. Dr Chaput is a Healthcare Scientist in Infection Prevention and Control at NHS Greater Glasgow and Clyde and is based in the Scottish Microbiology Reference Laboratories, Glasgow. She is the author of the report 'Microbiological testing of water and environmental samples from the Queen Elizabeth University Hospital (Adults) and Royal Hospital for Children, 2015-2020, Overview of sample numbers and test results; 3 March 2023 and related presentations[394].

325. In its Closing Statement following Glasgow 3, NHS GGC expressed concern that "no evidence" had been led of the content of the reports by Dr Chaput[395]. This amounted to a misunderstanding of the procedure adopted. Dr Chaput's reports and the underlying data were considered by the Inquiry's experts, Dr Walker, Mr Mookerjee, Mr Poplett, Dr Mumford, and Ms Dempster in their reports[396]. There is no need to formally lead oral evidence about the creation of such a database, just as it was not necessary to lead evidence of the creation of the BSI results databases used by Mr Mookerjee, Dr Mumford, Ms Dempster, the CNR Expert Panel and the HAD Authors. The data was available to the Inquiry and was used.

326. Dr Chaput gave evidence in Glasgow 4, Part 2, about five issues: the work to refit Ward 2A; the creation of biofilm; the various reports she produced setting out the water testing done at the QEUH; her concern about the use of the word 'contamination' to describe the water system at the QEUH, and her criticisms of the comparative infections exercise carried out by Mr Mookerjee and Dr Mumford.

327. It should be noted that Dr Chaput is not independent. As she explains in her Glasgow 4, Part 2, statement[397] she was part of the NHS GGC group that examined the initial expert reports of Dr Mumford, Ms Dempster and Mr

[394] Bundle 18, Volume 1, Document 2, Page 13.
[394] Bundle 18, Volume 2, Document 117, 118, 119 and 120, Pages 1030, 1040, 1063 and 1073.
[395] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 56, Para 77.
[396] Bundle 21, Volume 1, Documents 1, 4, 5 and 6, Pages 3-63, 96-355.
[397] Glasgow 4, Part 2, Witness Statements, Volume 1, Dr Dominique Chaput, Document 1, Page 8, Para 24.

Mookerjee. It could be argued that, strictly speaking, she was an 'advocacy' expert, but as we have resolved to hear the perspectives of skilled or expert persons and to address their evidence, that does not prevent her evidence from being heard and considered.

328. The Inquiry Team were interested to read the paper in ‘Water Research’ by Dr Chaput, Mr Clarkson, Dr Bagrade, Dr Marek, Mr Kelly, Mr Watson, Professor Steele and Professor Leanord, entitled "Reversing and controlling microbial proliferation in the water system of a high-risk hospital ward after extended closure and reconstruction"[398]. This set out how, towards the end of the refit of the water system of Ward 2A in December 2021, NHS GGC found unexpected microbial proliferation - that is to say water microbial results that were not acceptable - and described the actions taken to resolve the issue, including replacing the taps in the ward. This paper is relevant to the work of the Inquiry in relation to TOR 7. It was the first the Inquiry Team had been told that there were issues that needed to be, and were, resolved) in reducing microbial proliferation in the refurbished Ward 2A.

329. Dr Chaput was very clear that it is very difficult to understand the extent of biofilm in a water system. She explained that biofilm gives microbes a safe environment to proliferate, protects them from disinfectant, and provides nutrients. It is not possible to measure biofilm without cutting up and into pipes; all that can be done is to assume the presence of biofilm on basis of the presence of known biofilm-forming species in the water. She explained that if biofilm is present, it cannot be eradicated, only minimised, with the goal of managing the system to make it as inhospitable as possible. It was her opinion that biofilm only matters if it is shedding - what is important is what is coming out of the tap. The risk is not simply the presence of biofilm, but the presence of biofilm within it growing to point where the biofilm can shed[399].

330. In a significant piece of evidence, when asked by the Chair whether, when managing a water system, it is prudent to assume that biofilm may shed, Dr Chaput agreed, and explained that she thought it was prudent to assume

[398] Bundle 44, Volume 8, Document 6, Page 141.
[399] Transcript, Dr Dominique Chaput, 20 August 2025, Pages 61-63, Columns 117-122.

many things when managing water systems and not to rely on any one control measure or to rely entirely on testing results either[400]. Dr Chaput also confirmed that:

- If you leave water in a still holding tank, not moving or flushed, that could lead to biofilm formation due to stagnation[401].
- If left undisturbed by flushing or other disinfection, biofilm can evolve/become more complex over time due to a succession of species[402].
- Mitigation measures to deal with biofilm have a risk that, in attacking the biofilm, they can cause release of organisms into the water[403].

331. Dr Chaput explained the origin of her reports on what testing had been undertaken. The Report of 3 March 2023 followed a request from Professor Leonord to gather and summarise testing data since 2015 at QEUH. She saw this as data, not analysis[404]. She accepted that prior to March/April 2018 there was a relatively modest number of water tests being done, given the size of the campus, but her understanding was that this was broadly in compliance with rules at the time[405]. She confirmed the evidence of Mr Clarkson and Mr Kelly that the testing regime put in place after 2018 and its thresholds are bespoke to QEUH. There is no comparative data and, in her view, generally no normal baseline, to which the results can be compared.

332. Dr Chaput rejected the use of the word 'contamination' when asked the question, "can you comment on whether there was systemic contamination of the water system at the new hospital in 2015?". She explained that the word means ‘something that’s gotten in there that should not be there,’ and she maintained that Dr Walker had used it as a synonym for ‘may pose a possible risk’. It was her opinion that, if normal microbial flora have access to sufficient nutrients or substrate to proliferate, then they are not the contamination, that word should be reserved for objects or microorganisms that should not be in

[400] Transcript, Dr Dominique Chaput, 20 August 2025, Page 63, Column 122.
[401] Transcript, Dr Dominique Chaput, 20 August 2025, Page 99, Column 194.
[402] Transcript, Dr Dominique Chaput, 20 August 2025, Page 99, Column 194.
[403] Transcript, Dr Dominique Chaput, 20 August 2025, Page 100, Column 195.
[404] Transcript, Dr Dominique Chaput, 20 August 2025, Page 68, Column 132.
[405] Transcript, Dr Dominique Chaput, 20 August 2025, Page 99, Column 193.

domestic water (such as species found in faecal matter). She then explained that she adopted a slightly looser definition, as *Legionella* strictly wouldn't meet the definition of contamination because one would expect to see it occasionally in water. If it proliferates to pose a risk, she would call it 'microbial proliferation' – a normal presence has been allowed to grow to numbers which are undesirable. Dr Chaput then explained that the problem is identifying contamination by 'naturally present' organisms without knowledge of what 'normal' is, particularly where there is no baseline data[406].

333. Dr Chaput did not appear to accept that 'contamination' is nevertheless widely used by persons who work with water systems, including the people she worked with at NHS GGC. The Minutes of the WTG from April 2018 reaching the conclusion that there was widespread contamination were put to her. Dr Chaput accepted that she was not involved at the time but maintained she had the advantage of more data. The understanding of NHS GGC had changed, particularly by reference to Dr Inkster's paper which referred to hospitals which had 100% positives for GNBs, with high counts – yet no water incidents[407]. It was Dr Chaput's view that the context includes looking back now, seeing positivity rates elsewhere that are just as high or higher (and no outbreak), so QEUH doesn't appear to be an outlier – the range in 2018 has been seen elsewhere. As a result, if the suspicion is the gram-negative test results are indicators of "contamination", both in terms of counts and the species detected, then it follows that these other hospitals would also be similarly contaminated, and therefore, if everywhere is contaminated, that word loses meaning[408].

334. She was of the view that it was important to recognise that if one sees a cluster, it may be a 'real' cluster, but alternatively it may be a random variability. As IPC operates on the precautionary principle, they have to assume it's an incident, investigate and do interventions. Dr Chaput's concern was the challenge that scientists have no way of knowing whether one of the hypotheses was entirely correct, and if that is what brought down the numbers

[406] Transcript, Dr Dominique Chaput, 20 August 2025, Pages 76-80, Columns 148-156.
[407] Bundle 18, Volume 2, Document 76, Page 138.
[408] Transcript, Dr Dominique Chaput, 20 August 2025, Pages 81-85, Columns 157-166.

of infections. That could be causality, or it could be regression to the mean. Dr Chaput did accept that if multiple interventions are put in and infection numbers have decreased, one of the possible explanations is that one or more of those interventions has had an effect[409].

335. The final topic addressed by Dr Chaput was her critique of the comparative exercise carried out by Mr Mookerjee and supported by Dr Mumford[410]. It is highly regrettable that issues raised by Dr Chaput, in her report of 6 December 2024[411], her Glasgow 4, Part 2, statement[412] and further note on de-duplication, produced a matter of days before she and Mr Mookerjee gave evidence,[413] were not identified in the summer of 2024 when she was part of the NHS GGC team that supported the preparation of the Direction 5 response to Mr Mookerjee's first report[414], but the issues she raised do require to be addressed, albeit late and out of sequence.

336. Dr Chaput's initial critique of Dr Mumford and Ms Dempster's evidence in Glasgow 3, is set out in her report of 6 December 2024[415]. She accepted, following the production of an Addendum report by Dr Mumford dated 28 May 2025[416], that the selection of microorganisms to record and count both at QEUH and in the comparison units were not biased, and that Mr Mookerjee used all the organisms that met the definition in his calculations. However, she explained that, because of the table for Great Ormond Street produced in that Addendum Report,[417] she then had further questions about the extent to which Mr Mookerjee had properly de-duplicated the data received from the comparator hospitals. It was Dr Chaput's view that Mr Mookerjee could not know whether Leeds, Cardiff and the Vale and Oxford had de-duplicated their data or interpreted their responses differently from him, to conclude that they had not, and that Mr Mookerjee had used the wrong method to de-duplicate

[409] Transcript, Dr Dominique Chaput, 20 August 2025, Pages 85-86, Columns 166-167.
[410] As discussed in detail in the CTI Closing Statement, Glasgow 3, Chapter 7.3, Pages 613-639, Paras 309-378.
[411] Bundle 44, Volume 4, Document 1, Page 3.
[412] Glasgow 4, Part 2, Witness Statements, Volume 1, Dr Dominique Chaput, Document 1, Page 3.
[413] Bundle 44, Volume 9, Document 1.1, Page 17.
[414] Bundle 21, Volume 3, Document 2, Page 6.
[415] Bundle 44, Volume 4, Document 1, Page 3.
[416] Bundle 44, Volume 4, Document 2, Page 9.
[417] Bundle 44, Volume 4, Document 2, Page 11; The full table at Bundle 44, Volume 10, Document 3, Page 9.

the data supplied by Great Ormond Street. He also had erroneously only taken account of a part year in the Leeds data in 2016. Consequently, the numbers of BSIs in those comparator units would be higher than they would be without complete de-duplication to the detriment of NHS GGC in any comparison. It was her view that this was a factual dispute and not a reasonable professional disagreement of opinion. It is simply not possible to compare these institutions in the way that has been attempted, and a lot of the work by Mr Mookerjee and Dr Mumford rested on how he went about his calculations.

337. As discussed below, Mr Mookerjee produced further calculations on the evening before he gave evidence in Glasgow 4, Part 2 and Dr Chaput was given the opportunity to produce a short supplementary statement[418]. This set out three major criticisms; that the R Code provided by Mr Mookerjee was unclear and incomplete; that his further adjustment for the partial year (2016) in the Leeds data was arbitrary and invalid, and that the calculation he produced of the statistical significance of the difference between his 'Overall Schiehallion Rate per 1000 admissions' and the agglomerated comparator rate for each year used both an unsuitable statistical measure and was unclear or inaccurate. She concluded that any conclusions relying in whole or in part on Mr Mookerjee's work will be unsafe.

4.4.6 Mr Siddharth Mookerjee

338. Mr Mookerjee had given evidence at the Glasgow 3 hearing in respect of the Quantitative Report he had produced to explore a link between infections and environmental bacteria and fungi in large comparable institutions over the period 2015-2022[419]. He returned in Glasgow 4, Part 2 to contribute to the Inquiry's consideration of the HAD Report. He was also asked to address the issues arising with his Quantitative Report raised by Dr Chaput.

THE HAD Report

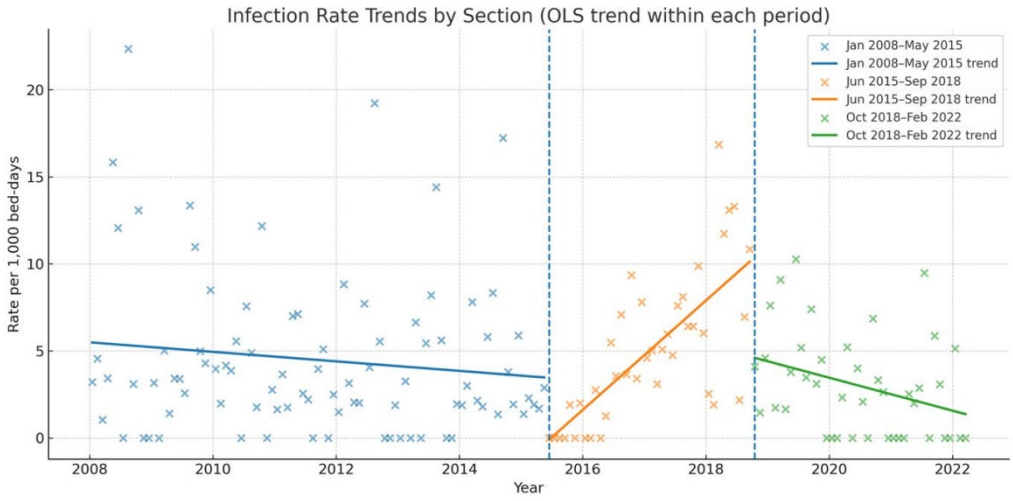
339. He echoed the criticism of the HAD report offered by Ms Cairns, namely that

[418] Bundle 44, Volume 9, Document 5, Page 53.
[419] As discussed in CTI Closing Statement following Glasgow 3, Section 7.1, Page 610.

HAD had taken an approach of analysing infections according to consultant, whereas his own work had attempted to match infection to location. He considered that, accordingly, the HAD Report results did not necessarily reflect the infection rates properly corresponding to those in the Schiehallion paediatric haemato-oncology unit. There would likely be a considerable overlap, but ultimately the HAD analysis would not be specific enough for such an analysis[420].

340. He met Dr Drumright and produced charts for shorter periods at our request[421], which he adopted as part of his evidence. For BSIs amongst the paediatric haemato-oncology patients he was asked to look at three periods: January 2008 to May 2015 at Yorkhill, June 2015 to September 2018 at RHC and October 2018 to February 2022 at RHC. The divisions between these three periods were (a) the move to the new hospital and (b) the return of the Schiehallion Unit to the refitted Wards 2A and 2B. His work produced a single chart[422]:

Figure 2: Environmental bacteraemia in paediatric patients, Infection Rate Trends 2008–2022.



341. Whilst he maintained that his linear best fit lines for the second and third periods were both statistically significant, he took a positive view of the further

[420] Transcript, Sid Mookerjee, 26 August 2025, Pages 53-54, Columns 101-103.
[421] Bundle 44, Volume 7, Documents 4,5 and 6, Pages 51-215.
[422] Bundle 44, Volume 7, Document 3, Page 47.

work carried out by Dr Drumright.[423] Her GAM model took proper account of the data points giving a more nuanced approach, acknowledging changes of rate at different points of time (as opposed to the linear presentation). It demonstrated, from the middle of 2016 to the end of 2019, an increase in the rate of infection not captured by the linear blue line[424].

342. He described his joint work with Dr Drumright and the report he had produced[425], but he rejected any criticism of his decision to divide the timeline into three periods on a clinical basis, thereby serving as a tool to aid better understanding of the data[426]. The trend for the period June 2015-18 had a p-value of less than 0.05 therefore indicating a statistically significant slope upwards. The linear smooth line presented by Dr Drumright, in his view, indicated quite clearly an increase in infection, as demonstrated by the increase in p-value compared to the rest of the period. He considered their conclusions on this point to be consistent[427].

343. He was content with the hypothesis that the rate of infections would react to interventions such as action taken to address the water system. He considered it likely that some infections were not associated with the water, but the extent of polymicrobial positives recorded in the Schiehallion Unit in 2017/18 presented a cause for concern. He had seen no plausible explanation for rates there exceeding those of comparator hospitals, other than an issue with the water system[428].

Response to criticism of his comparative exercise

344. In evidence Mr Mookerjee accepted Ms Cairns's view that, the availability of water testing data was too erratic for statistical comparison to work with the caveat that it was all the data that was available[429]. His intention was to compare the trend of positive water results with the trend in cases at Schiehallion per 1000 admissions – the idea being that the degree of

[423] Bundle 44, Volume 5, Document 2, Page 50, Figure 2.F.3.
[424] Transcript, Sid Mookerjee, 26 August 2025, Pages 57-58, Columns 109-112.
[425] Bundle 44, Volume 7, Document 3, Page 37.
[426] Transcript, Sid Mookerjee, 26 August 2025, Page 61, Column 118.
[427] Transcript, Sid Mookerjee, 26 August 2025, Pages 64-67, Columns 123-129.
[428] Transcript, Sid Mookerjee, 26 August 2025, Pages 70-72, Columns 136-140.
[429] Transcript, Sid Mookerjee, 26 August 2025, Page 11, Columns 17-18.

correlation between the two sets of peaks and dips would be of value, which it so proved, giving a p-value of about 0.7, representing a strong-to-very-strong concordance, but could be effected by more water samples being taken for a period in reaction to what was being seen as rates of infection[430].

345. He did not accept Dr Chaput's criticism that errors had been introduced by inconsistent de-duplication processes (i.e. adjusting to take account of multiple recording of incidents among the data). He considered that there had been sufficient data to permit proper interpretation of the list of blood cultures. He stood by his conclusion that a p-value comparison of infections to admissions allowed him to identify with certainty that there had been an above-average rate of infection for the period 2017-2019.

346. He maintained that given his approach of accepting the answers of experience hospital data teams he was entitled to proceed on the basis that Leeds, Cardiff and the Vale and Oxford had de-duplicated the data that they supplied in part because had they not de-duplicated any one of them would have stood out as an outlier[431]. In respect of the Great Ormand Street Hospital data, he accepted[432] Dr Chaput's criticism that he should have used the right hand "14-day dedupe" column from the table supplied[433]. He accepted that in calculating the annual infection rate for Leeds he had used a third of the years infection numbers (all that was available), but a whole year of admissions numbers[434]. However, after he had considered Dr Chaput's note on de-duplication produced a matter of days before he gave evidence[435] he decided to accept her approach and see if it would produce a different chart from his previous attempt[436]. He maintained that it did not, and that following Dr Chaput's broad approach to the data supplied under the FOI and the data supplied by NHS GGC still produces significantly higher rates of infection in 2017 and 2018 in the Schiehallion unit than in the aggregate comparator rate. He rapidly calculated whether that difference was statistically

[430] Transcript, Sid Mookerjee, 26 August 2025, Page 12, Columns 19-20
[431] Transcript, Sid Mookerjee, 26 August 2025, Pages 21 and 22, Columns 37 and 40.
[432] Transcript, Sid Mookerjee, 26 August 2025, Pages 20-27, Columns 40-49.
[433] Bundle 44, Volume 10, Document 3, Page 9.
[434] Transcript, Sid Mookerjee, 26 August 2025, Page 20, Column 35.
[435] Bundle 44, Volume 9, Document 1.1, Page 17.
[436] Bundle 27, Volume 18, Document 1, Page 3.

significant and concluded that it was[437].

347. After the end of the Glasgow 4, Part 2 hearing the Inquiry Team invited Mr Mookerjee to respond to both Ms Cairns'[438] and Dr Chaput's final statements[439] and he produced a final response[440].

a. His final response to Dr Chaput was:

> "d. The methodology adopted in calculating the risk ratios, confidence intervals and p-values is standard epidemiological methodology when comparing rates of infection.
>
> e. I stand by the report produced on the 02.09.2025, and the summary it evidences, i.e. that the Schiehallion rate of infection for the years 2016 – 2018 was significantly higher than that of comparator hospitals."[441]

348. The principal criticism of Mr Mookerjee by Ms Cairns and NSS was in respect of the way he created the aggregate comparator BSI incidence rate principally with reference to concerns about confounding. In response Mr Mookerjee repeated his defence of this challenge that he made in Glasgow 3 and drew attention to the graph charting the rate of infections per 1000 admissions provided by NSS agreeing that it largely aligns with the analysis done by him and other authors.

4.4.7 Dr Mumford

349. Dr Mumford has previously given evidence alongside Ms Dempster in the Glasgow 3 hearing on 12 and 13 November 2024[442]. She was asked to return to address Dr Chaput's criticism; to provide additional evidence on Risk Management (this evidence is discussed in Chapter 6) and to revisit her conclusions on Key Question 4 in light of additional evidence.

Infection Data & Analysis

350. Dr Mumford collaborated with Mr Mookerjee and others to assess infection

[437] Bundle 44, Volume 9, Document 3, Page 37.
[438] Bundle 44, Volume 9, Document 4, Page 46.
[439] Bundle 44, Volume 9, Document 5, Page 53.
[440] Bundle 44, Volume 9, Document 6, Page 58.
[441] Bundle 44, Volume 9, Document 5, Page 53.
[442] See discussion in the CTI Closing Statement, Glasgow 3, Chapter 7.4, Page 664.

rates in the Schiehallion Unit, focusing on environmental organisms[443]. She understood that a question had arisen over selective inclusion of organisms in Mookerjee's report, with Dr Chaput raising the issue of analytical bias[444]. Dr Mumford adopted her Addendum in Response to Dr Chaput's December 2024 report[445] acknowledged some inaccuracies in earlier evidence due to her not reviewing Mr Mookerjee's calculations[446] but defended the overall methodology[447]. She maintained that Mr Mookerjee had taken into account all the organisms in his calculations but acknowledged that the 'master list' should have been included in his report[448]. She also thought that Mr Mookerjee should have gone back to seek clarification on the admissions and occupied data received from NHS GGC[449], which had led to him needing to provide the two updates to his calculations in 2024[450].

351. Dr Mumford explained that a manual de-duplication exercise led to reduced infection counts[451], aligning more closely with comparator hospitals like Great Ormond Street[452]. In the disputed infections relating to deduplication, in the majority of cases Dr Mumford agreed with Dr Chaput rather than Mr Mookerjee[453]. Despite revisions, Dr Mumford maintained that infection rates in the Schiehallion Unit 2016–2018 were statistically significantly elevated and this was seen consistently across multiple reports[454]. In any event, she considered the shape of the curve was roughly the same in different reports; there is still an increased rate of infections between 2016 and 2018[455].

Application of risk management principles to the QEUH

352. In respect of the assessment of risks posed by ventilation systems of the hospital, Dr Mumford was of the view that the assessment of likelihood of

[443] Transcript, Dr Sara Mumford, 29 August 2025, Page 4, Column 3.
[444] Transcript, Dr Sara Mumford, 29 August 2025, Pages 4 and 6, Columns 3 and 7.
[445] Bundle 44, Volume 4, Document 2, Page 9.
[446] Transcript, Dr Sara Mumford, 29 August 2025, Page 6, Column 7.
[447] Transcript, Dr Sara Mumford, 29 August 2025, Page 73, Column 142.
[448] Transcript, Dr Sara Mumford, 29 August 2025, Page 5, Column 5.
[449] Transcript, Dr Sara Mumford, 29 August 2025, Page 7, Column 10.
[450] Bundle 21, Volume 1, Document 3, Page 71; and addendum to that report - Bundle 21, Volume 1, Document 10, Page 767.
[451] Transcript, Dr Sara Mumford, 29 August 2025, Page 9, Column 14.
[452] Transcript, Dr Sara Mumford, 29 August 2025, Page 10, Column 16.
[453] Transcript, Dr Sara Mumford, 29 August 2025, Page 9, Column 14.
[454] Transcript, Dr Sara Mumford, 29 August 2025, Page 11, Column 17.
[455] Transcript, Dr Sara Mumford, 29 August 2025, Page 11, Column 17.

Aspergillus or *Cryptococcus* infections is challenging. It would require a really comprehensive risk assessment, which would consider whether the ventilation was built to regulation, and also whether there was building work in the vicinity, as that would impact on the likelihood of acquiring *Aspergillus* in those situations. The fact that there is not an awful lot of direct evidence about the impact, particularly of air change rates, on the likelihood of acquiring air borne infections is, in Dr Mumford's view is "absolutely [the] bread and butter for a risk register". She was clear that, at opening, if it was known that the ventilation system had not been built to regulation, specification, or guidance, then, as the guidance had been constructed in an evidence-based manner, based on fairly old but good research, you would say, “This is a really high risk to our patients.”[456]

353. When referred to the NHS GGC Risk Registers,[457] Dr Mumford was clear that risks such the pre-filling of the water system 18 months before handover, the decision to go ahead and use Horne Optitherm taps after the meeting with HPS in June 2014, and the agreed ventilation derogation, should all have been on the project risk register prior to handover and then moved to the main corporate risk register. For the agreed ventilation derogation, she felt the issue was the risk to certain patient groups such as Wards 2A, 2B, 4B, 4C and PICU. Dr Mumford thought that the ventilation system deficiencies in Ward 4B in 2015 should have been recorded in the register, as it was a regional service and that the Ward 2A ventilation system should have been recorded in the register in 2015 as well. She stressed the importance of active oversight and governance, observing that risks not escalated within the organisation lack visibility and proper management, particularly in respect of reputational risk[458].

354. When the agreed ventilation derogation emerged in 2016, a group should have been put together to examine all of the issues, and to undertake a comprehensive risk assessment for the whole site to determine where the risk points were, and to further test what the ACH actually was in reality compared

[456] Transcript, Dr Sara Mumford, 29 August 2025, Pages 35-36, Columns 65-68.
[457] See Bundle 45.
[458] Transcript, Dr Sara Mumford, 29 August 2025, Pages 41-49, Columns 78-93.

with what they thought they were on paper[459].

355. When asked about an entry in 2018 (Datix ID 2190)[460] - which appeared six weeks after the DMA Canyon report emerged for which the accountable owner was the medical director - in “Failure to implement national guidance, systems and policies in relation to water safety", Dr Mumford felt the entry was generic, failed to describe the risk and the controls listed were a list of committees and generic actions. Her concern was also that, by 2018, no-one was checking if the management of the water system was to plan and that was why the DMA Canyon L8 Risk Assessments were missed[461].

The HAD Report and interpretation of the epidemiology reports

356. Dr Mumford remains of the view that a comparison between BSI incidence rates at Yorkhill and RHC is not valid because of the differences between the buildings, partly because the RHC was a new building, but also because she does not know details about the water and ventilation at Yorkhill. This is why it was better to compare with several units as was done by Mr Mookerjee[462].

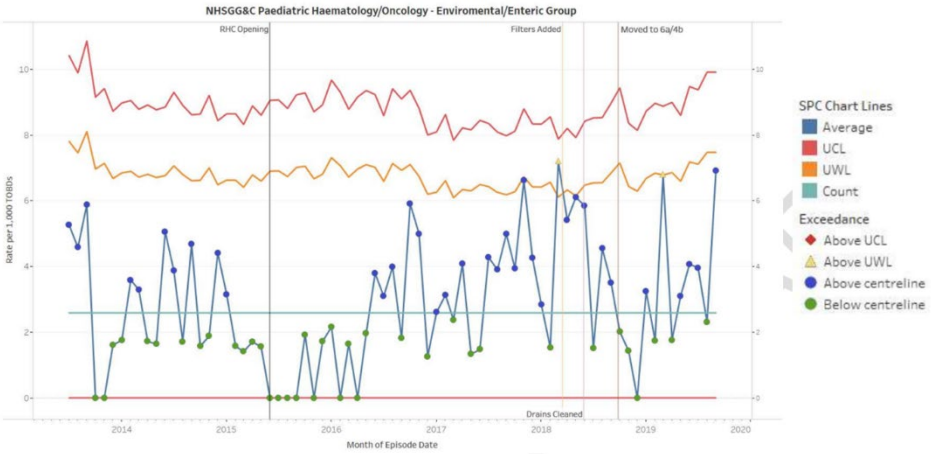
357. Dr Mumford noted the difference in scale between Figures 21 and 22 in the HAD Report[463] and Figures 2.F.3 and 2.F.4 in the HAD Response Document[464] to show that the non-environmental bloodstream infections are more common than the environmental ones[465].

358. Dr Mumford was asked to review multiple reports and charts. These included:

359. Figure 6 in the October 2019 HPS Review[466] which shows the “environmental including enteric” group of BSIs and which she considered showed much the same thing as Dr Drumright's Figure 2. F.3[467].

[459] Transcript, Dr Sara Mumford, 29 August 2025, Page 49, Columns 93-94.
[460] Bundle 45, Document 29, Page 333.
[461] Transcript, Dr Sara Mumford, 29 August 2025, Pages 51-53, Columns 97-102.
[462] Transcript, Dr Sara Mumford, 29 August 2025, Pages 57-60, Columns 110-115.
[463] Bundle 44, Volume 1, Document 1, Pages 117-118.
[464] Bundle 44, Volume 5, Document 1, Pages 50-51.
[465] Transcript, Dr Sara Mumford, 29 August 2025, Page 61, Column 117.
[466] Bundle 7, Document 6, Page 230.
[467] Transcript, Dr Sara Mumford, 29 August 2025, Page 63, Column 121.

Figure 6: SPC chart using the environmental including enteric group case definition for HPS data from the July 2013 to September 2019.[1]



1. Source of data is Electronic Communication of Surveillance in Scotland (ECOSS) & Total occupied bed days: from activity data provided by NHSGG&C.

360. When looking at Dr Kennedy's 2019 Report[468], Dr Mumford felt it showed very much the same shaped curve as Dr Drumright's Figure 2.F.3 but also indicated the importance of polymicrobial infections as indicators of a higher level of environmental contamination[469].

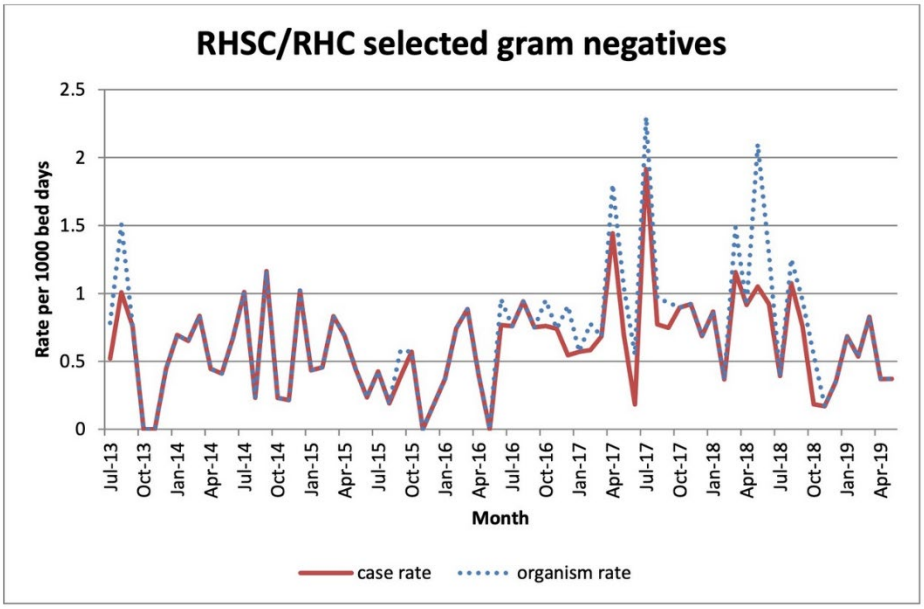


Table 1 Counts of most common organisms July-June.

361. She considered alternative explanations—such as single room nursing,

[468] Bundle 6, Document 28, Page 107.
[469] Transcript, Dr Sara Mumford, 29 August 2025, Pages 63-64, Columns 121-123.

antibiotic use, lab contamination, and team dynamics, but did not consider that these undermined her core conclusions:

a. In respect of single room nursing, Dr Mumford rejected that as a significant cause on the basis that she expected that the number of nursing staff to provide safe staffing levels on a unit such as the Schiehallion Unit had been carefully assessed, and that it would not be a huge problem;

362. In respect of antibiotic use, she relied on the work done in Dr Peters' and Ms Harvey-Wood's presentation in October 2018[470]: that the rate of Ciprofloxacin-resistant organisms clung tightly to the zero line all the way through their piece of work; that for Meropenem resistance whist that went in peaks and troughs, the numbers were so small that it would be hard to think that one peak here and then a few months later another peak was more than coincidence[471]: and that the issue of antibiotic resistant driven infections was not mentioned in any of the PAGs or IMTs around the environmental organisms;

a. In respect of contamination in the laboratories, she relied on the evidence of Ms Harvey-Wood, who categorically said that was not the case; and

363. In respect of the impact of team dynamics - particularly within Estates - she did think it was plausible that dynamics between estates and other teams might influence infection rates, but it would be difficult to work out if this was the case[472].

364. Dr Mumford explained that she saw the work on CLABSI led by Ms Rodgers starting in 2016, as driving the reduction in non-environmental BSI shown in Figure 2.F.4 of the HAD Response Document[473].

365. She also explained that the overall shape of infection curves supported the view of elevated risk during the period 2016-2020 and association between the water and the rate of environmentally relevant BSI amongst paediatric haemato-oncology patients, but that, whilst it is very difficult to give a

[470] Bundle 19, Document 19, Page 161.
[471] Detailed evidence on this chart can be found in the transcript of Ms Harvey-Wood's evidence on 22 August 2025 - Transcript, Dr Kathleen Harvey-Wood, 22 August 2025, Pages 18-21, Columns 31-38.
[472] Transcript, Dr Sara Mumford, 29 August 2025, Pages 67-70, Columns 130-136.
[473] Bundle 44, Volume 5, Document 1, Page 51.

percentage of how many of the environmental infections are directly due to the water, a reasonable number of them would be[474].

366. When asked whether her conclusions, and those jointly produced with Ms Dempster, were undermined by reliance on the conclusions of Mr Mookerjee, she rejected the suggestion, partly because there has clearly been an increase in infections in environmental organisms, which has been reproduced in various different reports, including the HAD Response Document. She has no doubt that the water was contaminated and that there was widespread contamination of the water system, and so her overall conclusion is not changed[475].

367. Her conclusion in the Qualitative Report she produced with Ms Dempster[476] was put to her[477]:

> 11.34. On the balance of probabilities, it is our expert opinion that the cases of environmental gram-negative blood stream infections, *Mycobacterium Chelonae*, C*ryptococcosis*, *Aspergillosis* seen in Schiehallion Unit patients were strongly associated with contaminated water and waste water system and inadequate ventilation system on wards 2A, 2B and 6A

a. In respect of the water system Dr Mumford expressed the view that this conclusion stands as she hadn't seen any evidence to change that.

b. In respect of the *Aspergillus* link, following the work of Dr Agrawal, Dr Drumright, Mr Mookerjee in respect of *Aspergillus*, she stepped back partly from that conclusion, explaining that there was clearly a risk, a risk that was unnecessary for those patients, but that she could not now say that it was strongly associated, but that it was associated. This was because the HEPA filtration was absent, air was recycled through thermal wheels, there was potential for buildup of dust and therefore spores on the chilled beams, the rooms were negatively pressure when they should have been positive, so that there is certainly a highly associated risk, which was

[474] Transcript, Dr Sara Mumford, 29 August 2025, Page 73, Column 141.
[475] Transcript, Dr Sara Mumford, 29 August 2025, Pages 73-74, 79, Columns 142-143, 153-154.
[476] Bundle 21, Volume 1, Document 4, Page 179, Para 11.34.
[477] Transcript, Dr Sara Mumford, 29 August 2025, Pages 73-74, Columns 142-144.

avoidable, with the ventilation system.

c. In respect of the *Cryptococcus* risk, she observed on the balance of probabilities, that it is surprising how many cases of *Cryptococcosis* there have been in such a small geographical area and associated with the same hospital.

368. Dr Mumford thought it very difficult to answer the question about when - if ever - the adequacy of ventilation might be said to have adversely impacted patient safety and care but took the view that, for the Schiehallion Unit patients, all of the time that those patients were in areas where they had out of spec ventilation, they were at additional risk[478].

4.5 CTI Submission on Key Question 4

369. In their application for receipt of the HAD Report in March 2025, NHS GGC submitted, that the HAD Report directly addresses TOR 1 and whether "the built environment of the QEUH/RHC expose[s] patients to an increased risk of infection". This effectively amounts to a submission that the report addresses Key Question 4 which is:

> [4] Is there a link, and if so in what way and to what extent, between patient infections and identified unsafe features of the water and ventilation systems?

370. As we have observed, the exposure of the HAD Authors to the work of HPS, Dr Kennedy, Ms Harvey-Wood and others, has caused them to significantly change their position, to the extent that they now see an excess of environmentally relevant BSIs amongst paediatric haemato-oncology patients in 2016, 2017 2018 and 2019, just as many others have. Not only that, but Professor Hawkey has entirely undermined the proposition that the absence of a close WGS connection disproves the possibility of a connection between infections and the environment.

Biofilm - a reminder

371. As Dr Walker put it in his evidence in Glasgow 3[479]:

[478] Transcript, Dr Sara Mumford, 29 August 2025, Pages 77-78, Columns 149-151.
[479] Transcript, Dr James Walker, 6 November 2011, Page 51, Columns 97-98.

> "Bacteria will arrive in your water system within the water phase. Those same bacteria, when given the opportunity, will start to become attached to the surfaces either through gravity, sedimentation or attraction to a surface for nutrients. That biofilm will then grow on a surface, and as it grows it will produce products like polysaccharides, which will then encase the bacteria. As biofilm develops, it will encompass other bacteria, other microorganisms, other sediment and debris to become a niche environment where those bacteria will grow and multiply … It's the tolerance of those bacteria within a meshwork of the biofilm, tolerance to biocides, to temperature. The retention of it and the viability of the material will be retained even where biocides and sometimes where higher temperatures are developed …"

372. Once present, biofilm risks re-contaminating the system even if removed in part. Chemical treatment can manage the problem if the system is properly operated in accordance with the water safety plan.[480] Certain locations are more likely to harbour biofilm than others - in particular, rough, or complex surfaces present a risk - 'nooks and crannies' are perfect locations for biofilm to lodge and seed.[481]

373. Flushing, to draw chemical treatment into contact with the biofilm, is essential, and particularly important in the case of *Cupriavidus*, that being a pathogen commonly located at outlets.[482] Biofilm was recorded at various locations within the water system.[483] Dr Chaput gave a striking description of the inevitability and persistence of biofilm in a water system, with the goal being to inhibit its growth:

> "I would question any claim that a water system was free of any biofilm. I think our goal is to manage systems to make it as inhospitable as possible for those biofilms to grow, but I'm not sure it's realistic to claim that there will never be-- it is possible in any water system … to say that you can operate a system and there will not be any biofilm anywhere is unrealistic … biofilm is where microbes have a safe environment to proliferate … they multiply, and if that's allowed to happen,

[480] Transcript, Dr James Walker, 6 November 2011, Page 53, Columns 101.
[481] Transcript, Andrew Poplett, 8 November 2024, Pages 59-60, Columns 114-115.
[482] Transcript, Dr Thomas Makin, 27 August 2024, Page 19, Column 34.
[483] Bundle 21, Volume 1, Document 5, Pages 203-204, Paras 3.3.6-3.3.9.

then it can grow and grow and your microbial load increases, and then it can shed into the system."[484]

374. The growth and creation of a biofilm in the water system of the QEUH/RHC is an entirely plausible event and the consideration of Key Question 4 involves the acknowledgment of that fact.

Was the water System ever contaminated?

375. The starting point must be the virtually unanimous view that an unmanaged, potentially stagnant, out of correct temperature range, large hospital water systems can quite possibly generate biofilm over the sorts of period available between filling in 2013 and the water incident in 2018. The fact that tests to identify biofilm are difficult, or that very few tests were carried out by NHS GGC that could have identified the sort of microorganisms that later caused infections in patients during that period, does not undermine that basic piece of plausibility.

376. However, it appears that some in NHS GGC wish to continue to debate whether there was ever 'widespread contamination' of the water system of the QEUH/RHC. As we have noted before[485], in his evidence Professor Steele explained that he considers contaminated to mean that the system had microorganisms in it at numbers that would not ordinarily have been expected to have been in there, that the control of the system was not robust enough to eradicate microorganisms so as to allow biofilm to proliferate, that whatever was found in April 2018 could be described as 'systemic' because it was throughout the whole system and whether the water system was contaminated or not, the system had the potential to be contaminated.[486]

377. Dr Chaput has a particular approach to the use of the word 'contamination'. It may well be technically correct to limit that word to things that should not be in a water system, but experienced and key people (including NHS GGC staff working in the area of the management of water system and those to whom they looked for advice) did use the word 'contamination' in a broader sense to

[484] Transcript, Dr Dominique Chaput, Page 61, Column 118.
[485] CTI Closing Statement, Glasgow 3, Page 17 and Chapter 6.1, Page 529.
[486] Transcript, Professor Tom Steele, 4 October 2024, Pages 54-46, Columns 104-107.

describe what they found in April 2018[487]. A good example would be Mr McLaughlan of HFS who explained:

> "I talk about contamination. It's not really contamination. These are organisms that naturally live in supply water, so they're not contaminants. This is their natural home, their natural environment".[488]

378. Where does this take us? Dr Chaput seems to be complaining that NHS GGC's own staff (Mary Anne Kane, the Interim Director of Facilities and Co-Chair of the Board Water Safety Group; Alan Gallacher, then General Manager – Estates and Designated Person (Water) for NHS GGC; Iain Powrie, then Deputy General Manager – Estates; Colin Purdon, then Senior Estates Manager; Dr Iain Kennedy, Consultant in Public Health Medicine and the Lead ICD Dr Inkster and also advisors from NHS NSS (Edward McLaughlan, Assistant Director (Engineering, Environment and Decontamination) at HFS; Annette Rankin, Nurse Consultant Infection Control at HPS and Ian Storrar, Principal Engineer at HFS) used the wrong word in a technically inappropriate way in the minute of the WTG. This does not take away from the fact that they were trying to describe what they had found as the Water Incident developed. Dr Chaput's principal report[489] contains corroborating evidence of significant numbers of tests in the high-risk areas of the hospital generating *Cupriavidus* or other GNB out of spec results (20.3% in Ward 2A/2B RHC for *Cupriavidus* during the February to April 2018 sampling effort[490]). Dr Chaput's Figure 16 illustrates this clearly.

[487] Bundle 10, Documents 2 and 3, Page 9 and 14.
[488] Transcript, Eddie McLaughlan, 10 September 2024, Page 68, Column 132.
[489] Bundle 18, Volume 1, Document 2, Page 13.
[490] Bundle 18, Volume 1, Document 2, Page 64.

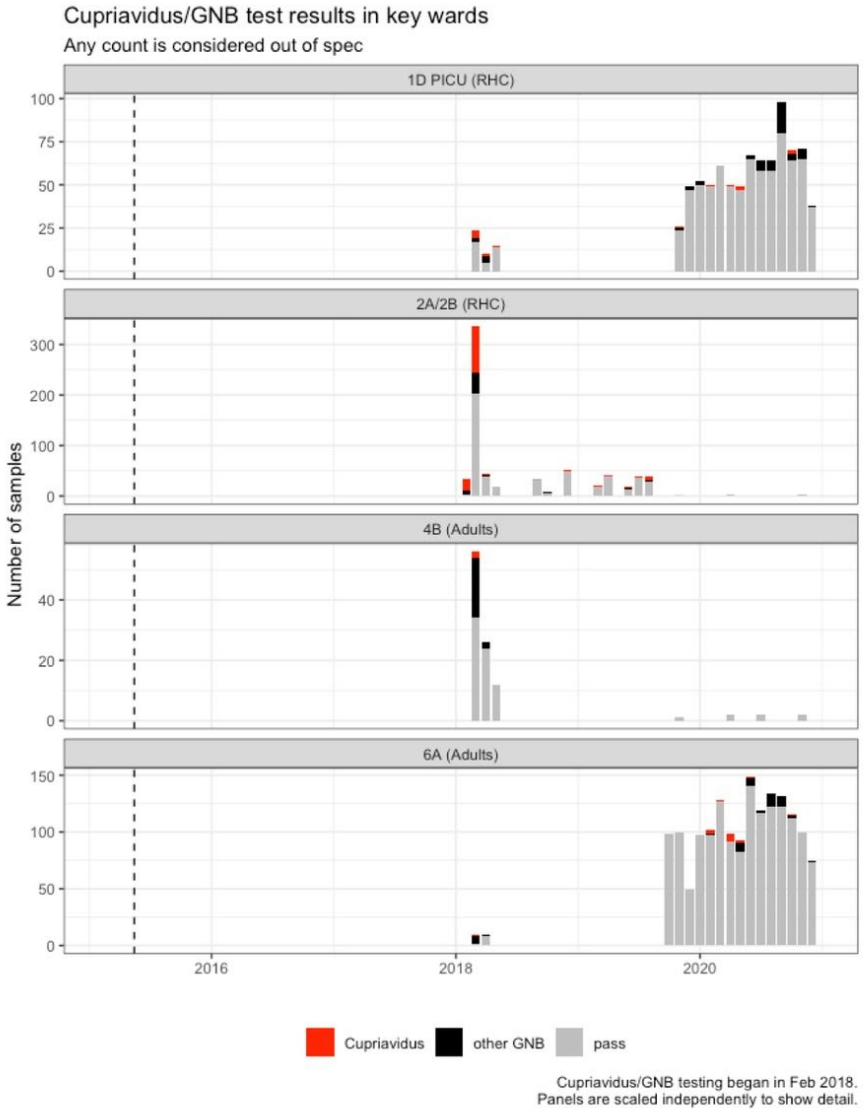


Figure 16. Number of Cupriavidus/GNB tests out of spec per month in key wards. Panels are scaled independently to show detail.

379. The practical consequence is that Dr Chaput's concern about the use of technical terms does not assist in addressing the key question set for the Inquiry in its remit, to "determine how issues relating to … water contamination … adversely impacted on patient safety occurred; if these issues could have been prevented … and whether the buildings provide a suitable environment for the delivery of safe, effective person-centred care".

380. There is no doubt that in April 2018 those given responsibility by NHS GGC for the protection of patients from the risk of being infected by bacteria or

pathogens which occur naturally in water systems[491] and those brought in by HFS and HPS to support and assist them, were clear that there were microorganisms in the water system that should either not be there at all or should not have been there in the quantities or found in numbers to give rise to concerns about patient safety - whether that is properly described as 'contamination' is irrelevant.

The weight given to exceedance of internal thresholds for micro-organisms

381. In its Closing Statement following Glasgow 3 NHS GGC drew attention to Dr Walker's focus on microbial counts in water being above "set thresholds"[492]. It was observed that at the time of the Water Incident and before there were no national (or international) guidance on thresholds for microbial counts. NHS GGC argued that it "remains unclear upon which set thresholds Dr Walker seeks to rely in offering his conclusion on the question of safety" by reference to Paragraphs 5.1.15 (ii)[493], 5.6.4[494] and 5.30.3[495]. It was then argued that "NHSGGC chose to have unusually strict thresholds for TVC testing for its own internal monitoring purposes. Exceeding these thresholds, which are not national standards, does not equate to an unsafe water system." There are three problems with this argument:

382. There was no uncertainty in the footnote to para. 5.1.15 (ii) that the thresholds in question were internal thresholds reported to have been breached in Dr Chaput's report[496].

383. Whilst Dr Walker was not asked about these two paragraphs when he gave evidence on 6 November 2024, he did explain why it was possible to draw a conclusion as to risk from exceedance of internally set thresholds, because he proceeded on the basis that the thresholds would be based on NHS GGCs own SOPs, which should take account of the presence of highly vulnerable immunocompromised patients, compared to others in general wards who are

[491] To quote from the Introduction to the NHS GGC Water Systems Safety Policy: Bundle 27, Volume 2, Document 1, Page 7.
[492] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 51, Paras 53-54.
[493] Bundle 21, Volume 1, Document 5, Page 247.
[494] Bundle 21, Volume 1, Document 5, Page 253.
[495] Bundle 21, Volume 1, Document 5, Page 282.
[496] Bundle 18, Volume 1, Document 2, Page 13.

not at such risk from those microorganisms[497].

384. The NHS GGC staff who formed the WTG during the Water Incident have not explained that the thresholds they used in 2018 were "unusually strict", if that has any meaning. That may be the case for later thresholds, but they are not the ones that matter here. Their evidence, that of the HFS/HPS staff supporting them, what they were content to record in the Minutes of the WTG and the Full Incident Management Team Report covering the IMTs from 2 March 2018 to 13 April 2018 dated 5 June 2018[498], all supports the conclusion that the people put in by NHS GGC to manage this system and their external advisors saw exceedance of these thresholds as a pattern of factors that tended to suggest that the primary exposure to environmental gram negatives and fungi from biofilm was a "contaminated water supply".

385. The fact that it was internally set thresholds that were exceeded is irrelevant. Whilst it might suit a revisionist view of events at the QEUH/RHC, from the day that the water system was filled until the time systematic controls were started under the leadership of Professor Steele, the Inquiry is entitled to take factors such as the exceedance of the thresholds, the reaction of the people NHS GGC tasked with responding to the rising levels of potentially environmentally relevant BSIs in the Schiehallion Unit, and the external advisors, to reach a conclusion that at that point water contamination adversely impacted on patient safety.

Was there an exceedance of infections in QEUH/RHC

386. In their submission proposing that the Inquiry receive the HAD Report, NHS GGC submitted that:

> "2.3. The Report concludes, following detailed data analysis, that there were no excess infections at the QEUH/RHC when compared with other hospitals."

387. In its Closing Statement following Glasgow 3[499] NHS GGC submitted that it had:

[497] Transcript, Dr James Walker, 6 November 2024, Pages 62-63, Columns 120-122.
[498] Bundle 27, Volume 5, Document 19, Page 46.
[499] Glasgow 3 - Core Participants Closing Submissions, NHS Greater Glasgow & Clyde, Document 4, Page 60, Para 99.

"… obtained a report which provides a detailed analysis of the number of infections per patient in the QEUH/RHC. It utilised comparator data from other hospitals. It utilised both inpatient and outpatient data in respect of the QEUH/RHC and comparator hospitals. It therefore compares like with like, which is plainly not the case with Mr Mookerjee's analysis. It reaches the conclusion that there was no increased risk of infection. Such a conclusion supports that the hospital is safe and that there is no need for public concern as to any risk posed by the hospital."

388. As discussed above, a decision was taken not to ask the HAD Authors to consider in any way the specifications of the actual water or ventilation systems of the hospital, or how the various ICDs, ICNs, Microbiologists, treating clinicians, estates officers, engineers or managers had responded to the infections in the QEUH/RHC from 2015 to 2022. For some reason, none of the other reports into the numbers of infections at the Schiehallion Unit - including those by HPS and Dr Kennedy - were passed on to Professor Hawkey, Dr Agrawal or Dr Drumright. Such an approach might well have resulted in a report that was not influenced by the views of others who had looked at the topic before. However, it was, in our submission, not particularly surprising that, when provided with the reports by HPS, the HAD Authors appear to have reflected and have concluded that comparing Yorkhill with the RHC for the paediatric haemato-oncology patients there were more infections in the new hospital than the trend in the old. There was an increased risk of infection. The HAD Report does not support the conclusion that the hospital was 'safe' in 2016-2020. If anything, it is consistent with the other pieces of descriptive epidemiology, that there was in fact an exceedance of infections amongst the paediatric haemato-oncology patients in the RHC in the period 2016 to 2019.

389. By the time Dr Drumright had finished giving evidence, it was clear that she and her colleagues, Professor Hawkey and Dr Agrawal, had discovered that at the RHC, there were more infections for environmentally relevant BSIs than the long term trend they had identified in such infections amongst the paediatric haemato-oncology patients in the care of NHS GGC from 2005 to 2009.

390. Figure 2.F.3 clearly shows how environmentally relevant BSIs increase, from a low base of effectively no infections just after the new hospital opens, to a peak in approximately January 2018, that reduces back to below the expected trend in 2020. Figure 2.F.4 shows how non environmentally relevant BSIs start to exceed the trend at Yorkhill, grow to a peak in 2017 and then drop back down to the expected trend in mid-2019.

391. There is an area of inconsistency that does require to be addressed. That is that Dr Drumright concludes there was a long-term reducing trend of environmentally relevant BSIs at Yorkhill from 2005 to 2015. That is not the view of Ms Cairns, who did not think there was such a trend. The clinicians who were treating the patients at the Schiehallion Unit, and the lead ICN at Yorkhill, did not think that infections were higher at Yorkhill than the RHC. They saw the infections in 2017, 2018 in 2019 as different and remarkable. Were they wrong and simply did not notice that infection rates would be higher in 2005 to 2008 or is there an issue with the data?

392. In our submission, the decision of Dr Drumright to impute occupied bed day data for 2005, 2006 and 2007 was a step too far. That was 20 years ago, records do not appear to exist for meetings of relevant committees, and memories are even worse for that period than they clearly are for events since the hospital opened. Dr Drumright's long-term trend line cannot, given the source of its denominator data for its first three years, overcome the general informed perception, as expressed by witnesses, that matters in the RHC at the time of the water incident were significantly worse than they had been at Yorkhill. The Inquiry should follow the evidence of Ms Cairns and Figure 2.4 and para 2.4.2 from the HAD Response Document[500] and proceed on the basis that there was no long-term trend in environmentally relevant BSIs at Yorkhill from 2008 to 2015.

[500] Bundle 44, Volume 7, Document 4, Page 57.

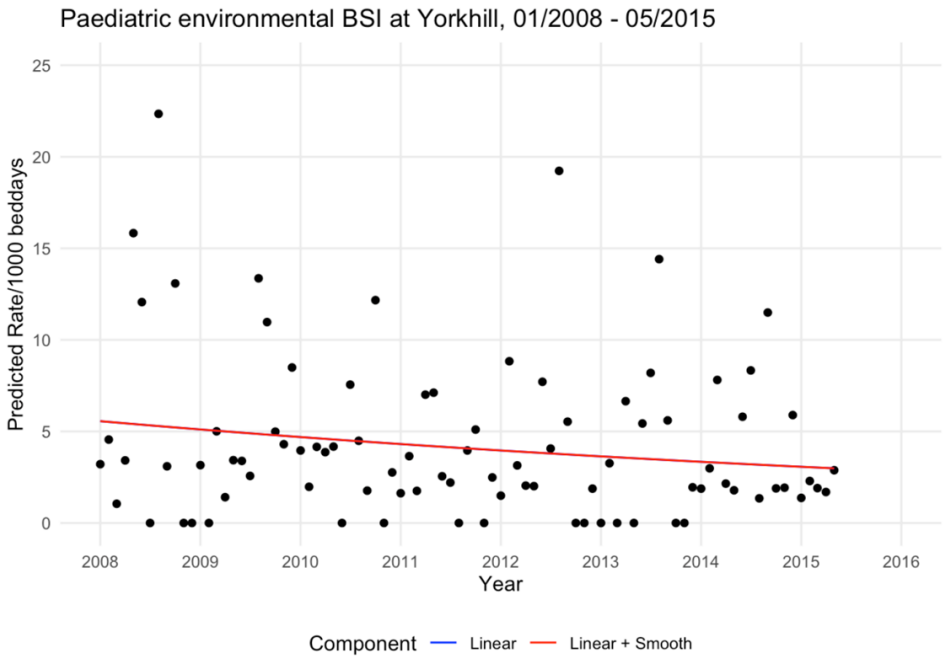
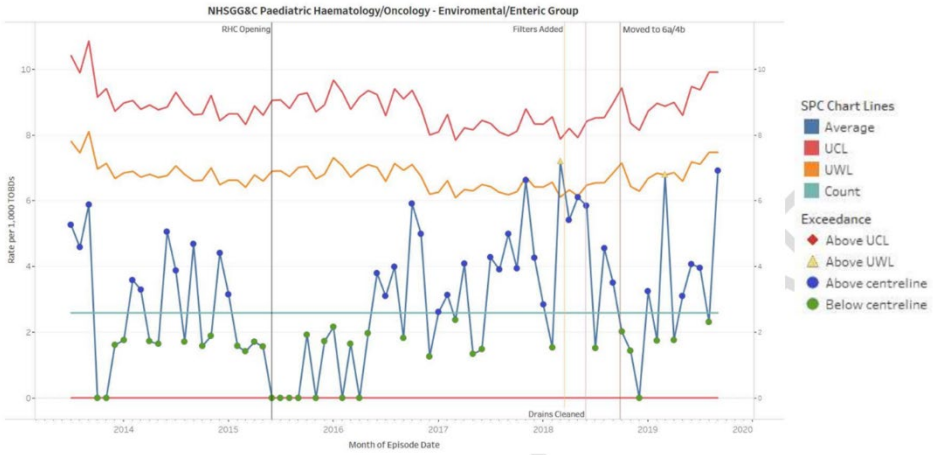


Figure 2.4. GAM model of incidence rates of environmental BSI per 1,000 bed days among paediatric haematology-oncology patients from 2008 to May 2015

393. We also have the account of our late realisation that the basis of the average rate of BSI per 1,000 occupied bed days in the HPS Review of NHS GG&C paediatric haemato-oncology data Report of October 2019 was the average of the rate in Yorkhill before the move to the RHC as its baseline[501].

Figure 6: SPC chart using the environmental including enteric group case definition for HPS data from the July 2013 to September 2019.[1]



1. Source of data is Electronic Communication of Surveillance in Scotland (ECOSS) & Total occupied bed days: from activity data provided by NHSGG&C.

[501] Transcript, Shona Cairns, 20 August 2025, Page 7, Column 10; Transcript, Laura Imrie, 6 September 2024, Page 21, Column 38.

394. Looking again at Figure 6[502]. shows very much the same shaped curve as Dr Drumright's Figure 2.F.3 and further confirms that the rate of environmentally relevant BSI amongst this patient group at RHC more significantly higher than it had been just after handover and in the final eighteen months at Yorkhill. Accordingly, the Inquiry can determine that there was exceedance of environmentally relevant BSI amongst paediatric haemato-oncology patients QEUH/RHC starting in 2016 and only reducing back to something like the general trend or expected level in 2020.

What to make of Mr Mookerjee's comparative exercise

395. Mr Mookerjee's comparative exercise was carried out at the suggestion of Dr Mumford, Ms Dempster, and Mr Mookerjee in to discover whether there was a greater incidence of environmentally relevant BSI at the Schiehallion Unit at the RHC than in other paediatric haemato-oncology units. This may well have been partly in response to the submissions made by NHS GGC that such a comparison was necessary to determine whether there had been an exceedance of infections amongst the paediatric haemato-oncology patients in the RHC.

396. In Glasgow 3 and Direction 5 responses NHS NSS advanced criticisms of Mr Mookerjee's methodology in part by identifying how difficult it would be to create a valid comparator data set and to compare the incidence of BSI in comparator units to the RHC. It now seems that at the very least the concern about the practicality of such an approach expressed by NHS NSS has some merit. It will always be difficult to compare different units even if the incidence rate is calculated by aggregating a wide range of different units. Data is recorded in different hospitals in different ways and assumptions have to be made about how that data is handled. At the end of Glasgow 3 the Inquiry was faced with considering Mr Mookerjee's final chart[503] alongside the retrospective descriptive epidemiological studies carried out by Dr Kennedy, Ms Harvey-Wood, Dr Peters and the team at HPS/ARHAI[504]. To that end, as Ms Cairns observed in Glasgow 4, Part 2 the shape of Mr Mookerjee's final

[502] Bundle 7, Document 6, Page 230.
[503] Bundle 27, Volume 18, Document 1, Page 3.
[504] CTI Closing Statement, Glasgow 3, Section 7.3, Pages 643-659, Paras 390-433.

chart was of interest as it showed that there had been a change in the trend of infections.

397. Now, at the end of Glasgow 4, Part 3, Mr Mookerjee's work has been the subject of a greater level of scrutiny than any of the earlier reports. Dr Chaput has made many criticisms, some of which are powerful, and all of which came unhelpfully very late. However, the reality is that it does not really make any difference whether the criticisms of his understanding of the extent of deduplication done by the comparator units in response to the FOI are valid, or whether his final assessment of statistical significance has value, because at the end of the day the shape of the chart he found is the broadly the same as all the others - and most importantly that produced by Dr Drumright, Professor Hawkey and Dr Agrawal. It is our submission that the extract from Mr Mookerjee's final chart, produced by NHS NSS, is just another piece of evidence of an exceedance in the number of infections at the RHC from 2016-2020, to consider along with all the others.

Was there a link between environmentally relevant BSI and the water system?

398. For the avoidance of doubt, we acknowledge that identifying an exceedance of infections amongst the paediatric haemato-oncology patients in the RHC in the period 2016 to 2020, does not necessarily mean that there was a link between patient infections and features of the water and ventilation systems. Dr Mumford, Ms Dempster, Professor Wilcox, Professor Hawkey, Ms Evans, Doctor Drumright, Mr Mookerjee, Ms Cairns, Ms Imrie, Ms Rankin, Ms Dodd, Dr Inkster and Dr Peters have all told us this. We need to consider alternative possibilities and whether we can exclude them.

399. However, our submission is that there clearly was a link between patient infections and features of the water system in the hospital. We reach this conclusion for these reasons:

    a. It is entirely biologically plausible that a large water system filled long before proper management was in place, with calorifiers that failed to keep the temperature out of the range that encourages the growth of microbes, with a possibility of contamination during construction and which used large numbers of Horne Optitherm taps could grow a biofilm containing the

organisms that infected the patients in the Schiehallion Unit between 2016 and 2020.

b. Figure 2.F.3 is consistent with the descriptive epidemiology charts produced by HPS, Dr Kennedy, Ms Harvey Wood and Mr Mookerjee in their various attempts to understand the numbers of infections that have the potential to be associated with the water system.

c. Figure 2.F.4 is consistent with the known work of the CLABSI Group, and the analysis of that carried out by Dr Kennedy and Ms Rogers in September 2019.

d. Whilst adult patients do not show similar excesses of environmentally relevant BSIs to those found in the paediatric patients, only the south sector haematology patients in Ward 4C were ever exposed to the potentially contaminated water system. It may simply be that, due to the nature of their treatment, the paediatric patients in the Schiehallion Unit were more vulnerable and were accommodated in their ward for longer periods of time than the adults.

e. We can exclude a number of the potential counterfactuals or confounders. There is no evidence to support the view that contamination in the laboratory or samples caused these numbers of BSIs. There is equally no evidence to support the view that antibiotic prescribing caused these infections, and the observations by Professor Hawkey and Dr Agrawal are entirely speculative.

f. Line care issues might cause some of the environmental BSI, but they cannot explain all of them. Team dysfunction might explain some of the increase in both types of BSIs, but team dysfunction existed long before either of these peaks started and continued long afterwards.

g. The only potential causative event that matches the shape of the charts produced by Dr Drumright, HPS, Dr Kennedy and Ms Harvey-Wood for potentially environmental BSI is 'contamination' of the domestic water system or 'microbial proliferation' within it. If the water system was filled eighteen months before the hospital opened it seems entirely possible that

microbes proliferated, and a biofilm began to grow. We know the management of the water system was insufficient to satisfy Mr Watson of DMA Canyon in 2015. We know management of the water system did substantially improve until 2018. We know that, in the investigations in the Water Incident, NHS GGC's own staff was sufficiently concerned to identify widespread contamination of the water system, and to see the water system as a risk to patients' safety.

h. Most importantly, there is considerable evidence of significant interventions following the arrival of HPS and HFS to provide advice on the water incident, and the steps taken under the supervision of Professor Steele to improve management of the water system from late 2018. Interventions were put in place to protect the patients from the water by installing POUFs, to reduce the number of microorganisms growing in the water by fitting a chlorine dioxide dosing system and then to test at very high intensity. These are exactly the sort of interventions that would reduce the number of environmentally relevant BSIs in this patient group during 2018 and 2019 and into 2020 in the way seen in Figure 2.F.3.

i. Finally, in contrast with the position advanced by NHS GGC and set out in the HAD Report, there is no basis for the view that the absence of a WGS close connection between patient samples and or environmental samples proves that there is no connection between those infections and the environment. This water system was too big to reach such a conclusion, prior to December 2019 there were too few samples, and those samples were not taken or handled in a sufficiently consistent manner to enable such a conclusion to be reached.

400. This is probably the moment to mention the 'true spike' in environmentally relevant BSIs in adult haemato-oncology patients at the QEUH in early 2018. If, as now seems certain, there was an exceedance of similar BSIs amongst the children in the Schiehallion Unit that peaked at that point, and given Dr Agrawal's professional opinion that immunocompromised haematology patients are at an increased risk of infections, then it may well be the case that this is evidence within the data of the state of the water system impacting on

the health of adult haematology patients in Ward 4C at the start of 2018.

401. In our Closing Statement following Glasgow 3,[505] we encouraged the Chair to use the nine principles identified by Bradford Hill to support his fact-finding in respect of the determination of the Key Question 4. We do so again. For the water system the following observations can be made:

Index	Guideline	Application to this question
1	Strength or degree of association	The point when the Water Incident is identified and is seen to be at its peak closely correlates with the peak of infections for environmentally relevant BSI in early 2018.
2	Consistency	It is not surprising to find a connection between high levels of both *Cupriavidus* and other GNBs in a water system and the numbers of environmentally relevant BSI in immunocompromised patients
3	Specificity	Significant numbers of environmentally relevant BSI are found in the paediatric haemato-oncology patients in 2016-2020, but there is also in the 'true spike' in the adult haemato-oncology patients in 2018.
4	Temporality (including spatial property)	Levels of environmentally relevant BSI are found in the paediatric haemato-oncology patients after the water system is mis or undermanaged and numbers of infections reduce once POUFs are fitted to protect patients from the water in that unit.
5	Biological gradient	As time passes during which the water system of the QEUH is either is mis or undermanaged and after a delay it is biologically plausible the numbers of environmentally relevant BSI in the paediatric haemato-oncology patients increase in response.
6	Plausibility	As discussed above the association is biologically plausible.
7	Coherence	Epidemiological and laboratory findings at a species level agree with each other, but there is no close connection by WGS, albeit that this may well be explained by the limited testing done or samples retained and the size of the mis or undermanaged water system which could well have had a greater diversity of micro-organisms than other studies have considered.

[505] CTI Closing Statement, Glasgow 3, Chapter 7.3, Page 660, Para 437.

Index	Guideline	Application to this question
8	Experiment	When interventions were applied which reduced the exposure of paediatric haemato-oncology patients to the water, the numbers of environmentally relevant BSI reduce significantly.
9	Analogy	There are a number of different outbreaks of different species or genera of environmentally relevant microorganisms in the same population over the same time when there is significant concern about water contamination.

402. In conclusion, there was a link between some of the infections suffered by patients in the Schiehallion Unit between 2016 and 2020. To some extent there will always be infections caused by environmentally relevant microorganisms in this patient group. Clinicians will strive to reduce the numbers, and if the trend identified by Dr Drumright has any validity they are succeeding over the long term.

403. This Inquiry has not been asked to assess which infections were connected to the environment or even what proportion of the infections are connected. There is much to be said for Dr Drumright's assessment that Figures 2.F.3 and 2.F.4 were consistent with the water having an impact in possibly around a third of cases[506].

404. Various numbers have been produced, but if we return to the remit of the Inquiry and the question whether the contamination of the water system had an impact on patient safety and care, then the answer is clearly yes.

Was there a link between *Aspergillus* infections and the ventilation system?

405. We addressed this issue in Chapter 7.2 of our Closing Statement following Glasgow 3[507]. The discussion of the risks of *Cryptococcus* infection is also relevant[508]. In essence our conclusion was that paediatric patients (and indeed adults) with immuno-compromised systems are put at risk from *Aspergillus* and *Cryptococcus* infection by being housed in environments that

[506] Transcript, Dr Lydia Drumright, 21 August 2021, Page 72, Column 139.
[507] CTI Closing Statement, Glasgow 3, Page 597, Section 7.2, Paras 250-252, 259.
[508] CTI Closing Statement, Glasgow 3, Page 601, Section 7.2, Paras 262-281.

do not have HEPA filtration or pressure differentials, and that lower air change rates mean lower dilution of anything harmful which may have entered the room. We now have the opportunity of reviewing that conclusion following the work of Dr Agrawal, the work of Dr Drumright and Mr Mookerjee with his data, and the commentaries of Ms Cairns and Dr Mumford.

406. The main point to draw from Dr Agrawal's work is that there is no statistically significant epidemiological evidence of increased *Aspergillus* infections amongst the paediatric haemato-oncology patients at the RHC. However, the small numbers of cases involved means that this conclusion does not undermine the logic of Mr Bennett, Mr Hoffman and others that the ventilation system of the QEUH/RHC, outside those isolation rooms correctly fitted with HEPA filtration and a positive pressure ventilation system, poses a risk to immunocompromised patients of *Aspergillus* and *Cryptococcus* infections. The essential point remains that for an immunocompromised patient, any encounter with *Aspergillus* poses a risk.

407. We know that such infections can be deeply harmful for such patients. As Mr Bennett explained in Glasgow 3, it is probably impossible to work out whether particular *Aspergillus* or *Cryptococcus* infections were caused by spores that came in via ventilation ducts without HEPA filters, came into rooms in the absence of pressure gradients or were not cleared from rooms due to air change rates of 3 ACH or less.

408. The likelihood of such infections amongst these patients may well be on the low side, but given the severe consequences to such patients and a number of known or suspected deaths with a connection to *Aspergillus* and *Cryptococcus* infection, the prudent approach is to consider, notwithstanding Dr Agrawal's results, that there is a sufficient risk for this small group of patients that suggests that the bulk of the rooms in the hospital are unsafe for them. Acknowledgement of this risk and the conversion of significant numbers of PPVL rooms to Positive Pressure Isolation Rooms (“PPIR”) should now enable policies and protocols to be delivered to ensure that this group of patients is not exposed to these risks.

5. CHAPTER 5 - NARRATIVE OF EVENTS

5.1 Introduction

409. This chapter is a narrative in three parts:

a. The first covers the period from the earliest inception of the new SGH Project in 2002, through the tendering process, design and construction to handover of the building to NHS GGC on 26 January 2015.

b. The second covers 2015 to 2020 and adds to the narrative in Chapter 5 of our Closing Statement following Glasgow 3.

c. The third narrates evidence about the management of NHS GGC, Scottish Government involvement and the Oversight Board, remediation of defects and the approach of NHS GGC to the CNR.

5.1.1 PPP 15 - Governance

410. The sections that cover the period up to the approval of the Full Business Case should be read alongside PPP 15, which describes the governance structure within the project. We have reviewed CP responses to PPP 15[509] and:

a. We accept the substantive factual changes to the narrative in PPP 15 as proposed by NHS GGC[510].

b. We note and accept the comments made on behalf of Currie & Brown that that company was not involved in the project before its appointment in February 2008.

c. We note the observation by the Scottish Government that Mr Baxter disputed our description in PPP15 of his role in the NSGHLPEB. We will address this issue later in this Chapter.

411. Other issues raised by CPs in response to PPP 15 have been addressed within this document. To the extent that this chapter does not contradict PPP

[509] Bundle 50.
[510] Bundle 50, Document 1, Page 3.

15 it remains our position.

412. Readers of this chapter should have to hand PPP 15 to fully appreciate the governance structures in the new SGH project, prior to approval of the Full Business Case and authorisation to proceed.

5.1.2 Key Companies and Organisation

NHS GGC	NHS GGC is the collective term used in this PPP for Greater Glasgow Health Board; NHS Glasgow and Clyde and NHS Greater Glasgow and Clyde. Where possible, this PPP refers to the entity at the time of the event/document being discussed.
Currie & Brown	Currie & Brown UK Limited: lead consultant appointed by Greater Glasgow Health Board.
HLM	HLM Architects: subconsultant (architect advisor) appointed by Currie & Brown.
Buchan	Buchan Associates: subconsultant (healthcare planner) appointed by Currie & Brown UK Limited
Wallace Whittle/ TUV SUD	TUV SUD Limited (trading as "Wallace Whittle"): mechanical electrical and plumbing (MEP) services engineer. Subconsultant appointed by Currie & Brown to advise Greater Glasgow Health Board. Subsequently replaced ZBP as the MEP Services Engineer appointed by Multiplex.
Capita	Capita Symonds Limited: Project Supervisor appointed by Greater Glasgow Health Board. It changed its name to Capita Property and Infrastructure Limited on 1 October 2013.
URS	URS Corporation Limited: subconsultant (civil and structural designer and CDM co-co-ordinator) appointed by Currie & Brown.
Multiplex	Brookfield Construction (UK) Limited: main contractor appointed by Greater Glasgow Health Board to design and build the QEUH/RHC. After 21 February 2011, Brookfield Construction (UK) Limited became known as Brookfield Multiplex Construction Europe Limited. From 31 August 2016, it was known as Multiplex Construction Europe Limited. For ease of convenience, we will refer to the company by the collective term of "Multiplex" rather than its different company names.
Nightingale /IBI	Nightingale Associates: architect appointed by Multiplex. Nightingale Associates was acquired by IBI in June 2010. In 2014, Nightingale Associates' trade and assets were transferred to IBI and its former trading activities continued with IBI.

ZBP	Zisman Bowyer & Partners LLP: mechanical and electrical (M&E) designer appointed by Multiplex. Replaced by Wallace Whittle on 7 March 2013.
Mercury	Mercury Engineering: subcontractor appointed by Multiplex in respect of mechanical and electrical works.
WSP	WSP UK Ltd: civil and structural designer appointed by Multiplex.

5.2 Initial Stages - 2002 to 2008

5.2.1 Site Selection

413. Site selection was a consideration from the very beginning of the consultation 'Modernising Glasgow's Acute Hospital Services'[511] from March 2000. A consultation meeting at Yorkhill on 16 May 2000, raised issues of both an 'obnoxious' sewage smell and whether what was to be built would be a 'state of the art' hospital[512]. The NHS GGC Board received reports on its consultation throughout 2000 and 2001[513] [514] [515] [516] [517].

414. On 14 March 2001 the Scottish Government approved the development of an OBC[518] for a single acute southside hospital on the existing Southern General Hospital site, further to a full site selection appraisal.

415. Whether selection of the site was appropriate or gave rise to an increased risk of environmental organisms causing infections, arises in TOR 10. Site selection also has the potential to have a bearing on the decision to design the hospital with sealed windows and a mechanical ventilation system which is explored elsewhere.

416. The Independent Review said:

[511] Bundle 30, Documents 13, 14, 15, 17, 19, 20.
[512] A50979866 - Bundle 30, Document 20, Page 144.
[513] Bundle 30, Documents 22, 23, 24, 25, 26, 28, 32.
[514] A50976658 - Bundle 30, Document 25, Page 268.
[515] A50978539 - Bundle 30, Document 26, Page 304.
[516] A50974917 - Bundle 30, Document 28, Page 328.
[517] A50975943 - Bundle 30, Document 32, Page 348.
[518] A50979843 - Bundle 30, Document 34, Page 358.

> "We conclude that the site selection for the hospital was properly considered at the time of the Acute Hospitals Review when it completed in 2001, taking public health matters into account. Site management of waste water facilities adjacent to the site complies with regulatory requirements and the site appears well maintained on direct inspection; no new knowledge or information has come to light that challenges the assumptions and assurances on which the decision was founded; public concern has been expressed to us as part of this Review but generally recorded nuisance and relevant data remain at a low level, and not appreciably different to other areas in the city on routine monitoring".[519]

417. Evidence about odour and infection link with neighbouring sites is set out in detail in our Closing Statement following Glasgow 3[520]. None of the IPC clinicians who worked at the Southern General Hospital had concerns of infections arising because of the proximity to Shieldhall. Mr Calderwood appeared to think that Shieldhall had not been a wastewater treatment site[521]. That appears to be incorrect[522].

418. Alan Seabourne did not consider the issue of the smell particularly significant.[523] Mr Calderwood had told him that Shieldhall had changed or was changing from a sewage works to a transfer station where sewage only got mixed twice a year.[524] During his seven years in the project the ICDs and microbiologists had not raised the issue of infection risk arising from Shieldhall with him.[525]

419. Apart from infection, proximity to the waste water treatment works led to consideration of particular features. Annette Rankin said long before the 2007 HAI-SCRIBE, on which she had been named but had not in fact participated, risk from the works ought to have been considered before the initial site selection was made, such that by 2007 the process would no longer require to do so[526].

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[519] A32385767 - Bundle 27, Volume 9, Document 11, Page 145 at Para 3.7.1.
[520] Chapter 9.2, CTI Closing Statement from Glasgow 3, Page 767, Paras 37-50.
[521] Glasgow 4, Part 3 - Witness Statements, Volume 3, Robert Calderwood, Document 1, Page 16, Para 47.
[522] A51308483 - Bundle 39, Document 1, Page 9, Para 5.10.
[523] Transcript, Alan Seabourne, 29 May 2025, Page 13, Column 21.
[524] Transcript, Alan Seabourne, 29 May 2025, Page 12, Column 20.
[525] Transcript, Alan Seabourne, 29 May 2025, Page 13, Column 21.
[526] Transcript, Annette Rankin, 19 August 2025, Pages 67-68, Columns 130-131.

420. The Design Solution Report in July 2007 treated proximity to the sewage works as a constraint, recommending the provision of mechanical ventilation systems fitted with activated carbon filters to remove odour [527]. Carbon filters remove gases and vapours from the air stream and are graded according to the range of substances they remove. Multiplex suggested mechanical ventilation and carbon filters on the fresh air side of the air handling units[528]. Carbon filters were never fitted.

5.2.2 Design Brief

421. In February 2007, the Design Brief was being developed by NHS GGC's Project Team and its technical advisors[529]. These did not include Currie & Brown as they were not engaged until 2 September 2008. Alan Seabourne described the function of the Project Team as being "to support the construction and design people in order that they could fulfil their contract to the Health Board"[530]. In March 2007, the User Groups were in the process of engaging with the Project Team and the Clinical Advisory Board to validate and complete the next stages in the emerging design of the QEUH/RHC.

422. The next steps were to complete the OBC, the Public Sector Comparator ("PSC") and then move on to producing the Clinical Output Specifications ("COSs") in advance of the Invitation To Participate ("ITP") which would inform the bidders of NHS GGC's requirements[531].

5.2.3 Design approvals

423. It had been decided, by December 2007, that there would be one PSC Design to assist with establishing budget for both the QEUH and RHC. Most of the Schedules of Accommodation ("SoAs") had been reviewed and agreed. The 1:200 drawings for each hospital were being completed [532].

424. On 9 April 2008, the last Project Executive Group Meeting took place, at which Peter Moir commented that procurement and funding options were being

[527] A33519492 - Bundle 20, Document 46, Page 741.
[528] Bundle 28, Document 6, Page 447 at Section 3.9.
[529] A35423300 - Bundle 43, Volume 6, Document 17, Page 419.
[530] Transcript, Alan Seabourne, 29 May 2025, Page 4, Column 3.
[531] A35423336 - Bundle 43, Volume 6, Document 18, Page 422.
[532] A35423255 - Bundle 43, Volume 6, Document 19, Page 426.

considered for the QEUH/RHC[533]. In 2008, the NHS GGC Project Team had a Clinical Lead (medical), Nurse Advisor, and Infection Control Advisor[534]. The User Groups were meeting with the NHS GGC Project Team to advance the design specifications for specific clinical and other areas[535].

425. On 22 August 2008, Dr Hood had specified no chilled beams were to be installed in haemato-oncology wards[536]. That chilled beams nevertheless became a feature of the Schiehallion Unit was a matter which Emma White could not explain – it appeared that there had been an assumption that that Ward 2A would be a normal ward, rather than one for immuno-compromised patients[537]. She was unpersuaded that NHS GGC staff should have noticed that immunocompromised patients were either in isolation rooms or had no special protection, since it would not have been evident during the design process and in any event the patients were protected by single rooms and in a controlled ward for that patient cohort[538]. Chilled beams are not prohibited in healthcare premises but the emphasis being now placed more on research before installation[539]. She thought the onus was on everyone to understand and risk assess the use of chilled beams which reflected the position in the latest English guidance, HTM 03-01, issued in 2021[540].

426. In September 2008, the User Groups began to focus their attention on the ERs, with support from the NHS GGC Project Team and technical advisors. It was expected that the COSs would be finalised by the NHS GGC Project Team at the end of October 2008[541].

427. On 7 October 2008, the NHS GGC Project Director, and NHS GGC's technical and financial advisors, gave a presentation to the NHS GGC Board on the proposed procurement model of the 2-stage design and build. On 21 October 2008, the NHS GGC Board approved this[542]. Mr Calderwood said it was the

[533] A35422679 - Bundle 43, Volume 6, Document 20, Page 430.
[534] A43115791 - Bundle 43, Volume 6, Document 49.5-7, Pages 1015-1034.
[535] A52701528 - Bundle 43, Volume 6, Document 13, Page 74.
[536] A51667198 - Bundle 43, Volume 1, Document 4, Page 15.
[537] Transcript, Emma White, 13 May 2025, Page 75, Column 145.
[538] Transcript, Emma White, 13 May 2025, Page 75, Columns 145-146.
[539] Transcript, Emma White, 13 May 2025, Page 75, Columns 145-146.
[540] Transcript, Emma White, 13 May 2025, Page 71, Column 138.
[541] Bundle 43, Volume 6, Documents 21 and 22, Pages 432 and 436.
[542] A34866463 - Bundle 37, Document 35, Pages 475-476.

most appropriate procurement method, as NHS GGC would not take on any financial risk during the selection of a single bidder at stage one in the competitive dialogue, with the preferred bidder developing the design at stage two[543].

428. On 15 December 2008, Claire Phillips of Partnerships UK emailed Alan Seabourne and suggested positive steps to meet the objective that the M&E system of the QEUH/RHC was fit for purpose, reliable and functional. The recommended steps were: careful specification, enhanced site supervision, handover criteria, enhanced handover and commissioning procedures, creation of a joint building management team (contractor and NHS GGC), and independent certification. She also suggested commercial steps: performance bonds which over-run completion, deferred milestone payments, extended retention periods (of 3 years post-handover), 5 year extended compliance warranty post-handover, and performance payments[544].

5.2.4 Clinical Output Specifications

429. A Project Executive Group meeting on 14 March 2007 set out 'next steps,' including completion of the OBC before moving on to producing the COSs[545]. In 2008, User Groups met with the NHS GGC Project Team to advance design specifications, moving in September 2008 towards focusing attention onto ERs, with support from the NHS GGC Project Team and technical advisors. It was expected that the COSs would be finalised by the NHS GGC Project Team at the end of October 2008[546].

430. Emma White (of the architects Nightingale Associates in winning Multiplex bid) described the COSs as:

> "…important briefing documents that the client develops with their clinical team … supported by a healthcare planner, who has experience of developing these documents. The various clinical teams would … explain how they work and

[543] A34866476 - Bundle 37, Document 34, Page 463.
[544] A51650503 - Bundle 43, Volume 6, Document 23, Page 439.
[545] A35423336 - Bundle 43, Volume 6, Document 18, Page 422.
[546] A51650419 - Bundle 43, Volume 6, Documents 21 and 22, Pages 432 and 436.

provide information to the author … [Sometimes] there is reference to something technical, sometimes [not]."[547]

431. She described a process where the clinical team and healthcare planner would explain to the author the specifications, such as how many rooms are required, their types and general function[548]. Once prepared, the COS would form part of the brief, informing the bid and development of the layout[549]. She explained that COSs depend upon the input of the department concerned, some having more technical expertise than others, and hence no standard pattern is possible[550].

432. Ms White said that COSs may contain technical information if the clinician drafting the COS has consulted more technical users and that COSs can range from detailed to very high-level technical information[551]. For example, the COS for the Schiehallion Unit had little technical detail beyond the double-door entry, indicating the importance placed by clinicians upon it being a pressurised ward [552]. The COS for the immuno-compromised adult ward had more detail[553]. An IPC representative (and one for facilities management) would normally be present in meetings[554].

433. Mark Baird described COSs and ERs as two halves of the whole, when it came to creating a working building:

> "if you didn't understand how clinicians wanted to use the space, you wouldn't be able to articulate that and share it with bidders, who then wouldn't have the steerage to understand what to feed back. … the Employer's Requirements, have to capture what's the structure and fabric and performance of the building that were going to perform that clinical activity within. … So only if you put those two together are you seeing a fuller picture"[555]

434. On 15 August 2008, Dr Hood was asked by the Clinical Service Manager and

[547] Transcript, Emma White, 13 May 2025, Pages 23-24, Columns 42-43.
[548] Transcript, Emma White, 13 May 2025, Pages 23-24, Columns 42-43.
[549] Transcript, Emma White, 13 May 2025, Page 24, Columns 43-44.
[550] Transcript, Emma White, 13 May 2025, Pages 73-74, Columns 141-143.
[551] Transcript, Emma White, 13 May 2025, Pages 24-25, Columns 44-45.
[552] Bundle 16, Document 16, Page 1604.
[553] Transcript, Emma White, 13 May 2025, Page 26, Column 47.
[554] Transcript, Emma White, 13 May 2025, Page 73, Columns 141-142.
[555] Transcript, Mark Baird, 28 May 2025, Pages 15-17, Columns 26-29.

Lead Nurse, Myra Campbell, for guidance on appropriate ventilation for haemato-oncology in the new hospital, on behalf of the project manager, Heather Griffin. On 22 August 2008, Dr Hood responded by stating that if the Haemato-oncology ward was to have the same patient cohort as 'B7 Beatson' then the specification must be the same[556].

435. Other witnesses also spoke to the COS process. Frances Wrath described COSs as the starting point for the design process, informing the ERs[557]. Alan Seabourne spoke to the COSs being prepared through a User Group process led by Heather Griffin (for QEUH) and Mairi Macleod (for RHC), together with 'health planner' Iain Buchan[558]. David Hall agreed with Mr Seabourne's recollection of the process and stated that his own role was very limited[559]. Ms Macleod confirmed that the COSs would be derived from the input of young people, their carers, clinicians and departments[560]. Mark Baird stated that the COS captured the clinical requirements, whereas the ERs captured the building requirements[561]. To see the full picture, the ERs and COS had to be put together, with Iain Buchan of Buchan Associates taking the lead on the co-ordination exercise[562].

436. Mr Seabourne accepted that the COSs were the only information given to the contractor to explain the service to be provided[563]. His expectation had been that a designer should revert on any points where they did not understand what might be required[564].

437. Witnesses described a variation in quality in the COSs. Mr Seabourne expressed surprise that the COS did not follow a standard format[565]. He described the 2A and Ward 4B COSs as "night and day"[566], the Ward 2A COS being too light and "probably the poorest one he'd seen" for a child cancer

[556] A51666715 - Bundle 43, Volume 1, Document 4, Page 15.
[557] Transcript, Frances Wrath, 14 May 2025, Page 15, Columns 25-26.
[558] Transcript, Alan Seabourne, 29 May 2025, Pages 20-21, Columns 36-38.
[559] Transcript, David Hall, 22 May 2025, Page 32, Column 59.
[560] Transcript, Mairi Macleod, 14 May 2025, Page 46, Columns 87-88.
[561] Transcript, Mark Baird, 28 May 2025, Pages 16-17, Columns 28-29.
[562] Transcript, Mark Baird, 28 May 2025, Page 17, Columns 29-30.
[563] Transcript, Alan Seabourne, 29 May 2025, Columns 37-38.
[564] Transcript, Alan Seabourne, 29 May 2025, Pages 36-38, Columns 69-72.
[565] Transcript, Alan Seabourne, 29 May 2025, Page 20, Column 36.
[566] Transcript, Alan Seabourne, 29 May 2025, Page 19, Column 34.

unit[567]. Steve Pardy commented that COSs were unclear and that the designer ought to "read between the lines" and contact the relevant department for confirmation[568]. He acknowledged that he would not have direct contact with those departments unless there was a specific reason[569].

438. Professor Gibson, the senior clinician in the Schiehallion Unit, did not recall having seen the COS for the RHC Haematology & Oncology area[570]. Her impression was that this COS had been prepared by a manager without significant clinical input:

> "…this refers to a national bone marrow transplant unit. This document even doesn't mention how many transplant cubicles there will be, never mind how they will ventilate it. There's no mention of HEPA filtration. I'd like to think that nobody in the transplant unit was involved … I think if we had been writing it, we'd have certainly said, "There's going to be eight cubicles and they're going to be HEPA-filtered," and said something along that lines. But there's no mention of that at all."[571]

439. Mr Calderwood expressed surprise at this, as his understanding was that Professor Gibson herself had approved the new facilities, though this was an assumption made based on her attendance at a relevant meeting[572].

440. The Adult Haemato-oncology COS,[573] which is undated but believed to have been completed in 2009 before being included in the ERs, stated that advice was requested from Dr Hood regarding suitable ventilation to provide a protected environment. Dr Hood's advice said:

> "Please note the haemato-oncology ward area has a very specific function and a considerably higher than average requirement for additional engineering support/infrastructure. There should be no opening windows, no chilled beams, space sealed and ventilated. Positive pressure to the rest of the hospital and all highly filtered air >90%, probably HEPA with adequate number of positive

[567] Transcript, Alan Seabourne, 29 May 2025, Page 21, Column 37.
[568] Transcript, Steve Pardy, 27 May 2025, Page 28, Column 51.
[569] Transcript, Steve Pardy, 27 May 2025, Page 28, Column 52.
[570] Bundle 16, Document 16, Page 1599.
[571] Transcript, Professor Brenda Gibson, 19 August 2025, Page 33, Columns 61-62.
[572] Transcript, Robert Calderwood, 1 October 2025, Pages 46 and 52, Columns 88 and 99.
[573] A35184640 - Bundle 16, Document 15, Page 1595.

pressure sealed HEPA filtered side rooms for neutropenic patients as in the Beatson West of Scotland Cancer Centre."

441. Wallace Whittle contributed to compilation of the ERs[574].

442. As a generality, Ms White was aware of the standard requirement to ensure the design is compliant with Infection Control requirements, and that there would normally be an IPC representative (and facilities manager) present in meetings[575]. She alluded to what appeared to be a potential difficulty that designers wouldn't necessarily know where issues had arisen in the past, and staff might be focused upon those past issues – with the result that the output emphasis may vary considerably according to the expertise of the department in question[576].

5.2.5 Instruction of Partnerships UK Ltd

443. Partnerships UK ('PUK') was established in 2000 to help government pursue the PFI/PPP programme. It was 51% owned by the private sector and 49% by the UK Treasury and Scottish ministers. The PUK team came from the private sector, and it became a centre of commercial expertise within government to support the public sector, primarily focused on the pursuit of PFI/PPP programmes[577].

444. The Inquiry has been able to recover part of the correspondence that brought PUK into the new SGH Project to support NHS GGC. We do not know the full extent of the role given to PUK, but it appears to extend to giving specific pieces of advice and placed its Chief Executive, Mr Stewart, on the project Executive Board[578]. Mr Stewart suspected that the instruction came at the request of the Scottish Government[579]. It was the approach of PUK to have both a member on the Project Board and people working with the Project

[574] Transcript, Stewart McKechnie, 27 May 2025, Page 62, Column 121 and Glasgow 4, Part 1 - Witness Statements, Volume 3, Document 2, Page 38.
[575] Transcript, Emma White, 13 May 2025, Page 73, Columns 141-142.
[576] Transcript, Emma White, 13 May 2025, Pages 73-74, Columns 141-143.
[577] Transcript, James Stewart, 18 September 2025, Pages 5-6, Columns 5-7.
[578] Bundle 43, Volume 3, Document 5, Page 433-439 and Transcript, James Stewart, 18 September 2025, Pages 6-8, Columns 8-12.
[579] Transcript, James Stewart, 18 September 2025, Page 26, Column 48.

team to provide additional information channels [580]. Mr Stewart discussed 'assurance' and the model of first, second and third lines of defence from the perspective of a high degree of expertise[581] but unfortunately could not remember whether there was an assurance system in the new SGH[582].

5.2.6 Change in funding model from PFI to traditional Design & Build

445. The two procurement models available to the Scottish Government in 2008 for the procurement of a major piece of infrastructure such as the new SGH were:

a. PPP/PFI, whereby the Government would contract out the design, build and maintenance/operation of a public facility to a private project delivery company, with costs repaid over a 25-to-30-year concession period. This involves the contractor assuming liability for the design and providing the up-front finance, with the benefit to the Government of increasing infrastructure investment without increasing public debt but typically incurring higher maintenance costs later. Peter Gallagher described this model as being “more of a service than a building” because it was bundled with the running of the hospital after completion[583].

b. Conventionally Procured Asset Model (“CPAM”) whereby a contractor designs and/or builds the project, with the public sector taking ownership and maintenance upon completion. This is sometime also known as a capital funding model as the funding is obtained by direct government borrowing, in contrast with PPP/PFI where the project delivery company borrows the funds directly. A variation of this is ‘Design & Build’, where the employer sets out requirements, and the contractor submits a design. The idea with "design and build” is that design risk falls on the contractor.[584]

446. The majority of public procurement before 2008 was undertaken via PPPs, so there was greater expertise on PPP models, although knowledge of Design & Build was also not uncommon[585].

[580] Transcript, James Stewart, 18 September 2025, Page 18, Column 32.
[581] Transcript, James Stewart, 18 September 2025, Pages 22-25, Columns 40-43.
[582] Transcript, James Stewart, 18 September 2025, Pages 19-21, Columns 33-37.
[583] Transcript, Peter Gallagher, 18 September 2025, Page 45, Column 85.
[584] A49286669 - Bundle 26, Document 3, Page 264.
[585] Transcript, James Stewart, 18 September 2025, Page 5, Column 5.

447. On 21 November 2006 the Performance Review Group received a paper that asked them to endorse the procurement of the New South Glasgow and New Children's Hospitals as a single integrated PFI building.[586] In March 2007 NHS GGC remained committed to that model[587].

448. Mr Calderwood described a move away from PFI to a capital model occurring with the change in the Scottish Government in 2007. The retention of a maintenance role made forward financial planning easier, in that the payment of big-item maintenance costs to the relevant PFI consortium would be less predictable[588].

449. From August 2007 the funding model began to be questioned at meetings of the Project Executive Group, with cost as a specific consideration[589] [590].

450. The Gateway Review 1 (Business Justification) in January 2008 made reference to alternative funding models being back on the table:

> "The Outline Business Case (OBC) is currently being finalised – a paper which will reference the OBC is due to be submitted to the January 15th, 2008, GGC Health Board meeting [sic]. Options appraisal work has been completed. Work is underway on funding considerations, which may lead to some limited re-scoping of the project."[591]

451. Section 5.2 of that document also recorded that a revisal to OBC would contain a reassessment of the procurement method:

> "One major challenge to the project is the impact of the chosen procurement route… The OBC will set out the implications of three different procurement routes for the project: PFI, PFI (non-profit distribution model) and traditional (design and build). The project team are confident that the financial implications of these options are manageable. However, the additional complexity, impact on timetable, and form of contracts are less clear although the project team will be seeking advice from the Board's legal, financial and technical advisors.

[586] A36022954 - Bundle 42, Volume 2, Document 2, Page 13.
[587] A35423343 - Bundle 43, Volume 2, Document 2, Page 24.
[588] Transcript, Robert Calderwood, 30 September 2025, Pages 7-9, Columns 10-11 and 14.
[589] A35423375 - Bundle 42, Volume 2, Document 3, Page 20.
[590] A35423425 - Bundle 42, Volume 2, Document 4, Pages 24-25.
[591] A33998293 - Bundle 43, Volume 2, Document 3, Page 37.

It is likely that such a large project will be attractive to the market, and early resolution of the procurement model will help maintain interest."[592]

452. In February 2008 a workshop took place involving a wide range of key personnel including Mr Seabourne, Mr Calderwood, Ms Byrne, Mr Moir, Ms Macleod, Ms Griffin, NHS GGC's solicitors, Currie & Brown, the technical team behind the Exemplar Design, and Mike Baxter from Scottish Government.[593] The stated objective was "To determine the most appropriate public finance procurement route that meets the Board's key objectives".

453. By the time of finalisation of the OBC in February 2008, that position had hardened into an assessment that CPAM and specifically Design & Build, was now the only realistic option. The OBC recorded that:

"In carrying out its [Value for Money] evaluation, the Board has considered three potential procurement routes:

1. Traditional Procurement – also referred to as the Conventionally Procured Asset Model ("CPAM")

2. Private Finance Initiative ("PFI")

3. Not for Profit Distribution Model ("NPD")."[594]

454. The conclusion reached was in favour of "CPAM":

"The Board's financial plan forecasts that total expenditure will be contained within its overall funding envelope thereby enabling it to secure achievement of its revenue financial target by managing within its "revenue resource limit" (RRL).

The baseline assumption is that the new South Glasgow and new Children's Hospitals and new Laboratory facility are revenue neutral.

Given the above, the CPAM procurement route is considered the only deliverable option."[595]

455. Douglas Griffin, although not personally involved in the decision, understood

[592] A33998293 - Bundle 43, Volume 2, Document 3, Pages 40-41.
[593] Bundle 17, Document 34, Pages 1805-1087.
[594] A35289377 - Bundle 17, Document 28, Page 1162.
[595] A32552230 - Bundle 43, Volume 2, Document 4, Pages 46-48.

that capital funding was selected as the preferred funding model on the basis that it was affordable and offered better overall value for money[596].

456. On 8 April 2008, Shona Robison MSP, Cabinet Secretary for Health, presented a paper to cabinet which discussed revenue and capital funding as potential funding models for the project. Cabinet approved her recommendation.[597] The paper explained that the capital funding model was thought to present significantly better value for money. It stated:

> "the impact of the two routes is markedly different with the additional revenue costs of the public capital option £53.8m per annum against the impact of £76m per annum for the NPD route. In other words use of the NPD route would require an additional £22m of service savings to be achieved with no additional value for money benefit."

457. Mr Seabourne spoke to attempting to mitigate costs by seeking an extended liability period of seven years, where the contractor would take on building structure and building services risks. In the event only two years was achievable, and that did not amount to an agreement for Multiplex to take on maintenance obligations for the building[598].

458. An Ernst & Young paper summarised for the Performance Review Group on 16 September 2008 recognised Design & Build as the most appropriate approach:

> ".. the most appropriate procurement method to achieve the Board's objectives is a two stage Design and Build process with rapid selection to a single preferred bidder at stage one using the competitive dialogue procedure. At stage two the preferred bidder develops the detailed design in conjunction with the Board."[599]

459. The intention was to discuss and test the proposed procurement method with the newly appointed Technical Advisers and Partnerships UK (PUK) before presenting for Board approval on 21 October 2008. The Procurement and Finance Group discussed it at their meeting on 1 October 2008.[600] It was

[596] Glasgow 4, Part 3 - Witness Statements, Volume 1, Douglas Griffin, Document 5, Page 117.
[597] Glasgow 4, Part 3 - Witness Statements, Volume 2, Shona Robinson, Document 3, Page 65.
[598] Transcript, Alan Seabourne, 29 May 2025, Pages 14-16, Columns 24-27.
[599] A35422662 - Bundle 17, Document 35, Page 1811.
[600] A35423152 - Bundle 42, Volume 2, Page 30.

reported to the NHS GGC Board on 21 October 2008, supported by a report from the Chief Operating Officer and Director of Acute Services Strategy, Implementation and Planning, Procurement Model for the Construction of the New Development on the Southern General Hospital Site.[601] The decision was:

> "That the Procurement Model, as recommended by the New South Glasgow Executive Board and supported by the Board's advisers, of the two-stage Design and Build process with rapid selection of a single preferred bidder at stage one using the competitive dialogue procedure, be approved." [602]

5.2.7 Change in contract format, from SBCC Standard Form to NEC3

460. NHS GGC decided to use a Design & Build route using public capital funding, a Target Cost, Competitive Dialogue, and the NEC3 form of contract. The format selected was 'NEC3 Option C'. In this pricing model there is no contract sum. Instead, parties identify a target cost at the outset. The contractor is thereafter incentivised to meet the target, or to improve upon it, and in doing so taking a share in any savings[603].

461. The change arose from the production on 1 December 2008 of a paper, recommending the NEC3 form, by NHS GGC's legal advisors, Shepherd & Wedderburn LLP ("S&W"), and Currie & Brown:

> "due to the importance of time and cost drivers to the Board as well as the cultural fit with the collaborative approach and Target Price outlook of the procurement process and the avoidance of significant bespoke drafting that would be required if JCT were utilised." [604]

462. The paper stated that a disadvantage of the NEC3 form of contract is the huge responsibility on the project manager of the Employer. To mitigate this risk, the paper stated that the Employer must ensure that a competent and experienced project manager is appointed to undertake the role, and that the Employer may consider several project managers to manage compensation

[601] A34866463 - Bundle 37, Document 35, Page 473.
[602] A34866476 - Bundle 37, Document 34, Page 457.
[603] Bundle 26, Document 3, Page 187.
[604] A35423137 - Bundle 43, Volume 2, Document 8, Page 86.

events, risks, and early warnings[605]. Ken Winter spoke to his experience on other hospital builds, where his experience was that the client would engage mechanical and engineering support to mirror that available to the contractor – being architect, structural engineer, M&E engineer, and other specialists such as a healthcare planner[606]. While this was planned, by a date in 2010 those specialist advisers were no longer available to NHS GGC.

463. Currie & Brown's understanding was that the NEC form was being increasingly used in the health sector and was considered to provide a better framework for collaboration[607]. Douglas Ross described the switch to NEC3, and taking over by NHS GGC of the Project Manager role, as part of a process of managing risk and retaining control over project management functions[608]. He considered it to have been the correct decision[609].

464. Mr Calderwood described how the NEC3 contract was envisaged as a means of achieving a disciplined regimen in terms of time and cost:

> "The use of NEC3 was an attempt to try and bring in some of the disciplines that the public sector had learned from PFI procurement projects. The public sector, healthcare, have a history of projects becoming, you know, overspent and coming in late. PFI brought the discipline to the procurement process where, in the main, PFI projects come in on time and within agreed budget variations during the process. So, the aim was to try and take the learning from the PFI procurement about incentivisation and about putting the responsibility for design within the contract with the construction consortia, and NEC3 was highlighted as being a contract form common within the industry which brought some of these disciplines into play."[610]

465. The Scottish Government did not receive specific legal advice on NEC3 at the time when the choice to move to this form of contract was made. They too operated on the understanding, based on experience with Health Facilities Scotland and with the NHS in England, that this form encouraged early

[605] A35423137 - Bundle 43, Volume 2, Document 8, Page 100.
[606] Transcript, Ken Winter, 16 September 2025, Pages 68-69, Columns 132-133.
[607] Glasgow 4, Part 1 - Witness Statements, Volume 3, Douglas Ross, Document 10, Page 331.
[608] Glasgow 4, Part 1 - Witness Statements, Volume 3, Douglas Ross, Document 10, Page 347.
[609] Glasgow 4, Part 1 - Witness Statements, Volume 3, Douglas Ross, Document 10, Page 349.
[610] Transcript, Robert Calderwood, 30 September 2025, Page 25, Column 45.

engagement with contractors and benefits in terms of time and delivery. HFS would have made help available to NHS GGC[611]. Early engagement with the contractor is key[612].

5.3 OBC to Issue of the Tender - 2008-2009

5.3.1 Approval of OBC - April 2008

466. The purpose of the OBC was to present the initial proposal for a design to meet the aspirations outlined in the Initial Agreement to the Scottish Government and obtain approval to proceed. It develops the concept design and outlines the project management requirements to carry out the project successfully, in preparation for the procurement and tender process. The expectation was that the OBC would be adhered to[613].

467. Mike Baxter explained that one would not expect to see extensive detail about the proposed design of a building within an OBC. The purpose was to create a process to enable an estimate of cost:

> "…effectively the outline business case would be prepared pre-procurement. So, effectively, the level of design would be adjacencies in terms of healthcare planning, in terms of the sizing of the building based on the number of beds and various specialisms, and the costings would be based on those estimates. Only when you're in procurement were you then into the absolute detailed design process with the contractor."[614]

468. The OBC should detail the expertise being brought to bear in taking forward the project, internal or external. Had there been any deviation from standard, disclosure should take place at an early stage to allow analysis[615].

469. As the business case process developed, he would have expected to see engagement between NHS GGC and Scottish Government, such as seeking guidance around compliance with the Scottish Capital Investment Manual. The purpose was to avoid the presentation of a business case which was not

[611] Transcript, Mike Baxter, 16 September 2025, Page 14, Columns 23-24.
[612] Transcript, Mike Baxter, 16 September 2025, Page 16, Column 27.
[613] Glasgow 4, Part 3 - Witness Statements, Volume 2, Shona Robinson, Document 3, Page 65.
[614] Transcript, Mike Baxter, 16 September 2025, Pages 6-7, Columns 8-9.
[615] Transcript, Mike Baxter, 16 September 2025, Pages 8-9, Columns 12-13.

the final version. Ownership remained with NHS GGC, who had technical advisers – not available to Mr Baxter's team, who, if presented with a technical issue, would have sought advice through HFS and, where appropriate, the Chief Medical Officer's office[616].

470. Multiplex submitted that our provisional conclusion in PPP 15 that a reader of the OBC would assume that SHTM 03-01 was being complied with might well be undermined by the fact that SHTM 03-01 Draft 2009 was not published until April 2009[617]. This is of course correct. The statement in the OBC that the hospital would provide "the highest quality and safety standards"[618] and be designed with "best practice in terms of infection control principles"[619] is not enough to give rise to that assumption. Mr Baxter argued that what would give rise to that assumption was the statement that there would be compliance with 'A Policy on Design Quality for NHS Scotland',[620] which is a policy that includes a requirement for health boards to use ADB[621]; extreme care was recommended for Scottish users to ensure ADB was compliant with SHTMs[622]. Any project that undertakes to comply with 'A Policy on Design Quality for NHS Scotland', according to Mr Baxter was offering to comply with all SHTMs as they are produced.

471. On 19 February 2009 the NHS GGC Board approved the OBC.[623] Helen Byrne, Director of Acute Services, Strategy, Implementation and Planning presented a paper[624]. It was received by the CIG on 18 February 2008, subject to board approval the following day, and considered by the CIG on 26 February 2008, with approval in April 2008. CIG members appear to have only been given one week to consider the OBC and make comments.[625]

472. On 8 April 2008 the OBC was discussed at Cabinet, with a pre-cabinet paper by Shona Robison MSP, then Minister for Public Health, discussing funding

[616] Transcript, Mike Baxter, 16 September 2025, Pages 7-8, Columns 10-11.
[617] Bundle 50, Document 4, Page 65.
[618] Bundle 17, Document 28, Page 1085.
[619] Bundle 17, Document 28, Page 1118.
[620] Bundle 17, Document 28, Page 1153.
[621] Edinburgh 1 - Bundle 3, Volume 1, Document 2, Page 125.
[622] Edinburgh 1 - Bundle 3, Volume 1, Document 2, Page 133.
[623] A34866470 - Bundle 37, Document 31, Pages 402 and 404.
[624] Bundle 37, Document 32, Page 413.
[625] A35068126 - Bundle 48, Document 6, Page 307.

choice[626]. NHS GGC were informed of the decision to approve by letter on 21 May 2008[627]. The Inquiry does not hold minutes of the meeting of the CIG that approved the OBC, or the exact date of Cabinet approval.

5.3.2 Appointment of Currie & Brown

473. As discussed above, in June 2008 NHS GGC had sought tenders for project management of the project, to include technical and design aspects. On 16 September 2008 Helen Byrne submitted a paper[628] to the Performance Review Group[629], informing them that the successful team was led by Currie & Brown. On 2 September 2008 Currie & Brown were formally appointed:

> "The appointment is initially for Stage 1A – Preparation of Employers Requirements Documentation, with appointment to successive stages subject to approval from the Board, all as set out in ITT documentation." [630]

474. When, in September 2009, Multiplex commented on the proposed contractual terms between them and NHS GGC in their tender documents, the proposed project manager was identified as Currie & Brown[631].

475. The Currie & Brown team remained fully appointed throughout the whole of Stage 1, until the scope of their work was reduced by letter from Mr Moir to Mr Ross of Currie & Brown on 18 January 2010[632].

5.3.3 Approval of Exemplar Designs

476. Mr Hall explained that an exemplar design is the use of a model or example elements to inform the creation of a design. Exemplars were used to provide guidance, identify potential issues, and inspire new ideas[633]. Mr Baird described an 'exemplar design' as capturing discussions in a drawn form[634] - how the clinicians want to work and use their hospital[635]. Mr Hall said that the

[626] A35289380 - Bundle 52, Volume 2, Document 1, Page 7.
[627] A35100837 - Bundle 48, Document 8, Page 329.
[628] Bundle 34, Document 16, Page 120.
[629] Bundle 34, Document 15, Page 117.
[630] Bundle 17, Document 38, Page 1902.
[631] A51651834 - Bundle 43, Volume 6, Document 29, Page 498.
[632] Bundle 17, Document 74, Page 2870 and Bundle 17, Document 39, Page 1903.
[633] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Hall, Document 6, Page 205, Para 32.
[634] Transcript, Mark Baird, 28 May 2025, Page 15, Column 26.
[635] Transcript, Mark Baird, 28 May 2025, Pages 15-16, Column 27.

exemplar design laid out what 'perfection' might have been for the hospital design[636]. A Design Solution Report was published in July 2007[637].

477. The exemplar design process brought together designers and stakeholders in sessions where the stakeholders could outline their requirements. Subsequent sessions involve reviewing draft design solutions until an agreed exemplar design for a specific department was agreed[638]. The process was refined by User Groups, with eleven selected departments drawn out to illustrate the types of facilities that should be present and then compromises could be included to allow Nightingales to advance the design[639]. In this way a picture of adjacency, flow, etc would begin to emerge. David Hall's role was to facilitate the meetings[640]. The process involved moving from 1:500 'helicopter' view, down to perhaps eleven departments at 1:200 scale, zooming in further to individual rooms at 1:50, corresponding to the RDSs[641].

478. During later design work, in Stages 2 and 3 following the conclusion of the contract, User Groups were asked to consider and approve adjacencies – the idea being to allow them to move rooms around so that the layout achieved what they required.

5.3.4 Gateway Review 2 - January 2009

479. For QEUH, the Gateway Review 2[642] was carried out between 27 and 29 January 2009 and issued to the then Senior Responsible Owner, Helen Byrne, on 29 January 2009. The result was reported to the Acute Services Review Programme Board on 20 March 2009 by Robert Calderwood, then NHS GGC Chief Operating Officer.[643]

480. Ms Byrne explained that one of the recommendations of Gateway Review 2 was to reverse the governance changes made by Gateway Review 1. Subsequently, the New South Glasgow Hospital Executive Board and the

[636] Transcript, David Hall, 22 May 2025, Page 30, Column 55.
[637] Bundle 17, Document 32, Page 1706.
[638] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Hall, Document 6, Page 10, Para 32.
[639] Transcript, David Hall, 22 May 2025, Page 30, Columns 55-56.
[640] Transcript, David Hall, 22 May 2025, Pages 29-31, Columns 54-58.
[641] Transcript, Mark Baird, 28 May 2025, Pages 15-16, Columns 26-28.
[642] A34872853 - Bundle 43, Volume 2, Document 9, Page 108.
[643] A37216946 - Bundle 42, Volume 2, Document 8, Page 39.

Procurement and Finances Group were merged to create the New South Glasgow Hospitals and Laboratory Project Executive Board ('NSGHLPEB').[644]

481. Mike Baxter described the Gateway Review process as being an evaluation of the process structure of a project, which depended upon the information provided to the Gateway Review in the first place:

> "one of the things that a Gateway Review, as an independent process, would do would be to look at the hierarchy within a project management structure in terms of reporting maybe some of the issues that we touched on earlier in terms of escalation, in terms of risk management, for example, and how those are being dealt with. Those are factors that I would certainly expect a typical Gateway Review on a project to test at various stages as the project goes through its lifecycle … the project management arrangements, the hierarchy of those arrangements, the management of risk, escalation of risk, delegated authority. Those are typically things that would be looked at in a Gateway Review, and the Gateway Reviews that were provided on the Queen Elizabeth project were extremely positive, from memory."[645]

482. Ian Lee described the Gateway Review as "a process check" designed to ensure that objective requirements of the gateway were met, rather than to approve the decisions themselves. He thought the Project Team would have been involved in its preparation, but big decisions would have been referred upwards to CEO or Executive Board level[646].

5.3.5 Approval of the Employer's Requirements - April 2009

483. On 7 April 2009 a joint meeting of the New South Glasgow Hospital Executive Board and the Procurement and Finances Group extended the Stage 1A process for the production of the ERs, which had the effect of extending the bid return date to 11 September 2009[647].

484. At a further joint meeting on 24 April 2009, the joint group gave approval to proceed to tender[648], despite there being no update on the Stage 1A process.

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[644] Transcript, Helen Byrne, 30 May 2025, Page 34, Column 64.
[645] Transcript, Mike Baxter, 16 September 2025, Pages 41-42 and 44, Columns 77-80 and 83-84.
[646] Glasgow 4, Part 3 - Witness Statements, Volume 1, Ian Lee, Document 4, Pages 89-90.
[647] Bundle 42, Volume 2, Document 9, Page 49.
[648] Bundle 43, Volume 7, Document 6, Page 15.

Helen Byrne, who chaired the meeting, explained that she relied upon the Project Team and the Board's Technical Advisors to carry out a development process[649].

485. Mr Seabourne described himself as "a follower, not a leader" on the compilation of the ERs. It was Currie & Brown's role to lead, and the Project Team's role to ensure that the right people were present to give Currie & Brown the information to pull the ERs together[650].

486. Currie & Brown were doing the legwork of organising meetings[651]. NHS GGC would require that guidance be met but would not take an active role in explaining how that should be done and would leave the question of derogations or 'alternative solutions' to Currie & Brown[652].

487. Mr Baird of Currie & Brown described their work as "the glue in the middle"[653]. The purpose of the ERs was to:

> ".. form a portion of the invitation to participate in competitive dialogue. So, from a context point of view, they're a constituent part of that suite that will be issued to the market for bidders. So, the Employer's Requirements therefore capture what the employer, so the NHS in this context, want to buy, effectively. So, it's laying out what we want, the minimum standards, etc., that are required, the minimum requirements in a variety of areas, and that's articulated in written and drawn information"[654]

488. It was Mr Baird's view the NHS GGC Project Team would have been well aware that the contents of the ERs might change at any time up to conclusion of negotiations[655]. The final version would come from Currie & Brown saying, "Here's what we consider the final version to be from working through the process.", followed by Board approval[656].

489. As Currie & Brown encouraged us to consider[657], it is unlikely that Mr

[649] Transcript, Helen Byrne, 30 May 2025, Page 31, Column 57.
[650] Transcript, Alan Seabourne, 29 May 2025, Page 17, Column 29 and Page 41, Column 77.
[651] Transcript, Mark Baird, 29 May 2025, Page 14, Column 23.
[652] Transcript, Alan Seabourne, 29 May 2025, Pages 17-18, Columns 29-32.
[653] Transcript, Mark Baird, 28 May 2025, Page 9, Column 14.
[654] Transcript, Mark Baird, 28 May 2025, Page 8, Column 12.
[655] Transcript, Mark Baird, 28 May 2025, Pages 4-6, Columns 4-7.
[656] Transcript, Mark Baird, 28 May 2025, Pages 10-11, Columns 15-17.
[657] Bundle 50, Document 2, Page 56, Para 13.1.

Seaborne's description[658] is entirely correct. Whilst Currie & Brown had a key role, they were not solely responsible for compiling the ERs. They required information about what was needed by the client. The detail of how this was done was set out by Mr Baird in his statement[659].

490. Ms Byrne considered her responsibility to be to get a hospital that was fit for purpose and that met the ERs on two levels: the detailed requirements and the higher conceptual level[660]. She expected any risk elements to have been escalated to her, which she could then have escalated to the Board and the PRG for decision. She was reliant on Mr Seabourne and the Project Team, as she did not have the level of detail or necessary expertise and skills to evaluate responses[661].

491. Mr Calderwood said Ms Byrne had responsibility for the ERs[662]. He saw the ERs as being about ensuring that the facilities would be delivered to the standard stipulated in the detailed design phase[663]. He had not, before his involvement with the Inquiry, appreciated the distinction between compulsory guidance and recommended guidance. He had been told by the Project Team that SHTM 03-01 was guidance not of a compulsory nature, though he now understood its importance[664].

492. The failure to appreciate this distinction had a direct consequence. Mr Calderwood explained (or tried to):

> "SHTM 03, as issued by Health Facilities Scotland as it is now, I believe-- In relation to the recommendation contained within it suggesting 6 air changes, I was told it was guidance. In the documentation that we sent to the bidders and the statement that we put it into the “compulsory” box, that was a choice that the Project team put in the documentation. They subsequently accepted a design solution that was different. So, it’s the difference between the guidance being mandatory or guidance. The contract boxes are different. Again, they’re not the same thing. If we put something into the “compulsory” box but it’s not mandatory

[658] Transcript, Alan Seabourne, 29 May 2025, Page 44, Column 77.
[659] Glasgow 4, Part 1 - Witness Statements, Volume 3, Mark Baird, Document 3, Page 49.
[660] Transcript, Helen Byrne, 30 May 2025, Page 48, Column 91.
[661] Transcript, Helen Byrne, 30 May 2025, Pages 48-49, Columns 92-94.
[662] Transcript, Robert Calderwood, 30 September 2025, Page 26, Column 48.
[663] Transcript, Robert Calderwood, 30 September 2025, Page 27, Column 50.
[664] Transcript, Robert Calderwood, 30 September 2025, Page 32, Columns 59-60.

on the Board to achieve it, then the Board's at liberty to move it out of that box, which is what I understand, with the benefit of looking at it retrospectively, is what happened."[665]

493. The ERs were eventually in the form set out in Volume 2/1 of the Invitation to Participate in Competitive Dialogue[666]. Ms Byrne stated they went to the PRG for approval in May 2009[667]. She read them but only at a 'high level' and not in detail as she was reliant on her expert team to evaluate responses that came in from bidders[668].

494. The ERs[669] did require compliance with a range of NHS Guidance, including Draft for Consultation SHTM 03-01 Part A and Part B[670] and mandated that ACH should be "in accordance with CIBSE guides, SHTMs, HTMs and Building Regulations"[671]. They did not resolve the tensions between natural and mechanical ventilation, or around chilled beams and other air ventilation or indeed issues around energy requirements. The ERs did not contain a requirement for specific immuno-compromised or neutropenic rooms/wards, other than by reference to the COSs.[672] Subject to that qualification, accommodation was either to be in a single bedroom or a PPVL room compliant with SHPN 04 Supplement 1[673].

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[665] Transcript, Robert Calderwood, 30 September 2025, Page 33, Column 61.
[666] Bundle 46, Volume 3, Document 1, Pages 5-239.
[667] Transcript, Helen Byrne, 30 May 2025, Page 31, Column 57.
[668] Transcript, Helen Byrne, 30 May 2025, Page 49, Column 94.
[669] Bundle 46, Volume 3, Document 1, Pages 5-239.
[670] See sections 2.2.10 and 5.1.2, Bundle 46, Volume 3, Document 1, Pages 15 and 29-31.
[671] Section 8.2.11.8, Bundle 46, Volume 3, Document 1, Page 169.
[672] Section 8.2.14.6, Bundle 46, Volume 3, Document 1, Page 177.
[673] In the Employer's Requirements (Bundle 46, Volume 3, Document 1), Table 2 sets out the mandatory NHS Guidance Documentation. There is mandatory guidance which relates specifically to isolation rooms in acute facilities, namely HBN 04 Supp (page 35). The air handling units in the isolation facilities in the Critical Areas and the general areas were to be configured in accordance with 'SHBN04' (Para. 8.1.5.5, page 150. Section 8.2.14 [Ventilation of Isolation Rooms] states "Refer to draft SHPN 4 and drawings G1274 M(57)02 & 03" and "Ventilation and air conditioning systems for these areas shall be designed and installed in accordance with SHTM 2025, SHTM 2040, SHPN 4 and NHS Model Engineering Specification C04" (page 177). The relevant schematic for the isolation toom was listed in Appendix M (G-1274-M(57)02) (page 219). The schematics dated April 2009 show ventilation parameters. It is 10 ACH for the isolation room and a pressure differential of nominally zero from the room to the corridor. The pressure differential from the lobby to the corridor should be 10 Pa. The en-suite should have negative pressure and at least 10 ACH (Bundle 43, Volume 7, Document 1, Page 3). These ventilation parameters for isolation suites are identical to HBN 4 Supplement 1 (Bundle 16, Document 4, Page 314) and the SHPN 04 Supplement 1 (Bundle 23, Document 94, Page 945).

495. On 1 May 2009, the Invitation to Participate in Dialogue ITPD") documentation was sent out to the three successful bidders[674].

5.3.6 Late decisions made about IPC requirements

496. It was not until a meeting on 18 May 2009 that decisions were made on the Infection Control input into the ventilation system of the QEUH. There is no evidence of such a meeting taking place in respect to the RHC.

497. The minute[675] recorded that the meeting agreed "a final infection control position with regard to the New South Glasgow Adult Hospital", that extended to the ventilation of the adult Haemato-oncology Ward and the choice of the type of isolation rooms. It considered a paper by Dr Hood, Ms Rankin and Dr Redding. We do not have the paper but have heard evidence about the meeting from Mr Walsh[676], Dr Redding[677], Ms Rankin[678], Ms Joannidis[679], Ms McCluskey[680] and Mr Seabourne[681]. Ms Devine was not asked about it.

498. Dr Redding recalled that the paper was likely produced before 2008, following discussions with clinicians, Estates, and Infection Control[682]. She was never Lead ICD and not involved with the new SGH Project after she stood down as Lead ICD for SGH in August 2008[683].

499. Dr Hood's involvement arose because he was the most experienced person on ventilation, (though Dr Redding was uncertain whether he had the expertise for a project of such scale and she emphasised the need for external expert input)[684]. The ventilation requirements listed in the minute contain less detail that the August 2008 requirements set out by Dr Hood. In respect of the isolation rooms the requirements differ significantly from those

[674] A51258908 - Bundle 34, Document 21, Page 146.
[675] Bundle 14, Volume 1, Document 3, Page 75.
[676] Transcript, Tom Walsh, 13 September 2024, Page 15, Columns 25-27.
[677] Transcript, Dr Penelope Redding, 4 September 2024, Pages 31-32, Columns 58-60.
[678] Transcript, Annette Rankin, 3 September 2024, Pages 9-11 and 14, Columns 13-18 and 23-24.
[679] Transcript, Pamela Joannidis, 30 August 2024, Pages 34-37, Columns 63-69.
[680] Transcript, Fiona McCluskey, 15 May 2025, Pages 24-25, Columns 44-46.
[681] Transcript, Alan Seabourne, 29 May 2025, Pages 87-88, Columns 170-171.
[682] Transcript, Dr Penelope Redding, 4 September 2024, Pages 31-33, Columns 57-62.
[683] Glasgow 3 - Witness Statements, Volume 3, Dr Penelope Redding, Document 2, Pages 71, 83, Para 18 and 61.
[684] Transcript, Dr Penelope Redding, 4 September 2024, Pages 31-33, Columns 58-61.

set out in section 8.2.14 of the ERs,[685] which define the hospital isolation rooms by reference to SHPN 4 to be PPVL Rooms. The 18 May 2009 minute sought, for the adult hospital, a mix of Negative Pressure Rooms without Anterooms and Positive Pressure Rooms with Negatively Pressured Anterooms.

500. On 5 June 2009 an email was sent from Dr Hood to Ms Griffin, copied to Professor Williams, stating that H13 filters should be in the Haemato-oncology specification in the new QEUH and he expected Professor Williams to agree that they also be in RHC specification[686].

501. Ms Griffin responded by informing him it would be sent to the 'Technical Advisers' at a meeting later that afternoon[687]. Professor Williams claimed not to recall being sent the email[688].

502. The simple point is that the conclusions of this meeting and the subsequent email of 5 June 2009, did not form part of the ERs and appear not to have been passed to the bidders. This conclusion is confirmed by the Multiplex tender[689] stating that: “Each isolation room will be provided with its own ventilation system in line with SHBN 04”. There is no “SHBN 04” guidance document. Multiplex may have mis-abbreviated SHPN 04 or conflated HBN 04 with SHPN 04.

503. What they did not do is respond to the request for a multiplicity of different sorts of Isolation Rooms, as envisaged by those present on 18 May 2009.

5.3.7 Changes to Governance Structures in April 2009

504. In Spring 2009 the Procurement and Finance Group and Project Executive Group were combined to form a single New South Glasgow Hospitals and Laboratory Project Executive Board (‘NSGHLPEB’), also known as the Executive Board. This change was approved by the Performance Review

[685] Bundle 46, Volume 3, Document 1, Page 177.
[686] A48743262 - Bundle 43, Volume 2, Document 21, Page 322.
[687] A48743262 - Bundle 43, Volume 2, Document 21, Page 322.
[688] Glasgow 4, Part 2 - Witness Statements, Volume 1, Document 11, Page 90.
[689] The Specification for Ventilating Systems Within Volume 4 of the Multiplex tender: Bundle 17, Document 10, Page 455.

Group on 19 May 2009. A paper prepared by Helen Byrne,[690] included, as an Appendix, Terms of Reference, [691] which set out the group's role and remit as including (quoting key terms only):

> "The NSGHLPEB will have appropriate delegated authority to take forward necessary negotiations to ensure objectives are achieved, progress is maintained and business is concluded especially where programme and financial matters are at a critical stage.
>
> The NSGHLPEB will have delegated authority to conduct and conclude negotiations at project critical moments.
>
> The NSGHLPEB will oversee the management of change control procedures in that any change which impacts upon the project must be authorised by this Board before it can be implemented."

505. The Terms of Reference for the NSGHLPEB, provided for eleven voting members, including James Stewart (then Chief Executive of Partnerships UK) and Mike Baxter (then newly appointed Deputy Director (Capital Planning and Asset Management) within the Health and Social Care Directorates of the Scottish Government).

506. The new Terms of Reference for the NSGHLPEB were reported to the NSGHLPEB on 1 June 2009[692]. Ms Byrne understood that Mr Seabourne would have been conducting negotiations with Multiplex in the period between them being chosen as preferred bidder and Mr Calderwood signing on 18 December 2009[693].

507. The Inquiry has heard evidence about the Terms of Reference from Mr Seabourne, Ms Byrne, Ms Grant, Mr Baxter and Mr Stewart.

508. Mr Seabourne agreed that they granted this body delegated authority to make executive decisions on critical points in the project programme which included negotiation, although he emphasised that in general, when it came to change control, that meant cost and change in programme rather than to technical

[690] Bundle 34, Documents 20-21, Pages 133-134 and Page 145.
[691] Bundle 34, Document 21, Pages 152-153.
[692] Bundle 42, Volume 2, Document 10, Page 54 at Item 4.
[693] Transcript, Helen Byrne, 30 May 2025, Page 36, Column 68.

issues[694].

509. Ms Byrne described it as more of a strategic body than a management body. Although it might appear clear in 2025 that a decision such as changing the maximum temperature of the building requires to be part of a change control procedure that involves the executive board, that was not so clear back in 2009[695]. The evidence heard and the records of the papers and minutes of the NSGHLPEB, suggest that no change control procedures were set up to report to the NSGHLPEB during its existence from June 2009 to the departure of Ms Byrne and further governance changes in February 2010.

510. Ms Grant was Chief Operating Officer ('the COO') in 2009. After a period away from NHS GGC she was appointed as Chief Executive in 2017. She was a member of the NSGHLPEB[696], which she described as a multi-disciplinary, non-technical expert decision-making body[697]. Technical matters were expected to be brought to the NSGHLPEB for ratification if they had substantial financial or environmental implications[698]. Ms Grant could not recall any formal change control process being in place[699] and agreed that a clearer process and explicit records of decisions would have made it easier to track decisions, particularly as by the time she became Chief Executive some involved staff had left[700]. Mr Baxter, one of the external voices, explained that he was unaware he had been appointed as a voting member, that it would be incompatible with his role as a civil servant and chair of the CIG, and that as soon as he became aware of that appointment, he asked for it to be changed[701] [702]. He had been attending various meetings relating to the new SGH Project for some years as an observer[703]. He did not attend the Joint Meetings of the NHS GGC Procurement and Finance Group and New South

[694] Transcript, Alan Seabourne, 29 May 2025, Pages 75-77, Columns 146-149.
[695] Transcript, Helen Byrne, 30 May 2025, Pages 37-40, Columns 69-75.
[696] Transcript, Jane Grant, 23 September 2025, Page 5, Column 5.
[697] Transcript, Jane Grant, 23 September 2025, Page 6, Columns 7-8.
[698] Transcript, Jane Grant, 23 September 2025, Pages 6-7, Columns 8-10.
[699] Transcript, Jane Grant, 23 September 2025, Page 9, Column 14.
[700] Transcript, Jane Grant, 23 September 2025, Pages 9-10, Columns 14-15.
[701] Transcript, Mike Baxter, 16 September 2025, Page 32, Column 60.
[702] Glasgow 4 Part 3 - Witness Statements, Volume 1, Mike Baxter, Document 1, Page 12, Para 30.
[703] See Project Executive Group Meeting 24 October 2007: Bundle 42, Volume 2, Document 3, Page 23.

Glasgow Executive Board on 8 April 2009[704] or 24 April 2009[705]. He was not involved in the establishment of the NSGHLPEB and did not see its Remit and Terms of Reference,[706] until he was preparing for the 7 December 2009 meeting. He then explained at that meeting that, given his role as chair of CIG, it would not be appropriate for him to be a voting member of the Executive Board[707].

511. It does appear that when he attended meetings of the NSGHLPEB he did not routinely review the minutes of earlier meetings attended by his colleague[708]. It does seem reasonable to ask why no Scottish Government official had noticed this enhanced status for their observer before December, but in any event as far as Mr Baxter can recall during this time on the Executive Board no changes come through for approval in relation to technical memoranda[709]. He felt he was entitled to proceed on the basis that in the absence of requests for change under a change management control the Executive Board understood that there were no changes[710]. If it was the case that changes were carried out to prevent there being a cost overrun, he would expect to be told, as in his view there would be opposition from the Scottish Government to cutting corners or derogation from standards simply to cut costs[711].

512. Mr Stewart could remember nothing about his time attending the Executive Board or whether there was a change control process[712]. Without access to his papers, he felt unable even to comment on the extent of the role he was asked to carry out. Best practice should suggest that had technical changes being required the Executive Board would have been notified, and there would have been discussion whether to involve other governance bodies with technical experience[713]. Mr Stewart appeared to accept that, taken in the round, and acknowledging that he could no longer remember his involvement

[704] Bundle 42, Volume 2, Document 8, Page 44.
[705] Bundle 43, Volume 7, Document 6, Page 15.
[706] Bundle 34, Document 21, Pages 152-153.
[707] Glasgow 4, Part 3 - Witness Statements, Volume 1, Mike Baxter, Document 1, Page 12, Para. 30 and Transcript, Mike Baxter, 16 September 2025, Page 27, Column 50.
[708] Transcript, Mike Baxter, 16 September 2025, Page 25, Column 46.
[709] Transcript, Mike Baxter, 16 September 2025, Page 22, Column 39.
[710] Transcript, Mike Baxter, 16 September 2025, Page 23, Column 42.
[711] Transcript, Mike Baxter, 16 September 2025, Page 24, Column 44.
[712] Transcript, James Stewart, 18 September 2025, Page 21, Column 38.
[713] Transcript, James Stewart, 18 September 2025, Page 17, Column 29.

in the project, the role of PUK might have been 'light touch' rather than the more intensive involvement they had had in other projects[714].

5.4 Tender to selection of Preferred Bidder - 2009

5.4.1 Competitive Dialogue

513. The formal procurement process began in February 2009, when a fresh advert for construction of the new SGH was placed in the Official Journal of the European Union.

514. NHS GGC's advisers created a scoring matrix. Bids were assessed on a Pre-Qualification Questionnaire ("PQQ"). Multiplex scored a total of 371.1 points.[715]. NHS GGC's legal advisors, S&W, Susan Logan and Mark McAllister awarded very low points in relation to technical ability. No financial scoring was awarded[716]. On 20 March 2009, the PQQs were returned by all bidders. The PQQs were evaluated by the following individuals on the Evaluation Panel: Alan Seabourne, Hugh McDerment, Alan McCubbin, Tony Cocozza, Simon Fraser (S&W), Michael McVeigh (Ernst & Young), and Jim Hackett (C&B). The PQQ scores were weighted more on technical ability (46%) and to a lesser extent financial standing (26%) than bidder details and information on advisers.

515. Mr Gallagher and Mr Seabourne did not consider themselves to have the expertise to score the bids, and although this task had been allocated to them in the minute[717], they passed it on to advisers Currie & Brown, Ernst & Young and S&W. Mr Gallagher did not consider this to be a matter of NHS expertise[718].

516. On 1 April 2009, an overall score was agreed and a draft report issued. On 8 April 2009 three bidders were chosen for the Competitive Dialogue by a joint meeting of the New South Glasgow Hospital Executive Board and the Procurement and Finances Group, which considered a report on the

[714] Transcript, James Stewart, 18 September 2025, Pages 28-31, Columns 52-57.
[715] A51651444 - Bundle 43, Volume 6, Document 65, Page 1121.
[716] A51651444 - Bundle 43, Volume 6, Document 65, Page 1121.
[717] A35560076 - Bundle 30, Document 3, Page 26.
[718] Transcript, Peter Gallagher, 18 September 2025, Pages 54-55, Columns 101-103.

Prequalification Questionnaire (PQQ) process.[719] The three bidders were: Balfour Beatty Group Limited, Multiplex, and Laing O'Rourke Construction Limited ("LOR")[720]. On 30 April 2009, the ITPD Volume 3 documentation was updated and a new inclusion made by C&B was "7.0 HTM/SHTM Compliance Statement"[721].

517. On 1 May 2009, the ITPD documentation was sent out to the successful bidders. The deliverables required were in three areas: project scope and commercial, works information/ERs, and Bid Deliverables & Evaluation[722].

518. Between June and August 2009, a series of competitive dialogue meetings took place with the bidders to discuss and clarify NHS GGC's requirements. The meetings were in four workstreams; design/site; logistics; laboratories/FM; commercial. Ms Rankin did not recall the topic of isolation rooms arising[723].

519. During this period, Requests for Information ("RFIs") could be and were made by bidders to NHS GCC in a prescribed form, for example on plant and distribution strategy. Multiplex submitted 147 RFIs, later recorded in the RFI log in the Building Contract.

520. The competitive dialogue process concluded in August 2009. Proposals were then presented on 11 September 2009 and formal submission by the three bidders and evaluation thereafter.[724]

5.4.2 Removal of the Maximum Temperature Variant

521. On 8 June 2009 document entitled 'NSGH Project Issue 1 Maximum Temperature Variant[725] was issued by NHS GGC as a revision to the Contract, stating that "The maximum temperature variant has been removed from the bid requirements, the bidders shall put forward schemes to ensure thermal comfort and avoid overheating", and recording that "For design

[719] Bundle 42, Volume, Document 9, Page 49.
[720] A35422584 - Bundle 30, Document 2, Page 22.
[721] A51652388 - Bundle 43, Volume 6, Document 25.1, Page 461.
[722] Bundle 34, Document 21, Page 146.
[723] Transcript, Annette Rankin, 19 August 2025, Page 67, Column 129.
[724] A35560076 - Bundle 30, Document 3, Page 26.
[725] A33010775 - Bundle 17, Document 26, Page 1063.

purposes the level of thermal comfort shall be: Room temperatures should not go below 18C in winter for longer than 2 hours at a time, or higher than 26C in summer for more than 50 hours in total, but not on successive days" [726].

522. In Glasgow 4, Part 1, the Inquiry heard evidence on the removal of the mandatory maximum temperature variant from Mr Pardy[727], Mr McKechnie[728], Mr Hall[729] and Mr Seabourne[730]. The primary reason given for making the change was experience in new-build hospitals. Peter Gallagher stated that cost was not a factor in the decision-making, though he did not claim to know what the change would involve[731]. His evidence was of being involved in any changes which created significant costs, though he also mentioned having sat on numerous groups and thereby becoming aware of changes as they arose, notwithstanding that cost may not have been an issue[732].

523. The change was not raised to Board level[733]. Mike Baxter was concerned that it did not appear to have engaged governance structures so as to invite scrutiny from the Executive Board, being an "absolutely material" variation from standard requirements[734]. Ms Byrne said that in 2009 there was a lack of clarity that those sorts of changes should come to the Board[735]. Her view, from her experience in NHS England, was that this type of change should have come to the Board[736].

524. Mr Calderwood explained that, while he was unaware of what had been done to assess consequences of the change, it must have been the case that:

[726] A33010775 - Bundle 17, Document 26, Page 1063.
[727] Transcript, Steven Pardy, 27 May 2025, Pages 8-9, Columns 12-14.
[728] Transcript, Stewart McKechnie, 27 May 2025, Page 71, Column 138.
[729] Transcript, David Hall, 22 May 2025, Pages 35-36, Columns 66-67.
[730] Transcript, Alan Seabourne, 29 May 2025, Page 22, Column 40.
[731] Transcript, Peter Gallagher, 18 September 2025, Page 58, Column 112.
[732] Transcript, Peter Gallagher, 18 September 2025, Page 40, Column 75.
[733] Bundle 42, Volume 2, Document 10, Page 54; Bundle 42, Volume 2, Document 11, Page 57; Bundle 34, Document 23, Page 154, Page 156, Item 45(b).
[734] Transcript, Mike Baxter, 16 September 2025, Pages 22-23, Columns 40-41.
[735] Transcript, Helen Byrne, 30 May 2025, Page 39, Column 74.
[736] Transcript, Helen Byrne, 30 May 2025, Page 40, Column 75.

"..it clearly didn't take them outwith the parameters of their delegated authority to proceed because they didn't have to come back to the Board for more money or for a delay in the project"[737].

525. The implication therefore appears that the criterion by which any change might have resulted in escalation in practice would have been on the basis of increased cost. Mr Calderwood spoke later of 'inferred schemes of delegation' such that:

"The big issues that would go back to the Board automatically – i.e., they would never be delegated to directors, including myself – were … finance, clinical specification, and by that I mean the services going in and the scale of the project that we had agreed to buy for that amount of money. The project director and the Chief Operating Officer could not have agreed to take only a thousand beds, "but we'll keep it within the budget and we don't need to tell the Board" … that would have to be reported to the Board. Likewise, if you decided that we were just not going to have a particular department because we didn't have space, that again would need to be reported to the Board, but outwith that, the detailed design of the ward, the detailed design of theatres, the discussions that were had about whether you have clean and dirty corridors within the theatres, all of these kind of operational issues, that was delegated."[738]

526. Mr Gallagher's evidence suggested that the decision-making structure, when it came to changes, was heavily reliant upon officials doing the expected thing. Asked whether the functioning of the project is dependent on what the project director tells people, he was initially reluctant to accept that scrutiny might stop if the Project Director declined to elevate it upwards ("It'd be unlikely that the project director was the only person dealing with an issue"), but, when pressed, accepted the risk of that occurring:

"if the project team hadn't agreed something to escalate, and the project director was going to escalate that but didn't, then I take your point, what happened to it at that point."[739]

527. Mr Seabourne's evidence was of the temperature change being decided at a

[737] Transcript, Robert Calderwood, 30 September 2025, Page 39, Column 74.
[738] Transcript, Robert Calderwood, 30 September 2025, Page 77, Column 149.
[739] Transcript, Peter Gallagher, 18 September 2025, Page 38, Column 72.

lower level, by the Director of Facilities in discussion with Currie & Brown[740]. Ms Byrne noted that escalation would have had to come from Mr Seabourne and his technical advisors.[741]

528. In the Ventilation and Air Treatment Design Strategy[742] within the Multiplex tender it was clear that a mixed mode ventilation could not meet the maximum temperature threshold of 26 degrees. The only way to meet that temperature requirement, it was said, was to deliver a lower air change rate in single bedrooms throughout the hospital not in compliance with SHTM 03-01 2009 (Draft). The specification for Ventilating Systems[743] did not state that that the mechanical Ventilation and air conditioning systems will comply with SHTM 03-01 (Draft 2009).

529. Mr Ballingall encapsulated the issue:

> "The issue was that, in black and white, we couldn't comply with the six air changes in the SHTM, and if we went for the six air changes, we couldn't satisfy either the energy model, or the energy limits, or the heat limits"[744]

530. Mr Seabourne described the decision to require a lower maximum temperature of 26 degrees as the "first derogation"[745]. Ms Byrne explained that there was a lack of clarity on derogation and alternative solutions. If an alternative solution was proposed that the project team and technical advisors thought was good, then it would not come to Ms Byrne's group's attention, but in hindsight she would have preferred a different approach[746].

5.4.3 Activity Database Sheets ("ADB")

531. The ADB system was addressed during the Edinburgh hearings. It is a database tool with detailed clinical requirements for hospital areas, based on guidance relevant to the design of hospitals in England, including Health

[740] Transcript, Alan Seabourne, 29 May 2025, Page 23, Column 41.
[741] Transcript, Helen Byrne, 30 May 2025, Page 40, Column 76.
[742] Within Volume 3 ("Design Narratives) of the Multiplex tender: Bundle 18, Volume 1, Document 8, Pages 311-312.
[743] Within Volume 4 of the Multiplex tender: Bundle 17, Document 10, Page 455.
[744] Transcript, Ross Ballingall, 21 May 2025, Page 17, Column 29.
[745] Transcript, Alan Seabourne, 29 May 2025, Pages 22-23, Columns 40-41.
[746] Transcript, Helen Byrne, 30 May 2025, Page 39, Column 73.

Building Notes (“HBNs”) and Health Technical Memoranda (“HTMs”)[747]. ADBs are generally used when creating Room Data Sheets (“RDSs”). A room type is selected, identified by one of a number of “ADB codes”, and then tailored to the clinical needs of the room - a 'starter for ten'[748]. Not every room type has an ADB code; for example, there is no code corresponding to use by immuno-compromised patients.

532. An ADB briefing code is applied to each room type, that contains the initial brief for that type of room[749]. It consists of a briefing sheet describing the clinical activity, an environmental briefing sheet which contains spaces for mechanical ventilation, lighting levels etc., a finishes sheet dealing with wall finishes, door types etc., and a component sheet which contains the equipment to be in the room[750]. Where there is no ADB code for a particular room, such as a BMT room, a standard room is used and then adapted[751].

533. On 7 April 2009, ADBs were prepared. The ADB for ‘isolation single room; Critical care’ specified 6 ACH and balanced pressure relative to the adjoining space; however, the ‘notes’ section recorded the need for protective isolation. It is not in accordance with SHTM 03-01[752]. The ceiling is recorded as being smooth, imperforate and jointless, which matches the Haemato-oncology COS[753](though there is no reference to it being sealed).

534. In the RHC, the ADB for single room isolation set out no specified ACH and had balanced pressure to the adjoining space. In the notes section there is reference to HBN text but not SHTM 03-01[754]. The ceiling is not required to be smooth and jointless.

535. Emma White said that there were no "specific Single Rooms in ABD which identify immunocompromised patent bedrooms (e.g. Haematology-Oncology-BMT)"[755] and that the goal was to maintain the same brief in order to

[747] CTI Closing Statement, Edinburgh, Page 21, Para 65.
[748] Transcript, Andrew Poplett, 10 May 2022, Page 38, Column 71.
[749] Transcript, Emma White, 13 May 2025, Page 5, Column 6.
[750] Transcript, Emma White, 13 May 2025, Pages 7-8, Columns 10-11.
[751] Transcript, Frances Wrath, 14 May 2025, Page 9, Column 13.
[752] A51909742 - Bundle 43, Volume 6, Document 24, Page 443.
[753] A51909742 - Bundle 43, Volume 6, Document 24, Page 444.
[754] A51909742 - Bundle 43, Volume 6, Document 24, Page 445.
[755] Transcript, Emma White, 13 May 2025, Page 47, Column 89.

standardise the building[756]. She believed that the assumption in ADB was that the most at-risk patients would be accommodated in isolation rooms[757]. The ADB code for Adult Haematology-Oncology patients' rooms was initially the same as the Generic Patient Room code, but eventually a code was written to accommodate the additional requirements for Adult Haematology-Oncology patients' rooms[758]. Ms White believed that this change occurred during the RDD review process[759].

5.4.4 Appointment of Multiplex as Preferred Bidder

536. In October 2009 NHS GGC and its advisers used a Most Economically Advantageous Tender ("MEAT") scoring methodology to evaluate the tenders, based on design, logistics and commercial aspects[760].

537. On 3 November 2009, the Performance Review Group were asked to approve the appointment of Multiplex as preferred bidder[761]. It took account of the technical overview and evaluation, cost analysis, legal considerations, MEAT score, affordability and recommendations. It concluded that Multiplex "Fully met the Board's Exemplar requirements" and was "Compliant with Employer's Requirements" when it came to the 1/500 scale drawings in respect of departmental adjacencies[762]. The appointment was approved.

5.5 Final Six weeks to contract signature

538. The period between Multiplex being appointed preferred bidder (in early November 2009), and the Building Contract being signed (on 18 December 2009), contained only six working weeks. There were many meetings between Currie & Brown, NHS GGC and Multiplex in this period. Mr Hall and Mr Baird of Currie & Brown explained that the Clarification Logs, the M&E Logs, and the entries in them were the records of these meetings.

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[756] Transcript, Emma White, 13 May 2025, Page 47, Column 89.
[757] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 203.
[758] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 201, Para 30.
[759] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 203.
[760] A51652797 - Bundle 43, Volume 2, Document 10, Page 125.
[761] A34871046 - Bundle 17, Document 64, Page 2651.
[762] Bundle 17, Document 66, Page 2724 and 2725 respectively.

5.5.1 Agreed Ventilation Derogation

539. As described in PPP 15[763], at the time that Multiplex was appointed as preferred bidder it was clearly well known within the Project Team and by NHS GGC's technical advisers, that none of the bidder's proposals delivered both the maximum temperature of 26 degrees and compliance with SHTM 03-01 2009 (Draft) in terms of ACH in the single rooms.

540. On or around 15 December 2009, this was resolved between NHS GGC and Multiplex, and the agreement was recorded in a document called the “M&E Clarification Log”. As a result, the ventilation system would deliver lower air change rates than those specified in the ERs by reference to SHTM 03-01. Those involved had no doubt that this was the case. This is what the Inquiry has called the “Agreed Ventilation Derogation”. It was then incorporated into the Construction Contract dated 18 December 2009.

541. Fiona McCluskey, Senior Nurse Advisor to the Project Team, explained that, just days before the derogation was approved, she was asked by Mr Seabourne to provide a nursing assessment of how many people could be in a ward bedroom at any given time. After discussion she, "came up with a sort of average of five"[764]. Mr Seabourne recalled a discussion with Dr Hood, Professor Williams, Infection Control Nurses, and Peter Hoffman where the conclusion reached was that rooms did not need 6 ACH[765]. It was Mr Hoffman's evidence that his first involvement with the QEUH was in late 2010[766]. Mr Calderwood's evidence was that he had later been told by the Project Director that SHTM 03-01 was 'only guidance'.[767]

542. Ms White stated that as a matter of good practice, the default assumption should be that there is no derogation from a mandatory piece of national guidance, unless this were made clear, with good practice being to record the change on a schedule for visibility[768]. Mr Wilson accepted that information in a

[763] Bundle 48, Document 15, Page 417, from Para 205.
[764] Transcript, Fiona McCluskey, 15 May 2025, Pages 28-29, Columns 51-54.
[765] Transcript, Alan Seabourne, 29 May 2025, Page 47, Column 89.
[766] Transcript, Peter Hoffman, 26 September 2024, Pages 5-6, Columns 6-8. See also Bundle 17, Document 79, Page 3032.
[767] Transcript, Robert Calderwood, 30 September 2025, Page 32, Column 60.
[768] Transcript, Emma White, 13 May 2025, Page 51, Column 97.

Log was harder to find, and thus to create PPM information[769].

543. Mr Hall's view was that the M&E Clarification Log had been an appropriate means of recording the variation. He accepted that that did not equate to visibility for the wider Board but did not accept that he had had a responsibility to ensure that the matter was brought to the Board more widely[770].

544. The Minutes of the Acute Services Review Programme Board from 11 November 2009[771] report at Item 4 that:

> "Since the successful bidder was announced there have been meetings with Brookfield in the pre-contract phase which included resolving issues that arose during the evaluation process. These are being resolved to the Board's satisfaction.
>
> Briefing meetings have been held this week with key members of the Board's team in the run up to the signing of contracts next week. HB reported that there was a planned further briefing meeting held early next week just before the contracts are signed."

545. Currie & Brown confirmed a meeting attended by Mr Baird and Mr McKechnie, with NHS GGC and Multiplex, at the Project Team office in Hillington, to discuss the M&E Clarifications Log and the proposed Ventilation Derogation.[772] An email from Mr Baird to Mr McKechnie at 6:44pm on Wednesday 16 December 2009 records the agreed steps:

> "Think we have a way forward on this one, need a calculation carried out however tomorrow morning to prove our resolution. This involves litres per second, air changes etc and therefore requires your technical input and illustration. Can we have support for half hour/hour in the morning please …"[773]

546. Mr Seabourne identified Currie & Brown (led by Mr Baird) in liaison with Mr Ballingall of Multiplex, ZBP, and Wallace Whittle, as having taken this aspect

[769] Transcript, David Wilson, 20 May 2025, Page 38, Column 74.
[770] Transcript, David Hall, 22 May 2025, Pages 46, 47, 58, Columns 87, 89, 112.
[771] A35560081 - Bundle 30, Document 5, Page 34.
[772] A51129109 - Bundle 22, Volume 3, Document 3, Page 20.
[773] A48745734 - Bundle 17, Document 73, Page 2869.

forward[774]. He himself, or Mr Moir, would have given the final agreement [775]. Mr Seabourne has suggested that the derogation would have been included in an Alternate Design List which he understood Multiplex would have delivered at handover.[776] This list was not mentioned by any other witness. Mr Gallagher could not recall having been told about the change, but could see the logic in informing him, from a financial point-of-view. His assumption was initially that the decision would have gone to 'a senior group', but he could not recall details and thought instead that it may have been referred to as a slide on 'evaluation day'[777]. Mr Seabourne speculated that the reason the ventilation derogation was negotiated through the Project Team, rather than through the Executive Board, was because “they obviously thought we were the best people to do it”, despite the general rule that compensation events with an effect on the target price should be elevated to that level[778]. On the other hand, James Stewart was clear that it would make little sense for a Project Board to be conducting negotiations – this would more likely be for executive members of the Executive Board[779].

547. Ian Lee, a non-executive member of the NHS GGC Board, considered the ventilation derogation to be a technical matter to be reported to the Performance Review Group or to the main Board, though the actual decision-making would have been at a lower level[780]. There was no such report.

548. Ms Rankin emphasised that IPC should be involved in any discussions over whether to carry out a derogation, especially in a high-risk area[781], but she had left the Project Team by this point[782].

549. Mr Ballingall’s description of Wallace Whittle’s role, in relation to the ventilation derogation, was of ZBP giving Wallace Whittle the information that they

[774] Transcript, Alan Seabourne, 29 May 2025, Page 40, Column 76.
[775] Transcript, Alan Seabourne, 29 May 2025, Page 42, Columns 79.
[776] Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 44, Para 17.
[777] Transcript, Peter Gallagher, 18 September 2025, Pages 59 and 61, Columns 113-114 and 117.
[778] Transcript, Alan Seabourne, 29 May 2025, Page 77, Column 150.
[779] Transcript, James Stewart, 18 September 2025, Page 25-26, Columns 45-47.
[780] Glasgow 4, Part 3 - Witness Statements, Volume 1, Ian Lee, Document 4, Page 101, Paras 60-61.
[781] Transcript, Annette Rankin, 19 August 2025, Page 69, Column 134.
[782] Glasgow 4, Part 2 - Witness Statements, Volume 1, Anette Rankin, Document 13, Page 118, Question 6.

needed to then advise NHS GGC that the derogation was the sensible way to proceed[783], with Wallace Whittle having have seen the ZBP Ventilation Strategy Paper [784].

550. In or around 15 December 2009, the ZBP Ventilation Strategy Paper was created, primarily authored by Mr Pardy but supported by the ZBP team and Multiplex[785]. Mr Pardy had no concerns about the proposals within the ZBP Ventilation Strategy Paper[786]. The reason why ZBP had been asked to produce the ZBP Ventilation Strategy Paper was to help get the project signed-off,[787] and it followed that the aim of the ZBP Ventilation Strategy Paper was to propose to NHS GGC a departure from what they had stated was to be mandatory[788]. He thought that ZBP would have talked through the ZBP Ventilation Strategy Paper with Wallace Whittle and others by telephone[789] once it had been produced[790] to explain why they had written what they had written and answer any questions[791]. Mr Ballingall recalled Mr McKechnie of Wallace Whittle and Mr Pardy were both putting the ZBP Ventilation Strategy Paper together and Mr McKechnie was commenting on it as it was being produced[792].

551. The background work undertaken in the preparation of the ZBP Ventilation Strategy Paper included thermal analysis and ventilation arrangements[793]. Thermal modelling was carried out in the bid stage on the use of natural ventilation and then mechanical ventilation,[794] and the conclusion reached was that all ward rooms be provided with mechanical cooling in the form of active CBUs[795]. The ZBP Ventilation Strategy Paper was prepared to provide an alternative approach, based on environmental control using CBUs, single

[783] Transcript, Ross Ballingall, 21 May 2025, Page 22, Column 40.
[784] Transcript, Ross Ballingall, 21 May 2025, Page 25, Column 46.
[785] Glasgow 4, Part 1 - Witness Statements, Volume 3, Steven Pardy, Document 1, Page 14, Para 46.
[786] Glasgow 4, Part 1 - Witness Statements, Volume 3, Steven Pardy, Document 1, Page 14, Para 46.
[787] Transcript, Steven Pardy, 27 May 2025, Page 21, Columns 37-38.
[788] Transcript, Steven Pardy, 27 May 2025, Page 14, Column 23.
[789] Transcript, Steven Pardy, 27 May 2025, Page 16, Column 28.
[790] Transcript, Steven Pardy, 27 May 2025, Page 23, Column 41.
[791] Transcript, Steven Pardy, 27 May 2025, Page 21, Column 38.
[792] Transcript, Ross Ballingall, 21 May 2025, Page 26, Column 47.
[793] Glasgow 4, Part 1 - Witness Statements, Volume 3, Steven Pardy, Document 1, Page 14, Para 47.
[794] Bundle 16, Document 21, Page 1657.
[795] Bundle 18, Volume 1, Document 8, Pages 311-312; Bundle 16, Document 21, Page 1657.

occupancy bedrooms and reducing energy consumption[796].

552. The ZBP Ventilation Strategy Paper was submitted to the NHS GGC Project Team in the tender process. Mr Pardy considered it to be a derogation from SHTM 03-01,[797] which is consistent with the 'Board Requirement' section of the ZBP Ventilation Strategy Paper which expressly states that the temperature limit exceeds the guidance provided within the draft SHTM 03-01[798]. The ZBP Ventilation Strategy Paper stated that while the ACH did not meet SHTM 03-01 guidance, it did comply with the Scottish Building Regulations and also CIBSE codes[799].

553. Mr Calderwood's account was of not having been aware of the derogation until later, and of having been unaware of the ZBP Ventilation Strategy Paper[800] at the time[801]. He maintained that had anyone been told, it would have been Ms Byrne[802]. Later, in the run-up to opening, he did not interrogate the ventilation parameters but trusted the Project Team to have identified what was acceptable[803]. His working basis was that the technical advisors would have approved the change[804].

554. Both Mr Hall and Mr Seabourne were of the view that the process of agreement in 2009 should not be regarded as a final one. Mr Hall described the process of reaching the ventilation derogation as being about achieving a ‘baseline’ for the Contract, with further design and development to be carried out later:

> “…the finality of the decision was not until 2010 because that’s when the design was concluded for all the systems. What happened in 2009 was that it was agreed at that point that there was a reasonable prospect that a solution could be found based on that, and therefore the terms and cost of the contract … we had to put a line in the sand which said, “That’s what you’ve based your price upon,” and there was a reasonable assumption between ZBP and Wallace Whittle that the solution

[796] Glasgow 4, Part 1 - Witness Statements, Volume 3, Steven Pardy, Document 1, Page 16, Para 52.
[797] Glasgow 4, Part 1 - Witness Statements, Volume 3, Steven Pardy, Document 1, Page 16, Para 52.
[798] Bundle 16, Document 21, Page 1657.
[799] Bundle 16, Document 21, Page 1658.
[800] Bundle 16, Document 21, Page 1657.
[801] Transcript, Robert Calderwood, 30 September 2025, Pages 43-44, Column 82-84.
[802] Transcript, Robert Calderwood, 30 September 2025, Page 52, Column 100.
[803] Transcript, Robert Calderwood, 30 September 2025, Page 48, Column 92.
[804] Transcript, Robert Calderwood, 1 October 2025, Page 68, Column 131.

that was put forward at that time could be made to work. If, as the design developed, that was proven not to be able to work, then it could have been varied at that point."[805]

555. Mr Seabourne likewise emphasised the scope for revisiting the terms of whatever had been included in the Contract at the end of 2009, his mindset at the time of conclusion of the Contract being:

> "I'm not bothered about this decision the now because I can go back and readdress that … these logs are very high level. These are only concluding the ERs basically … There may or there may not be cost implications. It depends in the design what solution we might have come up with"[806]

556. Mr Hall stated that he was aware of discussions in 2010, in which Infection Control and Mr Hoffmann had participated, as to whether to proceed with the ventilation derogation[807], but the earliest involvement of Mr Hoffmann the Inquiry Team has considered is in 2010 about the renal dialysis space discussed below.

557. Stewart McKechnie gave evidence to the effect that, at the point at which Wallace Whittle was stood down (which was in January 2010), there had been insufficient detail for them to give a detailed commentary on the ventilation proposals (they had considered that aspect in November 2009). He stated that it was agreed that the detailed commentary would be provided during the detailed design stage[808]. His evidence was however not entirely clear on timeline – he explained that the commentary was noted on a document dated November 2010, but was in fact provided in November 2009[809]; and also stated that Wallace Whittle had provided some commentary on the Environmental Matrix in 2010[810] (though he was clear that in doing so they did not provide an opinion on the ventilation solution)[811].

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[805] Transcript, David Hall, 22 May 2025, Pages 36-37, Columns 68-69.
[806] Transcript, Alan Seabourne, 29 May 2025, Pages 37-38, Columns 69-71.
[807] Transcript, David Hall, 22 May 2025, Page 55, Column 106.
[808] Transcript, Stewart McKechnie, 27 May 2025, Page 60, Columns 115-116.
[809] Transcript, Stewart McKechnie, 27 May 2025, Page 61, Column 117.
[810] Transcript, Stewart McKechnie, 27 May 2025, Page 63, Column 122.
[811] Glasgow 4, Part 1 - Witness Statements, Volume 3, Stewart McKechnie, Document 2, Page 41, Para 28.

5.5.2 Drivers of the Agreed Ventilation Derogation

558. Differing views were presented as to the reason behind moving to the ventilation derogation. Mr Ballingall said that energy, BREEAM and heat were the main drivers[812]. Mr Pardy stated that the carbon dioxide target of 80kg/m2 was a key driver for the project, with a view to having QEUH one of the most energy efficient hospitals in the UK[813].

559. However, Susan Logan of Ecoteric, explained that BREEAM credits generally do not apply to areas where the clinical need would take priority, and would never contradict or override a health technical memorandum[814]. Mr Seabourne also stated categorically that they never prioritised BREEAM over safety[815]. Ms Logan had advised in 2008 against sealing the hospitals for ventilation but did so based on practical sense and not on BREEAM[816].

560. As a result of the site selection with an adjacent operational sewage works the new SGH practically had to be a fully sealed hospital with no opportunity for natural ventilation.

561. Ms White also stated that BREEAM was not a significant factor in the ventilation derogation, to the extent that there had been no attempt to maximise the BREEAM ventilation credits available in respect of thermal ventilation[817]. She believed that NHS GGC's 'Technical Advisory team' were comfortable with the logic of the ventilation derogation, because it was supported with thermal calculations[818].

562. Ms White also explained at the time of the approval, the design approach was to inpatient wards and not areas of specialist ventilation and isolation rooms. Thermal modelling had been focused on the wards and key departments required for tender submission. There was no environmental matrix at this stage[819].

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[812] Transcript, Ross Ballingall, 21 May 2025, Page 22, Column 40.
[813] Glasgow 4, Part 1 - Witness Statements, Volume 3, Steven Pardy, Document 1, Page 7.
[814] Glasgow 4, Part 1 - Witness Statements, Volume 3, Susan Logan, Document 15, Page 481.
[815] Transcript, Alan Seabourne, 29 May 2025, Page 33, Column 61.
[816] Glasgow 4, Part 1 - Witness Statements, Volume 3, Susan Logan, Document 15, Page 482-483.
[817] Transcript, Emma White, 13 May 2025, Page 72, Column 139.
[818] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 181.
[819] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 182.

563. Mr Ballingall stated that it was impossible to both comply with the 6 ACH in the SHTM 03-01 for general rooms and to satisfy the energy model and heat limits[820]. His recollection was that NHS GGC had involved Wallace Whittle, and the ventilation derogation solution was deemed to be a sensible way of meeting differing requirements in relation to heat, air, and meeting the SHTMs[821]. NHS GGC had specifically stated in the M&E Clarification Log that the derogation would require Infection Control review[822].

564. TUV SUD, in their response to the Inquiry's PPP 15, were categoric that Wallace Whittle had identified that the proposal would be non-compliant with guidance and that ZBP had identified as such, and that:

> "…the decision whether to proceed with a 2.5 A/C rate was one to be made by NHS GGC in light of: (a) its requirement for a maximum temperature level of 26C; (b) its requirement that the energy efficiency target/BREEAM objectives had to be met; and (c) the explanation set out in the ZBP Ventilation Strategy Document."[823]

5.5.3 Building Contract Approval and Signature

565. No decisions about signing of the Construction Contract were made at the full meeting of the NHS GGC Board on 15 December 2009[824] or at the Performance Review Group on 3 November 2009[825].

566. How the governance arrangements worked was addressed with Ms Byrne, who spoke of whether there were any issues recorded at Board level such as would prevent signature of the contract[826], and as the authority “to conduct and conclude negotiations at project critical moments” had been delegated to the NSGHLEB by the Performance Review Group on 19 May 2009[827]. Mr Baxter could not recall the context of the discussion at the meeting but acknowledged that there was no formal recommendation to sign the contract

[820] Transcript, Ross Ballingall, 21 May 2025, Page 18, Column 29.
[821] Transcript, Ross Ballingall, 21 May 2025, Page 19, Column 34.
[822] Transcript, Ross Ballingall, 21 May 2025, Page 22, Column 39.
[823] Bundle 50, Document 5, Page 66.
[824] A51259159 - Bundle 37, Document 40, Page 526.
[825] Bundle 17, Document 64, Page 2652, Item 66.
[826] Transcript, Helen Byrne, 30 May 2025, Page 38, Column 71.
[827] Bundle 34, Document 21, Page 152.

recorded[828].

567. Ms Byrne could not explain why there was no record of a decision by the NSGHLEB, PRG or the Board to authorise Mr Calderwood to sign the contract on 18 December 2009. She could not recall any major decisions being recorded in the minutes that would prevent Mr Calderwood from signing it[829]. Mr Seabourne had been delegated authority to conduct and conclude negotiations with Multiplex, but if negotiations stalled then it would have been escalated[830].

568. Mr Baxter agreed with the suggestion that one should expect the incipient decision to sign being elevated to Board level in advance of signature. NSGHLEB had not seen a statement to that effect made by the Project Board, and speculated that he (as Scottish Government representative) would have operated under the assumption that a process would have been followed from the Project Board through the Chief Executive and NHS GGC Board prior to signature[831]. Scottish Government's interest was not in the contents of the contract, but in whether the procurement process had been properly carried out[832].

569. Mr Calderwood explained that he was one of only three Board Executives who had the delegated responsibility to sign contracts of this value. He attended at the lawyers' offices on only one occasion. The Project Team, Multiplex and their respective lawyers had been together over a period of days, attending to the contract documentation. Mr Calderwood himself was particularly interested in "only two or three aspects of the contract that I was seeking to ensure were watertight in relation to our responsibilities"[833].He did recall asking the Project Director if he was getting everything specified in the contract and was told 'Yes'.[834]

5.6 Design Development stage

[828] Transcript, Mike Baxter, 16 September 2025, Pages 28-30, Columns 52-55.
[829] Transcript, Helen Byrne, 30 May 2025, Page 38, Column 71.
[830] Transcript, Helen Byrne, 30 May 2025, Page 37, Column 69.
[831] Transcript, Mike Baxter, 16 September 2025, Page 30, Column 55.
[832] Transcript, Mike Baxter, 16 September 2025, Pages 31-33, Columns 57-62.
[833] Transcript, Robert Calderwood, 30 September 2025, Page 28, Columns 51-52.
[834] Transcript, Robert Calderwood, 30 September 2025, Page 29, Columns 53.

570. The signing of the Contract on18 December 2009 was followed by approximately one year of design development. This was Stage 2, which ended with the authorisation to proceed on 16 December 2010. The Contract provided that the contractor could not advance to Stage 3 (construction), unless the FBC was approved by Scottish Government.

571. In the Design Development Stage, the Contractor to develop its Proposals and submit these to the Client for review. The information that the contractor was to provide was detailed in Appendix K (Design Development), prior to the submission of FBC. However, as part of the development of the contractor's proposals, there was to be a Reviewable Design Process to enable review of the design "Reviewable Design Data" ("RDD") by the Client. All information was to be subject to review in three categories: "for approval", "for acceptance", "for comment". This was to be used "to review and approve/accept/comment, as appropriate, a range of deliverables such as clinical functionality at department and room level, specifications including finishes, colour schemes, and materials and components"[835] [836].

5.6.1 Governance During the Reviewable Design Stage

572. As described in Chapter 8 of PPP15, at its meeting of 19 February 2010, the Acute Services Review Programme Board approved new governance arrangements for the Acute Services Review Implementation including the new SGH Project.[837] On 16 March 2010 the Performance Review Group approved the changes.[838] The changes to the structure were:

a. That the Acute Services Review Programme Board and the South Glasgow Hospitals and Laboratory Project Executive Board be amalgamated into a bi-monthly Acute Services Strategy Board ("ASSB");

b. That a weekly ASSB Executive Sub-Group be created;

c. That construction management arrangements be introduced to support

[835] Bundle 26, Document 3, Pages 197 and 259.
[836] A32372025 - Bundle 17, Document 12, Page 613.
[837] A35560136 - Bundle 30, Document 6, Page 36.
[838] Bundle 34, Documents 27 and 28, Pages 185-217.

effective joint working between the Board and Multiplex;

d. That the Acute Services Redesign Group take forward the process of developing clinical service models and implementing a clinical service transformation programme.

573. The paper to the Acute Services Review Programme Board sets out the membership and remits of the ten management groups intended to run the project.[839] Mr Seabourne did not recall a specific 'scheme of delegation' in place, but there were Standing Financial Instructions ("SFIs") that would impact the Project Team's work because of capital expenditure threshold limits.[840]

574. On 20 April 2010, the first meeting of ASSB took place. It was chaired by Chief Operating Officer, Jane Grant, in the absence of Mr Calderwood. Mr Seabourne informed the meeting that Price Waterhouse Coopers ("PWC") had carried out an audit of the new governance arrangements. The authors of the PWC review[841] did not discover that the contract signed between NHS GGC and Multiplex approved the construction of a hospital with ventilation that did not comply with Scottish Government guidance and did not address the lack of a change control process during Stage 1. Ms Grant informed the meeting that an Executive Sub-Group had been set up, since NHS GGC had entered an NEC3 contract. There was a requirement for a senior group with authority to make decisions at short notice concerning issues that would impact on costs or programme. No limit could be breached without the appropriate request to the next level. Mr Seabourne outlined the formal change control process in place to consider potential changes which might occur in contract stages 1 and 2[842]. Ms Grant considered the ASSB to be a high-level group, which would not have had the technical expertise to make any assessment of issues relating to ventilation systems and chilled beams[843]. Mr Gallagher emphasised that change control was primarily monitored for financial

[839] Bundle 30, Document 6, Page 50 (Described in more detail below).
[840] Glasgow 4, Part 1 - Witness Statements, Volume 3, Alan Seabourne, Document 5, Page 159, Para 45.
[841] Bundle 34, Document 28, Page 197, at Item 5. The Review itself is Bundle 34, Document 28, Pages 207-217.
[842] A35422363 - Bundle 42, Volume 7, Document 1, Page 5.
[843] Glasgow 4, Part 3 - Witness Statements, Volume 4, Jane Grant, Document 1, Page 17, Q9.

impact[844]. Any major change in cost would be put on a spreadsheet by the Project Director, considered at the Executive Sub-Group, and find its way up. He would be aware of any significant cost as that would have to be escalated[845]. He would not have expected a change to an SHTM requirement without discussion at a senior project group[846].

575. Mr Gallagher considered the project to be a success which came in on budget unlike other major Scottish projects[847]. He acknowledged that not everyone shared his view as there would not have been an Inquiry if everyone thought it was a success[848]. However, Mr Gallagher rejected the suggestion that NHS GGC was too focused on money to the detriment of the build quality and design, because the project was not financially challenged[849].

576. Mr Gallagher acknowledged that if the Project Director, Mr Seabourne, did not escalate something then it could stop there[850]. He assumed that the Project Team would escalate bigger things to the Executive Sub-Group[851]. The minutes of the Executive Sub-Group meeting would be provided to the group above, the ASSB, as a matter of routine[852].

Project management structure

577. The New SGH Project had a bespoke management structure comprising a Project Steering Group and nine groups that reported to it. Each group had members from both the Contractor and Client side[853].

5.6.2 The NHS GGC Project Team

578. In May 2006, a core Project Team was established, led by a Project

[844] Transcript, Peter Gallagher, 18 September 2025, Page 54, Column 104 and Glasgow 4, Part 3 - Witness Statements, Volume 1, Peter Gallagher, Document 2, Page 51.
[845] Transcript, Peter Gallagher, 18 September 2025, Page 40, Column 75.
[846] Glasgow 4, Part 3 - Witness Statements, Volume 1, Peter Gallagher, Document 2, Page 64, Para 213.
[847] Transcript, Peter Gallagher, 18 September 2025, Page 65, Column 126; Glasgow 4, Part 3 - Witness Statements, Volume 1, Peter Gallagher, Document 2, Page 69, Paras 244 and 248.
[848] Transcript, Peter Gallagher, 18 September 2025, Page 65, Column 126.
[849] Transcript, Peter Gallagher, 18 September 2025, Page 66, Column 127.
[850] Transcript, Peter Gallagher, 18 September 2025, Page 38, Column 72.
[851] Transcript, Peter Gallagher, 18 September 2025, Page 44, Column 83.
[852] Glasgow 4, Part 3 - Witness Statements, Volume 1, Peter Gallagher, Document 2, Pages 37-38, Paras 53-55.
[853] Bundle 40, Document 1, Page 12.

Director[854]. Mr Seabourne described the function of the Project Team as being "to support the construction and design people in order that they could fulfil their contract to the Health Board"[855].

579. The key members of the Project Team after the February 2010 ASR Programme Board Governance review were[856]:

Alan Seabourne, Project Director

Peter Moir, Deputy Project Director and Project Manager

Mairi Macleod, Children's Hospital Project Manager

Heather Griffin, Adult Hospital Project Manager

Karen Connelly, Facilities management lead

Fiona McCluskey, Senior Nurse Advisor

Frances Wrath, Project Manager

Sam Suddese, Project Manager

Hugh McDerment, Project Manager

Stephen Gallacher, Project Medical Director Adult Hospital

Jane Peutrell, Project Medical Director Paediatrics

Shiona Frew, Project Administrator

Project Director, Alan Seabourne

580. The Project Director from June 2006 to July 2013 was Mr Seabourne. He had been transferred into NHS GGC from NHS Argyll & Clyde. He had worked in many acute hospitals, both adult and children's, mental health hospitals, learning disability hospitals and health board corporate offices, but does not appear to have any significant experience in the procurement of large hospital

[854] Glasgow 4, Part 1- Witness Statements, Volume 3, Alan Seabourne, Document 5, Page 117.
[855] Transcript, Alan Seabourne, 29 May 2025, Page 4, Column 3.
[856] Bundle 30, Document 6, Page 45.

buildings[857]. When the possibility of using a NEC3 contract came up in 2009, Mr Seabourne did not know what NEC3 was[858].

Project Manager and Deputy Project Director - Peter Moir

581. NHS GGC appointed their employee, Mr Moir, as Project Manager. As discussed in Chapter 1, Mr Moir was not available as a witness to the Inquiry. Mr Seabourne described him as an architect by profession, with his role being 'holding the technical part of it', with Mr Seabourne sitting above him in the structure [859]. While Mr Moir knew about NEC3 he did not have any experience of it. Ms White asserted that Mr Moir did not have M&E technical ability,[860] while Ms McCluskey maintained that Mr Moir did have the technical expertise to be able to lead on a project[861].

Project Managers for the Adult and Children's Hospitals

582. There were also Project Managers below Mr Moir in the structure, Ms MacLeod for the RHC and Ms Griffin for the QEUH.

a. As discussed in Chapter 1, Ms Griffin was unable to give oral evidence in Glasgow 4, Part 1, but, in her statement, she explained that her background was in nursing. Although appointed project manager, she considered her role was to focus on the development of the various business cases, the co-ordination of the User Groups, input into the Boards Redesign Groups and the migration workstream. She maintained she was not the Project Manager for technical aspects[862].

b. Ms MacLeod gave evidence that her role was not technical and did not involve M&E or construction related matters[863]. This was not entirely consistent with the CV she attached to her Inquiry statement[864] or her job description[865]. She explained although designated 'project manager' in an

[857] Glasgow 4, Part 1 - Witness Statements, Volume 3, Alan Seabourne, Document 5, Page 117.
[858] Transcript, Alan Seabourne, 29 May 2025, Page 8, Column 12.
[859] Transcript, Alan Seabourne, 29 May 2025, Page 5, Column 6.
[860] Transcript, Emma White, 13 May 2025, Page 20, Column 35.
[861] Transcript, Fiona McCluskey, 15 May 2025, Page 12, Column 19.
[862] Glasgow 4, Part 1 - Witness Statements, Volume 3, Heather Griffin, Document 9, Page 287, Questions 4.
[863] Transcript, Mairi MacLeod, 14 May 2025, Page 50, Columns 95-96.
[864] Glasgow 4, Part 1 - Witness Statements, Volume 1, Mairi MacLeod, Document 3, Page 305.
[865] Bundle 43, Volume 6, Document 49, Page 1015.

NHS sense, she did not consider herself project manager in an NEC3 sense, and was unaware of the requirements of that role or of 'Supervisor' under NEC3[866]. When emails that appeared to involve Ms MacLeod raising technical matters with Ms White were put to her,[867] she described her role as a 'scribe' who was 'putting things together'[868]. She did not know what a HEPA filter was[869] and would have obtained technical information from others, such as Mr Hall[870].

583. Mr Ballingall spoke to the role of the Project Managers as being organisers of the UGMs in order to make sure that everybody that had to be there was there[871]. Mr Hall described the role as the “pinch point” in an hourglass, between the contract and the users, able to work with both and managing and co-ordinating, but not themselves undertaking many tasks[872].

584. Ms McCluskey described Ms Macleod’s role as, “a lead and a coordinating role. So, anything that was to happen within the Children’s Hospital project, Mairi would have to know about it. Now, Mairi might not have been able to answer the questions on technical but would know the person to go to or get the information”. She would have expected Ms Macleod (and Ms Griffin) to be aware of technical matters, even if their roles did not involve resolving them[873].

Acute Services Review Programme Capital Planning Manager

585. Ms Wrath was seconded to the Project Team as Acute Services Review Programme Capital Planning Manager in April 2007. She reported to Mr Moir and Mr Seabourne. She had been involved in hospital project management for over 15 years. She was sometimes introduced or referred to in meetings as 'technical lead' in the same way that Ms Connolly was facilities lead, and

[866] Transcript, Mairi Macleod, 14 May 2025, Pages 54-56, Columns 104-107.
[867] See Bundle 43, Volume 5, Document 26, Page 160.
[868] Transcript, Mairi Macleod, 14 May 2025, Pages 59-60, Columns 113-115.
[869] Transcript, Mairi Macleod, 14 May 2025, Page 60, Column 115.
[870] Transcript, Mairi Macleod, 14 May 2025, Pages 71 and 80, Columns 137 and 156.
[871] Transcript, Ross Ballingall, 21 May 2025, Page 37, Column 70.
[872] Transcript, David Hall, 22 May 2025, Pages 11-12, Columns 18-19.
[873] Transcript, Fiona McCluskey, 15 May 2025, Pages 12-13, Columns 19-21.

Ms McCluskey was nursing lead[874].

586. Ms White identified Ms Wrath as a member of the Project Team with sufficient technical knowledge to assist in developing initial data sheets and correct room types. Ms Wrath observed that Ms White had identified her as the 'technical person,' because she was more technical than others like Mairi Macleod, Heather Griffin and Karen Connolly[875]. Ms White described Ms Wrath's role as to review documents for NHS GGC to ensure the brief requirements were met. She would, she assumed, have consulted internally where required[876].

587. Ms Wrath sent an email to Ms Barmanroy confirming the correctness of commissioning works, but she explained she would have obtained this information from Mr Hall, Mr Moir or Mr Powrie[877].

The ethos of the procurement exercise

588. Mr Seabourne described this as being to avoid an adversarial relationship with the contractor:

> "It came from the government. It came from … the Board's senior advisors… that was a key theme because the health service has had projects … that have turned out very adversarial. … They were trying to build a partnership that merged both organisations to the same goal. I'm not saying they achieved it, but … that's what they're talking about."[878]

589. He spoke about keeping 'an arm's length' distance in matters of design:

> " The ethos was, "The contractor knows what he's doing better than you do." I've heard you say in here, you know, "What does NHS people know about design?", for example, right? So let them do it."[879]

590. Mr Seabourne was unpersuaded that, had NHS GGC retained a shadow

[874] Glasgow 4, Part 1 - Witness Statements, Volume 1, Frances Wrath, Document 2, Page 258, Questions 14-16.
[875] Transcript, Frances Wrath, 14 May 2025, Page 6, Columns 7-8.
[876] Transcript, Emma White, 13 May 2025, Page 21, Column 38.
[877] Glasgow 4, Part 1 - Witness Statements, Volume 1, Frances Wrath, Document 2, Page 281, Question 36(g).
[878] Transcript, Alan Seabourne, 29 May 2025, Page 6, Column 7.
[879] Transcript, Alan Seabourne, 29 May 2025, Page 8, Column 11.

design team, matters would have been any different[880].

Experience of the NEC 3 Contract

591. The Project Team were not experienced in the NEC3 contract. Mr Seabourne had never heard of it.[881] Frances Wrath had never dealt with it[882]. Mairi Macleod was unaware of the requirements of a 'Supervisor' as under NEC3[883]. Mr Seabourne's recollection in oral evidence was that Peter Moir had some knowledge of NEC3 (in his Supplementary Statement he said Mr Moir was 'unfamiliar with it'[884]) but did not have experience of operating it. He arranged for the team to get a couple of days' training on NEC3 from an expert, plus a further day or half-a-day from Douglas Ross at Currie & Brown[885].

Technical Expertise of NHS Project Team

592. Would the Project Team have had the technical expertise to spot consequent issues from specific design choices? Mr Ballingall's view was that it was well-known, including by the Project Team, that the building was not compliant with SHTM 03-01 because of the ventilation derogation[886]. Ms White did not consider that it would have been obvious or foreseeable to non-technical Project Team members that a change to the Maximum Temperature Variant would carry knock-on consequences[887]. David Hall disagreed[888]. For Alan Seabourne, however, the possibility of knock-on effects was simply not something which would have entered anyone's mind[889].

593. Mr Seabourne confirmed that that the Project Team did not contain a ventilation designer nor anyone with water expertise[890]. Ms Wrath

[880] Transcript, Alan Seabourne, 29 May 2025, Page 9, Column 13.
[881] Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 39, Para 6.
[882] Transcript, Frances Wrath, 14 May 2025, Page 10, Column 16.
[883] Transcript, Mairi Macleod, 14 May 2025, Pages 54-56, Columns 104-107.
[884] Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 39, Para 6.
[885] Transcript, Alan Seabourne, 29 May 2025, Pages 6-7, Columns 8-9.
[886] Transcript, Ross Ballingall, 21 May 2025, Page 42, Column 80.
[887] Transcript, Emma White, 13 May 2025, Page 69, Columns 133-134.
[888] Transcript, David Hall, 22 May 2025, Page 35, Column 65.
[889] Transcript, Alan Seabourne, 29 May 2025, Pages 23-24, Columns 42-43.
[890] Transcript, Alan Seabourne, 29 May 2025, Page 44, Column 84.

acknowledged that none of the Project Team members had M&E knowledge[891].

594. Emma White identified Frances Wrath as having sufficient technical knowledge to assist in developing initial data sheets and correct room types[892]. Ms Wrath accepted this, though she pointed out that other project team members without technical experience such as Ms Macleod and Ms Griffin were also involved[893].

595. Although many of the Project Team acknowledged that they had neither remit nor expertise in technical matters, there were instances of them apparently getting involved. Ms MacLeod described going to David Hall's nearby room to seek advice on technical matters. Ms Wrath sent an email to Ms Barmanroy, confirming commissioning had been undertaken and the works were in accordance with the requirements. This information would have been sought from David Hall, Peter Moir or Ian Powrie[894].

596. Mr Seabourne considered that the Project Team had sufficient experience to mean that handover to Mr Loudon would not allow, e.g. the ventilation derogation, to fall through the cracks, as such matters should be brought to his attention[895].

597. Alan Seabourne considered the technical knowledge and experience of the Project Team to be adequate to raise questions on correctness of technical matters, provided that those matters had been adequately explained beforehand[896]. On ACH, it was the function of ZBP or the architect to pick up on and explain to users changes in that regard[897]. Other Team members did not agree. Frances Wrath was relying on Mr Hall to link to what she thought was an external technical team, with access to knowledge not possessed by Mr Hall or Mr Seabourne, Mr Moir or Mr Louden[898].

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[891] Transcript, Frances Wrath, 14 May 2025, Page 23, Column 42.
[892] Transcript, Emma White, 13 May 2025, Page 21, Column 38.
[893] Transcript, Frances Wrath, 14 May 2025, Page 6, Column 8.
[894] Glasgow 4, Part 1 - Witness Statements, Volume 1, Frances Wrath, Document 2, Page 281.
[895] Transcript, Alan Seabourne, 29 May 2025, Page 85, Column 165.
[896] Transcript, Alan Seabourne, 29 May 2025, Page 63, Column 122.
[897] Transcript, Alan Seabourne, 29 May 2025, Page 57, Columns 109-110.
[898] Transcript, Frances Wrath, 14 May 2025, Page 13, Column 21.

598. Mary-Anne Kane recalled that at handover she was not briefed on technical matters. At that time she had neither an awareness of current technical issues nor the expertise to make informed decisions, due to her 'soft FM' background and lack of estates management experience[899]. She assumed that commissioning, validation and the specifications were all readily available and were in accordance with the design[900].

599. Continuing with assumptions, both Ms Macleod and Ms Wrath assumed that there was a technical team acting in the interests of NHS GGC. Ms Barmanroy expected somebody from 'technical' to approach Ms Devine or her to ask for infection control attendance at water and ventilation meetings[901]. She assumed Professor Williams was giving clinical input into the technical meetings for water and ventilation[902]. Ms Wrath said Mr Hall of Currie & Brown was her “link” to the assumed NHS GGC technical team. Mr Fernie spoke to Mr Hall coming to the Multiplex construction team and asking for advice[903].

600. Ms Wrath mentioned technical input from her colleague, Alastair Smith, on the environmental sections of RDSs, to ensure they complied with requirements such as SHTM 03-01[904]. Darren Pike considered that of the Project Team only Mr Smith, who was recruited at a point after early 2011, would have had the technical knowledge to calculate ACH from flow rates marked on the drawings; other staff would have had to see the M&E clarification log to get this information[905].

601. Professor Gibson had the impression of a dismissive approach towards her team on technical matters in 2011. They were told that there was a technical team and external technical advisers available to address building requirements but never told who they were[906].

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[899] Transcript, Mary Anne Kane, 13 May 2025, Page 14, Column 23.
[900] Transcript, Mary Anne Kane, 13 May 2025, Page 71, Column 137.
[901] Transcript, Jackie Barmanroy, 15 May 2025, Page 97, Column 189.
[902] Transcript, Jackie Barmanroy, 15 May 2025, Page 98, Column 191.
[903] Transcript, Alasdair Fernie, 21 May 2025, Page 59, Columns 113.
[904] Transcript, Frances Wrath, 13 May 2025, Page 22, Columns 39-40.
[905] Transcript, Darren Pike, 20 May 2025, Page 13, Column 23.
[906] Transcript, Professor Gibson, 19 August 2025, Page 40, Column 75.

An additional resource - Mr Kenneth Winter

602. Mr Winter was a very experienced construction professional, having held senior positions in Balfour Beatty. He was brought in as a non-executive, given the lack of experience of the then Board with construction.[907] His focus was to be on progress and cost. He visited the site around once per month, had a walk-round, and discussed the position with Alan Seabourne and others. He had not operated a contract under NEC3, but in any event was given no contract documentation - 'It was a high-level overview'.[908]

603. Mr Winter could not form a view as to the capabilities of the Project Team generally, but thought Mr Seabourne was 'good at his job'.[909] He did not see the ERs. On design on the NHS GGC side he,'…just assumed that the consultants…. were doing their job'.[910] As a contractor he would usually expect a client to have a 'virtual mirror-image' of what the contractor had.[911]

604. Mr Winter usually reported orally to the Board. He assumed something like the Agreed Ventilation Derogation would have gone up 'to a very high level'.[912] He recalled that, '..everybody was delighted at the end of handover that the job was complete on time and on budget'.[913] To have done more than he did and gone into design, sign-off, and inspection would have required more than one person.[914]

5.6.3 IPC Involvement

605. In 2008, Ms Annette Rankin was a Nurse Consultant in IPC,[915] and had some involvement in the new SGH Project. That included attending meetings during the competitive dialogue process in the summer of 2009[916]. By the end of November 2009 she moved to Health Protection Scotland ("HPS" now known

[907] Transcript, Ken Winter, 16 September 2025, Page 51, Column 97.
[908] Transcript, Ken Winter, 16 September 2025, Page 52, Column 100.
[909] Transcript, Ken Winter, 16 September 2025, Page 54, Column 103.
[910] Transcript, Ken Winter, 16 September 2025, Page 55, Column 106.
[911] Transcript, Ken Winter, 16 September 2025, Page 68, Column 132.
[912] Transcript, Ken Winter, 16 September 2025, Page 64, Column 124.
[913] Transcript, Ken Winter, 16 September 2025, Page 59, Column 113.
[914] Transcript, Ken Winter, 16 September 2025, Page 66, Column 128.
[915] Glasgow 3 - Witness Statements, Volume 3, Annette Rankin, Document 1, Page 3.
[916] Transcript, Annette Rankin, 3 September 2024, Pages 11-12, Columns 18-20.

as ARHAI Scotland)[917]. She was not replaced for three months.

The secondment of ICN Jackie Stewart

606. On 1 March 2010, Jackie Stewart/Barmanroy[918] was appointed as the Infection Control representative for the project[919].. She commenced in April 2010 on a two-year secondment. She did not have any background knowledge of the project[920]. She attended meetings, including technical meetings, without professing particular understanding of what was going on in them[921]. Mr Ballingall recalled the Infection Control representative who attended the User Group Meetings ("UGMs") was an infection control nurse. That would have been Jackie Stewart[922].

607. Ms Barmanroy's initial tasks were in 1:200 design plan meetings, concerning room locations as opposed to layout of items within the rooms. These did not touch on ceilings, or ventilation matters, in which she had no expertise[923]. She recalled making that clear to Ms Devine, and being told how to address these: "..it was explained to me that anything water or ventilation related should be referred to Professor Williams because Professor Williams was the main microbiologist for the project"[924]. She was surprised to have been recorded as having provided advice "on all aspects"[925]. She was not being invited to technical water and ventilation meetings, and not asking for minutes, as they would have been "too technical for me"[926]. She rarely saw Professor Williams for the two years she was working for the Project Team[927].

608. Ms McCluskey was asked how Ms Barmanroy, would know whether a technical matter was important enough to raise with somebody else. She had refused to review the water or ventilation parts of RDSs and believed that Ms

[917] Glasgow 4, Part 2 - Witness Statements, Annette Rankin, Volume 1, Document 13, Page 114.
[918] Subsequently Jackie Barmanroy.
[919] A33502024 - Bundle 40, Document 120, Page 358.
[920] Transcript, Jackie Barmanroy, 15 May 2025, Page 58, Column 111.
[921] Transcript, Jackie Barmanroy, 15 May 2025, Page 59, Columns 113-114.
[922] Transcript, Ross Ballingall, 21 May 2025, Page 9, Column 13.
[923] Transcript, Jackie Barmanroy, 15 May 2025, Page 60, Column 115.
[924] Transcript, Jackie Barmanroy, 15 May 2025, Page 63, Column 121.
[925] Transcript, Jackie Barmanroy, 15 May 2025, Page 61, Column 118 and A49401486 - Bundle 27, Volume 8, Document 3, Page 39.
[926] Transcript, Jackie Barmanroy, 15 May 2025, Page 65, Column 125.
[927] Transcript, Jackie Barmanroy, 15 May 2025, Page 69, Column 134.

Barmanroy would likewise have refused to do so. She was unaware of any system to ensure that technical matters of potential importance would be drawn to Professor Williams' attention[928]. Ms Barmanroy relied very heavily on technical and Estates colleagues in relation to guidance such as SHTMs[929]. She relied upon things being flagged to her:

> "So unless anything is highlighted to me, I'm assuming everything in the garden is rosy and the hospital is being built."

609. Mr Seabourne's account was:

> " If Jackie Stewart or Annette hadn't been there, then Peter and I would have to have done that job, and maybe we would have done it differently with our long experience, but that's what we had and we used that. And if it's a flaw, then- - If you think it's a flaw, it's a flaw"[930]

> "Jackie recognises from a clinical perspective that that could be an issue. She sees her-- the senior, and the senior says, "Go and ask an expert." So, that's it working perfectly. Now, I'm not saying it worked perfectly in every case."[931]

610. By August 2010 Ms McCluskey had written a paper with Mr Gallagher, medical director, addressing views on the critical care unit[932]. It was prompted by an impasse between designers and users regarding the plan for QEUH to be all single rooms. Ms MacNamee and Mr Walsh represented Infection Control at those meetings, but Ms McCluskey did not recall an Infection Control doctor being present. Her expectation was that Ms MacNamee would have discussed the matter with Professor Williams[933].

Fiona McCluskey's 2014 paper on IPC involvement

611. Whilst preparing for her evidence in Glasgow 3, Dr Armstrong provided the Inquiry with Fiona McCluskey's 2014 paper on IPC involvement[934] and the associated email chain on 30 July 2014.[935] This followed discussions on 6

[928] Transcript, Fiona McCluskey, 15 May 2025, Pages 20-23, Columns 36-42.
[929] Transcript, Jackie Barmanroy, 15 May 2025, Page 61, Column 117.
[930] Transcript, Alan Seabourne, 29 May 2025, Page 31, Column 57.
[931] Transcript, Alan Seabourne, 29 May 2025, Page 32, Column 60.
[932] A39465187 - Bundle 14, Volume 1, Document 2, Page 17.
[933] Transcript, Fiona McCluskey, 15 May 2025, Pages 15-18, Columns 25-31.
[934] Bundle 27, Volume 8, Document 3, Page 39.
[935] Bundle 27, Volume 8, Document 2, Page 37.

June 2014 at the BICC, when Ms McCluskey provided a detailed overview, along with a paper setting out who had been involved, and in what capacity, from IPC in the design and at all the stages of work[936]. Ms McCluskey asked Ms Joannidis and Ms Barmanroy to help pull together the table in the report. There is no mention of ICDs in her report: she was giving the nursing update[937]. Questions from the Project team were routed through Ms McCluskey and focused on sinks, taps and fittings[938]. Professor Williams explained that he met early in the project with Ms Devine and Dr Inkster to discuss issues like sink fittings, but at no time were detailed specifications for either water or ventilation systems discussed with him[939]. His IPC involvement was limited and advisory, with focus being on reference to national guidance rather than managerial oversight or technical sign-off[940].

IPC Advice to Multiplex

612. Mr Ballingall said that the only people on the contractor side providing advice on prevention and control of infection were the medical planners, Tribal, who were in place throughout the medical planning process. They would take the guidance and try to satisfy NHS GGC's Infection Control team[941]. The Multiplex design team knew the requirements of SHTM and other healthcare regulations. They would develop the design with input from Infection Control[942].

5.6.4 Changing the role of the Currie & Brown

613. Currie & Brown had been appointed as leads of the Technical Adviser team on 2nd September 2008.[943]

614. During Stage 1, the team included M&E design engineers (Wallace Whittle), a

[936] Glasgow 3 - Witness Statements, Volume 8, Jennifer Armstrong, Document 5, Page 208.
[937] Transcript, Fiona McCluskey, 15 May 2025, Pages 48-50, Columns 92-95.
[938] Glasgow 3 - Witness Statements, Volume 5, Professor Craig Williams, Document 1, Page 13, Para 50.
[939] Glasgow 3 - Witness Statements, Volume 5, Professor Craig Williams, Document 1, Pages 13-14, Para 51.
[940] Glasgow 3 - Witness Statements, Volume 5, Professor Craig Williams, Document 1, Pages 12-13, Para 47.
[941] Transcript, Ross Ballingal, 21 May 20215, Page 7, Column 9.
[942] Glasgow 4, Part 1 - Witness Statements, Volume 2, Document 4, Page 127, Q5(c).
[943] Bundle 17, Document 38, Page 1902.

Healthcare Planner (Buchan Associates) and an Architect Advisor, (HLM Architects). This team remained in place until the scope of their work was reduced by letter from Mr Moir to Mr Ross of Currie & Brown on 18 January 2010[944]. That letter notified Currie & Brown that the Board were undertaking the role of NEC3 Project Manager. Currie & Brown's role was reduced to "providing project management support, primarily, and Douglas providing the costs management support"[945].

615. Currie & Brown stood down their technical team on 19 January 2010 (with any further work to be ad hoc) following passing of design responsibility to Multiplex[946]. Mr Hall considered it was abundantly clear to other participants that Currie & Brown's role had changed, as the whole Project Team worked out of one office[947]. However, Ms McCluskey was not aware of Currie & Brown' team having been stood down in 2010[948]. She was still referring to Currie & Brown as the Project Team's "technical advisors"[949], having Mr Hall in mind. Mr Hall tells us that the Project Team were aware that Currie & Brown had been stood down, as they expressly instructed Currie & Brown to stand down in its Technical Team in January 2010[950]. She would have been surprised to be told that there were no technical advisers at that point[951]. Ms Wrath did not know who gave technical advice on M&E matters to the project after contract close and her contact remained Mr Hall[952].

616. Ms White did not have an impression of Currie & Brown having decreased involvement. They were still involved in meetings and in signing off documents for NHS GGC. She thought they would still have been involved in technical advice[953].

617. Mr Baird was adamant that the Project Team would have been aware of

[944] A32660883 - Bundle 17, Document 74, Page 2870.
[945] Transcript, David Hall, 22 May 2025, Page 6, Columns 7-8.
[946] Glasgow 4, Part 1 - Witness Statements, Volume 3, Douglas Ross, Document 10, Pages 316 and 318, Paras 28 and 33.
[947] Transcript, David Hall, 22 May 2025, Page 7, Column 9.
[948] Transcript, Fiona McCluskey, 15 May 2025, Page 9, Column 13.
[949] Bundle 14, Volume 1, Document 6, Pages 170-171.
[950] Glasgow 4, Part 3 - Witness Statements, Volume 7, David Hall, Document 3, Page 37.
[951] Transcript, Fiona McCluskey, 15 May 2025, Page 41, Columns 77-78.
[952] Transcript, Frances Wrath, 14 May 2025, Pages 12-13, Columns 20-21.
[953] Transcript, Emma White, 13 May 2025, Pages 9-10, Columns 13-16.

Currie & Brown's reduced role, though he did accept that someone not involved in M&E, such as Ms White, might have been of a different view[954].

618. In contrast, Mr Ballingall's understanding was that NHS GGC had felt they themselves had sufficient in-house experience to carry out the project manager role at that stage, bringing in technical expertise as and when needed. This was why Currie & Brown's role had been drastically reduced in 2011[955]. NHS GGC would have lost the opportunity to spot mistakes when they no longer had a technical team[956].

619. Ms Byrne accepted that, given the appointment of Currie & Brown had been reported to the Performance Review Group, the decision to restrict their role should have followed the same process[957]. Mr Calderwood recalled the issue going to the PRG at the instance of the Project Director.[958]

620. Mr Gallagher was aware of Currie & Brown's appointment and that they were assisted by a technical team but was not aware of that team being stood down. He did not think the decision would have been on cost grounds, as the project was not financially challenged and when he retired, it was underspent[959].

621. Mr Calderwood gave a contrary view, noting that Board members in the Performance Review Group had raised challenges on savings being justified and value for money:

> "..questioning whether you would pay twice for the same advice."[960]

622. Mr Seabourne also said that strictures on finance were in place, though he maintained that the decision to change the role of Currie & Brown was made due to the change to the NEC3 contract and not directly for financial reasons.[961]

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[954] Transcript, Mark Baird, 28 May 2025, Pages 38-39, Columns 71-74.
[955] Transcript, Ross Ballingall, 21 May 2025, Page 10, Column 15.
[956] Transcript, Ross Ballingall, 21 May 2025, Page 38, Column 71.
[957] Transcript, Helen Byrne, 30 May 2025, Page 45, Column 85.
[958] Transcript, Robert Calderwood, 30 September 2025, Pages 62-63, Columns 120-122.
[959] Glasgow 4, Part 3 - Witness Statements, Volume 1, Peter Gallagher, Document 2, Page 59.
[960] Transcript, Robert Calderwood, 30 September 2025, Pages 63-64, Columns 122-124.
[961] Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 38.

623. The FBC did not expressly state that Currie & Brown's role had changed. Appendix N stated Currie & Brown had been appointed to provide technical advisor services, without mentioning that Currie & Brown's role had changed, and reference to the Technical Design Group meetings made no suggestion of an alteration to their role; only Appendix O made an oblique reference to a changed role, referring to them as technical advisor in Stage 1 and cost advisor with respect to Stage 2[962].

5.6.5 Wallace Whittle and sources of technical advice

624. Wallace Whittle had been appointed by Currie & Brown as mechanical electrical and plumbing (MEP) services engineer subconsultant. Their role was to identify any shortcomings within the M&E proposals [963]. This was a task not for Wallace Whittle alone, but others were also involved, such as Ian Storrar of HFS, Mr Powrie with his M&E background, and Mr Hoffman providing advice to Mr Seabourne[964]. Mr McKechnie recalled that they were stood down in December 2009 or January 2010[965].

625. Mr McKechnie spoke to the existence of a parallel process during the preparation of RDSs, where ZBP would present their detailed ventilation drawings which Wallace Whittle were involved in[966].

626. Whilst both Currie & Brown and Wallace Whittle were clear that the latter had been stood down in early 2010, other opinions varied. Ms White's view was that NHS GGC was reliant upon technical advice from Currie & Brown and Wallace Whittle until design agreement was reached[967]. Mr Calderwood recalled Wallace Whittle having been retained into 2010[968]. Mr Ballingall spoke to Wallace Whittle providing M&E advice to NHS GGC during the bid assessments until they were ultimately stood down at the start of 2011[969], at

[962] Bundle 17, Document 30, Page 1662-1665.
[963] Transcript, Stewart McKechnie, 27 May 2025, Page 68, Column 131.
[964] Transcript, Stewart McKechnie, 27 May 2025, Page 73, Columns 141-142.
[965] Transcript, Stewart McKechnie, 27 May 2025, Page 57, Column 110.
[966] Transcript, Stewart McKechnie, 27 May 2025, Page 66, Column 128.
[967] Transcript, Emma White, 13 May 2025, Page 20, Column 35.
[968] Transcript, Robert Calderwood, 30 September 2025, Pages 66-67, Columns 127-129.
[969] Transcript, Ross Ballingall, 21 May 2025, Page 8, Column 11.

the time when Currie & Brown's role was drastically reduced[970].

627. In August 2010, Wallace Whittle were engaged in providing feedback on the Environmental Data Matrix. Workshops followed, with a review process featuring presentations on a variety of topics including fire detection, smoke removal, water systems, ventilation, and heating. Wallace Whittle were attending these workshops and commenting upon the various issues[971]. Mr Hall described these reviews as being "for Multiplex to present any issues that they believed did not strictly comply with the employers' requirements" as part of the ongoing process of ZBP developing the design. He described this as "a gateway review of the M&E design". In attending, Wallace Whittle were acting as a sub-consultant to Currie & Brown[972].

628. Mr Hall said that this process was initiated by Multiplex identifying a conflict between the SHTM guidance and the ERs – the point was to seek agreement for an alternative design as a solution to this conflict[973].

629. In March 2013 Wallace Whittle replaced ZBP as MEP Services Engineer for Multiplex. PPP13 sets out the sequence of their involvement.[974].

5.6.6 Detailed Design Development Process

630. The design process increased in granularity from 1:500 scale, to working with a 1:200 model, and finally to 1:50[975]. The 1:200 process involved Nightingales, coming forward with a proposal, to the User Groups. One of the issues to be agreed was 'adjacencies', the spatial relationship between departments, wards, rooms or other areas[976], or 'which room should be near which room'[977]. This might involve infection control flagging up that they did not like clean linen being next to a waste room[978]. A specific example might be lift cores, whose best position required examining how the area worked

[970] Transcript, Ross Ballingall, 21 May 2025, Page 10, Column 15.
[971] Transcript, David Hall, 22 May 2025, Page 15, Columns 25-26; Transcript, David Hall, 22 May 2025, Page 17, Column 29.
[972] Transcript, David Hall, 22 May 2025, Page 17, Column 29.
[973] Transcript, David Hall, 22 May 2025, Page 34, Columns 63-64.
[974] A49286669 - Bundle 26, Document 3, Pages 242-243.
[975] Transcript, Mark Baird, 28 May 2025, Pages 15-16, Columns 26-28.
[976] Transcript, Emma White, 13 May 2025, Page 28, Column 51.
[977] Transcript, Emma White, 13 May 2025, Page 13, Column 21.
[978] Transcript, Emma White, 13 May 2025, Page 74, Column 143.

holistically.

631. User Groups would be able to move rooms around, so the layout achieved what they required. There were three rounds of UGMs with clinical users on the 1:200 drawings, and then two rounds to review the 1:50 room layouts[979]. New drawings would be produced as necessary[980].

632. The Contract contains an entry describing "Mechanical and Electrical drawing to reflect architects 1:50's for rooms and departments'. Under the heading 'Aspects (specification including)' there is an associated comment "Review against Room Data Sheets, project specification and architects 1:50 drawings."[981]

Room Data Sheets (RDSs)

633. The ADB provides a starting point for the design of a room by setting out the layout, contents and performance, and by explaining which RDS applies[982]. Some room types, such as a BMT room, do not have an ADB code, in which case a standard room code is used and then adapted[983]. This led to a particular problem, described below, where a code was developed for an unallocated room, leading to its being followed in cases where its parameters did not apply.

634. The RDS is a standardised form of document that records all of the relevant design information for the specific room type. They were subject to revision and development up to the end of the design stage. When finalised, the design brief was fixed, informing the content of the 1:50 scale room layout plans, 1:50 room elevation drawings and 1:50 departmental layout drawings[984].

635. The RDSs were produced by Multiplex[985] and should have reflected the ERs, though Mr Pardy's view was that it was NHS GGC's responsibility to make

[979] Transcript, Emma White, 13 May 2025, Page 12, Columns 19-20.
[980] Transcript, Emma White, 13 May 2025, Page 13, Column 22.
[981] A32372025 - Bundle 17, Document 12, Page 736.
[982] Transcript, Andrew Poplett, 10 May 2022, Page 38, Column 71.
[983] Transcript, Frances Wrath, 14 May 2025, Page 9, Column 13.
[984] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 123, Para 4.15.
[985] Transcript, Steven Pardy, 27 May 2025, Page 26, Column 47.

sure of that[986]. The process appears to have been a cumbersome one - to work out the ventilation solution for a COS, ZBP had to read between the lines and feed that back to the relevant department for confirmation[987]. He expected NHS GGC to have technical people, fully knowledgeable in ventilation, to review the proposals and come up with commentary[988] or marked up drawings[989].

636. There was disagreement within NHS GGC as to how to go about RDS review. Mr Seabourne considered Ms Wrath, 'the holder of the RDSs,' and expected her and Mr Moir to flag any issues such as the wrong ACH to Emma White and her team[990]. Ms Wrath, by contrast, said that she had been instructed by Mr Hall and Mr Moir to review the RDSs from the point of view of the equipment going into the room. She was told, by Mr Hall and the 'technical team', that the environmental pages (which she was not qualified to assess) had been checked and that there were no problems with them[991]. If users asked about M&E, then she would ask David Hall for his view. Compliance of wards with the applicable COS would have been a responsibility of Mr Moir and Mr Hall[992].

637. Ms White required the RDSs to be signed off before the 1:50 drawings, addressing in-room layout, could be produced, with the Technical Group and third-party advisors being required to review them. She described how a 1:50 mock-up for a children's bedroom would be used to discuss furniture and elevated parts of the room[993], with a level of detail which would be easier for an NHS GGC representative to interpret[994].

638. Mr Pike thought that the data for the RDSs had been carried across from the ZBP Environmental Matrix (prepared per the ERs[995]). Accordingly, although the information could be found, if necessary, it would be more helpful if it were

[986] Transcript, Steven Pardy, 27 May 2025, Page 25, Column 46.
[987] Transcript, Steven Pardy, 27 May 2025, Page 28, Column 51.
[988] Transcript, Steven Pardy, 27 May 2025, Page 34, Column 64.
[989] Transcript, Steven Pardy, 27 May 2025, Page 35, Column 66.
[990] Transcript, Alan Seabourne, 29 May 2025, Page 64, Column 124.
[991] Transcript, Frances Wrath, 14 May 2025, Page 20-22, Columns 36, 39-40.
[992] Transcript, Frances Wrath, 14 May 2025, Page 26, Columns 47-48.
[993] Transcript, Emma White, 13 May 2025, Page 38, Column 72.
[994] Transcript, Emma White, 13 May 2025, Page 39, Column 74.
[995] Transcript, Darren Pike, 20 May 2025, Page 11, Column 19.

included on the RDSs. This could be seen on ventilation, where on the HVAC section in the RDSs the boxes for ‘extract’ and ‘supply’ had been left blank[996]. One could find flow rates on drawings, but that then required interpretation to work out air change rates. The result was that the issue was not drawn to the attention of User Groups[997].

639. Mr Pardy recalled no significant conversations with the Estates team on the project, whereas he would usually get quite a lot of input [998]. Mr Seabourne was of the view that Ms Wrath, having been told about the 40L/s rate, should have had it in mind and been able to identify whether the drawings reflected this[999].

640. A specific issue arose around the Room Code ‘B0503’, which was developed during the 1:50 process to reflect a different haemato-oncology brief. Two rooms which were marked ‘B0503A’ thereby became prescribed to a standard 40L/s air rate, which conformed to haemato-oncology bedrooms but not to the 80L/s rate specified on the design plan (immunocompromised bedrooms having no dedicated code)[1000]. Ms White's preference was for rates to be specified much more clearly on drawings, rather than relying on the RDSs, and she had since changed her practice accordingly[1001].

User Group Meetings ("UGMs")

641. The Adult and Children's Hospital User Groups were a key part of the process of. NHS GGC saw their role to be to review architectural design progress for 1:200 and 1:50 drawing detail, provide professional input into the design process, communicate with other colleagues and stakeholders, liaise with Acute Directors on issues requiring attention, and finally sign off the design details[1002].

642. Ms White explained how the increase in granularity would work to ensure

[996] See for example: An RDS for a Standard Room in Ward 2A: Bundle 47, Volume 3, Document 8, Page 393 is for Room NCH-02-TCT-003 with its ensuite as NCH-02-TCT-004 from page 398 which can be found on the equivalent drawing at Bundle 47, Volume 3, Document 5, Page 7.
[997] Transcript, Darren Pike, 20 May 2025, Pages 6 and 7, Columns 9 and 11.
[998] Transcript, Steven Pardy, 27 May 2025, Pages 5-6, Columns 5-7.
[999] Transcript, Alan Seabourne, 29 May 2025, Page 66, Column 127.
[1000] Transcript, Emma White, 13 May 2025, Page 63, Column 122.
[1001] Transcript, Emma White, 13 May 2025, Page 65, Column 126.
[1002] A35560136 - Bundle 30, Document 3, Page 36.

delivery of the users' desired service. It would normally take three meetings, of increasing detail, for a User Group to hone in on agreement. The starting point would be an architect's explanation of the design of the building, with input thereafter from a project manager and two or three departments[1003].

643. As Project Managers, Ms Griffin and Ms MacLeod described how User Groups would feature around twelve representatives from different specialties. Members of the Project Team and Design Team would attend. Infection Control had also been involved.[1004] The User Group was to do the spatial design but not ventilation or water matters[1005].

644. A User Group would developed the Schedule of Accommodation, COS and drawings, with in one case a full-size mock-up of a bedroom and ensuite being built to invite comments.

645. Mr Seabourne described the purpose as being to tell the contractor how the room worked[1006], and thereafter essentially to take an interest in whether the necessary elements of that room were present but not in the technical specification[1007]. It was for designers to take a view of what the specifications should be, with that to be accepted or further discussed on an iterative basis[1008]. He considered the technical knowledge and experience of the Project Team to be adequate to raise technical questions, provided that those matters had been adequately explained beforehand[1009]. Specifically, regarding air change rates, he considered it to be the function of ZBP or the architect to explain to users changes in that regard[1010].

646. Ms Wrath explained that it was drawings that the User Group reviewed; not RDSs. It would have been better to have discussed M&E issues in the UGMs, but she understood that there were separate specialist ventilation meetings which involved Professor Craig Williams (and his predecessor, Dr Penelope

[1003] Transcript, Emma White, 13 May 2025, Page 13, Column 21.
[1004] Glasgow 4, Part 1 - Witness Statements, Volume 3, Heather Griffin, Document 9, Pages 295-296, Q4.9.
[1005] Transcript, Mairi Macleod, 14 May 2025, Pages 58-59, Columns 112-113.
[1006] Transcript, Alan Seabourne, 29 May 2025, Page 50, Column 95.
[1007] Transcript, Alan Seabourne, 29 May 2025, Pages 52-53, Columns 100-102.
[1008] Transcript, Alan Seabourne, 29 May 2025, Page 54, Columns 103-104.
[1009] Transcript, Alan Seabourne, 29 May 2025, Page 63, Column 122.
[1010] Transcript, Alan Seabourne, 29 May 2025, Page 57, Columns 109-110.

Redding)[1011]. Professor Williams was clear that at "no time were detailed specifications for either water or ventilation systems discussed by me"[1012] (noting that his direct involvement only began after the decision was made to move the infectious disease unit to the new hospital in late 2014)[1013]. Dr Williams had been part of the 18 May 2009 meeting about specialist ventilation requirements [1014]. It was Dr Redding's evidence that she was never Lead ICD[1015].

647. RDS work progressed during 2010. In March, an initial 'batch of rooms' was identified by the healthcare planners, Tribal, RDSs provided to and approved by NHS GGC as "…an acceptable start point for the RDS development"[1016].

648. In April, 1:200 Drawings UGMs took place and some 1:50 Drawings UGMs had started. Mock ups of the 1:50 Drawings were created in a unit in Govan. Meanwhile Tribal were reviewing the SoAs. NHS GGC confirmed that they had not received the final documents for formal sign-off and informed Multiplex that they needed clarity of what needed signed off before FBC[1017].

649. On 2 June, NHS GGC requested ZBP to provide an update on the environmental data matrix schedule[1018]. By 7 July, Tribal had issued the SoAs[1019]. On 19 July, Alan Keeley and Fiona McCluskey visited the mock-ups, User Groups following in August.

650. Mr Ballingall recalled that in 2010, 500 rooms had been fully loaded and the RDSs produced. That covered every room type with work into 2011 being based on what had been agreed in 2010[1020]. On 10 May 2011, the NHS GGC Team requested that RDSs stop being issued as they did not contain

[1011] Transcript, Frances Wrath, 14 May 2025, Page 22, Column 40.
[1012] Glasgow 4, Part 2 - Witness Statements, Volume 1, Professor Craig Williams, Document 11, Page 93.
[1013] Glasgow 4, Part 2 - Witness Statements, Volume 1, Professor Craig Williams, Document 11, Page 93.
[1014] See CTI Closing Statement, Glasgow 3, Section 9.1, Paras 9-10, Page 754 and also earlier in this chapter.
[1015] Glasgow 3 - Witness Statements, Volume 3, Dr Penelope Redding, Document 2, Pages 71 and 83, Para 18 and 61.
[1016] A34099838 - Bundle 43, Volume 1, Document 20, Page 73.
[1017] A51637125 - Bundle 32, Document 5, Page 59.
[1018] Bundle 40, Document 123, Page 378.
[1019] Bundle 40, Document 124, Page 388.
[1020] Transcript, Ross Ballingall, 21 May 2025, Page 34, Column 64.

environmental information[1021]. From Mr Ballingall's perspective the technical review of the RDSs was being carried out by Currie & Brown, so "you had technical people looking at technical information," and they could have spotted if there was a mistake[1022]. The RDD process had three levels of approval: A – proceed to construction, B – Minor comments to take on board then proceed to construction and C – not approved, amend and re-submit[1023].

Technical Issues and the UGMs

651. The process of designing during Stage 2 and producing the Contractor's Proposals, required decisions to be made about the ventilation system and water system for the hospital. During Glasgow 4, Part 1, and Part 3, two distinct perspectives emerged about whether these questions were discussed at the UGMs.

652. The first set of witnesses were of the view that those were not User Group matters. Mr Pardy from ZBP said that the UGMs would normally concentrate on room relationships, room sizes and ultimately the actual room layout[1024].

653. Ms White for Nightingale understood that UGMs did not discuss things like M&E and ventilation, which were covered separately in workshops[1025]. The UGMs would not necessarily be familiar with how to read drawings[1026]. This matched her general view that NHS GGC was reliant upon Currie & Brown and Wallace Whittle until design agreement was reached[1027].

654. Ms McCluskey could not recall any technical discussion or discussion about ventilation during the Ward 2A UGMs[1028] nor attendance at any technical meetings relating to PPVL/BMT rooms[1029]. Ms Wrath was clear that the UGMs did not include M&E, with the discussion being focused on layout, such as light fittings[1030]. Ms Barmanroy had assumed there were parallel M&E

[1021] A33501997 - Bundle 31, Document 31, Page 198.
[1022] Transcript, Ross Ballingall, 21 May 2025, Page 37, Column 69.
[1023] Glasgow 4, Part 1 - Witness Statements, Volume 2, Ross Ballingall, Document 4, Page 144, Q27.
[1024] Transcript, Steven Pardy, 27 May 2025, Page 28, Column 52.
[1025] Transcript, Emma White, 13 May 2025, Page 16, Column 27.
[1026] Transcript, Emma White, 13 May 2025, Page 16, Column 28.
[1027] Transcript, Emma White, 13 May 2025, Page 20, Column 35.
[1028] Glasgow 4, Part 1 - Witness Statements, Volume 1, Fiona McCluskey, Document 4, Page 320.
[1029] Glasgow 4, Part 1 - Witness Statements, Volume 1, Fiona McCluskey, Document 4, Page 321.
[1030] Transcript, Frances Wrath, 14 May 2025, Page 7, Column 10.

meetings, as she had been specifically asked by Currie & Brown who they should invite to 'these Water and Ventilation meetings'[1031]. Ms Barmanroy stated that water and ventilation meetings were separate groups and not discussed in UGMs[1032]. Ms MacLeod confirmed that the UGMs did not discuss ventilation[1033]. Mr Seabourne stated that the Project Team's role was limited to clinical and operational functionality, and not to approving technical specifications or technical compliance, which was always the responsibility of Multiplex[1034]. Mr Hall made a similar distinction[1035].

655. In contrast, Mr Ballingall stated that technical requirements such as ACH, pressure differentials and filter requirements would have been discussed at UGMs by Multiplex's design team and then captured in the environment section of the RDSs[1036]. Mr Seabourne assumed that ZBP's job in the UGMs was to discuss ventilation, because otherwise there was no point in them being there. ZBP had not mentioned critical information such as ACH. This would have alerted users to a change and prompted them to seek confirmation from him, but nobody did[1037].

656. During the UGMs, if M&E matters such as ventilation were raised by the users, Ms MacLeod explained that these (including compliance with SHTM 03-01) would be taken to David Hall of Currie & Brown or Peter Moir. Mr Seabourne explained that if the Project Team needed technical advice, they would ask Currie & Brown to ask Wallace Whittle and, in any event, it was their role to comment not to design[1038].

The Technical Design Group

657. There was little consensus on meetings to address technical aspects. Within the construction management structure,[1039] the only group that appeared to

[1031] Transcript, Jackie Barmanroy, 15 May 2025, Page 67, Column 129.
[1032] Glasgow 4, Part 1 - Witness Statements, Volume 1, Jackie Barmanroy, Document 5, Page 353.
[1033] Transcript, Mairi Macleod, 14 May 2025, Page 50, Column 95.
[1034] Glasgow 4, Part 1 - Witness Statements, Volume 3, Alan Seabourne, Document 5, Page 155, Q39(e).
[1035] Transcript, David Hall, 22 May 2025, Page 62, Column 119.
[1036] Glasgow 4, Part 1 - Witness Statements, Volume 2, Ross Ballingall, Document 4, Page 144, Q29.
[1037] Transcript, Alan Seabourne, 29 May 2025, Pages 57-58, Columns 109-111.
[1038] Transcript, Alan Seabourne, 29 May 2025, Page 44, Column 84.
[1039] Bundle 40, Document 1, Page 12.

have responsibility for technical aspects of design, was the Technical Design Group. The Project Team did attend the Technical Design Group from February 2010 to December 2010[1040]. A view supported by the Minutes which either are blank on that topic or say 'no issues'[1041]. Ms Macleod said the 'Technical Design Group' did not discuss M&E issues , [1042] and Ms Wrath agreed none of the members had M&E knowledge[1043]. In her view, Mr Seabourne and Mr Moir had the ultimate responsibility to ensure wards complied with technical requirements[1044].

658. Ms MacLeod explained that technical matters would be taken by Mr Hall to weekly technical group meetings, but she was not able to specify what the group was called. She also thought that M&E concerns would be taken to the monthly Joint Project Steering Group, and that Alan Seabourne and Peter Moir had the ultimate responsibility to ensure wards complied with technical requirements[1045].

659. Mr Pike spoke to there being M&E workshops in August 2010. He also described a process of pre-RDD meetings with Ms Wrath, Mr Hall and others between 2011 and into 2012[1046].

660. Ms McCluskey's evidence was that Jackie Stewart had multiple conversations and meetings with Dr Williams regarding the technical requirements for ventilation in the hospital[1047]. Ms Stewart recalled no such meetings[1048].

661. Ms White had not seen records of the technical workshops, but had seen reports indicating Wallace Whittle and ZBP involvement[1049].

662. Both Ms MacLeod and Ms Wrath assumed that there was a technical team for NHS GGC. Ms Barmanroy spoke to assuming there were Ventilation Group meetings and that other colleagues would sign off their parts of the HAI-

[1040] Bundle 40, Documents 119-129, Pages 354-424.
[1041] Bundle 40, Documents 119-129, Pages 354-424.
[1042] Transcript, Mairi MacLeod, 14 May 2025, Page 58, Column 112 and Transcript, Frances Wrath, 14 May 2025, Pages 62-63, Columns 120-122.
[1043] Transcript, Frances Wrath, 14 May 2025, Page 23, Column 42.
[1044] Transcript, Frances Wrath, 14 May 2025, Page 13, Column 21.
[1045] Transcript, Frances Wrath, 14 May 2025, Page 13, Column 21.
[1046] Transcript, Darren Pike, 20 May 2025, Page 10, Columns 17-18.
[1047] Transcript, Fiona McCluskey, 15 May 2025, Page 21, Column 37.
[1048] Transcript, Jackie Barmanroy, 15 May 2025, Page 86, Column 167.
[1049] Transcript, Emma White, 13 May 2025, Pages 17-19, Columns 30-33.

SCRIBE document[1050].

663. Mr Fernie spoke to Mr Hall taking action points away from project review meetings, and if it was an M&E issue then asking him and Mr Pike to discuss with Multiplex's design team[1051]. Mr Hall would often come to the Multiplex construction team and ask for advice [1052]. Mr Pike stated that the RDD process went through a workstream led by Nightingale and supported by ZBP, with a separate User Group workstream to develop the ward layouts and review RDSs[1053]. It was typically NHS GGC, Currie & Brown and Capita that were involved in the MEP RDD reviews[1054].

664. Ms Wrath stated that she was involved in a number of M&E meetings, primarily in respect of equipment detailed on room layouts and ADB equipment lists, but that general MEP installations were managed by David Hall and Peter Moir with others on the team[1055].

Responsibility for ventilation design

665. Nor was there consensus on responsibility for ventilation design. Mr Pardy argued that, while ZBP were responsible for designing the ventilation system, they were not responsible for signing it off[1056]. He acknowledged that ZBP filled in the RDSs based on their own interpretation[1057], but the RDSs should reflect the ERs, and it was NHS GGC's job to make sure that that was the case and to sign off[1058].

666. Ms White's view was that ZBP retained responsibility for the environmental data within the RDS at all stages of the project,[1059] but she did understand there to be MEP workshops where environmental data would have been presented by Multiplex and ZBP to NHS GGC[1060]. She thought the

[1050] Transcript, Jackie Barmanroy, 15 May 2025, Pages 77-78, Columns 150-151.
[1051] Transcript, Alasdair Fernie, 21 May 2025, Page 58, Column 111.
[1052] Transcript, Alasdair Fernie, 21 May 2025, Page 59, Column 113.
[1053] Glasgow 4, Part 1 - Witness Statements, Volume 2, Darren Pike, Document 3, Page 94, Q23(a).
[1054] Glasgow 4, Part 1 - Witness Statements, Volume 2, Darren Pike, Document 3, Page 94, Q23(b).
[1055] Glasgow 4, Part 1 - Witness Statements, Volume 1, Frances Wrath, Document 2, Page 282, Q38.
[1056] Transcript, Steven Pardy, 27 May 2025, Page 30, Column 55.
[1057] Transcript, Steven Pardy, 27 May 2025, Page 38, Column 72.
[1058] Transcript, Steven Pardy, 27 May 2025, Page 25, Column 46.
[1059] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 124, Para 4.15.
[1060] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 205, Q37.

environmental data on the RDSs was reviewed by Wallace Whittle and possibly Capita[1061].

667. Mr Hall's position was that the technical team, insofar as it related to design, was Multiplex's team. He carried out a project management support function and was not qualified to do M&E[1062]. It was Multiplex's responsibility to deliver safe water, but NHS GGC's responsibility to check there was a tap in the room[1063].

Extent of completion of design before Authorisation to Proceed

668. 1:50 plans for Generic Wards were reviewed from June 2010 to July 2011[1064]. Project Team members in attendance included Heather Griffin, Fiona McCluskey and Jackie Stewart. The process was described by Ms Stewart; everyone would sign once happy with it[1065].

669. Mr Pike described the 1:50 process as one where errors or discrepancies could be picked up, such as the absence of a lobby at the entrance to Ward 2A[1066]. He was open to the possibility that the separation of technical matters from user group matters in the review process, might be a source of things being missed, but also observed that in practice it might be difficult to arrange for a specific step where that gap could be filled[1067].

670. Ms MacLeod recalled that the 1:200 drawings did not have ventilation technical information on them, so others such as Nightingales would know that the User Group had not approved the ventilation specification.

671. Finalisation was proceeding throughout 2010. In late May almost all the QEUH 1:200 plans had been agreed[1068]. In August, the 1:50 process remained ongoing[1069]. The 1:200 Drawings for RHC were issued and the

[1061] Transcript, Emma White, 13 May 2025, Page 45, Column 85.
[1062] Transcript, David Hall, 22 May 2025, Pages 8-10, Columns 11-15.
[1063] Transcript, David Hall, 22 May 2025, Page 24, Columns 43-44.
[1064] Bundle 43, Volume 1, Document 27, Page 105; Bundle 43, Volume 1, Document 30, Page 111; Bundle 43, Volume 1, Document 37, Page 210; Bundle 43, Volume 1, Document 39, Page 216; Bundle 43, Volume 1, Document 38, Page 215.
[1065] Transcript, Jackie Barmanroy, 15 May 2025, Page 68, Column 132.
[1066] Transcript, Darren Pike, 20 May 2025, Page 19, Column 36.
[1067] Transcript, Darren Pike, 20 May 2025, Pages 36-37, Columns 70-72.
[1068] A33501936 - Bundle 31, Document 10, Page 69.
[1069] A33501935 - Bundle 31, Document 15, Page 97.

QEUH 1:200 Drawings were to be issued to NHS GGC in the beginning of September[1070]. At the end of September, Mr Moir flagged that NHS GGC required clarification on exactly what it was signing off at this stage, to which Mr Hall clarified that it was 1:50, 1:200, and 1:500 drawings, but not technical specifications[1071].

5.6.7 Stage 2 HAI-Scribe

672. HAI-SCRIBE is a procedure mandated by SHFN 30 for the identification, management and mitigation of issues in the built environment giving rise to a risk of infection[1072]. Had any of the four HAI-SCRIBE stage reviews had been carried out for the new SGH Project? We found one.

673. On 7 July 2010, Ms Barmanroy signed a HAI-SCRIBE document in respect of stage 2[1073]. She described suggesting that one be done, whereupon an hour later she and Mr McDerment were sitting down completing it[1074]. She sought reassurance from him that things were 'going okay,' and made a series of assumptions around other people's work, to tick every box[1075]. She made those positive assumptions because nobody had told her otherwise[1076]. She regretted having taken it on trust that colleagues would complete their parts. Taking matters on trust undercut the very purpose of the HAI-SCRIBE process[1077]. She had been mistaken to do so, but there was time after Stage 2 to iron out any issues[1078].

674. The Stage 2 HAI-SCRIBE document produced and signed by Ms Barmanroy recorded "Stage 1 - Completed for Outline Business Case by Annette Rankin", although she had not seen that document and was simply told that by Mr

[1070] A33501923 - Bundle 31 Document 16, Page 102.
[1071] A33501945 - Bundle 31, Document 18, Page 117.
[1072] The HAI-SCRIBE procedure is set out in SHFN 30 (A33662182- Bundle 27, Volume 3, Document 22) which was originally published in 2002.2002 version was updated by a version published in 2007. Use of the 2007 version was mandated by CEL 18 (2007) of 13 December 2007. The latest version published in October 2014 is Bundle 27, Volume 4, Document 35, Page 365.
[1073] Transcript, Jackie Barmanroy, 15 May 2025, Page 77, Column 149.
[1074] Transcript, Jackie Barmanroy, 15 May 2025, Pages 76 and 104, Columns 147 and 203.
[1075] Transcript, Jackie Barmanroy, 15 May 2025, Pages 78-82, Columns 151-159.
[1076] Transcript, Jackie Barmanroy, 15 May 2025, Page 97, Column 190.
[1077] Transcript, Jackie Barmanroy, 15 May 2025, Page 104, Column 204.
[1078] Transcript, Jackie Barmanroy, 15 May 2025, Pages 82-83, Columns 160-161.

McDerment[1079]. The Inquiry Team has been unable to recover a Stage 1 HAI-SCRIBE. Ms Rankin was adamant that she had not completed one and was never contacted by the Project Team to clarify whether she had completed a Stage 1 HAI-SCRIBE[1080].

675. Consultant ICN Sandra Devine[1081] and Professor Williams[1082] only learned that Ms Barmanroy had completed a Stage 2 HAI-SCRIBE because of evidence to the Inquiry. It was Ms Devine's view that the production of a Stage 3 HAI-SCRIBE was the responsibility of the Project Team[1083]. Professor Williams agreed, by reference to Section 2 of SHFN 30 Part B, Version 3.0, October 2014,[1084] which requires that the Project Owner/Sponsor is the responsible officer for the Stage 1 HAI-SCRIBE at 'Initial Brief and proposed site for development" and that the Project Manager is the responsible officer for the remaining HAI-SCRIBE stages. He was not asked to advise, assist or contribute to any part of the HAI-Scribe process[1085]. When asked about the Stage 3 HAI-SCRIBE, he argued that as Lead ICD his job description related to functioning hospitals in NHS GGC and not the new build project[1086]. He had no knowledge of a Stage 4 HAI-SCRIBE[1087].

676. Jackie Barmanroy explained she was asked to make enquiries as to whether things were going okay with water and ventilation by Sandra Devine. It was not her place to enquire why it was being made, or whether it should be more specific[1088]. Ms McCluskey was of the view that Ms Barmanroy's signing of the Stage 2 HAI-SCRIBE should be viewed as having been done with support from her senior IC colleagues[1089].

677. At a meeting of the Construction Interface Group on 24 March 2021, Mr Calderwood is recorded to have asked about HAI-SCIBE and to have

[1079] Transcript, Jackie Barmanroy, 15 May 2025, Pages 75-76, Columns 146-147.
[1080] Glasgow 4, Part 2 - Witness Statements, Volume 1, Annette Rankin, Document 13, Page 118.
[1081] Then Sandra Macnamee.
[1082] Glasgow 4, Part 2 - Witness Statements, Volume 1, Document 11, Page 91, Q14.
[1083] Glasgow 4, Part 2 - Witness Statements, Volume 1, Sandra Devine, Document 10, Page 75.
[1084] Bundle 27, Volume 4, Document 35, Page 380.
[1085] Glasgow 4, Part 2 - Witness Statements, Volume 1, Document 11, Page 91, Q14.
[1086] Glasgow 4, Part 2 - Witness Statements, Volume 1, Document 11, Page 92, Q15.
[1087] Glasgow 4, Part 2 - Witness Statements, Volume 1, Document 11, Page 92, Q16.
[1088] Transcript, Jackie Barmanroy, 15 May 2025, Pages 98-100, Columns 192-195.
[1089] Transcript, Fiona McCluskey, 15 May 2025, Page 24, Columns 43-44.

received an assurance from Mr McDerment. The minute records:

> "RC queried if HAI Scribe had been carried out on site, HMc confirmed that this had been completed for the whole site with Jackie Stewart, Infection Control."[1090]

5.6.8 Gateway 3 Review and Full Business Case

678. The Gateway 3 Review is described in some detail in PPP15[1091], as is the Full Business Case ('FBC')[1092]. We do not repeat that detail, but the opportunity was taken to explore these issues with witnesses in the Glasgow 4 hearings.

679. When asked about the October 2010 Gateway 3 Review, Mr Seabourne stressed that NHS GGC needed sufficient time to enable drawings to be appropriately reviewed and signed[1093].

680. The Inquiry Team has been unable to recover from NHS GGC, or Scottish Government, documents supplied to the reviewers who carried out the Stage 3 Gateway Review in October 2010. In an email from the Scottish Government Programme & Project Support Manager on 8 June 2010 to Ms Byrne she is asked to:

> confirm:
>
> • when the Project will be ready for the next review;
>
> • that there have been no significant changes in the Project scope or overall risk level since the last Review; and
>
> • that if the Project is ready that we should contact Peter Moir to put arrangements in place.

681. The same email sets out the “purpose and scope of a Gateway 3 Review”, which includes checking “that all the necessary statutory and procedural requirements were followed throughout the procurement/evaluation process”.

682. Although this email was apparently never received by Ms Byrne, it was intended for her, and she was asked how she would have answered the

[1090] Bundle 40, Document 42, Page 153.
[1091] Bundle 48, Document 15, Pages 429-433, Paras 250-254.
[1092] Bundle 48, Document 15, Pages 433-439, Paras 255-266.
[1093] A33501916 - Bundle 31, Document 19, Page 123.

question. She explained that she would have read this in the context of the Gateway 3 Review, and would have said there were no significant changes. However, knowing what she now knows about what the Inquiry has called the "Agreed Ventilation Derogation", she explained:

> "If you are asking me specifically about the departure from the ERs, then it's a different answer. There were changes.[1094]

683. The FBC was to go to the NHS GGC Board on 26 October 2010[1095]. The draft was issued to the Senior Responsible Owner, Robert Calderwood, on 8 October 2010. He accepted that, as Chief Executive, he was responsible for it[1096]. He described the FBC as a document laid out on a prescribed basis. It was very much a financial document which described how the strategy had been signed off; the approval of the procurement strategy and provided the detailed financial and clinical information needed. From his perspective the FBC went through the Finance Directorate in the Scottish Government, who were interested in the Board's ability to afford the investment[1097].

684. Mr Calderwood did not know whether the departure from government guidance on ventilation was in the FBC or should have been in the FBC. If what was required to be included had included details of the technical solutions proposed, then they must have been in the document to get it approved. The Chair put to Mr Calderwood that others had said there would have been an expectation on the part of those receiving that FBC to be informed if there had been a decision to depart from current government guidance on design. Mr Calderwood's response was that:

> If colleagues within Scottish Government Health Directorate asked questions following receipt of the Full Business Case along the lines of technical compliance with Scottish Health Technical Memoranda, then there should be a communication chain from them to the Project team/project director to answer the question[1098].

685. When it was put to Mr Calderwood that the FBC contained no reference to

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[1094] Transcript, Helen Byrne, 30 May 2025, Page 62, Column 119.
[1095] A33501940 - Bundle 31, Document 17, Page 116.
[1096] Transcript, Robert Calderwood, 30 September 2025, Page 68, Column 132.
[1097] Transcript, Robert Calderwood, 30 September 2025, Pages 64-68, Columns 123-132.
[1098] Transcript, Robert Calderwood, 30 September 2025, Pages 69-70, Columns 133-136.

what is now called the Agreed Ventilation Derogation, he claimed that he could not comment on what readers interpreted from the FBC. He explained his inability to comment by reference to the fact (as he saw it) that the derogation decision was taken by the Project Team pre-contract. He also would not comment on whether Scottish Government readers would assume compliance with guidance from the absence of a statement that guidance was not to be followed. Finally, he passed responsibility for the preparation of the FBC onto others such as the Director of Finance, the Project Director and the Chief Operating Officer. Despite his earlier evidence he did not ultimately accept responsibility for the contents of the FBC as senior responsible owner[1099].

686. On 26 October 2010 the FBC was approved by NHS GGC's Board and on 9 November 2010 it was submitted to the Capital Investment Group[1100].

687. Mike Baxter was the Chair of the CIG at the time of FBC approval. He explained how CEL 19 (2009)[1101] and the 2006 version of the Policy on Design Quality for NHS Scotland[1102] import a reference to SHTM 03-01, so that whilst SHTMs are guidance, the policy requires mandatory application. No derogations from standards were referred to in the OBC or FBC. He described an example when the Sick Kids in Edinburgh wanted a derogation from the single room standard set out in a CEL, that had been formally requested, considered by the Chief Medical Officer and agreed, before FBC stage. Anyone in the community of procurers of health projects in Scotland, who was attending workshops run by his team, would have known or should have known that there was a derogation process out there to be used[1103].

688. Mr Baxter explained that the Scottish Government would not have contemplated a project being built otherwise than in conformity with the SHTMs – "the expectation is that a project, or any building that was being developed, would have been compliant"[1104].

[1099] Transcript, Robert Calderwood, 30 September 2025, Pages 70-73, Columns 136-141.
[1100] A35421719 - Bundle 42, Volume 7, Document 5, Page 27.
[1101] Bundle 48, Document 1, Page 4.
[1102] Edinburgh 1 - Bundle 3, Volume 1, Document 2, Page 125.
[1103] Transcript, Mike Baxter, 16 September 2025, Pages 9-10 and 33-35, Columns 14-15 and 61-65.
[1104] Transcript, Mike Baxter, 16 September 2025 Pages 13 and 35-37, Columns 21, 66-69.

689. Mr Baxter explained that his team took a degree of assurance from what was expected to have happened internally within a Health Board to approve a FBC before it comes to the CIG. He described "internal approval processes within any health board involving those that are involved with the delivery of care, planning of care, to provide that health board and the board of management for that health board with assurance around what the full business case is"[1105]. There appears to be no evidence that such processes were effective within NHS GGC.

5.6.9 The Environmental Matrix

690. The specification of the rooms was set out in an Environmental Matrix created by ZBP[1106]. The Inquiry Team have not had sight of the original of that document, but is aware that it was included within the FBC Project Bible in two Batches, which were added to the ERs' ADB Environmental Matrix Folder J in 2010 [1107]. In those two Batches, rooms were designated under three columns, being given a department code, an ADB briefing code, and then the next one is the generic name of the room type.

691. Mr Ballingall's recollection was that the Environmental Matrix was fed from the agreed RDSs produced in 2010[1108]. The RDSs would show requirements for the room such as the temperature, air change rate, pressure and any filtration rates[1109]. Those fields would have been filled in by ZBP using the ADB sheets as a starting point. There was scope to vary them, the example given being the change of ACH to 40 litres per second[1110].

692. Mr Pardy could not recall ZBP preparing the Environmental Matrix, but did describe how the process would have been carried out:

> "the codebook system allows you to export the rooms and the various fields that we have to fill in, and we would have had that export from Nightingales, filled in the various elements of the rooms, fields, and then fed that back to Nightingales,

[1105] Transcript, Mike Baxter, 16 September 2025, Page 39, Column 73.
[1106] Transcript, Steven Pardy, 27 May 2025, Page 25, Column 45.
[1107] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 136.
[1108] Transcript, Ross Ballingall, 21 May 2025, Page 35, Column 65.
[1109] Transcript, Steven Pardy, 27 May 2025, Page 24, Column 44.
[1110] Transcript, Steven Pardy, 27 May 2025, Page 25, Column 46.

which then formed the completed Room Data Sheet. So we would've filled in all those fields, generally using the ADB sheet as the starting point unless we varied it; obviously the 40 litres per second was a variance to the, whatever's in the ADB sheet."[1111]

693. Wallace Whittle, when asked by Currie & Brown to carry out the task of highlighting areas appearing not to be in compliance with the ERs, did so on the understanding that the rooms listed in the Environmental Matrix Batches 1 and 2 contained a representative sample of rooms for the whole project[1112]. Among those batches a haemato-oncology single room in the QEUH was recorded in Batch 1 as being supplied with 40 litres/second (i.e. 2.5-3 ACH) with negative pressure from the bedroom to the corridor[1113]; whereas an isolation room in Critical Care within the QEUH was instead expressed in terms of 6 ACH, with pressure differentials in accordance with Table 1 of HBN 04 Supplement 1[1114]. Mr McKechnie made distinction between an 'RDD Process', with NHS GCC carrying out a detailed analysis of whether the ERs had been correctly picked up; and a 'parallel process' involving ZBP presenting their detailed design ventilation drawings, Wallace Whittle being involved though he did not know who had examined the drawings[1115].

694. Mr Pike described Multiplex's role in checking that "nothing had been lost in translation between ZBP and Nightingale". However, they did not back-check by looking behind the matrix, to ascertain what the requirements of relevant guidance were from the guidance itself[1116]. He was open to the idea that participants should point out aspects which did not seem to match up, but keen to emphasise that often the state of parties' knowledge simply would not allow for this:

"I think there's an obligation on anybody if they spot something that they don't think is right at any point in time. I think there's probably a knowledge gap between

[1111] Transcript, Steven Pardy, 27 May 2025, Page 25, Column 45.
[1112] Transcript, Stewart McKechnie, 27 May 2025, Page 64, Column 124; referring to ZBP Consulting Engineers, NSGH Environmental Data Matrix, Bundle 16, Page 1677, Page 1679, Section 3.0.
[1113] Bundle 43, Volume 5, Documents 45 and 46, Pages 412 and 413; see rows for codes NSGH-HOW B0305A, Single bedroom haemato-onco type 3/2/1.
[1114] Bundle 43, Volume 5, Documents 45 and 46, Pages 412 and 413; see row for codes NSGH-CCW.
[1115] Transcript, Stewart McKechnie, 27 May 2025, Pages 66-67, Columns 128-129.
[1116] Transcript, Darren Pike, 20 May 2025, Page 15, Column 28.

some of the healthcare side and some of the technical side and certainly, from my perspective as a M&E manager, looking at some of the immunocompromised patients and then the terminology that might be used elsewhere actually meaning the same thing isn't something I would automatically pick up."[1117]

5.7 Development of designs for specific wards

695. This section deals with the development of designs for specific wards or parts of the hospital during Stage 2 and then Stage 3, that may have a connection to the existence of potentially deficient features in the water or ventilation systems.

5.7.1 Ward 2A - The Schiehallion Unit

696. Professor Gibson described that unit when at Yorkhill as having HEPA filtered corridors, HEPA filtered wards, and double door ward access[1118]. The ward had single bedrooms, with one exception with two beds. The rooms were pressurised[1119]. Mr Hill expected the ventilation system in Ward 2A/2B would be at a minimum equivalent standard to that installed in Yorkhill, or better, with any upgrades depending on what the regulations required. The expectations of patients going into a brand-new hospital would be that it was built to the current standards[1120].

697. In May 2010, the User Group refused to sign off on Ward 2A, being unhappy with the Schedule of Accommodation. This did not match the area they had in the old facility – "They feel they are not getting the same accommodation as they have now"[1121]. Ms White's understanding was that eventually the specification was agreed outside the User Group structure. By 'signing off,' she meant conclusion of the iterative process indicating conclusion of the NHS's internal consultation process, such that they were happy with the layout and design, and content to proceed to the next stage[1122]. Professor

[1117] Transcript, Darren Pike, 20 May 2025, Page 17, Column 32.
[1118] Transcript, Professor Brenda Gibson, 19 August 2025, Page 19, Column 34.
[1119] Transcript, Professor Brenda Gibson, 19 August 2025, Page 21, Column 37.
[1120] Transcript, Kevin Hill, 17 September 2025, Page 51, Column 97.
[1121] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 15, Page 83.
[1122] Transcript, Emma White, 13 May 2025, Pages 52-53, Columns 99-101.

Gibson described being shown floor plans and being told that the design was already fixed[1123] and this was also the recollection of Mr Jenkins[1124]. She refused to sign off on the plans due to concerns about inadequate space and facilities[1125]. She recalled there being pressure to sign off, and referred to "duress and inappropriate behaviour" during the process[1126]. She did not recall having any direct communications with external advisers or the NHS GGC technical team. It 'never dawned' on her that there would be a problem with water or ventilation[1127].

Non-Isolation Rooms in Ward 2A

698. Mr Hall accepted that a 40 litres per second air change rate on the RDS for a Ward 2A non-isolation room was an error. It was ZBP that was responsible for the error[1128]. Mr Pike's view was that the Project Team were aware that single rooms had 40 litres per second, as it was 'a talked about thing'[1129].

699. Mr Pardy was surprised to learn that there were rooms outside the isolation rooms within Ward 2A that did not have the required 10 ACH but instead had 2.5 ACH[1130]. ZBP may not have appreciated that 10 ACH applied to various rooms, not just isolation rooms[1131]. Although the COS said "immunocompromised", they might have assumed that such patients would be dealt with in the isolation rooms and the other rooms were more of a 'step-down type arrangement'[1132]. The negative pressure in the wards of immunocompromised patients such as Ward 2A, may have been an error again caused by applying the standard bedroom criteria and missing that it should have been positive pressure[1133].

700. Mr Ballingall was also surprised to learn that the Agreed Ventilation

[1123] Transcript, Professor Brenda Gibson, 19 August 2025, Page 36, Column 68.
[1124] Glasgow 4, Part 3 - Witness Statements, Volume 4, Gary Jenkins, Document 2, Pages 159-160, Q13(c).
[1125] Transcript, Professor Brenda Gibson, 19 August 2025, Pages 36-37, Columns 68-69.
[1126] Transcript, Professor Brenda Gibson, 19 August 2025, Pages 37-38, Columns 69-72.
[1127] Transcript, Professor Brenda Gibson, 19 August 2025, Page 37, Column 69.
[1128] Transcript, David Hall, 22 May 2025, Page 79, Column 153.
[1129] Transcript, Darren Pike, 20 May 2025, Page 14, Column 25.
[1130] Transcript, Steven Pardy, 27 May 2025, Page 38, Columns 71-72.
[1131] Transcript, Steven Pardy, 27 May 2025, Page 45, Column 85.
[1132] Transcript, Steven Pardy, 27 May 2025, Page 45, Column 85.
[1133] Transcript, Steven Pardy, 27 May 2025, Page 44, Column 84.

Derogation had been applied in Ward 2A, because his understanding was that it applied only to general wards, and from memory the general wards were Level 5 up in the tower[1134].

The missing 'airlock'

701. Mr Seabourne highlighted that the COS for Ward 2A had an airlock, and he did not know how Nightingales could have missed that. If a ward has an airlock, that flags that it has a different ventilation system[1135].

702. Mr Pike was unable to explain why there was no airlock entrance lobby in Ward 2A, but the UGMs would have looked at the 1:200 scale, which included the corridor, and would have had an opportunity to pick that up[1136].

703. Regarding the 1:200 Schiehallion Plan[1137], Ms White explained that this was used in User Groups to illustrate boundaries and correspondence with the higher-level 1:500 drawings, which showed department location and circulation. The airlock in the COS was not present on this 1:200 drawing – Ms White speculated that sometimes items were not picked up correctly by the CAD model. When asked whether the question of pressurisation to the outside world had 'slipped away' during the design development stage, she did not attribute this to any issue at the ADB stage[1138]. Mr Hall said that nobody had been appointed with the function of picking up such errors[1139]. He was a facilitator, but he was not a designer, and his role was only to encourage work to progress[1140]. Technical content and application of guidance was beyond his remit, experience and understanding[1141]. Mr Seabourne said it was such an obvious point that ZBP ought to have had it in mind[1142].

704. Mr Pike stated that Multiplex has subsequently put in place sample reviews

[1134] Transcript, Ross Ballingall, 21 May 2025, Pages 32-35, Columns 59-65.
[1135] Transcript, Alan Seabourne, 29 May 2025, Page 51, Column 98.
[1136] Transcript, Darren Pike, 20 May 2025, Page 19, Column 36.
[1137] A52353204 - Bundle 47, Volume 3, Document 1, Page 3.
[1138] Transcript, Emma White, 13 May 2025, Page 31, Column 58.
[1139] Transcript, David Hall, 22 May 2025, Page 68, Column 132.
[1140] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Hall, Document 6, Page 206, Q35.
[1141] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Hall, Document 6, Page 206, Q36.
[1142] Transcript, Alan Seabourne, 29 May 2025, Page 59, Column 113.

and cross-checks of M&E design and RDS content to check they aligned[1143].

BMT Rooms in Ward 2A

705. Ms Barmanroy said that in September 2012 she arranged a meeting between Professor Williams and the 'technical guys' relating to water and ventilation[1144]. Professor Williams said that he attended no such meeting. Ms Barmanroy did not attend any meeting but recalled making clear to Mr Hall that Professor Williams should be contacted for advice on water and ventilation[1145]. On 25 August 2011, Ms Coral Brady, Business & Administration Manager for the Schiehallion Unit, contacted Ms MacLeod to check the plans for the air filter system for the Haemato-oncology unit. No-one knew who had been discussing this and she was seeking clarification. Ms MacLeod responded that:

> "…The plans for the haemato-oncology area in the NCH include HEPA filter and pressure as necessary. When we are further in the design, we will contact staff as and when required. We do however have a full NHS technical team supported by external technical advisers who are aware of the building requirements for the unit.
>
> Thanks for your email though - it is helpful if people keep us advised of any concerns that they have to avoid costly mistakes.[1146]"

706. Mr Wilson maintained there was no requirement in the design for HEPA filters in Ward 2A. However, there was a requirement for HEPA filter housing, so that a HEPA filter could be installed at some stage. He accepted that he did not know the definition of neutropenic patient at the time[1147].

5.7.2 The original proposal for Ward 4B

707. The initial intention was not to have an adult BMT ward at the new SGH, but simply a 14 patient Haemato-oncology ward. Dr Hood's advice set out in the COS for this original ward was silent on the required ACH, but specified no

[1143] Glasgow 4, Part 1 - Witness Statements, Volume 2, Darren Pike, Document 3, Page 103, Q36(a).
[1144] Glasgow 4, Part 3 - Witness Statements, Volume 8, Jackie Barmanroy, Document 6, Page 57.
[1145] Glasgow 4, Part 3 - Witness Statements, Volume 8, Jackie Barmanroy, Document 6, Page 58.
[1146] Bundle 46, Volume 3, Document 5, Pages 717-718.
[1147] Transcript, David Wilson, 20 May 2025, Pages 17-19, Columns 32-33.

opening windows, no chilled beams, positive pressure to the rest of the hospital, HEPA filtered air and an adequate number of positive pressure sealed HEPA filtered side rooms for neutropenic patients[1148].

708. On 7 May 2010, the Haemato-oncology User Group approved the 1:200 drawings[1149] for what was then to be the Adult Haematology Ward. The attendees were Mr Best, Ms MacLeod, Ms McCluskey, Ms Wrath and Ms Stewart[1150]. Part of the ward is identified in green as "NSGH Haemo Oncology Ward". There is no ventilation technical information on the drawing and no lobby at the entrance. The drawing was signed by Ms Griffin, Ms Stewart, Ms Connelly and an architect from Nightingales. Ms Stewart explained that she had signed because she agreed that was how the rooms were going to be laid out inside the ward (but insisted that the area identified in green was to be for renal patients, that she did not realise there was going to be a Haematology Ward, and that she had not reviewed the COS[1151]).

709. In June 2010, a PMI was issued by Mr Moir to Multiplex which requested that HEPA filters be removed from 8 single rooms in the Haemato-oncology ward[1152]. Ms Stewart did not know about this.[1153] The drawing shows eight rooms not coloured green. These must be the renal rooms, presumably not considered to need HEPA filtration.

710. Mr Calderwood asserted the haemato-oncology patients initially due to go to Ward 4B, were not immuno-suppressed[1154]. They were low-level oncology patients, who would be administered drugs with an overnight stay or short stay[1155].

5.7.3 The Design of Ward 4C

711. Ms White stated that the COS requirement for a sealed ceiling in Ward 4B

[1148] Bundle 16, Document 15, Page 1595.
[1149] Bundle 43, Volume 4, Document 19, Page 406.
[1150] A51667056 - Bundle 43, Volume 1, Document 25, Page 99.
[1151] Jackie Barmanroy, Transcript, 15 May 2025, Pages 71-75, Columns 137-145.
[1152] A36939861 - Bundle 16, Document 24, Page 1674.
[1153] Transcript, Jackie Barmanroy, 15 May 2025, Page 75, Column 145.
[1154] Glasgow 4, Part 3 - Witness Statements, Volume 3, Robert Cadlerwood, Document 1, Page 64, Para 214.
[1155] Glasgow 4, Part 3 - Witness Statements, Volume 3, Robert Cadlerwood, Document 1, Page 67, Paras 223-224.

appeared to have been missed[1156] and despite this requirement also applying to Ward 4C, that Mr Hall had made no comments to suggest the ceiling type was incorrect on the ceiling plans in 2013[1157].

5.7.4 Renal Outpatients

712. Mr Seabourne[1158] and Mr Hall[1159] spoke in the context of a specific ACH discussion following complaints of draughts in outpatient renal dialysis areas in the Stobhill and Victoria hospitals and the point was referred to Peter Hoffmann for advice via Dr Hood, Professor Williams and the "Infection Control nurses"[1160].

713. On 15 October 2010, Jackie Stewart, Consultant Nurse Infection Control, asked Professor Williams and Dr Hood for a decision on the ventilation for the renal dialysis area to be communicated to Fiona McCluskey[1161]. On 21 Oct 2010, Fiona McCluskey requested the decision and explained the information was needed for the FBC. Dr Hood responded on the same date, explaining that he was not happy with the reduction of ventilation in a dialysis area to 2.5ACH because ACH is about dilution and removal. He further explained that a normal ward area would be expected to have 6 ACH. He concluded by stating that he wished to discuss the issues with Mr Peter Hoffman from the Health Protection Agency ("HPA")[1162]. On 25 October 2010, Dr Hood sent an email to Fiona McCluskey, Jackie Stewart, and Professor Williams relating to ventilation. The email confirmed that Dr Hood had spoken to Mr Hoffman, and he was happy with the proposal for chilled beams in the renal dialysis area. It also confirmed that Mr Hoffman considered 6ACH was for temperature control not infection control issues[1163].

714. Mr Hoffman gave evidence that his first involvement with the QEUH was in

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[1156] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 214, Q46(f).
[1157] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 218, Q46(m).
[1158] Transcript, Alan Seabourne, 29 May 2025, Page 44, Column 83.
[1159] Transcript, David Hall, 22 May 2025, Page 19, Columns 32-33; by reference to Bundle 43, Volume 3, Document 24, Page 1280.
[1160] Transcript, Alan Seabourne, 29 May 2025, Page 44, Column 83.
[1161] A48745034 - Bundle 17, Document 79, Page 3033.
[1162] A48745034 - Bundle 17, Document 79, Pages 3032-3033.
[1163] A48745034 - Bundle 17, Document 79, Page 3032.

late 2010, when he said he was asked by Dr Hood for his views on ACH for a renal dialysis outpatient area[1164] and that what is recorded in the emails was likely to have been his advice[1165]. Mr Walsh stated that in 2009 Dr Hood and Professor Williams identified an area of the Renal Dialysis Outpatient Unit had a derogation but that this was acceptable for that group of patients given the risk[1166]. It was Professor Williams's evidence that he was not involved in the conversation, just copied in[1167].

715. Mr Seabourne's commentary these emails is that:

> "it's not about the Renal Unit. It's about them saying, "These rooms don't need 6 air changes." If I can take anything out of that email, that's what it's throwing at me. That, for me and my team, was, "That's fine. We're happy. We've made a right decision further back down the road."[1168]

Ms McCluskey recalled Mr Hood being asked for his view on ACH and he had asked Peter Hoffman, and the upshot was that infection control would not be affected by the number of ACH in a single bedroom in a general ward[1169]. Mr Pike recalled being involved in a renal dialysis detailed workshop in 2010 or 2011 and he stated that the name Dr Hood did ring a bell[1170].

5.7.5 Isolation Rooms

716. As noted above, section 8.2.14 of the ERs[1171] defined all isolation rooms by reference to SHPN 4, to be Positive Pressure Ventilated Lobby Rooms ("PPVL"). An understanding of this had not permeated the management structure of NHS GGC by the time the hospital opened.

Realisation that Isolation Rooms were to be PPVL Rooms

717. In November 2012, Peter Hoffman told Dr Inkster[1172] that he suspected that

[1164] Transcript, Peter Hoffman, 26 September 2024, Pages 5-6, Columns 6-8. See also Bundle 17, Document 79, Page 3032.
[1165] Transcript, Peter Hoffman, 26 September 2024, Page 7, Column 9.
[1166] Transcript, Thomas Walsh, 13 September 2024, Page 17, Column 29.
[1167] Glasgow 4, Part 2 - Witness Statements, Volume 1, Professor Craig Williams, Document 11, Page 89, Q11.
[1168] Transcript, Alan Seabourne, 29 May 2025, Page 47, Columns 89-90.
[1169] Transcript, Fiona McCluskey, 15 May 2025, Page 29, Column 54.
[1170] Transcript, Darren Pike, 20 May 2025, Page 14, Column 26.
[1171] Bundle 46, Volume 3, Document 1, Page 177.
[1172] Bundle 23, Document 13, Page 194.

the PPVL isolation rooms planned for the QEUH/RHC would be designed to HBN4 Supplement 1. Dr Inkster described being shown plans for a suite of isolation rooms with lobbies[1173]. He commented that he was not entirely happy with the PPVL concept, and the HBN4 Supplement 1 guidance does not apply to highly neutropenic patients, who should have HEPA filtration and positive pressure[1174].

Professor Williams becomes involved

718. Professor Williams explained that his direct involvement began in late 2014 after the decision to move the infectious diseases unit to the QEUH[1175]. The issue was whether the PPVL rooms provided complied with MDRTB guidance, and how to achieve the safest possible ingress and exit of patients with Ebola to the new unit[1176].

719. Ms Barmanroy expressed surprise that Professor Williams may not have known what sort of isolation rooms they were in August 2014[1177].

720. When Ms McCluskey was asked about her presentation to the BICC on 6 October 2014 describing IPC involvement in the new SGH Project,[1178] she explained that her input was not on ventilation. Had it been she would have requested that someone technical attend[1179]. In a discussion about the new adult infectious diseases unit, Professor Williams points out that placing isolation rooms in the ward itself would require a massive air flow change[1180].

The Design of PPVL Rooms

721. In August 2012, the ZBP Specification stated that the lobbied isolation rooms would each have their own dedicated ventilation system in line with SHBN 04[1181]. There is no guidance known as 'SHBN 04'. HBN 04 requires that the extract is in the en-suite. The ZBP Specification stated, contrary to HBN

[1173] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Page 67, Para 184.
[1174] Transcript, Peter Hoffman, 26 September 2024, Columns 11 and 15.
[1175] Bundle 27, Volume 8, Document 4, Pages 43-45.
[1176] Glasgow 4, Part 2 - Witness Statements, Volume 1, Professor Craig Williams, Document 11, Page 93, Q17.
[1177] Transcript, Jackie Barmanroy, 15 May 2025, Page 43, Column 82.
[1178] Bundle 27, Volume 8, Document 3, Page 39.
[1179] Transcript, Fiona McCluskey, 15 May 2025, Pages 47-48, Columns 89-92.
[1180] Bundle 42, Volume 1, Document 68, Pages 350-351.
[1181] Bundle 23, Document 11, Page 77.

04[1182], that air would be "…extracted from the suite via the bedroom and en-suite WC…"[1183].

722. Mr Hall recalled that Multiplex and their designers had requested the change to the main extract from the en-suite to the bedroom. This had been approved by Mr Moir. He understood the rationale for the change was to do with improved distribution of air and avoiding stagnant areas, albeit it did not comply with SHPN 04 Supplement 01. Multiplex considered it to be a better solution[1184].

723. They expected the RDSs to confirm the requirements[1185]. He said that they split the extract in PPVL rooms between the room and the en-suite, which he said HBN 04-01 suggested could be done[1186]. He accepted that by placing the additional extract at high level in the bedroom, he had not strictly followed HBN 04-01 (which allowed an additional extract terminal at low level in the bedroom[1187]). The brief was not clear and ZPB's erroneous interpretation could have been picked up by NHS GGC when the RDSs were submitted[1188].

724. Mr Wilson did not have any concerns about isolation rooms at the time of commissioning, because the installation was per the design drawings which he understood were based on NHS GGC requirements[1189]. He understood that the final agreed design was PPVL rooms with 10 Pa, main extract from the bedroom and 10 ACH[1190]. In oral evidence, Mr Wilson resisted a suggestion that he had been unhelpful in restricting a reply to David Loudon's complaint on the isolation rooms so that it focused only on the question of compliance. Compliance was the question they had been asked to address[1191].

725. Mr Pardy confirmed that the isolation rooms were all designed as PPVL

[1182] Bundle 16, Document 4, Page 323.
[1183] Bundle 23, Document 11, Page 77.
[1184] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Hall, Document 6, Pages 235-236, Paras 126-129.
[1185] Transcript, Steven Pardy, 27 May 2025, Page 38, Column 72.
[1186] Transcript, Steven Pardy, 27 May 2025, Pages 48-50, Columns 92 -96.
[1187] Transcript, Steven Pardy, 27 May 2025, Page 51, Column 98.
[1188] Transcript, Steven Pardy, 27 May 2025, Page 46, Column 88.
[1189] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Wilson, Document 2, Page 67, Q40.
[1190] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Wilson, Document 2, Page 68, Q41(c).
[1191] Transcript, David Wilson, 20 May 2025, Pages 26-29, Columns 49-56.

rooms[1192]. He explained that he and his colleagues adopted splitting the extract between the ensuite and bedroom because taking all of the extract from the ensuite can lead to excessive ACH in the ensuite and can cause noise[1193]. Nobody made ZBP aware that NHS GGC clinicians were discussing the need for a mix of room types beyond PPVL[1194]. HBN 04-01 suggested that having different room types of isolation rooms could be problematic[1195], but accepted that both HBN 04-01 and SHPN 04-01 stated they were not suitable for immunocompromised or infectious disease units. Despite this, ZBP proceeded with PPVL designs, assuming they were appropriate[1196].

726. Mr Pardy admitted that ZBP should have applied their mind to what should have been provided for immunocompromised patients but could not recall if they did or not[1197]. They split the extract ventilation between the ensuite and the bedroom in isolation rooms in accordance with the guidance, HBN 04-01. He justified this on engineering grounds, citing issues with airflow, privacy, and noise[1198]. ZBP did not carry out any validation or testing of the modified design for PPVL isolation rooms[1199]. He reiterated that ZBP expected NHS GGC to review and approve their design proposals, including deviations from guidance, but did not know whether this review was done by someone with appropriate ventilation expertise[1200].

727. On 5 January 2015 it was stated by Multiplex that Wallace Whittle[1201] had advised the isolation rooms had been designed in line with SHPN 04 Supplement 1[1202]. They could see no reason why the isolation rooms could not be used under the guidance issued previously by the NHS[1203].

5.7.6 Stage 3: Authorisation to Proceed to Handover

[1192] Transcript, Steven Pardy, 27 May 2025, Page 46, Column 88.
[1193] Glasgow 4, Part 1 - Witness Statements, Volume 3, Steven Pardy, Document 1, Page 20, Para 72.
[1194] Transcript, Steven Pardy, 27 May 2025, Page 46, Column 88.
[1195] Transcript, Steven Pardy, 27 May 2025, Pages 46-47, Columns 88-89.
[1196] Transcript, Steven Pardy, 27 May 2025, Page 47, Columns 89-90.
[1197] Transcript, Steven Pardy, 27 May 2025, Page 48, Column 91.
[1198] Transcript, Steven Pardy, 27 May 2025, Pages 49-52, Column 93 -100.
[1199] Transcript, Steven Pardy, 27 May 2025, Page 53, Columns 101-102.
[1200] Transcript, Steven Pardy, 27 May 2025, Page 50-52, Columns 95-100.
[1201] By this time acting for Multiplex.
[1202] Edinburgh 1 - Bundle 1, Document 5, Page 252.
[1203] Edinburgh 1 - Bundle 4, Document 5, Pages 21-22.

728. This part of the chapter deals with specific events that occurred following the authorisation to proceed that may have a connection to the existence of potentially deficient features in the water or ventilation systems.

5.7.7 Sign Off Process for RDSs

729. Ms Wrath accepted that she had signed off RDSs. Mr Seabourne instructed her to sign off RDSs in the 1:50 drawings process[1204]. That involved her having copies of all the signed drawings, together with user instructed amendments provided by the architects. She would check the new drawings against the signed drawings. She did not review "service drawings" involving the whole ward relating to M&E[1205]. She could not recall any significant changes to service requirements[1206]. Mr Pike said that Ms Wrath and Mr Hall would have seen M&E ventilation drawings at the pre-RDD meetings[1207]. Ms Wrath explained that Mr Hall signed off all the M&E type drawings which had trunking, and she signed off the 1:50s dealing with things like sinks and sockets[1208]. Mr Hall would take notes for technical MEP purposes during the 1:50 process[1209]. Ms Wrath said she signed off the in the knowledge that she had all the backup paperwork, documentation and User Group signatures for each of the rooms[1210].

730. Mr Pardy accepted that Mr Hall would not be qualified to sign off ventilation designs[1211]. Ms Wrath stated there was also a chartered engineer, Alistair Smith, who checked all M&E details on the RDSs[1212]. If further action or information was required, then he would note that on the RDS and discuss with Mr Hall and/or Mr Moir [1213]. Ms McCluskey recalled Mr Smith giving

[1204] Glasgow 4, Part 1 - Witness Statements, Volume 1, Frances Wrath, Document 2, Pages 264-265, Q18(m).
[1205] Transcript, Frances Wrath, 14 May 2025, Page 19, Column 34.
[1206] Glasgow 4, Part 1 - Witness Statements, Volume 1, Frances Wrath, Document 2, Page 263, Q18(i).
[1207] Transcript, Darren Pike, 20 May 2025, Page 12, Column 21.
[1208] Transcript, Frances Wrath, 14 May 2025, Page 18, Columns 31-32.
[1209] Glasgow 4, Part 1 - Witness Statements, Volume 1, Frances Wrath, Document 2, Page 264, Q18(l).
[1210] Transcript, Frances Wrath, 14 May 2025, Page 30, Column 55.
[1211] Transcript, Steven Pardy, 27 May 2025, Page 31, Column 58.
[1212] It should be noted that it was the evidence of Darren Pike that Alistair Smith was recruited into the team at a point after early 2011 (Transcript, Darren Pike, 20 May 2025, Page 13, Column 23).
[1213] Glasgow 4, Part 1 - Witness Statements, Volume 1, Frances Wrath, Document 2, Page 265, Q18(n).

advice during the checking of RDSs, although she was not sure what he did[1214].

731. Mr Pike described a pre-RDD process around 2011 or 2012, attended by Ms Wrath, Mr Hall and others, to disseminate information and seek comments, which Multiplex would try to address before issuing a formal RDD pack, and would also allow users to understand what information they were going to get so they could seek further technical input if required for reviewing the RDD[1215].

732. Mr Hill stated that sometime after 2010[1216] he had signed off every plan and room layout in the RHC. He was reassured by Mr Redfern that he could sign them off[1217] and that the clinical teams had seen them and they reflected their requirements as they stood at the time[1218]. He accepted that by signing them off, this indicated his approval on behalf of NHS GGC for the room layouts and plans in the RHC[1219]. However, he clarified that he was signing off internal fittings such as power cables and power points rather than the entire plan[1220]. He described his role as ensuring ward and department plans were signed off as accurate specifications of user requirements but that formal responsibility for sign-off lay with the General Manager, Mr Redfern[1221].

733. Throughout the process, Ms Wrath stated Infection Control were involved and senior Infection Control doctors were consulted on installations such as water and ventilation[1222] (but she was unable to name them)[1223]. Her view was that the over-arching responsibility for sign-off sat with Mr Moir. In the course of his evidence, Mr Pardy conceded that he and the other M&E designers would have read the ERs and been aware of the provision to take into account

[1214] Transcript, Fiona McCluskey, 15 May 2025, Page 9, Column 14.
[1215] Transcript, Darren Pike, 20 May 2025, Page 10, Column 17.
[1216] Transcript, Kevin Hill, 17 September 2025, Page 10, Column 16.
[1217] Transcript, Kevin Hill, 17 September 2025, Page 9, Column 14.
[1218] Transcript, Kevin Hill, 17 September 2025, Page 10, Column 16.
[1219] Transcript, Kevin Hill, 17 September 2025, Page 10, Column 16.
[1220] Transcript, Kevin Hill, 17 September 2025, Page 10, Column 16.
[1221] Glasgow 4, Part 3 - Witness Statements, Volume 5, Kevin Hill, Document 1, Pages 5-6, Q3(a).
[1222] Glasgow 4, Part 1 - Witness Statements, Volume 1, Frances Wrath, Document 2, Page 272, Q27(c).
[1223] Glasgow 4, Part 1 - Witness Statements, Volume 1, Frances Wrath, Document 2, Page 275, Q30(a)(iii).

infection prevention and control in their design[1224]. He understood that to mean designing facilities that would allow Infection Control to be maintained (e.g. access to cleaning ductwork systems) and prevent future microbiological contamination[1225].

734. Ms MacLeod accepted that she signed off the spatial designs for RHC along with Ms Barmanroy. She agreed that the room adjacencies complied with Infection Control and the Clinical Lead from the RHC, was Professor Craig Williams[1226]. The mechanical, electrical and plumbing design for the department (1:200) and rooms (1:50) were developed by the "MEP Group"[1227]. She subsequently explained in the course of her evidence that there was no 'MEP Group', but this was her own term for the Joint Project Steering Group (which included Mr Seabourne and Multiplex, and there may have been a group that dealt with technical matters that reported to the Joint Project Steering Group[1228]).

735. On 25 January 2011, Multiplex were expecting NHS GGC to sign off clinical functionality but were concerned that they would have all the construction information, including 1:50 drawings, but would not be able to progress without the relevant NHS GGC sign-off [1229]. At the time, Mr Seabourne stressed that the sign-off should be concluded as soon as possible and no later than 18 February 2011[1230]. By March 2011, the 1:50 design process was agreed by NHS GGC and Multiplex[1231]. It was suggested by Multiplex that NHS GGC did not have the resource to sign off the 1:50 drawings. Mr Hall and Ms Wrath had signed off 1:50 drawings[1232]. Mr Hall explained that he was only signing off "clinical functionality" not M&E[1233]. Nobody from NHS GGC was checking the drawings were compliant with NHS guidance because that

[1224] Transcript, Steven Pardy, 27 May 2025, Page 6, Columns 7-8.
[1225] Transcript, Steven Pardy, 27 May 2025, Page 7, Column 9.
[1226] Glasgow 4, Part 1 - Witness Statements, Volume 1, Mairi Macleod, Document 3, Page 295, Q13.
[1227] Glasgow 4, Part 1 - Witness Statements, Volume 1, Mairi Macleod, Document 3, Page 293, Q6(d).
[1228] Transcript, Mairi MacLeod, 14 May 2025, Pages 61-62, Columns 118-119.
[1229] A34227321 - Bundle 40, Document 167, Page 807.
[1230] A33501990 - Bundle 31, Document 25, Page 161.
[1231] A33501983 - Bundle 31, Document 16, Page 165.
[1232] A33501997 - Bundle 31, Document 31, Page 196.
[1233] Transcript, David Hall, 22 May 2025, Page 64, Columns 123-124.

was the responsibility of Multiplex[1234]. He was signing off that the process for reviewing the design had been completed, not the technical design itself[1235].

736. On 5 May 2011, Mr Seabourne informed the ASSB that the whole design development, including M&E, would be concluded by the end of December 2011. On 10 May 2011, Mr Smith of Multiplex raised concerns that the RDSs needed to be signed off at the same time as the 1:50 drawings. Mr Moir did not think they could be signed off without having all the elevations[1236]. Mr Ballingall agreed that elevations for critical rooms were important,[1237] but explained they would not have shown the ventilation systems [1238].

737. On 1 June 2011, at the Adult & Children's Hospital Design Group Meeting No. 5, ZBP were in the process of checking Environmental Data/output on the RDS prior to UGMs issue following 1:50 department sequence, with Nightingale Associates confirming that all ZBP environmental data would be included in the RDS issues[1239]. The sign-off strategy for RDS was stated as "RDS to be signed-off at the same time as the 1:50 Drawings following User Review"[1240].

738. In July 2011, 1:50 Drawings had been completed, and the second stage of the reviews of these Drawings was to go on until November 2011. Appendix K of the ERs had also been completed by July 2011[1241]. The RDD process had still not been agreed by NHS GGC and Multiplex, and Mr Moir observed that the RDD process would create an extremely heavy workload[1242].

739. In August 2011, PWC undertook the 4th Internal Review of the New Hospitals Project. They reviewed the project governance arrangements, project management methodology, project risk management, and project financial management. The audit concluded that the project was classified as low

[1234] Transcript, David Hall, 22 May 2025, Page 64, Columns 123-124.
[1235] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Hall, Document 6, Page 228, Para 103.
[1236] A33501997 - Bundle 31, Document 31, Page 196.
[1237] Transcript, Ross Ballingall, 21 May 2025, Page 44, Column 84.
[1238] Transcript, Ross Ballingall, 21 May 2025, Page 45, Column 85.
[1239] A33501703 - Bundle 40, Document 146, Page 588.
[1240] A33501703 - Bundle 40, Document 146, Page 588.
[1241] NB that Emma White estimated this as having occurred in 2010, see Transcript, Emma White, 13 May 2025, Page 49, Column 94.
[1242] A34227325 - Bundle 40, Document 170, Page 828.

risk[1243].

740. In September 2011, Multiplex had not yet provided the RDD Schedule to NHS GGC, but work was due to commence on the RDD[1244]. There were more than 6,000 RDSs. On 20 September 2011, Mr Seabourne informed the ASSB that the next major piece of work would be the RDD, which would be undertaken in conjunction with NHS GGC's advisors, Currie & Brown and Capita, to ensure that the ERs and specifications of equipment are to the required standard.

741. Ms Barmanroy conceded that she did not read the COS before she attended meetings to sign-off drawings for the Haemato-oncology ward[1245]. There were no ventilation or water specs on the drawings she signed off[1246].She saw a drawing with a lobby, but it did not specify what kind of ventilation, because that would be in a different schematic altogether[1247].

742. RDSs for Generic Ward C were signed off as category A (approved) in June 2012. The mechanical ventilation notes for acute single bedrooms in the ward narrate a supply air rate of 40 litres per second.[1248]

743. On 3 May 2012, the RDS for the haemato-oncology ward was signed[1249]. The mechanical ventilation notes for bedrooms stipulated a supply air rate of 40 litres per second, with the bedroom balanced or negative with respect to the adjoining corridor and positive with respect to the en-suite. (A report from Professor Williams for Dr Armstrong in 2015 stated that the positive pressure siderooms at the Beatson were 5-10 Pascals in relation to corridor and twelve ACH)[1250]. The RDSs for the Haemato-oncology ward were signed off as category B (approved subject to comments) in May 2012. The mechanical ventilation notes for acute single bedrooms in the ward narrate a supply air rate of 40 litres per second.[1251]

744. Ms White thought that, although Ms Wrath's signed off a lot of documents, she

[1243] A35421690 - Bundle 42, Volume 7, Document 10.1, Page 75.
[1244] A34227343 - Bundle 40, Document 171, Page 830.
[1245] Transcript, Jackie Barmanroy, 15 May 2025, Page 73, Columns 141-142.
[1246] Transcript, Jackie Barmanroy, 15 May 2025, Page 86, Column 167.
[1247] Transcript, Jackie Barmanroy, 15 May 2025, Page 86, Column 167.
[1248] A51667958 - Bundle 47, Volume 6, Document 21, Page 31.
[1249] A51667959 - Bundle 47, Volume 1, Document 7, Page 9.
[1250] A43502680 - Bundle 20, Document 2, Page 13.
[1251] A51667959 - Bundle 47, Volume 1, Document 7, Page 44.

would not have checked every detail but would have signed as representative of the team at NHS GGC, the signature confirming that that process was now complete, as well as that everything in that documentation is correct[1252]. A David Hall signature would be much the same[1253]. At that point the brief was ready for Multiplex and Nightingales to proceed. Where she referred to 'stamped as a record', it may that a drawing had been received or recorded, not that it had been finally approved[1254].

745. Mr Fernie's understanding was that the healthcare regulations and guidance (such as SHTM 03-01) would be incorporated into the design and specification. This would then be checked for compliance during the design sign off and the construction sign off[1255]. In his view, compliance was of the upmost importance for the building and end user success and ultimately patient and staff care. Where there were agreed derogations/changes to the regulations on a project, then these are reviewed by the client and normally their compliance team. They are then signed off and incorporated into the design and specification[1256]. It was accepted by Mr Fernie that Multiplex were responsible for making sure the design and construction was compliant with hospital standards and building standards or working to an agreed derogation[1257].

746. Mr Fernie's view was that the success of the project was measured on the basis of the information signed off, and it did not necessarily follow that the project team take a step back and consider whether the information is compliant [1258] , because the process of review gives rise to a belief that the information is correct[1259]. Someone would check what has been built against the construction drawings, but any review would not involve consideration of compliance with SHTMs[1260] since it is assumed that this has been dealt with

[1252] Transcript, Emma White, 13 May 2025, Page 22, Column 40.
[1253] Transcript, Emma White, 13 May 2025, Pages 21-23, Columns 38-41.
[1254] Transcript, Emma White, 13 May 2025, Page 21, Column 41.
[1255] Glasgow 4, Part 1 - Witness Statements, Volume 2, Alasdair Fernie, Document 1, Page 7, Q5(b).
[1256] Glasgow 4, Part 1 - Witness Statements, Volume 2, Alasdair Fernie, Document 1, Page 7, Q5(c).
[1257] Glasgow 4, Part 1 - Witness Statements, Volume 2, Alasdair Fernie, Document 1, Page 7, Q5(d).
[1258] Transcript, Alasdair Fernie, 21 May 2025, Page 61, Column 118.
[1259] Transcript, Alasdair Fernie, 21 May 2025, Page 62, Column 119.
[1260] Transcript, Alasdair Fernie, 21 May 2025, Page 64, Column 123.

in the design phase[1261]. He gave an example that a lay-in grid ceiling, installed in rooms which should have had a plasterboard ceiling, would not have been picked up as part of the process for the construction delivery team[1262], as he would not have seen the COS[1263].

747. Mr Seabourne was open to the idea of an additional final step in the design process, whereby the 'completed' design was looped back to users for final approval. Mr Seabourne also described the approach of a traditional building contract, where design is refined and re-refined before building, (as was the case at Monklands), but which carried the downside of greatly prolonging the lead-in time[1264].

5.7.8 Carbon Filter Removal

748. In June 2011, Ecoteric Ltd, in advance of the seventh contract issue meeting, prepared a document covering carbon filters. The parties had agreed to get whole life costs ("WLC") for no filtration, partial filtration and full filtration for the consideration of NHS GGC[1265]. On 9 August 2011, NHS GGC informed Multiplex that they did not want carbon filters installed but did want the option to install them in the AHUs, subject to costs being agreed. In October 2010, the viability of carbon filters was being seriously questioned by NHS GGC and Ecoteric Ltd, because it would significantly increase energy consumption and associated maintenance costs[1266]. Mr Seabourne attributed filter removal to a desire to get less cost and better energy use going forward.

749. In May 2012, NHS GGC decided to delete the provision and installation of carbon filters. The AHUs were to be re-sized (made smaller), and NHS GGC informed of the cost saving. The decision was implemented by PMI 157 (also referred to as PMI 945)[1267].

5.7.9 Open ended pipes during construction

[1261] Transcript, Alasdair Fernie, 21 May 2025, Page 69, Column 134.
[1262] Transcript, Alasdair Fernie, 21 May 2025, Page 71, Column 138.
[1263] Transcript, Alasdair Fernie, 21 May 2025, Page 72, Column 139.
[1264] Transcript, Alan Seabourne, 29 May 2025, Pages 69-70, Columns 133-136.
[1265] A36939827 - Bundle 43, Volume 1, Document 36, Page 134.
[1266] A36939874 - Bundle 20, Document 82, Page 1669.
[1267] A51784116 - Bundle 43, Volume 1, Document 44, Page 229.

750. In April 2012 Capita had concerns about open ends of pipework, although they did note a general improvement [1268].

751. In August 2012, the same issue is noted, but to a lesser degree. Capita observed that Multiplex should be reminded to seal the pipework to prevent the ingress of moisture and subsequent corrosion. While ventilation ductwork was being sealed, some exceptions were noted[1269].

752. In September 2012 the same issues continue to be reported within the Capita report[1270]. In November 2012, it was noted that the issue of open ventilation ductwork was a concern. Capita carried out a walk-around with Multiplex to enable 'work in progress' on uncapped pipework to be identified[1271].

753. Mr Pike accepted that they picked up open-ended pipes during 2012, and that it was an issue, but he did not consider it to be a major problem, and it was not continually unresolved[1272].

754. In January 2013, Capita raised concerns that there were some open ends in the Level 2 ventilation plantroom to the main heating and chilled water pipework, thereby exposing the ventilation system to the elements and any foreign material. The matter would be raised formally[1273].

755. In June 2013, any defects were generally of a minor nature. However, there were open ends of pipework identified on-site inspection reports,[1274] and in July 2013 it was becoming more evident, particularly on sprinkler pipework at upper levels[1275].

756. In October 2013, open ends on pipework were reported.[1276]. In December 2013, Capita monitored noted that there had been a marked improvement in

[1268] A33085259 - Bundle 33, Document 18, Page 337.
[1269] A33085223 - Bundle 33, Document 22, Page 447, Para 4.3.5 [Pipework].
[1270] A33085225 - Bundle 33, Document 23, Pages 478-481 and 488; Bundle 33, Document 25, Page 535; A33622921 - Bundle 43, Volume 1, Document 48, Page 241.
[1271] A33084788 - Bundle 33, Document 85, Page 1821.
[1272] Transcript, Darren Pike, 20 May 2025, Pages 27-28, Columns 52-53.
[1273] A33818733, Bundle 33, Document 26, Page 581.
[1274] A33085249 - Bundle 33, Document 30, Page 746, Para 4.3.5 [Pipework]*;* A33085301 - Bundle 43, Volume 6, Document 46, Page 947.
[1275] A33085270 - Bundle 33, Document 31, Page 784, Para 4.3.5 [Pipework].
[1276] A33085260 - Bundle 33, Document 34, Pages 921 and 923.

all areas[1277].In February 2014, it was again noted there had been a marked improvement [1278]. In April 2014, protection of exposed pipework previously noted and reported to Multiplex, resulted in resolutions which were not agreed by NHS GGC[1279].

757. Mr Fernie accepted in oral evidence that open-ended pipes were undesirable, and that they may have arisen from behaviours on site by operatives[1280]. He emphasised the scale of the project meant there were, at the peak, hundreds of M&E operatives on site,[1281] and inevitably human error may occur[1282].They struggled to have all the caps on all the time, but there was a system of cleaning pipework and ductwork to capture human error[1283]. Training of operatives was the approach identified to deal with management of open ends. It was still a struggle to eliminate all open ends, due to a tendency to take short cuts[1284].

758. Mr Pike was relatively positive about the scale of the problem: “Capita picked up open ends on pipes, but in my view, it was not an endemic problem, and it was resolved quickly by Mercury. I think as you see the time go through, they get better as time goes on … it wasn’t a major problem, and it wasn’t continually unresolved”[1285]. The issue was in a few reports across a long timeframe and large project[1286].

759. Mr Redmond said that the problem was comparable to other sites and described it as “sporadic”[1287]. The modular process only minimised the risk slightly' because there are still open-ended pipes[1288]. Mr Robert O’Donovan thought Mercury Engineering would have been fairly diligent about going

[1277] A36384808 - Bunde 33, Document 36, Pages 1005 and 1011, Paras 4.3.5 [Pipework] and 4.3.17 [Partitions]; A36384811 - Bundle 33, Document 39, Pages 1110 and 1113, Paras 4.3.5 [Pipework], 4.3.17 [Partitions].
[1278] A36384822 - Bundle 33, Document 37, Page 1039 and 1072.
[1279] A33084746 - Bundle 43, Volume 6, Document 52, Page 1053.
[1280] Transcript, Alasdair Fernie, 21 May 2025, Pages 81-82, Columns 158-159.
[1281] Transcript, Alasdair Fernie, 21 May 2025, Page 82, Column 160; Transcript, Robert O’Donovan, 30 May 2025, Page 5, Column 5.
[1282] Transcript, Alasdair Fernie, 21 May 2025, Page 83, Column 161.
[1283] Transcript, Alasdair Fernie, 21 May 2025, Page 83, Column 161.
[1284] Transcript, Alasdair Fernie, 21 May 2025, Pages 82-83, Columns 160-162.
[1285] Transcript, Darren Pike, 20 May 2025, Page 27-28, Columns 52-53.
[1286] Glasgow 4, Part 1 - Witness Statements, Volume 2, Darren Pike, Document 3, Page 112, Q48(a).
[1287] Transcript, John Redmond, 28 May 2025, Page 62, Column 120.
[1288] Transcript, John Redmond, 28 May 2025, Page 62, Column 120.

around capping pipes[1289]. He welcomed the reports. If people had spotted there were open ends, then Mercury Engineering would address it. It was a very large site, but did he not believe there was any significant risk or anything unusual about it[1290].

5.7.10 Horne Optitherm Taps

760. This section builds on the Inquiry Team's knowledge of the issues affecting Horne taps (TMT/thermostatic mixing tap/TMV/thermostatic mixing valve/Optitherm) discussed in Chapter 5 of our Closing Statement following Glasgow 3[1291].

761. The Horne Taps were installed in the clinical areas of the hospital. Marwick taps were also TMVs but were installed in non-clinical areas.

762. On 30 January 2012, Edwin Poots, MLA, Minister for Health, Social Services and Public Safety, Northern Ireland asked the Regulation and Quality Improvement Authority to undertake a review into incidents in neonatal care settings in Northern Ireland. This followed an outbreak, beginning in November 2011 and continuing into 2012, during which *Pseudomonas aeruginosa* infections and colonisation occurred, resulting in three neonatal deaths. An interim report was produced on 31 March 2012[1292]. That report set out conclusions and recommendations with specific reference to the taps in use.

763. Following the report, in March 2012, the Department of Health published guidance titled 'Water sources and potential *Pseudomonas aeruginosa* contamination of taps and water systems: advice for augmented care units', which was in March 2013 superseded and built upon by a specific addendum to HTM 04-01[1293]. The present guidance is published by DH and HPS/HFS as Part C to HTM 04-01, dating from May 2016, setting out precautions to avoid *Pseudomonas* infections[1294]. This identified the risk of biofilm

[1289] Transcript, Robert O'Donovan, 30 May 2025, Page 22, Column 40.
[1290] Transcript, Robert O'Donovan, 30 May 2025, Page 22, Column 40.
[1291] CTI Closing Statement, Glasgow 3, Section 5.2, Page 198, Paras 13-26.
[1292] Bundle 18, Volume 2, Document 85, Page 239.
[1293] Bundle 44, Volume 4, Document 4, Page 20.
[1294] A44999707 - Bundle 52, Volume 10, Document 35.

developing in flow straighteners[1295].

764. The course of events was different in Scotland. On 7 February 2012 the then Chief Medical Officer issued CEL 03 (2012)[1296] in respect of the risks from *Pseudomonas aeruginosa* in water systems in healthcare facilities.

765. Multiplex held a product presentation/selection meeting where thermostatic mixing taps (TMTs) from different manufacturers were presented to NHS GGC. A joint selection panel was then formed including representatives from the Project Team and Multiplex to which the manufacturers presented[1297]. Extensive evidence given on this topic in Glasgow III is not repeated here.

766. Ms McCluskey described visits to Monklands and Vale of Leven while carrying out research into Horne Taps. She attended the presentation with Horne, following which on 27 July 2012 she wrote a paper with Ms Barmanroy[1298].

767. The paper stated that Horne recommended thermal disinfection instead of chemical. The location of the taps was to be in all the clinical wash hand basins and scrub sinks within the QEUH and RHC[1299]. There was positive feedback from other Scottish hospitals for clinical usability, infection control, no signs of corrosion, loss of surface plating and domestic cleaning. The hospitals had also not reported any maintenance issues with the taps[1300]. There was only passing mention of the *Pseudomonas* outbreaks in Northern Ireland. The paper does take account of the pending Regulation and Quality Improvement Authority review or CEL 03 (2012).

768. Ms Barmanroy did not accept authorship of the paper; it having been dated after she had left the team[1301]. In an email thread from Ms Barmanroy to Mr Hall and others dated 6 August 2012,[1302] she was clearly still involved in how to respond to draft guidance from HPS on precautions to avoid *Pseudomonas* infections. However, Ms Barmanroy insisted that her involvement was

[1295]A44999707 - Bundle 52, Volume 10, Document 35, Page 88, Para 2.9.
[1296] Bundle 27, Volume 3, Document 36, Page 622.
[1297] Glasgow 3 - Witness Statements, Volume 1, Ian Powrie, Document 1, Page 342.
[1298] Transcript, Fiona McCluskey, 15 May 2025, Pages 32-33, Column 59-62; Paper at Bundle 43, Volume 1, Document 46, Page 231.
[1299] A33795369 - Bundle 43, Volume 1, Document 46, Page 231.
[1300] A33795369 - Bundle 43, Volume 1, Document 46, Page 231.
[1301] Transcript, Jackie Barmanroy, 15 May 2025, Page 87, Column 170.
[1302] Bundle 43, Volume 1, Document 47, Page 234.

restricted to reporting that no problems had been reported from NHS Lanarkshire, and that any installation should be compliant with guidance[1303]. She accepted that an opportunity was missed not to buy these taps in 2012, in part because the decision came about after “research by non-experts", although she had not been told of the intention to purchase. The email exchange of 6 August 2012[1304] makes most sense if a purchase of Horne Optitherm taps is in contemplation.

769. According to Ms McCluskey in oral evidence, Horne “was felt to be the way forward”. She was aware that there were disinfection regimes required, but not of their detail. The Chief Executive’s letter of 7 February 2012[1305] should have been included in her paper, as should the corresponding SBAR. This would have been a reason to not buy the Horne taps when the issue was live in 2012[1306].

770. Feedback was received “that Armitage Shanks and Horne products (are) being used and both had passed vigorous testing and therefore are acceptable,” at the Project Supervisors Meeting on 11 May 2012[1307]. Mr Seabourne explained at a Project Management Group meeting on 10 July 2012[1308], that the Horne tap would be requested for all clinical areas, should Infection Control confirm there are no issues preventing it from being used.

771. On 24 July 2012 Peter Moir informed the Project Management Group [1309] that an email had been received raising concern about the Horne tap at another hospital. “The taps had started to scream after an aggressive cleaning regime was undertaken to deal with the discovery of *Pseudomonas*”[1310]. Mr Moir agreed to forward the email to Mr Pike, and he confirmed Multiplex were preparing a sample. Mr Pike’s assumption was that there were sufficient contributions to make the tap process a robust one[1311]. On 31 July 2012, at a

[1303] Transcript, Jackie Barmanroy, 15 May 2025, Pages 87-88, Columns 170-171.
[1304] Bundle 43, Volume 1, Document 47, Page 234.
[1305] Bundle 27, Volume 3, Document 36, Page 622.
[1306] Transcript, Fiona McCluskey, 15 May 2025, Page 55, Column 106.
[1307] A34227479 - Bundle 33, Document 80, Page 1794.
[1308] A33501947 - Bundle 31, Document 47, Page 295.
[1309] A33501946 - Bundle 31, Document 48, Page 301.
[1310] The note by Infection Control referenced below states the Armitage Shanks tap had reports of starting to scream after chemical disinfection so this may be an inaccurate minute or a similar issue.
[1311] Transcript, Darren Pike, 20 May 2025, Page 23, Column 44.

Project Steering Group meeting[1312], a decision on the taps still needed to be made.

772. On 31 July 2012 HPS sent a consultation draft of "Guidance to minimise the risk of *Pseudomonas aeruginosa* infection from water," for comment,[1313] to Mr Gallacher at NHS GGC. It was forwarded by Ms Stewart (Barmanroy) to Ms McCluskey, Mr Seabourne and Mr Powrie (cc'd Mr Moir and David Hall). Mr Powrie queried if Horne taps could include POUFs, and Mr Hall said that Horne confirmed they can be fitted, for a recommended maximum 14-day use.

773. Mr Seabourne was to instruct Multiplex to proceed with the procurement of the Horne taps. Mr Powrie had told him the Horne tap was fully compliant but had a higher maintenance regime than the other two taps being considered[1314].

774. Mr Seabourne did not see a difficulty with the decision to proceed with Horne Taps in 2012:

> "we'd done a reasonable risk assessment. We spoke to the right people. We had Infection Control and nursing involved, and we come up with a solution, and we thought that was a good solution. Then, in 2014, Health Services Scotland gets everybody together to review that decision. The taps are bought, I agree with that, and they decide, "No, fine, we can run with these." So, I felt my decision was ratified"[1315]

775. In January 2014, Mr Hall noted there had been issues relating to *Pseudomonas* in flow straighteners in taps. No specific action was taken[1316]. On 23 January 2014, it was reported that flow straighteners in high-risk areas would need to be discussed with Infection Control representatives[1317].

776. On 16 January 2014, Mr Hall confirmed that the issue had been reported to NHS GGC's Board and enquired if Horne were undertaking a review [1318]. On 27 February 2014, Horne said the taps were compliant, and it was a

[1312] A34227370 - Bundle 40, Document 174, Page 848.
[1313] A49259626 - Bundle 43, Volume 1, Document 47, Pages 237-239.
[1314] Glasgow 4, Part 1 - Witness Statements, Volume 3, Alan Seabourne, Document 5, Page 177, Q55.
[1315] Transcript, Alan Seabourne, 29 May 2025, Page 79, Columns 153-154.
[1316] A51656504 - Bundle 32, Document 33, Page 517.
[1317] A51656515, Bundle 32, Document 34, Page 530.
[1318] A51656504 - Bundle 32, Document 33, Page 508.

maintenance issue to ensure they are kept clean.

777. An SBAR dated 1 April 2014 confirmed that NHS GGC sought advice from HPS on the requirement to remove flow straighteners from the Horne Optitherm taps[1319]. On 8 May 2014, Mr Powrie emailed Ian Stewart of NSS, clarifying that the Horne taps were fully procured, supplied, installed and awaiting final commissioning. They were compliant with guidance at the time of selection, and any subsequent non-compliance arose from revised SHTM and CEL guidance[1320].

778. A meeting with Horne and HPS was held on 5 June 2014[1321]. It was chaired by Mr Stewart (HFS), and attendees included representatives from HPS, NHS GGC, Golden Jubilee Hospital, NHS Ayrshire & Arran, Public Health England, HFS and Horne.

779. Horne gave a presentation. Dr James Walker gave a presentation on the issues in Northern Ireland and advised removal of the outlet components from the taps in wards accommodating immunocompromised patients[1322].

780. The meeting confirmed, “it was unanimously agreed that as the taps installed within the new build development had complied with guidance current at the time of its specification and briefing and that the hospital was in the process of being commissioned, it should be regarded as being in the “retrospective” category, not “new build”. There was no need to apply additional flow control facilities or remove flow straighteners and any residual perceived or potential risks would form part of the routine management process.”

781. NHS GGC were to draft and implement a management process for the maintenance of the Horne taps in critical areas[1323]. Mr Powrie explained that a thermal disinfection process had been devised and instructed, but due to pressure of work had not been put in place.

782. Ms Kane described Mr Eddie McLaughlin telling her in 2018 that NHS GGC

[1319] A37746908 - Bundle 3, Document 1, Page 5.
[1320] A39465130 - Bundle 14, Volume 1, Document 5, Page 138.
[1321] A39465202 - Bundle 15, Document 9, Page 692.
[1322] A44991886 - Glasgow 3 - Witness Statements, Volume 11, Dr James Walker, Document 5, Page 164, Para 17.
[1323] A32993797 - Bundle 32, Document 51, Page 817.

had been told not to use Horne taps but had chosen to go against that advice. She became concerned, but Mr Powrie told her that NHS GGC were to continue with them[1324]. She accepted that, as Interim Director of Estates & Facilities, she should have been aware of the need to maintain Horne taps. She also accepted that, with the benefit of hindsight, she should have linked up the WTG to the IMT, shared minutes and reported to the IMT on a routine basis[1325]. She had no awareness at the time of a Standard Operating Procedure ("SOP") that taps needed to be sampled every 6 months where flow straighteners were in use[1326]. In 2018, concerns about the water system were raised by Ms Kane with the COO (Mr Jonathan Best) and the CEO (Ms Jane Grant) specifically in relation to the proposed decant of patients from Ward 2A to Ward 6A. After she had raised her decant concerns, she was no longer invited to IMTs. She recalled feeling dismissed for raising concerns[1327].

783. Having put to Mr Calderwood that some might see the decision on the taps being driven by cost, he do not see this would have been an issue. He would, as he put it, have been 'grumpy' but the money was there.[1328]

5.7.11 Role of Capita as Project Supervisor

784. On 4 June 2010, it was confirmed that Capita had been awarded the contract as Supervisor under the NEC3 contract. The appointment followed the production of a High Level Information Pack[1329] in February 2010. At section 4.9 it identified the Currie & Brown technical team as still being in post[1330]. The pack described the intended role of the NEC 3 Supervisor, in Appendix A, as including review and comment on the contractor's design proposals[1331].

785. The extent to which NHS GGC were entitled to rely upon Capita to check contractual compliance was disputed. Mr Seabourne was sure that Capita had been asked to carry out that work[1332]. Mr Redmond, however, pointed out

[1324] Transcript, Mary Anne Kane, 16 May 2025, Page 65, Columns 125-126.
[1325] Transcript, Mary Anne Kane, 16 May 2025, Page 67, Columns 129-130.
[1326] Transcript, Mary Anne Kane, 16 May 2025, Page 78, Column 151.
[1327] Transcript, Mary Anne Kane, 16 May 2025, Page 75, Column 145.
[1328] Transcript, Robert Calderwood, 1 October 2025, Page 28, Column 51.
[1329] Bundle 17, Document 75, Page 2881.
[1330] Bundle 17, Document 75, Page 2983.
[1331] Bundle 17, Document 75, Page 2907.
[1332] Transcript, Alan Seabourne, 29 May 2025, Pages 28-29, Columns 51-54.

that in terms of Appendix A the obligation would arise only "if called upon"[1333], and that Capita were never called upon[1334]. While Mr Seabourne directly challenged Mr Redmond's account[1335] NHS GGC did not challenge Mr Redmond at the time of his oral evidence, and no party produced an instruction 'calling upon' Capita to do the assurance work.

786. Mr Redmond undertook review of Multiplex's method statements and quality reviews. He requested information from Multiplex and carried out room inspections in areas they offered up as complete. He also issued the Notification of Defects at Completion[1336]. Capita had limited involvement in RDD, and no involvement in design sign off or pre-approval[1337]. Mr Pike accepted that he would not automatically pick up some of the terminology, such as the reference to 'neutropenic' in the appendix of SHTM 03-01. He spoke to a probable knowledge gap between those working on the healthcare side and some on the technical side[1338].

787. On dead legs, Capita were of the view that Multiplex were “pushing the boundaries of what was acceptable”, though at a subsequent meeting NHS GGC had accepted that 5 metres would be acceptable[1339]. Mr Smith suggested that the ‘NHS Rep’ would not accept dead legs in excess of 5 metres. Mr Moir said that the dead legs should not be more than 3 metres, per the ZBP specification[1340].

788. Mr Seabourne said that Capita were involved in the earlier design process, evidenced by their chartered engineer, Mr Allan Follet's, name on drawing stamps[1341]. He also said that Capita had been asked (and paid) by Peter Moir to do additional works which involved review of the contract drawings to ensure compliance with the contract[1342]. He said that Capita had checked in

[1333] Bundle 17, Document 75, Page 2909.
[1334] Transcript, John Redmond, 28 May 2025, Page 56, Column 108.
[1335] Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 46.
[1336] Glasgow 4, Part 1 - Witness Statements, Volume 2, John Redmond, Document 5, Page 164.
[1337] Glasgow 4, Part 1 - Witness Statements, Volume 2, John Redmond, Document 5, Page 167.
[1338] Transcript, Darren Pike, 20 May 2025, Page 17, Columns 31-32.
[1339] Transcript, John Redmond, 28 May 2025, Page 64, Column 123.
[1340] A34227483 - Bundle 33, Document 83, Page 1808.
[1341] Transcript, Alan Seabourne, 29 May 2025, Page 28, Column 51.
[1342] Transcript, Alan Seabourne, 29 May 2025, Page 28, Columns 51-52.

detail the ventilation for the eight PPVL rooms in Ward 2A[1343]. Mr Ballingall stated that Capita's primary role was to carry out testing and inspections to confirm that the works completed by Multiplex were compliant with the contract. Where issues were found, they would issue defects notes which Multiplex would resolve[1344].

789. Mr Redmond explained that he would remind Multiplex that the design should be in line with the SHTMs, but there comes a point in the project when he would be unable to know whether the building was being built to SHTM standards, until actual testing is carried out[1345]. The Capita team would not go behind the construction drawings to check the ERs and logs. They were relying on the specialist consultants and designers[1346]. He would view the certificate issued by the specialist commissioning contractor, but he would not check their work[1347].

790. Mr Hall recalled Capita's role going beyond their primary role as Project Supervisor. Specifically, they were instructed via a Compensation Event Notice to review various alternative design drawings, including ventilation drawings. It was an additional service and involved an additional cost. Mr Follet of Capita had signed off drawings and returned them to Multiplex. Mr Hall explained that he had signed off the same drawings because Multiplex would not recognise Capita approval as authority to proceed[1348].

791. Mr Fernie claimed that an oversight may have occurred in the QA procedures because of the scale of the project but he did not consider Capita to be responsible[1349]. If concerns had arisen during the construction phase, he would have expected them to be flagged either by the Multiplex MEP commissioning management team or, as an additional safeguard, by the Capita team[1350]. There was a matrix managed by the Multiplex MEP

[1343] Transcript, Alan Seabourne, 29 May 2025, Page 29, Column 53.
[1344] Glasgow 4, Part 1 - Witness Statements, Volume 2, Ross Ballingall, Document 4, Page 133, Q6(l).
[1345] Transcript, John Redmond, 28 May 2025, Page 50, Column 96.
[1346] Transcript, John Redmond, 28 May 2025, Page 55, Column 106.
[1347] Transcript, John Redmond, 28 May 2025, Page 69, Columns 133-134.
[1348] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Hall, Document 6, Page 233, Para 119.
[1349] Transcript, Alasdair Fernie, 21 May 2025, Page 76, Column 147.
[1350] Glasgow 4, Part 1 - Witness Statements, Volume 2, Alasdair Fernie, Document 1, Page 26, Q35(s).

commissioning managers to track outstanding elements across all systems within the building. Each of these elements were reviewed, closed out and agreed upon with the inspection and quality team[1351].

792. Mr Fernie said in the last few weeks leading up to practical completion, Multiplex and NHS GGC teams were split into specific areas to carry out a final inspection. This was to give a level of confidence that the building works were finished prior to the Project Team accepting the building. This involved a visual inspection of every single room. There were no areas left off this inspection[1352].

793. Mr Fernie suggested, when asked for possible solutions, that there could be two hold points in a project. The first hold point would be prior to the concrete being poured and the fan core units installed in the hospital; the conclusion of the design[1353]. This would allow all the relevant parties to the project including the clinical team[1354] to check that everyone was happy with the lighting, ventilation, and water[1355]. The second hold point he suggested was before the patient is moved into the room[1356].

5.7.12 The Water System

794. During the oral evidence of Mr MacMillan in the Glasgow III Hearings, he indicated that he had retained in electronic form some data on samples taken from in and around April 2015[1357]. The Inquiry received a copy of that data and reviewed it, reaching the view that it could not reliably form a source of information, in part for reasons regarding testing practice alluded to by Mr MacMillan. Consequently, the Inquiry did not pursue that line of investigation further and has not sought to place reliance upon that data.

795. Capita reported that water testing was satisfactory in December 2015 in

[1351] Glasgow 4, Part 1 - Witness Statements, Volume 2, Alasdair Fernie, Document 1, Page 26, Q35(s).
[1352] Glasgow 4, Part 1 - Witness Statements, Volume 2, Alasdair Fernie, Document 1, Page 42, Q59(d).
[1353] Transcript, Alasdair Fernie, 21 May 2025, Page 90, Column 176.
[1354] Transcript, Alasdair Fernie, 21 May 2025, Page 90, Column 175.
[1355] Transcript, Alasdair Fernie, 21 May 2025, Page 87, Column 170.
[1356] Transcript, Alasdair Fernie, 21 May 2025, Page 88, Column 172.
[1357] Transcript, Melville MacMillan, 5 September 2024, Page 95, Column 185.

relation to Mechanical Services[1358]. On 7 January 2015, a PMI was issued to Multiplex to proceed with flushing and treatment prior to opening the Primary LTHW feed from the Energy Centre. It further instructed them to provide copies of test results at building handover and following top up of inhibitor in July 2015[1359]. There was no handover checklist for the water system appended to the Sectional Completion Certificate [1360].

796. Mr O'Donovan explained that air testing would be done first in, sections,[1361] to prove the system was sound. Hydraulic testing would then be carried out[1362] to prove the integrity of the system, to ensure there were no catastrophic leaks in the building[1363]. Multiplex or Capita would witness the test, which would involve filling the system with water, thereby venting out the air to an agreed pressure test rating[1364]. After hydraulic testing, flushing was carried out. This involved circulating water through the system and removing any foreign matter, dust or debris. The system would then be drained and filled again to make sure it was clean[1365]. Mr Fernie's understanding was that once the system was filled, the water would be tested until it got to a certain rate. The water would then be flushed through the system by operatives running the taps for a certain period[1366].

797. At the point of flushing, the water system had to be completely filled, as flushing cannot be carried out in sections. The specialist subcontractor, H&V, flushed the water around the system using a pump and then emptied the system [1367]. H&V would then sterilise the system, making sure it got around all the system to every outlet[1368]. Mr O'Donovan understood that sterilisation would have occurred after August 2014[1369].

798. Mr Wilson said that at least part of the water system, being that connected to

[1358] A33085218 - Bundle 12, Document 81, Page 722, Para 4.3.4.
[1359] A51784494 - Bundle 43, Volume 1, Document 58, Page 317.
[1360] A52446395 - Bundle 46, Volume 1, Document 25, Page 254.
[1361] Transcript, Robert O'Donovan, 30 May 2025, Page 18, Column 31.
[1362] Transcript, Robert O'Donovan, 30 May 2025, Page 14, Column 24.
[1363] Transcript, Robert O'Donovan, 30 May 2025, Page 15, Column 25.
[1364] Transcript, Robert O'Donovan, 30 May 2025, Page 15, Column 25.
[1365] Transcript, Robert O'Donovan, 30 May 2025, Page 15, Column 26.
[1366] Transcript, Alasdair Fernie, 21 May 2025, Pages 77-78, Columns 150-151.
[1367] Transcript, Robert O'Donovan, 30 May 2025, Page 16, Column 27.
[1368] Transcript, Robert O'Donovan, 30 May 2025, Page 16, Column 28.
[1369] Transcript, Robert O'Donovan, 30 May 2025, Page 19, Column 34.

plant room 21, was likely to have already been filled in the summer of 2013[1370]. Mr Pike did not recall filling in 2013 but would trust Mr Wilson's recollection [1371]. Mr O'Donovan understood that the final filling of the water system took place in 2014 and recalled Mercury and Multiplex team working out a plan to fill the water system and commission it. However, in oral evidence he conceded that the water was first in the system for hydraulic testing in June 2013[1372]. They were also trying to make sure they had enough time in the programme to go through each step: filling, pressure testing, leachate flushing, flushing and sterilisation, commissioning of hot water systems (from a temperature point of view), take the necessary water samples, obtain the water test results and then hand over to NHS GGC. Because it was a very large building, the water system was filled, in sections, and then commissioned afterwards. He did not believe the water system had been filled too early[1373]. Earlier in May 2012 it was noted that, prior to commissioning, a hydraulic test would be carried out on the water system, prior to flushing and chemical clean, before being closed with inhibitor to stop rust[1374]. In October 2012, Capita had heard that Multiplex were proposing to fill pipes with water and leave the water in the pipework. Mr Smith stated at the time that the team would need to take a view as to whether to allow that. Mr Follet said that leaving water in the pipes would lead to corrosion[1375].

799. Mr Redmond's conclusion from reviewing minutes[1376] was that water tanks had been filled in August 2013, at which time Capita were asked to check whether the pipes themselves had been filled; the pipes appear to have been filled by July 2013[1377].

800. Mr Fernie stated that, once a system is filled, then generally there is a regime of flushing the toilets and running taps, but it appears that water had been in the system since July 2013 and there was no regular flushing regime a year

[1370] Transcript, David Wilson, 20 May 2025, Pages 40, 50 and 52, Columns 78, 98 and 101.
[1371] Transcript, Darren Pike, 20 May 2025, Page 30, Column 57.
[1372] Transcript, Robert O'Donovan, 30 May 2025, Page 19, Column 34.
[1373] Transcript, Robert O'Donovan, 30 May 2025, Page 14, Column 23.
[1374] A33085230 - Bundle 33, Document 19, Page 363.
[1375] A34227483 - Bundle 33, Document 83, Page 1811.
[1376] Bundle 33, Document 83, Page 1811; Bundle 33, Document 92, Page 1856; Bundle 33, Document 92 at Page 1862.
[1377] Transcript, John Redmond, 28 May 2025, Pages 65-68, Columns 125-131.

later[1378]. Mr Redmond's understanding was also of the water system being filled by August 2013[1379]. Mr Fernie recalled Mercury were managing the process of flushing and testing, but this would have been monitored by Mr David Wilson[1380]. Mr Pike described a system of flushing by Mercury, with recording of the details and the records being passed to NHS GGC on handover[1381] and that Mercury were responsible for the quality of the water system until handover[1382]. Mr O'Donovan could not recall if the water in the system had been 'dropped' and then re-filled before the flushing process began, although he imagined that it would have been the case[1383].

801. Capita had commented earlier in August 2012 that Multiplex had advised them that the pipework systems would be filled after testing. They noted their concern about the effects of corrosion and sought reassurance from Multiplex. Mr Seabourne gave an example of Brighton Children's Hospital's pipes corroding after the water system had been filled, tested, and drained[1384].

802. Capita noted the Multiplex proposal to fill the pipes with water for the pressure tests and then drain them. This would mean the system sitting empty for a considerable amount of time, giving rise to concerns that a film of rust would form on the inside surface of the pipes before they were filled again at the end of the project.

803. There was concern in August 2014 within the Project Team about the possibility of infection control issues arising from the water system having been filled for some time before handover. Mr Hall of Currie & Brown enquired what Multiplex's proposals were to ensure no corrosion and no infection control issues. The meeting was assured by Multiplex that the pipework was stainless steel so no corrosion issues would arise, and that there would be a major sterilisation process from September 2014 to January 2015. Multiplex commented that they could not wait to fill the water system and so had taken

[1378] Transcript, Alasdair Fernie, 21 May 2025, Pages 77-78, Columns 150-151.
[1379] Transcript, John Redmond, 28 May 2025, Page 65, Columns 126; see also Glasgow 4, Part 1 - Witness Statements, Volume 3, Capita Corporate, Document 16, Page 514, Para 58.
[1380] Transcript, Alasdair Fernie, 21 May 2025, Page 79, Column 153.
[1381] Transcript, Darren Pike, 20 May 2025, Page 29, Column 56.
[1382] Transcript, Darren Pike, 20 May 2025, Page 31, Column 59.
[1383] Transcript, Robert O'Donovan, 30 May 2025, Page 24, Column 44.
[1384] A34227474 - Bundle 33, Document 81, Page 1797.

a view to fill the system and then undertake a major sterilisation programme[1385].

804. Mr Pike's recollection was that the water system was not filled until the last feasible moment. The standard process was followed: pressure testing, filling, cleaning, and disinfecting the system. Thereafter Mercury had a squad who turned the water over and signed off sheets confirming they had done so[1386]. It was the heating system that was filled in 2013, and not the domestic water system[1387].

805. The formal structure of statutory roles (Responsible Person etc) of the Estates team was described by Mr Leiper as dysfunctional. There was also a high level of staff turnover which led to ineffective handover of work and activities[1388]. Mr Leiper was unable to find any evidence that individuals had been appointed in the Estates team to any of the formal statutory roles at handover. He also did not find a formal SHTM-compliant structure put in place before handover by Multiplex, yet there were already filled water systems which had been operating pre-handover[1389].

806. Ms Kane was unaware, until she was appointed interim director of Estates and Facilities in 2014, that she was expected to fulfil the Designated Person for Water role[1390]. Leaving aside the compliance role of Mr Gallacher discussed in earlier submissions, Mary Anne Kane accepted[1391] that in her Interim Director of Estates role from 2014 she had a responsibility for making such appointments. Mr Calderwood as Duty Holder[1392] held ultimate responsibility.

807. Mr Leiper understood that the budget for the maintenance of the new hospital was based on the last year of budgeted expenditure at the demitted old hospitals, capped at £4.5 million. This was around half the amount anticipated

[1385] A33501484 - Bundle 43, Volume 3, Document 44, Page 1524.
[1386] Glasgow 4, Part 1 - Witness Statements, Volume 2, Darren Pike, Document 3, Page 108, Q44.
[1387] Glasgow 4, Part 1 - Witness Statements, Volume 2, Darren Pike, Document 3, Page 109, Q44(a).
[1388] A53366935 - Bundle 52, Volume 1, Document 38, Page 740.
[1389] A53366935 - Bundle 52, Volume 1, Document 38, Page 741.
[1390] Transcript, Mary Anne Kane, 16 May 2025, Page 28, Column 51.
[1391] Transcript, Mary Anne Kane, 16 May 2025, Page 7, Columns 9-10.
[1392] Although he was unaware of that role - Transcript, Robert Calderwood, 30 September 2025, Page 13, Column 22.

by the NHS GGC staff. The shortfall may have arisen because the old hospitals would have been running down maintenance services before closing and the QEUH/RHC had more expensive, highly serviced, engineering systems[1393].

808. Before handover, Mr O'Donovan said H&V would have taken hundreds of water samples and sent them for lab analysis to ensure the suitable potable water analysis. The final sampling would have been in December 2014/January 2015[1394]. Those results were later made available to the Inquiry and were passed to Mr Poplett for his assessment at the time of the additional instruction to him to carry out a water audit, which he produced in July 2025[1395].

809. Mr O'Donovan recalled that the results would then have been uploaded to ZUTEC to demonstrate the water system was clean at completion[1396]. The last stage was commissioning and would involve going around to check the water temperatures were correct and before handover[1397]. Mr O'Donovan said there was a team in place, right up to practical completion, going around the hospital opening outlets, turning on taps, flushing toilets, and making sure there was a proper turnover of water around the system and no stagnation[1398]. It was not a large flushing team; he thought it may be half a dozen operatives[1399].

810. Mr Wilson accepted that the only evidence that there was no contaminated water system at handover was the final samples taken in 2014[1400]. Mercury carried out the testing and commissioning of the hot and cold water systems in line with the ZBP/Wallace Whittle design, the specification, and guidelines such as ACopL8.

[1393] A53366935 - Bundle 52, Volume 1, Document 38, Page 735.
[1394] Transcript, Robert O'Donovan, 30 May 2025, Page 19, Column 34.
[1395] See Chapter 7 below. The H&V results constitute Sterilisation Certificates and Sterilisation Results for Plantrooms 21, 22, 32, 33 and 41. They are detailed in the email of instruction dated 8 July 2025 at Bundle 53, Document 1, page 5. The results and certificates themselves are to be found at Bundle 53, Documents 6-15, Pages 91-1005.
[1396] Transcript, Robert O'Donovan, 30 May 2025, Page 17, Column 30.
[1397] Transcript, Robert O'Donovan, 30 May 2025, Page 18, Column 32.
[1398] Transcript, Robert O'Donovan, 30 May 2025, Page 20, Column 36.
[1399] Transcript, Robert O'Donovan, 30 May 2025, Page 22, Column 39.
[1400] Transcript, David Wilson, 20 May 2025, Page 50, Column 97.

811. Ms Kane understood that ‘Dr Williams’ (Professor Williams) had signed off on the water system after a series of microbiological tests had been completed[1401].

5.7.13 Independent Commissioning Engineer

812. On 8 July 2013, NHS GGC deleted the requirement for an independent commissioning engineer. The apparent rationale was that Multiplex staff had a detailed knowledge of complex installations and would be best placed to undertake the role[1402]. Mr Pike said it was validation rather than commissioning that would have a third party appointed by NHS GGC[1403]. He accepted that for a commissioning engineer to be truly independent he would have to be appointed by the client or jointly[1404].

813. Mr Pike explained that this role “was basically an administration role, which is the same role as we would have in the commissioning manager, and, within that, it was part of the Multiplex contract … [an] independent commissioning manager, they would tend to sit either client-side or as a joint third-party appointment, not within the body of the contractors’ contractual arrangements”[1405]. He refuted the suggestion that Multiplex was 'marking its own homework', because the independent commissioning engineer's role was not to accept commissioning results. In his view, the designers, NHS GGC and Capita would sign off the systems[1406]. Had the appointment been independent the appointee would have been doing the same work as Mr Wilson did anyway[1407]. Mr Wilson's evidence was of not having been told that this role was effectively being allocated to him[1408]. He understood his role to be a commissioning manager; not the role of independent commissioning engineer[1409].

814. Mr Leiper considered this appointment may have reflected the confidence at

[1401] Transcript, Mary Anne Kane, 16 May 2025, Page 34, Column 63.
[1402] A33795364 - Bundle 16, Document 28, Page 1698.
[1403] Glasgow 4, Part 1 - Witness Statements, Volume 2, Darren Pike, Document 3, Page 112, Q47(a).
[1404] Transcript, Darren Pike, 20 May 2025, Page 34, Column 66.
[1405] Transcript, Darren Pike, 20 May 2025, Page 25, Column 48.
[1406] Transcript, Darren Pike, 20 May 2025, Page 26, Column 49.
[1407] Transcript, Darren Pike, 20 May 2025, Page 35, Column 67.
[1408] Transcript, Darren Pike, 20 May 2025, Page 22, Column 41.
[1409] Transcript, David Wilson, 20 May 2025, Page 22, Column 42.

the time between NHS GGC and Multiplex. However, it raised concern about the potential for a conflict of interest and possible 'conflict of impartiality'[1410].

5.7.14 Decision to add an Adult BMT Ward

815. In March 2013, Ms MacLeod stated that there would be a haemato-oncology ward for the new hospital with HEPA filtration positive to the rest of the hospital, with highly filtered air to H13, i.e. 99.95%[1411].

816. Ms White acknowledged that the amended Ward 4B did not meet the COS requirement for a sealed environment. This was a design oversight and should have been corrected earlier, following the issue of PMI 228[1412].

817. In June 2013, the NHS GGC Project Team were continuing to review and return RDD drawings to Multiplex.

818. Mr Best stated that work had been undertaken at a national level to centralise Adult BMT services and a plan was produced which included clinical arguments[1413] that demonstrated the need for a change in the service[1414]. That was a collective decision by the Board's chief executives, but it was his responsibility as Director of Regional Services to sign the Change Order on 19 June 2013[1415]. It was submitted by him to enable Ward 4B (the Haemato-oncology ward) to accommodate BMT services[1416]. The change request provided:

> "To HEPA filter ward area from bedrooms HOW-067 to bedroom RENW-190 to same standard as the current haemato-oncology ward.
>
> Convert HOW-009 (currently Socialisation Space) to a bedroom and ensuite – requires HEPA filtration to the same standard as current haemato-oncology ward.

[1410] A53366935 - Bundle 52, Volume 1, Document 38, Page 733.
[1411] Bundle 43, Volume 3, Document 6, Page 719.
[1412] Transcript, Emma White, 13 May 2025, Pages 54-55, Columns 104-105.
[1413] Glasgow 4, Part 3 - Witness Statements, Volume 1, Jonathan Best, Document 6, Page 144, Q16(g)(iii).
[1414] Glasgow 4, Part 3 - Witness Statements, Volume 1, Jonathan Best, Document 6, Page 144, Q16(g)(i).
[1415] Glasgow 4, Part 3 - Witness Statements, Volume 1, Jonathan Best, Document 6, Page 144, Q16(g)(ii).
[1416] A36372603 - Bundle 16, Document 29, Page 1699.

Form a single Nurse Base from HOW-45 Reception Base and HOW-070 Staff Base with a lobby separation similar to the standard ward.

Form breakthrough at Wheelchair Bay HOW-36, add hold-open fire door.

Create 2 further fire doors by the Clean Utility (as per standard ward).

Omit wall and double door in the corridor outside the 'Large Equipment Store' HOW-032.

Renal Ward – add HEPA filtration to isolation rooms and lobby and ensuite for RENW-046 and RENW-041."

819. Mr Best relied on a planning proposal, including clinical arguments, to justify the Change Order, but he was unable to recall if assurances were given about the technical and environmental requirements[1417]. He did not recall being made aware of the technical requirements set out in SHTM 03-01.That was a responsibility of the technical team[1418]. He accepted that when his colleague Mr Jenkins saw the Change Order, he thought it needed more detail and went to see the Project Team chaired by Ms Griffin. He could not remember the details, but he did remember Mr Jenkins being concerned and raising the matter through various managerial lines[1419] and having discussions with the Project Team to lay down the requirements[1420].

820. On 2 July 2013 the Quality and Performance Committee made the decision to relocate from the Beatson to QEUH (what was to become Ward 4B)[1421]. The proposal was approved: "That the changes in the Service Model for haematology and haemato-oncology be approved at a cost of £840,000 to be funded as a client instructed change."[1422]

821. On 9 July 2013, Mr Calderwood informed the ASSB that this would require substantial changes to level 4. The changes were approved by the Quality

[1417] Glasgow 4, Part 3 - Witness Statements, Volume 1, Jonathan Best, Document 6, Page 144, - Q16(g)(iii), and Q16(h)(i).
[1418] Glasgow 4, Part 3 - Witness Statements, Volume 1, Jonathan Best, Document 6, Page 145, Q16(i).
[1419] Transcript, Jonathan Best, 19 September 2025, Page 78, Column 151.
[1420] Transcript, Jonathan Best, 19 September 2025, Page 82, Column 159.
[1421] A34872080 - Bundle 34, Document 62, Page 542.
[1422] A34872080 - Bundle 34, Document 62, Page 553.

Performance Committee, and the best estimate of the current costs was £840,000[1423]. He stated that the Clinical Director for Cancer Services, Mr Best, sat down with the Project Team and said "This is the ward we are going into. What is the specification we need?" and the Project Team signed it off[1424].

822. The Deputy Project Director instructed Multiplex to pause and reassess works, and to develop a new design for the 4th floor of the tower.[1425] A Project Management Instruction Report was produced on 16 July 2013[1426]. On 22 July 2013 a Board Response was sent to Multiplex in the form of an amended drawing that marked the need to provide HEPA filtration and reconfigure spaces[1427]. It does not refer to higher ACH or HEPA filtration of the corridor.

823. Mr Calderwood stated a series of improvements were signed off by the doctors, not infection control. He understood the improvements would make the environment acceptable, and Multiplex proceeded to retrofit Ward 4B to the enhanced standards[1428].

824. The 'BMT Document' produced by NHS GGC suggests that Ms Griffin believed that the specification still reflected Dr Hood's advice of what the ward should achieve[1429]. Multiplex did not consider the Change Control form required them to amend the ventilation parameters already approved by NHS GGC[1430]. (Mr Jenkins' account of passing on details of the required specification is recounted in Chapter 8[1431]). In two documents dated 2 July 2013 the works were quoted at £840,000 and 'within £700k'[1432].

825. Multiplex produced proposals described as covering 'Level 4 Zones 512, 513

[1423] A35422018 - Bundle 42, Volume 7, Document 17, Pages 105-106.
[1424] Glasgow 4, Part 3 - Witness Statements, Volume 3, Robert Calderwood, Document 1, Pages 73-74, Para 250.
[1425] A36372565 - Bundle 16, Document 27, Page 1697.
[1426] A36372565 - Bundle 16, Document 27, Page 1697.
[1427] A48091340 - Bundle 22, Volume 1, Document 18.6, Page 408.
[1428] Glasgow 4, Part 3 - Witness Statements, Volume 3, Robert Calderwood, Document 1, Page 76, Para 256.
[1429] A43502680 - Bundle 20, Document 2, Page 13.
[1430] A36372554 - Bundle 23, Document 61, Page 668.
[1431] CTI Closing Statement, Glasgow 4, Chapter 8.
[1432] A34872080 - Bundle 34, Document 62, Page 542; A36372565 - Bundle 16, Document 27, Page 1697.

& 514 HEPA Filtration' and the Board confirmed acceptance on 2 October 2013[1433] .That instructed that an additional number of rooms ('Level 4 Zones 512, 513 & 514 HEPA Filtration') should be built to the same specification as those in the Haemato-oncology ward.

826. In September 2013, the ASSB were informed that the Project Team had confirmed the changes required to accommodate haemato-oncology to Multiplex. The Project Team were awaiting the detailed design from Multiplex[1434]. In October 2013, Multiplex's proposals were accepted by NHS GGC for Level 4 in the sum of £569,001.49[1435].

827. As Dr Armstrong explained in Glasgow 3,[1436] she and Ms Grant (then COO) put forward the proposal to move the adult BMT unit to the QEUH from the Beatson in part to ensure access to adult ITU.

828. On 25 December 2013 a Project Management Instruction Report required that the Pentamidine Treatment Room in Ward 4B be a negatively pressured room.[1437] This report specifically states that:

> "The current ventilation layout indicates both supply and extract at 125 litres/sec and the Board requests adjustment to deliver the negative pressure required."

829. Mr Jenkins did not recall being informed that the adult BMT ward in the QEUH did not have 10 ACH before patients were transferred from the Beatson. He recalled only becoming aware of the deficient ACH after the BMT service had transferred and then moved back to the Beatson[1438]. He recalled highlighting to the Project Team that it required the specification of a neutropenic ward[1439].

830. Ms White was unable to explain why Ward 4B had not been designed with 10 ACH – where an ADB code had been allocated and the environmental matrix exported; there ought to have been a defaulting to 10 ACH at the start. It

[1433] A36372655 - Bundle 23, Document 60, Page 666.
[1434] A35422060 - Bundle 42, Volume 7, Document 18.1, Page 121.
[1435] A36372655 - Bundle 23, Document 60, Page 666.
[1436] A48315274 - Glasgow 3 - Witness Statements, Volume 8, Jennifer Armstrong, Document 5, Page 210.
[1437] A51784363 - Bundle 43, Volume 1, Document 53, Page 268.
[1438] Glasgow 4, Part 3 - Witness Statements, Volume 4, Gary Jenkins, Document 2, Page 162, Q13(h).
[1439] Glasgow 4, Part 1 - Witness Statements, Volume 4, Gary Jenkins, Document 2, Page 162, Q14.

appeared that the data may not have been interrogated for some period[1440].

831. Ms White's understanding was that Multiplex had sized the air handling plant at a particular capacity for the whole building, based on a particular air requirement, and when the 'change' to 10 ACH was requested, there was no scope to do so, due to the impacts on ducting and the size of the plant room. It should have been possible to design to such a parameter had that been the initial intention. She did not know who approved the ventilation specification for either the original or the updated ward 4B[1441]. She recalled that the M&E drawings arising from PMI 228 for Ward 4B had 80 litres per second (approximately 6 ACH) and HEPA filtered, but this did not correspond to the Environmental Data Schedule. She was unable to say how this had come about[1442]. Mr Ballingall stated that the RDS would have captured the ceiling type and been approved by the NHS GGC team[1443]. Mr Pike recalled that Ward 4B had 80 litres per second which was equivalent to 6 ACH[1444].

832. There were a number of issues discovered in Ward 4B which led to PMI 424 being issued and the re-design of the ventilation. The changes to the ventilation system were aimed to achieve 10-12 ACH, positive pressure of 5-10 Pa, sealed ceilings and a pressure monitoring solution for rooms. HEPA filters were also to be installed and commissioned in the HDU (Level 1) and CCU (Level 1) Wards[1445]. A HAI-SCRIBE would need to be completed. Multiplex were carrying out investigation works as to 'how we had got to where we are'. Mr Hall said that the reality of what had been provided did not meet the COS. However, NHS GGC had signed off the RDS, 1:50 drawings, ceiling plans etc. Mr Wilson's evidence was that as commissioning took place according to the construction drawings, then even had the commissioning been 'whole room' (the commissioning process did not involve checking ceilings) the issues would not have been picked up as erroneous[1446].

[1440] Transcript, Emma White, 13 May 2025, Page 53, Column 101.
[1441] Transcript, Emma White, 13 May 2025, Page 54, Column 104.
[1442] Transcript, Emma White, 13 May 2025, Pages 63-64, Columns 122-124.
[1443] Glasgow 4, Part 1 - Witness Statements, Volume 2, Ross Ballingall, Document 4, Page 149, Q35(h).
[1444] Transcript, Darren Pike, 20 May 2025, Page 17, Column 32.
[1445] A34348059 - Bundle 32, Document 93, Page 1536.
[1446] Transcript, David Wilson, 20 May 2025, Page 32, Column 61.

833. In an Early Warning Trackers meeting of 29 July 2015, Mr Hall is recorded as saying that the ceilings of the rooms in Ward 4B were not sealed as a result of approval by the Board of RDS, 1:50 drawings and ceiling plans. He also then suggested that a UGM of 27 May 2010 was a significant date[1447].

BMT Rooms in Ward 4B

834. Mr Wilson explained that the rooms in Ward 4B were not isolation rooms as such, since there was no lobby. They were single bedrooms, with en-suites. Multiplex built to the drawings. If he had known the intended patient group, this would not lead him to pick up that there was a problem with the drawings[1448].

835. Mr Pardy expressed surprise on hearing that the BMT rooms in Ward 4B were only 2.5 ACH and not the required 10 ACH[1449]. ZBP may have erred[1450] and thought that the RDS applied also to specialised rooms for immunocompromised patients and not just standard rooms[1451]. ZBP would have started out with an ADB sheet 'off the shelf'. Ms White confirmed that the drawings provided were ‘pure’ exports out of ADB and did not reflect the rooms in the Exemplar Design[1452]. This ADB sheet would be from the ERs, so if that was wrong, then ZBP may well have followed this through [1453].

5.7.15 Decision to add an Infectious Diseases Unit to the hospital (2014)

836. The Brownlee Unit at Gartnavel Hospital was an Infectious Disease Unit (“IDU”) which had treated inpatients suffering from HIV/AIDS and multiple other infectious and tropical diseases, including tuberculosis. Level 5 of the QEUH, including its ventilation system, was designed and constructed as a General Ward. The decision to transfer these services to the new hospital appears to have been made in the period July to August 2014, at a relatively late stage in the construction process.

[1447] A34348017 - Bundle 32, Document 94, Page 1556.
[1448] Transcript, David Wilson, 20 May 2025, Pages 30-31, Columns 57-60.
[1449] Transcript, Steven Pardy, 27 May 2025, Page 38, Column 71.
[1450] Transcript, Steven Pardy, 27 May 2025, Page 39, Column 74.
[1451] Transcript, Steven Pardy, 27 May 2025, Page 38, Column 72.
[1452] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 15, Para 2.6.
[1453] Transcript, Steven Pardy, 27 May 2025, Page 40, Column 75.

837. A chain of correspondence on 11-12 August 2014, between Ms McCluskey, and Ms McNamee (later Ms Devine), confirmed that the transfer of ID to the 5th floor had not been foreseen:

> "… the hospital was never planned on the basis of the transfer of the Brownlee. The generic bedrooms are mechanically ventilated with pressure in the rooms negative to the corridors. There are no lobbied bedrooms in the adult tower …";[1454]

> "… the Brownlee Unit was not part of the planning process and therefore IPC advice on this was not actively sought nor given. I (and I think I will be correct in stating) and Professor Williams have significant concerns about this, especially in relation to the management of highly infectious patients …";[1455]

> "We were advised by ECMS [Department of Emergency Care and Medical Specialities] that the Brownlee is moving this was not a Project decision …"[1456]

838. Ms McNamee responded

> "- as you rightly point out the Brownlee Unit was not part of the planning process and therefore IPC advice on this was not actively sought nor given".

839. In August 2014, Infectious Diseases Consultants were instructed to submit a bid for the move of the IDU to QEUH. On 25 August 2014, David Bell, a Consultant in Infectious Disease and General Medicine, informed Professor Williams that:

> "There is no intention of building any new ID unit. In the ACDP [Advisory Committee on Dangerous Pathogens] guidance on page 48 there is a description of an enhanced room. It sounds very close to the negative pressure rooms we have or will have at the NSGH"[1457]

840. In August 2014 Ms McCluskey got information from the Emergency Care Directorate that they were looking to move Brownlee into the new hospital. She had sent ADB sheets, sourced from Ms Wrath to Professor Williams. To the suggestion that Professor Williams appeared not immediately reassured– specifically the ADB sent showed that rooms had been designed to HBN 04-

[1454] A38361052 - Bundle 14, Volume 1, Document 6, Page 159.
[1455] A38361052 - Bundle 14, Volume 1, Document 6, Page 158.
[1456] A38361052 - Bundle 14, Volume 1, Document 6, Page 162.
[1457] A38361052 - Bundle 14, Volume 1, Document 6, Page 168.

01 standards, which were not appropriate for highly infectious patients – Ms McCluskey resisted the suggestion that Professor Williams would not have known the specifications of the isolation rooms. She could not however identify how this information would have come to his attention[1458]. She also refuted any suggestion that she had stated to Professor Williams and others at an AICC meeting that the building was being done to the SHTM 03-01 standards - instead she gave an update on what infection control had been doing to help the project[1459].

841. The IDU relocated to the QEUH wards 5C and 5D, and opened to patients in 2015, without modifications to the general ventilation system. The Infectious Diseases ("ID") team were given assurances that, in addition to wards 5C and 5D, they would have exclusive access to two isolation rooms in Critical Care. This was agreed before the decision to move the IDU was made, as "it was clearly a deal breaker for the clinicians if it had not been possible".[1460]

842. The BICC of 1 December 2014[1461] discussed the move of the IDU, by reference to Professor William's concerns that he had yet to understand the contingency plan for MRDRTB patients. At the BICC on 26 January 2015, the decision remained in flux.[1462] The ID team raised concerns over whether lobbied rooms provided the negative pressure required to treat certain infectious diseases including MDRTB[1463.] Professor Williams felt that the issue had been resolved, based on the issue of highly infectious diseases such as MDRTB being sent to another site.[1464]

5.7.16 Interim Director of Estates & Facilities

843. Ms Kane said she had been told by Mr Calderwood that her role as Interim Director of Estates & Facilities did not extend into the Project Team or technical subjects she was not qualified to advise on (i.e. anything other than

[1458] Transcript, Fiona McCluskey, 15 May 2025, Pages 41-43, Column 78-82.
[1459] Transcript, Fiona McCluskey, 15 May 2025, Page 47, Columns 89-90.
[1460] Bundle 14, Volume 1, Document 4, Page 82.
[1461] A32221707 - Bundle 13, Document 28, Page 223.
[1462] A32221794 - Bundle 13, Document 29, Page 229.
[1463] A38361052 - Bundle 14, Volume 1, Document 6, Pages 157-161.
[1464] Transcript, Professor Craig Williams, 17 September 2024, Pages 48-49, Columns 91-94.

soft FM)[1465]. She had no technical background in estates management and was reliant on others to advise her on technical matters[1466].

844. Ms Kane said that Mr Gallacher and Mr Powrie considered SHTM 03-01 (and for that matter SHTM 04-01) were best practice and not mandatory[1467].

5.7.17 Commissioning

845. There was a good deal of evidence on Commissioning in Glasgow 3, and what follows should be read in that light. Commissioning guidance referenced in the ERs included the 'Guidance to Engineering Commissioning' published by The Institute of Hospital Engineers (1995)[1468].

846. That Guidance defined commissioning as the advancement of an installation from its static completion to full and satisfactory operation, complying with its design intent[1469]. Commissioning is not concerned with verifying performance criteria against healthcare guidance. Mr Wilson's description matched that definition. It was to ensure the equipment was working correctly, which might to some extent involve measuring outputs. But it would not involve measuring against the requirements of the client, which was the scope of validation[1470].

847. Mr Wilson, as Commissioning Manager for Multiplex, gave an overview of how those conducting commissioning would go about measuring the item being commissioned. They would compare against the design drawings and ERs, and against technical submissions, and potentially against guidance; but generally, it was not a task which required comparison to the contract documents[1471] or to RDSs[1472]. The essential purpose was to "make sure the systems were commissioned in line with the design". While he would expect that to be in line with the infection control and user group outputs, the task was to check against what had been designed, not against other

[1465] Transcript, Mary Anne Kane, 16 May 2025, Pages 13-14, Columns 22-23.
[1466] Transcript, Mary Anne Kane, 16 May 2025, Page 17, Column 30.
[1467] Transcript, Mary Anne Kane, 16 May 2025, Page 48, Column 92.
[1468] A35761303 - Bundle 16, Document 13, Pages 1515 and 1537.
[1469] A42787792 - Bundle 43, Volume 6, Document 14, Page 81.
[1470] Transcript, David Wilson, 20 May 2025, Pages 4-6, Columns 5-9.
[1471] Transcript, David Wilson, 20 May 2025, Page 6, Column 10.
[1472] Transcript, David Wilson, 20 May 2025, Page 25, Column 48.

requirements[1473]. This accorded with the detailed description of checking against designed parameters by Julie Miller of Multiplex[1474]. Mr Wilson was aware of the recommended ACH in SHTM 03-01 but understood the design ACH in the ZBP design schedules had been agreed by NHS GGC[1475].

848. The ERs stated that all services and equipment were to be commissioned to ensure compliance with the design specifications, and that all systems were to operate to the Board's satisfaction[1476]. The ventilation and domestic water systems were commissioned by H & V,[1477] a sub-contractor of Mercury[1478].

849. Multiplex provided over 400 commissioning reports by H&V relating to the testing and balancing of the ventilation system[1479]. The ventilation equipment was commissioned between mid-2013 and early 2015.

850. Multiplex also provided 118 documents relating to the commissioning of the water system. These include sterilisation certificates and outlet temperature reports. The water system was commissioned between early 2013 and early 2015. Mr Pike stated that H&V carried out the commissioning of both the ventilation and water systems. It was witnessed by Multiplex, Mercury, ZBP, Wallace Whittle, NHS GGC technical advisors, and the Project Supervisor, Capita, who ultimately signed off on the commissioning[1480].

851. Mr Wilson described his role as being to manage those activities, which in this case meant "to work with the subcontractor, which, in this case, was Mercury Engineering, to produce programmes of how we were going to start at the beginning of the commissioning activities right through to the end and the handover of the building"[1481]. His role to make sure the systems were commissioned in line with the design, and he expected the design to be in line

[1473] Transcript, David Wilson, 20 May 2025, Pages 6-7, Columns 9-12.
[1474] Glasgow 4, Part 1 - Witness Statements, Volume 3, Julie Miller, Document 19, Page 566, Q45(b).
[1475] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Wilson, Document 2, Page 66, Q37.
[1476] A35761303 - Bundle 16, Document 13, Pages 1515, 1536 - 1537, 1436.
[1477] A32949444 - Bundle 43, Volume 1, Document 43, Page 220; A42854799 - Bundle 43, Volume 1, Document 54, Page 269.
[1478] Transcript, Robert O'Donovan, 30 May 2025, Page 11, Column 18.
[1479] A32954551 - Bundle 43, Volume 1, Document 57, Page 301; A32949723 - Bundle 43, Volume 3, Document 42, Page 1514.
[1480] Glasgow 4, Part 1 - Witness Statements, Volume 2, Darren Pike, Document 3, Page 109, Q45(c).
[1481] Transcript, David Wilson, 20 May 2025, Pages 3-4, Columns 4-5.

with infection control[1482]. Multiplex had commissioned the design and that design had been accepted by the UGMs and NHS GGC to that standard[1483].

852. Mr O'Donovan confirmed that Mercury would commission the system to the design and values from ZBP on the drawings or on the equipment data sheets[1484]. He would not question the drawings, even if the room was for a ward that might be occupied by immunocompromised patients[1485]. Balancing of the ventilation system would be carried out. Each grill had a defined value of air that should be coming out. H&V would set the volume control dampers that would control the volume of air going into each grill. They would prove that the air being delivered to each room was per the design values provided by ZBP, which would be recorded and witnessed in most cases[1486].

853. Mr O'Donovan said that Mercury had a team in place right up to practical completion going around opening outlets, turning on the taps, flushing the toilets and making sure there was proper turnover of water around the system so there was no stagnation[1487]. He described the QEUH/RHC as a very large building and thought he may have had 6 guys going around opening taps and flushing toilets[1488].

854. On commissioning of the ventilation systems, Mr Wilson's view was that only Mr Powrie and Mr Smith would have technical knowledge to understand the system on the level that Mr Wilson was operating at. Mr Moir's technical knowledge was only "surface level experience"[1489]. Mr Pike considered that, of the Project Team, only Mr Smith (who was recruited into the team at a point after early 2011) would have had the technical knowledge to calculate ACH from the flow rates marked on the drawings; other staff would have had to see the M&E clarification log to get this information[1490].

855. Mr Fernie stated ACH requirements, and their testing, would have been

[1482] Transcript, David Wilson, 20 May 2025, Page 7, Column 12.
[1483] Transcript, David Wilson, 20 May 2025, Page 20, Column 38.
[1484] Transcript, Robert O'Donovan, 30 May 2025, Pages 11-12, Columns 18-19.
[1485] Transcript, Robert O'Donovan, 30 May 2025, Page 26, Column 48.
[1486] Transcript, Robert O'Donovan, 30 May 2025, Page 26, Columns 47-48.
[1487] Transcript, Robert O'Donovan, 30 May 2025, Page 20, Column 36.
[1488] Transcript, Robert O'Donovan, 30 May 2025, Page 22, Column 39.
[1489] Transcript, David Wilson, 20 May 2025, Page 9, Column 16.
[1490] Transcript, Darren Pike, 20 May 2025, Page 13, Column 23.

managed by the Multiplex MEP commissioning team and witnessed by NHS GGC's inspection team, normally Capita. The results would have been recorded and signed off. Had there been any irregularities, Mr Fernie would have expected this to have been raised during, and any concerns escalated to the senior team, via the Multiplex or Capita reports[1491]. He recalled conversations around room pressures being achieved in relation to isolation rooms[1492].

856. Mr Fernie's position was that the construction team would take the information provided throughout the design approval process and proceed on that basis. He did not consider any of the works to be non-compliant, since they had been approved under the contract[1493].

5.8 Events from handover to the end of 2019

5.8.1 Introduction

857. This section of the narrative covers the period from the handover of the building to NHS GGC on 26 January 2015 to the end of 2019 and should be read alongside the narrative of events contained in Section 5.2 of our Closing Statement following Glasgow 3.

858. The following sections set out where evidence from Glasgow 4 witnesses has an impact on that narrative. We use the same headings as in Section 5.2 and set out evidence in Glasgow IV Part 1, Part 2 and Part 3 that relates to the emergence of issues about the building, infections and the IPC team after handover.

5.8.2 2015: The first year after handover

The Culture of the IPC Team at Handover

859. Ms McQueen explained[1494] that when she was CNO she invoked the CNO Framework (formerly the CNO Algorithm) on 3 November 2015, contacting

[1491] Glasgow 4, Part 1 - Witness Statements, Volume 2, Alasdair Fernie, Document 1, Page 28, Q37.
[1492] Glasgow 4, Part 1 - Witness Statements, Volume 2, Alasdair Fernie, Document 1, Page 29, Q40.
[1493] Glasgow 4, Part 1 - Witness Statements, Volume 2, Alasdair Fernie, Document 1, Page 17, Q18(g).
[1494] Transcript, Fiona McQueen, 2 October 2025, Pages 15-19, Columns 26-34.

HPS in relation to cases of Serratia at NICU since July of that year[1495]. She met with the executive lead for HAI, Dr Armstrong, the Medical Director, the Infection Control Manager and the Infection Control nurse. She had invoked the framework because NHS GGC were not reporting infections, were not following guidance appropriately and rating some incidents too low. NHS GGC believed they were interpreting it appropriately.

860. Ms McQueen thought that there was a deep-seated behaviour within NHS GGC, and as the years progressed, that meant it was difficult for changes to be made[1496]. Failure to follow HAI reporting procedures in NIPCM was highly unusual during her time as CNO[1497].

Estates At Handover[1498]

861. Ms Kane supported the evidence of Mr Powrie about the challenges for the Estates Team at handover[1499]. No more resources were available. Estates staff were working under constant stress and being slow to respond to tasks[1500]. They were not resourced to address the volume and type of work they were expected to pick up[1501]. Managers were working excessive hours to keep up with the workload, often 10-14 hours a day and sometimes working weekends[1502]. It would have been impossible to keep the hospital operational without using third party contractors[1503].

862. Mr Calderwood could not recall any request for more budget for the Estates team[1504] He denied any knowledge of the challenges faced by them[1505]. The Chair from December 2015, Professor Brown, was initially unaware of these

[1495] Bundle 3, Document 3, Page 15.
[1496] Transcript, Fiona McQueen, 2 October 2025, Page 19, Column 33.
[1497] Glasgow 4, Part 3 - Witness Statements, Volume 2, Fiona McQueen, Document 4, Page 84, Para 37.
[1498] CTI Closing Statement from Glasgow 3, Paras 46-56, Pages 210-214.
[1499] Transcript, Mary Anne Kane, 16 May 2025, Page 15, Column 26.
[1500] Transcript, Mary Anne Kane, 16 May 2025, Pages 21-22, Columns 38-39.
[1501] Glasgow 4, Part 1 - Witness Statements, Volume 1, Mary Anne Kane, Document 6, Page 507, Q151.
[1502] Glasgow 4, Part 1 - Witness Statements, Volume 1, Mary Anne Kane, Document 6, Pages 510-511, Q155.
[1503] Glasgow 4, Part 1 - Witness Statements, Volume 1, Mary Anne Kane, Document 6, Page 511, Q156.
[1504] Glasgow 4, Part 3 - Witness Statements, Volume 3, Robert Calderwood, Document 1, Page 29, Para 104.
[1505] Transcript, Robert Calderwood, 1 October 2025, Pages 32-33, Columns 59-61.

challenges,[1506] and in his view the Board did not ever get to the bottom of why they had arisen.[1507] Although she did not become Chief Executive until 2017, Ms Grant was unaware of a lack of resources in the Estates team until discussions following the emergence of the DMA Canyon L8 Risk assessments[1508]. Mr Gallagher thought it logical that, if there was not enough budget for Estates and Facilities, their Director, David Loudon, would go to the Chief Executive and then they would say yes or no. However, if the Estates and Facilities Director did not think more budget was required it would not get escalated[1509].

863. There was significant additional evidence about the CAFM system and the weakness of ZUTEC. Ms Kane was of the view that ZUTEC did not provide what was needed by the CAFM system.[1510] When Mr Loudon told her and the Estates team that ZUTEC would be the only provision, it took them all by surprise. They had been expecting a full PPM manual and system, a computer-based software package for all the buildings, incorporating as-fitted drawings and specifications[1511].The ZUTEC system was not appropriately populated at handover,[1512] and was not provided until well after the building handover, which made no operational sense at all in terms of workforce and maintenance planning[1513].

864. These weakness of the ZUTEC system were also identified by Mr Leiper in his interview with the Oversight Board[1514]. He explained that ideally the CAFM system would be tested 'end to end' before handover, to ensure that it was operationally appropriate, practical, and efficient. It was unclear if this level of assurance was achieved for the QEUH/RHC or if it was a contractual obligation of Multiplex[1515].

[1506] Transcript, Professor John Brown, 3 October 2025, Page 8, Column 11.
[1507] Transcript, Professor John Brown, 3 October 2025, Page 23, Column 41.
[1508] Transcript, Jane Grant, 23 September 2025, Pages 68-69, Columns 132-133.
[1509] Transcript, Peter Gallagher, 19 September 2025, Page 51, Column 97-98.
[1510] Transcript, Mary Anne Kane, 16 May 2025, Page 40, Column 76.
[1511] Transcript, Mary Anne Kane, 16 May 2025, Page 42, Columns 79-80.
[1512] Transcript, Mary Anne Kane, 16 May 2025, Page 36, Column 68.
[1513] Glasgow 4, Part 1 - Witness Statements, Volume 1, Mary Anne Kane, Document 6, Page 430, Q49(c).
[1514] A53366935 - Bundle 52, Volume 1, Document 38, Page 739.
[1515] A53366935 - Bundle 52, Volume 1, Document 38, Page 738.

865. Mr Loudon and Mr Ross of Currie & Brown told Ms Kane that ZUTEC was fully populated[1516]. However, Ms Kane said that as-built specification documents, and testing and commissioning documentation for water and ventilation systems, were not easily accessible. Ms Kane said there were issues such as wrong model or specification having been uploaded or that the document was in the wrong location. There were limited as-fitted drawings[1517].

866. NHS GGC required to transfer data from ZUTEC to populate a useable asset register within the Board's preferred CAFM system. Mr Loudon claimed the problem was that the Estates team were not able to use ZUTEC effectively[1518].

867. Mr Pike accepted there was missing documentation in ZUTEC, and it was difficult to find documents. Mr Fernie acknowledged that the ZUTEC training should have had more focus[1519].

868. Mr Powrie's evidence that asset tagging was not complete until 2017 and Ms Connelly's view that it was still an issue in 2018[1520] was confirmed by Ms Kane[1521] [1522]. As a result, the Estates team were unclear on what they were required to routinely maintain or locations. In addition, PPM schedules could not be developed to reflect statutory and mandatory maintenance requirements[1523]. Asset labels would fall off, and the wrong tags were matched to room numbers. It was chaotic to use what was in place, and eventually NHS GGC made their own comprehensive local system that produced PPM schedules[1524].

869. From a Multiplex perspective Mr Pike's position was that everything was labelled, but the asset tagging was not there at handover because of a delay

[1516] Transcript, Mary Anne Kane, 16 May 2025, Pages 25-26, Columns 46-47.
[1517] Transcript, Mary Anne Kane, 16 May 2025, Pages 35-36, Columns 66-67.
[1518] Transcript, Mary Anne Kane, 16 May 2025, Page 26, Column 47.
[1519] Transcript, Alasdair Fernie, 21 May 2025, Page 97, Column 190.
[1520] See CTI Closing Statement, Glasgow 3, Section 5.2, Page 214, Para 54.
[1521] Glasgow 4, Part 1 - Witness Statements, Volume 1, Mary Anne Kane, Document 6, Page 427, Q48(a).
[1522] Transcript, Mary Anne Kane, 16 May 2025, Page 25, Column 46.
[1523] Glasgow 4, Part 1 - Witness Statements, Volume 1, Mary Anne Kane, Document 6, Page 427, Q48(a).
[1524] Transcript, Mary Anne Kane, 16 May 2025, Page 25, Column 45.

by NHS GGC providing information on the necessary codes[1525].

870. On maintenance costs, Mr Seabourne focused upon seeking an extended liability period of seven years, where the contractor would take on building structure and building services risks. In the event only two years was achievable, and that did not amount to an agreement for Multiplex to take on maintenance obligations for the building[1526].

871. Mr Gallagher suggested that questions around the Estates budget would be expected to be referred to the Chief Operating Officer and, if unresolved, ultimately to the Chief Executive[1527].

872. Concerns about the absence of robustness of water system management were raised with Ms Kane. She discovered that she was Designated Person for Water in 2014,[1528] yet had no qualification or training in water safety and did not realise the responsibility of the role until 2016[1529]. It was, she said, common for NHS managers to lack technical expertise in all the disciplines they are managing[1530]. There was no budget for Authorised Persons or Responsible Persons as it had not been included in the FBC, and subsequent requests for additional resources in 2017 were rejected by the Board[1531]. Ms Kane accepted that she could have undertaken water safety management training at the time. She could also have contacted HFS for support. She accepted that she had not been fulfilling the role of Designated Person appropriately, but given the challenges with the QEUH/RHC, it would have been difficult for the statutory roles to be fulfilled due to time constraints[1532].

873. Mr Calderwood had not only been unaware he was the Duty Holder but also did not get reports from the Water Safety Group[1533]. Ms Grant was aware of her responsibilities as Duty Holder when she became Chief Executive in 2017, but assumed that nominated persons (such as the Authorising Engineers)

[1525] Transcript, Darren Pike, 20 May 2025, Pages 31-32, Columns 60-62.
[1526] Transcript, Alan Seabourne, 29 May 2025, Pages 14-16, Columns 24-27.
[1527] Transcript, Peter Gallagher, 19 September 2025, Page 49, Column 93.
[1528] Transcript, Mary Anne Kane, 16 May 2025, Page 7, Column 10.
[1529] Transcript, Mary Anne Kane, 16 May 2025, Page 29, Column 54.
[1530] Transcript, Mary Anne Kane, 16 May 2025, Page 26, Column 48.
[1531] Transcript, Mary Anne Kane, 16 May 2025, Page 8, Column 12.
[1532] Transcript, Mary Anne Kane, 16 May 2025, Page 31, Column 58.
[1533] Transcript, Robert Calderwood, 30 September 2025, Page 15, Column 26.

were in place[1534].

Commissioning the Water System[1535]

874. Mr Calderwood was told by the Project Director that water systems were operational and fit for the move. Everything was 'good to go'.[1536] Indeed he had not been told of any issues with the water system by the time he left in 2017[1537].

875. After patient migration, Ms Kane said there were numerous reports from wards that temperatures were either too high or too low which resulted in distress to patients[1538]. The WTG later explored the link between the Combined Heat and Power centre ('CHP') and water temperatures and concluded that there had been temperature excursions since before the QEUH/RHC opened[1539]. Unfortunately, due to a software glitch, the archive files could not be checked to verify the excursions, but the group concluded that the excursions were a contributory factor to the Water Incident[1540].

876. Ms Kane was shocked when she found out about the 2015 DMA Canyon L8 Risk Assessment in May 2018. By this time there had already been the 'Water Incident' and the WTG had been set up[1541]. She accepted that the failure to deal with the matters set out in the 2015 report, such as dead legs, multiple temperature excursions and valve defects could have created a risk to patient safety[1542]. Professor Brown said that the Board never got to the bottom of why the inaction over DMA Canyon was never picked up.[1543]

877. Mr O'Donovan thought that Multiplex would have been responsible for the L8 Risk Assessment and that it should have been carried out just before putting occupants into the building[1544].

[1534] Transcript, Jane Grant, 23 September 2025, Pages 67-68, Columns 130-131.
[1535] CTI Closing Statement, Glasgow 3, Section 52, Paras 57-76, Page 215; Para 84 at Page 226.
[1536] Transcript, Robert Calderwood, 30 September 2025, Page 22, Columns 39-40.
[1537] Transcript, Robert Calderwood, 30 September 2025, Page 23, Column 42.
[1538] Transcript, Mary Anne Kane, 16 May 2025, Page 37, Column 69.
[1539] Bundle 10, Document 4, Pages 18-19.
[1540] Transcript, Mary Anne Kane, 16 May 2025, Page 37, Column 70.
[1541] Transcript, Mary Anne Kane, 16 May 2025, Page 52, Columns 99-100.
[1542] Transcript, Mary Anne Kane, 16 May 2025, Page 56, Column 108.
[1543] Transcript, Professor John Brown, 3 October 2025, Page 22, Column 39.
[1544] Transcript, Robert O'Donovan, 30 May 2025, Page 23, Columns 41-42.

Ventilation in the QEUH/RHC[1545]

878. At the time of the Glasgow 3 hearing, most of the evidence about lack of validation was documentary evidence, which we considered along with evidence from Dr Peters and Dr Inkster about their investigations and Professor Steele's investigation in 2019. Significant additional evidence was heard across Glasgow 4 from people involved in the commissioning of the ventilation system from inside NHS GGC, from Multiplex and its contractors, Currie & Brown and Capita.

879. Ms Kane explained that Mr Loudon had told her that all systems had been checked and were "good to go". However, he did not provide her with any documentary evidence that the ventilation system had been validated[1546]. She should have asked him for evidence that the QEUH/RHC had been commissioned and validated[1547]. She flagged to the Project Team that commissioning and validation information needed to be shared to allow the hospital to operate. She could not understand why clear answers were not being provided on the commissioning and validation data to inform clinical decision making[1548].

880. When Mr Loudon was asked why no validation was carried out he did not recall being made aware that validation was required over and above the building contract commissioning process Had he been he would have intervened accordingly[1549].

881. On 23 June 2015, Dr Peters asked Mr Walsh how the design of the new build hospital was signed off from an infection control point of view. She wanted to speak to the most appropriate person to give an overview from an infection control perspective. Mr Walsh responded that Professor Williams led on most of the ventilation design sign off, with some input from Dr Hood, but that

[1545] CTI Closing Statement, Glasgow 3, Page 228.
[1546] Transcript, Mary Anne Kane, 16 May 2025, Page 34, Column 63.
[1547] Transcript, Mary Anne Kane, 16 May 2025, Page 34, Column 63.
[1548] Glasgow 4, Part 1 - Witness Statements, Volume 1, Mary Anne Kane, Document 6, Pages 494-495, Q137.
[1549] Glasgow 4, Part 3 - Witness Statements, Volume 3, David Loudon, Document 6, Page 473, Q57(f).

design sign off was by Ms Stewart[1550].

882. Mr Calderwood understood the validation process to occur before handover. Capita's job was to go on site and look at, for example, the plumbing, before it was covered by a plastered wall and say, "that's fine"[1551]. He saw it as a series of steps to be taken such as a certificate of occupation from the council, and equipment signed off that they are technically installed correctly[1552].

883. Mr Kevin Hill was Director of Women and Children's Service at handover. He stated that prior to patient transfer environmental "snagging" had been completed by the clinical and operational teams to ensure the facilities enabled highest standards of patient care. He took the decision to move patients into the RHC in June 2015 because the hospital was physically complete, the ward areas were physically finished and ready for patient occupation[1553]. However, this did not include, from a hospital operational and clinical team perspective, any validation or testing of water, electrical, drains, air handling and ventilation systems as these were within the remit of the Director of Estates and Facilities. He ultimately considered the decision to move patients in was based on the physical finish of the ward areas[1554]. He understood what validation was and found it disturbing to learn that the ventilation system was not validated [1555].

884. Mr Jenkins was Director of Regional Services. He questioned the validation process prior to the completion of Ward 4B when he noticed there were no visible pressure monitors outside the bedrooms[1556]. He was informed that all of this was being managed centrally as part of the Project Team arrangements and building handover process[1557].

885. Mr Ballingall was clear that validation should have been done by NHS GGC

[1550] A39465188 - Bundle 14, Volume 1, Document 8, Pages 204-205.
[1551] Glasgow 4, Part 3 - Witness Statements, Volume 1, Robert Calderwood, Document 1, Page 13, Para 37.
[1552] Glasgow 4, Part 3 - Witness Statements, Volume 1, Robert Calderwood, Document 1, Page 23, Para 80.
[1553] Glasgow 4, Part 3 - Witness Statements, Volume 5, Kevin Hill, Document 1, Pages 10-11, Q8(i).
[1554] Glasgow 4, Part 3 - Witness Statements, Volume 5, Kevin Hill, Document 1, Page 11, Q8(i).
[1555] Glasgow 4, Part 3 - Witness Statements, Volume 5, Kevin Hill, Document 1, Page 11, Q8(i).
[1556] Glasgow 4, Part 3 - Witness Statements, Volume 4, Gary Jenkins, Document 2, Page 157, Q11.
[1557] Glasgow 4, Part 3 - Witness Statements, Volume 4, Gary Jenkins, Document 2, Pages 156-157, Q13(c).

after Multiplex had completed each area[1558] [1559]. Mr Pike took the same view[1560] [1561] and suggested that validation should be done just before migration, but after handover[1562]. Mr Wilson took the same view and considered that there was sufficient time for validation had that been scheduled to take place[1563]. He also stressed (as did all Multiplex witnesses) that it was their task to build and to commission according to the design[1564].

886. Mr Fernie's view was that validation should not only be checking the homework of the contractor but checking that it fits the bill for the patient. The definition of validation could have been clearer[1565].

887. Mr O'Donovan recalled that validation was going to be undertaken by an independent party employed by NHS GGC either immediately after practical completion or near that time It would not have been part of their programme[1566].

888. Mr Hall offered another view of why there was no validation. He thought NHS GGC decided not to include validation in the contract and as a result it was not included within the construction programme. The rationale may have been because a lot of equipment would need to go into the hospital post-completion, and there would be a cost for having to stand a contractor down for three months while validation was being undertaken[1567]. Mr Hall's own view was that validation should be undertaken before patients occupy the hospital, although he had concerns that equipment installation could impact on testing results relating to ventilation etc[1568]. This was a view shared by Mr Wilson[1569] and Mr Seabourne[1570].

[1558] Glasgow 4, Part 1 - Witness Statements, Volume 2, Ross Ballingall, Document 3, Page 157, Q54(a).
[1559] Transcript, Ross Ballingall, 21 May 2025, Page 45, Column 86.
[1560] Transcript, Darren Pike, 20 May 2025, Page 24, Column 46.
[1561] Glasgow 4, Part 1 - Witness Statements, Volume 1, David Wilson, Document 2, Page 80, Q58.
[1562] Glasgow 4, Part 1 - Witness Statements, Volume 2, Darren Pike, Document 3, Page 113, Q51(a).
[1563] Transcript, David Wilson, 20 May 2025, Page 19, Columns 35-36.
[1564] Transcript, David Wilson, 20 May 2025, Page 20, Column 38.
[1565] Transcript, Alasdair Fernie, 21 May 2025, Page 89, Column 173.
[1566] Transcript, Robert O'Donovan, 30 May 2025, Page 12, Column 19.
[1567] Transcript, David Hall, 22 May 2025, Page 73, Columns 141-142.
[1568] Transcript, David Hall, 22 May 2025, Pages 73-74, Columns 142-143.
[1569] Transcript, David Wilson, 20 May 2025, Page 19, Column 35.
[1570] Transcript, Alan Seabourne, 29 May 2025, Page 67, Column 129.

889. Mr Redmond used the term ‘validation’ in a completely different way to refer to the process of checking against drawings - which Capita carried out[1571]. He understood validation to be similar to commissioning, and it was really just a case of checking all the certification Multiplex were gathering such as building control. He was unable to explain the difference between commissioning and validation. His colleague witnessed all the M&E tests[1572].

Concern about the choice of PPVL Rooms for all isolation rooms

890. In our closing statement from Glasgow 3,[1573] we described in some detail concerns that Drs. Inkster and Peters had about the choice of PPVL rooms for all the isolation rooms in the hospital. That decision has its root in the ERs.

891. At handover in the RHC there were 8 PPVL isolation rooms in Ward 2A and 24 PPVL isolation rooms in total[1574]. The breakdown of the PPVL isolation rooms elsewhere in the RHC was as follows:

No.	Ward (RHC)	No. of PPVL Rooms
1.	2A	8
2.	Clinical Decision Unit (CDU)[1575]	2
3.	Cardiology[1576]	2
4.	Paediatric Intensive Care Unit (PICU)[1577]	4
5.	Acute Receiving[1578]	2
6.	Level 3[1579]	6

892. At handover, none of the RHC PPVL isolation rooms had HEPA filters. In June 2015, prior to the patients moving in, HEPA filtration was installed in the supply grilles of the lobbies of the PPVL isolation rooms in Ward 2A[1580].

893. At handover in the QEUH there were 12 PPVL isolation rooms which were as follows:

[1571] Transcript, John Redmond, 28 May 2025, Page 71, Column 137.
[1572] Transcript, John Redmond, 28 May 2025, Pages 69-70, Columns 134-135.
[1573] CTI Closing Statement, Glasgow 3, Section 5.2, Pages 46-47, Paras 93-98.
[1574] A46059364 - Bundle 23, Document 96, Page 997.
[1575] A44943477 - Bundle 23, Document 84, Page 835.
[1576] A44943477 - Bundle 23, Document 84, Page 836.
[1577] A44943477 - Bundle 23, Document 84, Page 836.
[1578] A44943477 - Bundle 23, Document 84, Page 836.
[1579] A44943477 - Bundle 23, Document 84, Page 838.
[1580] A46059364 - Bundle 23, Document 96, Page 997.

No.	Ward (QEUH)	No. of PPVL Rooms
1.	Intensive Care Unit (ICU)[1581]	5
2.	High Dependency Unit (HDU)[1582]	5
3.	Renal (4A)[1583]	2

894. None of the QEUH PPVL Isolation Rooms had HEPA filters at handover. Subsequently between September 2015 and June 2021, 7 of the 12 PPVL isolation rooms were fitted with HEPA filters (3 HDU, 3 ICU, 1 4A). The remaining 5 isolation rooms are a room in Ward 4A, 2 rooms in HDU and 2 rooms in ICU. The room in Ward 4A does not have HEPA filtration[1584].

Air Permeability Tests for Isolation Rooms

895. There was additional evidence about air permeability tests for all 32 isolation rooms.

896. In August 2015, it was discovered that air permeability tests had not been carried out on the 32 isolation rooms in accordance with the ERs, and HBN 04-01[1585]. Mr Wilson said it had been thought it would be the responsibility of a team dealing with the "fabric side of the building as opposed to the building services which (he) was dealing with"[1586].

897. The tests were done on 26 August 2015 in Ward 2A by RSK (a member of ATTMA). Ten isolation rooms were tested, with only 5 compliant[1587]. On 17 September 2015, 24 single rooms were tested under PMI 436 and a report submitted to NHS GGC for review[1588]. Multiplex confirmed the air permeability tests were all successfully completed during November 2015, some eight months after handover[1589].

[1581] A44943366 - Bundle 52, Volume 11, Document 11, Page 92.
[1582] A44943366 - Bundle 52, Volume 11, Document 11, Page 92.
[1583] A44943366 - Bundle 52, Volume 11, Document 11, Page 92.
[1584] A44943366 - Bundle 52, Volume 11, Document 11, Page 93.
[1585] A36384812 - Bundle 33, Document 54, Page 1564, Para 3.2 [Witness Testing and Commissioning].
[1586] Transcript, David Wilson, 20 May 2025, Pages 25-26, Columns 47-49.
[1587] A36384817 - Bundle 33, Document 55, Page 1565, Para 3.2 [Witness Testing and Commissioning].
[1588] A34348036 - Bundle 32, Document 101, Page 1694.
[1589] A33085216 - Bundle 33, Document 57, Page 1618, Para 3.2 [Witness Testing and Commissioning].

Remediation of PPVL Rooms

898. On 5 January 2015 it was stated by Multiplex that Wallace Whittle had claimed the isolation rooms throughout the hospital had been designed in line with SHPN 04 Supplement 1[1590]. They could see no reason why the isolation rooms could not be used under the guidance issued previously by the NHS[1591].

899. In 2017 an SBAR recommended PPVL rooms were not used for highly infectious patients, as they are not suitable for MDRTB or MERs-CoV. In addition, the rooms had been modified from the original criteria, due to an extract being present in the patient bedroom, and the ACH in the en-suite being 3 ACH rather than 10 ACH. There was a risk that immunosuppressed patients would not be adequately protected[1592].

900. Between January and March 2018, four isolation rooms in Ward 2A were converted from PPVL to Positively Pressured Isolation Room ("PPIR"). The extract grille in the bedroom was moved to the corridor, and the supply grille in the lobby was moved to the bedroom with the en-suite extract remaining unaltered[1593].

901. In September 2018, HEPA filtration was fitted in the two Cardiology PPVL rooms[1594].

902. In May 2019, one of the four PPVL isolation rooms in the PICU Ward was converted into a Negatively Pressured Isolation Room ("NPIR"). A supply grille was installed in the patient room and an extract grille in the lobby. The system was rebalanced to ensure the flow of air was from the corridor or lobby to the patient room[1595]. HEPA filtration was fitted during conversion works. The other three PPVL rooms were fitted with HEPA filtration between July and November 2020[1596].

[1590] Edinburgh 2 - Bundle 1, Document 5, Page 534.
[1591] Bundle 4, Document 8, Pages 21-22.
[1592] A39465126 - Bundle 23, Document 31, Page 329.
[1593] A44943477 - Bundle 23, Document 84, Page 834.
[1594] A44943477 - Bundle 23, Document 84, Page 835.
[1595] A44943366 - Bundle 52, Volume 11, Document 11, Page 92.
[1596] A44943366 - Bundle 52, Volume 11, Document 11, Page 95.

903. One of the two PPVL rooms in the CDU within RHC was converted into a NPIR room in May 2019. Both rooms now have HEPA filtration[1597]. In the same month, one of the two PPVL isolation rooms in the Acute Receiving was converted into a NPIR at the request of consultant physicians and infection control doctors. HEPA filtration was fitted to the room (that was subsequently converted) in September 2018 and the other room in May 2022[1598].

904. From 2019, all 8 AHUs serving the Ward 2A isolation rooms were refurbished. One of the remaining 4 PPVL rooms was converted into a Negatively Pressured Ventilation Lobby ("NPVL") room[1599]. Between September 2018 and April 2022, Level 3 PPVL isolation rooms were fitted with HEPA filtration[1600]. The Ward 2A isolation rooms are now 3 PPVL, 1 NPVL, and 4 PPIR[1601].

905. In June 2019, 4 PPVL isolation rooms (2 in HDU, 2 in ICU) were converted to Negative Pressure Isolation Rooms ("NPIR") at the request of consultant physicians and infection control doctors[1602].

906. The current status of isolation rooms in relation to both the RHC and QEUH is set out in the below table:

No.	Ward (RHC)	Isolation Rooms (2025)
1.	2A	3, PPVL, 4 PPIR, 1 NPVL
2.	Clinical Decisions Unit (CDU)	1 PPVL & 1 NPIR
3.	Cardiology	2 PPVL
4.	Paediatric Intensive Care Unit (PICU)	3 PPVL & 1 NPIR
5.	Acute Receiving	1 PPVL & 1 NPIR
6.	Level 3	6 PPVL

No.	Ward (QEUH)	Isolation Rooms (2025)
1.	Intensive Care Unit (ICU)	3 PPVL & 2 NPIR
2.	High Dependency Unit (HDU)	3 PPVL & 2 NPIR
3.	Renal (4A)	2 PPVL
4.	4B	24 PPIR[1603]

[1597] A44943477 - Bundle 23, Document 84, Page 836.
[1598] A44943366 - Bundle 52, Volume 11, Document 11, Page 95.
[1599] A44943477 - Bundle 23, Document 84, Page 835.
[1600] A44943477 - Bundle 23, Document 84, Page 838.
[1601] A44943477 - Bundle 23, Document 84, Page 835.
[1602] A44943366 - Bundle 52, Volume 11, Document 11, Page 92.
[1603] Bundle 23, Document 127, Page 1122.

Absence of HEPA Filters in Ward 2A[1604]

907. At the start of June 2015, it was discovered that there were missing HEPA filters in Ward 2A. Multiplex were to provide a timescale for their supply. Ms Kane recalled finding this out, the weekend before patients were due to be transferred. The issue was raised and discussed at a meeting [1605]. The COO (then Grant Archibald) stressed that the QEUH/RHC could not open if there were no HEPA filters in place. He and Mr Loudon pressed Multiplex, who obtained HEPA filters from Ireland. Ms Kane could not recall any reason being provided as to why there were no HEPA filters fitted at handover. She remembered thinking that there did not seem to be an understanding in the Project Team that HEPA filters should have been in place[1606].

908. Mr Calderwood discovered that there were problems on the Thursday before the final week of commissioning. In his view, the absence of HEPA filters was a "major oversight" by Multiplex and a "gross dereliction of duty" by Capita. He understood that the design of Ward 2A had been personally overseen by a senior clinician. The absence of HEPA filters was a "major faux pas" and "major technical error.[1607]. The Project Team were responsible for signing off Ward 2A and since the HEPA filters were not there then they clearly did not do their job[1608].

909. Mr Hill became aware there were no HEPA filters in Ward 2A in March 2015, two months before patient migration from Yorkhill. He would have contacted the RHC Commissioning Manager to seek clarification and then raised the matter personally with Mr Loudon[1609]. He was unaware why Ward 2A was accepted at handover without HEPA filtration in place[1610].

910. Ms Kane was not confident in the information she received from Mr Loudon

[1604] CTI Closing Statement, Glasgow 3, Pages 231-238, Para 99-122.
[1605] Transcript, Mary Anne Kane, 16 May 2025, Page 44, Columns 83-84.
[1606] Transcript, Mary Anne Kane, 16 May 2025, Page 45, Column 85.
[1607] Glasgow 4, Part 3 - Witness Statements, Volume 1, Robert Calderwood, Document 1, Page 88, Paras 307-309.
[1608] Glasgow 4, Part 3 - Witness Statements, Volume 1, Robert Calderwood, Document 1, Page 90, Para 313.
[1609] Glasgow 4, Part 3 - Witness Statements, Volume 5, Kevin Hill, Document 1, Page 15, Q14.
[1610] Glasgow 4, Part 3 - Witness Statements, Volume 5, Kevin Hill, Document 1, Page 15, Q15.

relating to the ventilation system[1611]. She assumed that 'Dr Williams' had been consulted at handover in relation to the HEPA filters, as he was the Ventilation Lead ICD for NHS GGC[1612]. She had been told by Mr Loudon that 'Dr Williams' had completed the ventilation system sign offs for the hospital. According to Mr Wilson of Multiplex, the design was for filter housing, not installed filters, and commissioning took place according to what had been designed, with those commissioning not having medical expertise to identify any problem[1613].

911. On 29 January 2015, the Sectional Completion Certificate was issued and signed off by John Redmond of Capita and Peter Moir of NHS GGC. The Certificate has an attached schedule of incomplete works dated 26 January 2015 with a date for completion of works [1614]. The attachments referred to in the Notification of Defects included with the Sectional Completion Certificate, were not attached. Mr Fernie stated that his recollection was the ventilation had been completed in accordance with the requirements of the contract, but there may have been some defects. The build conditions were completed to the level that, as he put it, allowed all parties to sign off the practical completion certificate with a defects list[1615]. The schedule of incomplete works included "35 Isolation Rooms – HEPA filters". No location or completion date was specified.

Air Quality on Ward 2A

912. In December 2018, SMT minutes record that Dr Inkster had noted the ACH was less than 3, and the pressure was set to negative in Ward 2A. Furthermore, there also appeared to be an issue with the ductwork which had contaminated the air and made the area unsuitable for patients to transfer back to[1616]. Mr Hill was unable to explain why it took three years for deficiencies in the ventilation system to be identified, when there were

[1611] Transcript, Mary Anne Kane, 16 May 2025, Page 76, Column 147.
[1612] Glasgow 4, Part 1 - Witness Statements, Volume 1, Mary Anne Kane, Document 6, Page 435, Q55(g).
[1613] Transcript, David Wilson, 20 May 2025, Page 17, Column 32.
[1614] A33085242 - Bundle 33, Document 62, Page 1683.
[1615] Glasgow 4, Part 1 - Witness Statements, Volume 2, Alasdair Fernie, Document 1, Pages 41-42, Q59(a).
[1616] A47648681 - Bundle 13, Document 95, Pages 719-720.

concerning signs in 2015, but it was not his direct area of responsibility[1617] and Ward 2A was deemed clinically safe at the time to treat patients[1618].

Ventilation system in Ward 4B [1619]

913. Mr Jonathan Best stated that, before any move of patients to Ward 4B (and other new wards), there would have been a range of assurances provided by the Project Team, along with clinical, Estates, and Infection Control colleagues[1620]. In June 2015, a concern raised was that the Pentamidine room would never reach 10 Pa, perhaps 1 or 2 Pa. Mr Moir suggested that Wallace Whittle be asked to comment, as this was part of the COS. User Groups expected the rooms to be as per the COS but had not changed the ceiling plans[1621]. Mr Moir and others in the Project Team believed that the Pentamidine room should be positive pressure and that the basis for this requirement came from the COS[1622]. However, on 29 July 2015, Mr Moir confirmed to Professor Williams and others that the ventilation system had been adjusted to achieve -1.5 Pa and 10 ACH[1623].

914. On 30 June 2015, Mr Jenkins became aware that Ward 4B had ventilation issues when Ms Campbell received the results of the first month's air sampling with a far higher count than would have been expected[1624].

915. On 25 June 2015, Dr Hood responded to a query from Professor Williams about the use of the rooms in Ward 4B for BMT patients, rather than lobbied side-rooms in the renal area. Dr Hood attached a specification for BMT rooms in the Beatson and gave additional details of the specification that are not on the sheet (sealed rooms, waterproof paint, plasterboard with embedded fungicide, positive pressure 5 Pa to 10 Pa, clear digital read out, and particle counts below 1000 at commissioning). He suggested that Professor Williams

[1617] Transcript, Kevin Hill, 17 September 2025, Page 50, Column 95.
[1618] Transcript, Kevin Hill, 17 September 2025, Page 31, Column 58.
[1619] CTI Closing Statement, Glasgow 3, Pages 241-252, Paras 132-171.
[1620] Glasgow 4, Part 3 - Witness Statements, Volume 1, Jonathan Best, Document 6, Page 143, Q16(f).
[1621] A34348059 - Bundle 32, Document 93, Page 1541.
[1622] A34348059 - Bundle 32, Document 93, Page 1541.
[1623] A39465076 - Bundle 13, Document 119, Page 845.
[1624] Glasgow 4, Part 3 - Witness Statements, Volume 4, Gary Jenkins, Document 2, Pages 163-164, Q15(c).

speak to Mr Hoffman[1625]. Mr Seabourne acknowledged that NHS GGC would ask Mr Hoffman and Dr Hood on major decisions[1626].

916. On 30 July 2015, the Project Team realised that works being carried out by Multiplex did not match up with PMI 424[1627]. ACH was 6 rather than 10-12[1628]. Mr Wilson's said the 'achievable' rate of 6 ACH was a function of the capacity of the installed ductwork, of the air handling plant. The latter formed an absolute constraint, because of space in the room where it was located, which was in turn a result of design choices made in 2010/2011[1629]. Mr Hall explained that practice (as reflected in the ERs) was to allow a 25% space margin for plant, primarily for operational inefficiencies, but also as a means of future-proofing, with horizontal expansion of plant far easier than vertical expansion[1630]. A specific PMI 430[1631] was issued for a pressure monitoring solution in Ward 4B which would involve installation of digital pressure monitor gauges, which would sound once the pressure dropped below 5 Pa for 5 minutes[1632]. Peter Moir enquired about the cost of air permeability tests for Ward 4B[1633].

917. On 1 July 2015, Dr Hood met with Dr Peters, Dr Inkster, and Professor Jones to discuss the adult BMT situation. The ventilation parameters and particle counts were discussed, and it was concluded that the environment was not safe for patients[1634].

918. On 3 July 2015, Dr Hood sent an email to Dr Peters, Dr Inkster and Professor Jones relating to the BMT rooms. Given his experience of design and commissioning of BMTUs in GRI in 1999 and the Beatson in 2007/2008, he would not have allowed patients into these units on the basis of the unverified and worrying information set out in Dr Peters' email sent earlier that day. Dr Peters' email set out a number of concerns such as no written data to confirm

[1625] A49073179 - Bundle 14, Volume 1, Document 13, Pages 323-324.
[1626] Transcript, Alan Seabourne, 29 May 2025, Page 44, Column 83.
[1627] A32993845 - Bundle 32, Document 95, Page 1576.
[1628] A32993845 - Bundle 32, Document 95, Page 1575.
[1629] Transcript, David Wilson, 20 May 2025, Pages 54-55, Columns 105-107.
[1630] Transcript, David Hall, 22 May 2025, Pages 19-20, Columns 33-35.
[1631] A41683206 - Bundle 16, Document 33, Page 1801.
[1632] A32993845 - Bundle 32, Document 95, Page 1577.
[1633] A32993845 - Bundle 32, Document 95, Page 1581.
[1634] A32310963 - Bundle 14, Volume 1, Document 27, Page 417.

6 ACH for Ward 4B, or to confirm pressure differential, particle counts above the upper limit in 12 rooms, no commissioning data for the HEPA filters and the ceiling had non sealed tiles. Dr Hood also stated that *Aspergillus* control was not only about HEPA filtration, but also ACH to dilute and remove and a consistent flow of air from the room to the corridor[1635].

919. On 5 July 2015, Consultant Haematologist Dr Anne Parker issued her SBAR which assessed the accommodation on Ward 4B was "potentially unsafe" and "not fit for high risk haemato-oncology patients to remain in safely". It also described all haematology patients as "potentially at risk because of a poor quality environment"[1636].

920. On 7 July 2015, Dr Hood responded to Professor Williams' email to clarify the original building requirements and validation process. The response agreed the safest option would be to return patients to the Beatson until isolation rooms were properly commissioned and validated[1637]. Professor Williams agreed that the rooms were not built to specification and should be the same as the Beatson[1638].

921. On 7 August 2015, Pauline Wright sent an email to Ms McNamee (Devine) stating that Dr Hood was discussing with Mr Powrie obtaining additional information including the room specification, validation and progress with permeability testing. Dr Hood was then going to discuss matters with Mr Hoffman. Until then, no recommendation could be made about whether rooms could be used for transplantation[1639]. On the same date, Professor Jones stated that he had discussed the situation at length with Dr Hood and that as he did not have all the facts then he was not in a position to give informed advice. Professor Jones stated that both he and Dr Hood would go to QEUH to see what they could do to help[1640].

922. On 10 August 2015, an RHSC BMT meeting was held. The minutes state that Dr Hood identified an alternate English building note 2013 to send to

[1635] A39465191 - Bundle 14, Volume 1, Document 16, Page 357.
[1636] Bundle 12, Document 30, Pages 234-237.
[1637] A39465191 - Bundle 14, Volume 1, Document 16, Pages 363-367.
[1638] A40241661 - Bundle 27, Volume 3, Document 13, Page 295.
[1639] A49661442 - Bundle 27, Volume 4, Document 28, Page 327.
[1640] A37852466 - Bundle 27, Volume 6, Document 23, Page 243.

attendees[1641].

923. On 13 August 2015, Ms McNamee sent an email to Dr Hood and Mr Moir setting out a brief summary of their meeting about the BMT Unit in the RHC. On 14 August 2015, Mr Moir added his comments[1642]. Later that day, Dr Hood forwarded the email to Mr Hoffman who responded with comments. Mr Hoffman stated the specification was irrelevant, the permeability test did not show total sealing and the smoke tests showed ingress of unfiltered air through gaps in the rooms' integrity which was not 'good news'. He suggested making the patient room HEPA filtered positive and the anteroom a bit negative[1643].

924. By 6 August 2015, ceilings had been taken down, and plasterboard walls were going up. A debate about responsibility was under way. [1644]. On 13 August 2015 the plasterboard ceilings were complete[1645]. Mr Wilson recalled the change in preparation for an air permeability test[1646]. Further works were the upgrading of the AHU to assist in achieving the required positive pressure, re-cleaning of the ductwork, re-balancing the supply and extract ventilation, HEPA filters, and installation of a room differential pressure display. The works had been carried out because the ward was deemed unsuitable by clinical staff and infection control[1647].

925. On 19 August 2015, Dr Hood carried out air sampling settle plates within the ensuite IPS panels and room to establish if this was the reason for the variable fungal results[1648]. On 2 September 2015, Dr Hood attended a smoke test in Ward 2A with Professor Williams, Mr Brattey and Julie Miller[1649].

926. On 30 November 2015, a BMT Unit Transfer to QEUH meeting was held. Dr Hood was not present. The minutes record, following smoke testing Dr Inkster

[1641] A48652586 - Bundle 13, Document 117, Page 842.
[1642] A33794564 - Bundle 12, Document 43, Page 294.
[1643] A33794564 - Bundle 12, Document 43, Page 293.
[1644] A34348097 - Bundle 32, Document 96, Page 1596.
[1645] A32993823 - Bundle 32, Document 97, Page 1614.
[1646] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Wilson, Document 2, Page 101, Q35(m).
[1647] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Wilson, Document 2, Page 101, Q35(m).
[1648] A34465897 - Bundle 12, Document 44, Page 296.
[1649] A34465774 - Bundle 23, Document 76, Pages 764-765.

was going to ask Dr Hood for a list of areas to be sealed. Dr Hood had tested the Pentamidine room and found it to be positively pressured when it should have been negatively pressured[1650]. On 2 December 2015, Dr Hood emailed to Dr Inkster relating to the adult BMT Unit rooms in which he stated that he had amended his inspection report on the adult BMT Unit to state all his pressure readings tallied with digital readings for each room[1651].

927. Mr Calderwood stated that the remedial works undertaken such as sealing the ceiling and HEPA filters still failed the tests and, on being presented with what he said was English guidance for a BMT unit, he recognised that Ward 4B was "light years away from that"[1652]. It was interesting that Mr Calderwood characterised the problems in 2015 as, either, a difference of opinion between IPC and clinical users, or a novel concern raised by ICDs once they had been appointed to the QEUH (compared with what previous IPC contributors had said)[1653].

928. According to Professor Brown, Mr Calderwood had told him that the problem was that 4B had not been properly specified.[1654] In December 2015, microbiologists recorded that the Pentamidine treatment room was showing a positive pressure (2.5 Pa) from room to corridor. This was a health and safety issue[1655].

5.8.3 2016

Realisation of the Ventilation Derogation

929. We have been unable to ask Mr Loudon about the email from Mr Powrie to Dr Inkster copied to him, Ms Harkness and Mr Walsh of 26 May 2016[1656], but in Glasgow 3 we heard the perspectives of Ms Powrie, Dr Inkster, Mr Walsh, Dr Armstrong, Professor Jones, Ms Pritchard and Dr Peters[1657].

[1650] A39465079 - Bundle 13, Document 121, Page 848.
[1651] A34465833 - Bundle 12, Document 84, Page 736.
[1652] Glasgow 4, Part 3 - Witness Statements, Volume 1, Robert Calderwood, Document 1, Page 79, Para 266.
[1653] Transcript, Robert Calderwood, 30 September 2025, Pages 30-31, Columns 56-58.
[1654] Transcript, Professor John Brown, 3 October 2025, Page 27, Column 49.
[1655] A39465079 - Bundle 13, Document 121, Page 848.
[1656] Bundle 20, Document 68, Page 1495.
[1657] CTI Closing Statement, Glasgow 3, Section 5.2, Page 271, Paras 236-254.

930. It now appears that, as explained in Mr Loudon's email of 21 June 2016,[1658] after he had received Dr Inkster's June 2016 SBAR[1659] he was instructed by Mr Calderwood to establish why the Agreed Ventilation Delegation was approved, and how it was signed off from a governance perspective. He and Ms Frew had not been able to find documentation. He appears to have wondered whether the email from Dr Hood about the renal dialysis area might be relevant,[1660] although he has the date of that email wrong. In any event he sought the help of Douglas Ross from Currie & Brown, David Ramsay from Capita, Mr Seabourne, Ms Griffin and Mr Moir. We have a reply from Mr Ross dated 22 June 2016[1661] which accurately explains when the decision was taken. The email states:

> "The decisions to change from 6 to 3 air changes was not made in renal dialysis unit and extrapolated to the whole hospital. The decisions accepting change was made in 2009 during bid evaluation / preferred bidder discussions."

931. Mr Ross's email then sets a justification broadly consistent with the ZBP Ventilation Strategy document[1662]. Mr Ross's email was followed the next day by Mr Seabourne's email of 23 June 2016[1663] which can be summed up by the first few words of its penultimate paragraph; "We are where we planned to be…".

932. In this email Mr Seabourne said that every aspect of the design was approved by IPC and Microbiology. Mr Ross was correct about when the decision was made. He identifies the maximum temperature of 26 degrees as a key driver for the derogation. He appears to allocate responsibility for IPC approval to Dr Redding and Ms Rankin when both had ceased to be involved in the project by the time the decisions were being made; but when he gave evidence Mr Seabourne accepted that and wished the Inquiry to be aware that he written that email whilst retired many years after the event[1664]. In the email Mr Seabourne described the approval of this derogation was given through

[1658] Bundle 12, Document 105, Page 816.
[1659] Bundle 4, Document 11, Page 52.
[1660] Bundle 17, Document 79, Pages 3032-3033.
[1661] Bundle 12, Document 105, Page 815.
[1662] Bundle 16, Document 21, Page 1657.
[1663] Bundle 12, Document 104, Page 813.
[1664] Transcript, Alan Seabourne, 29 May 2025, Pages 85-87, Columns 166-170.

something that sounds a bit like the user group process. When the emails were put to him Mr Seabourne was "gobsmacked" that people did not know about the Agreed Ventilation Derogation[1665].

933. Mr Calderwood denied all knowledge of the initial email from Mr Powrie,[1666] although it may be that the issue was raised with him by Dr Armstrong or others without reference to the email. He also denied knowledge of Mr Seabourne's email of 23 June 2016 - "We are where we planned to be…"[1667]. Mr Calderwood had no knowledge of the derogation at the time and appeared to see these events as a challenge by Dr Inkster to those who did take the decision in 2009[1668].

5.8.4 2017

934. In Glasgow 3 we heard evidence from Dr Redding about her attempts to contact initially Mr Calderwood but then Ms Grant[1669]. Ms Grant gave her perspective. She appeared to accept that it was only as a result of the contact from Dr Redding that she learnt about problems within the IPC team[1670]. She was unaware of the 2015 investigation by Dr Stewart[1671] into culture or relationships in the IPC team[1672]. She was not told that Dr Peters and Dr Inkster had raised concerns about the ventilation systems of Ward 2A RHC or Ward 4B QEUH in 2015[1673]. In fact, Ms Grant was not told about any issues of the ventilation systems in the hospital prior to the 3 October 2017 SBAR[1674].

The Stage 1 Whistleblow and SBAR of 3 October 2017

935. This was covered in considerable detail in section 5.2 of our Closing

[1665] Transcript, Alan Seabourne, 29 May 2025, Pages 55-56, Columns 106-107.
[1666] Glasgow 4, Part 3 - Witness Statements, Volume 3, Robert Calderwood, Page 73, Para 243; Transcript, Robert Calderwood, 30 September 2025, Page 49, Column 94.
[1667] Glasgow 4, Part 3 - Witness Statements, Volume 3, Robert Calderwood, Page 101, Para 365.
[1668] Glasgow 4, Part 3 - Witness Statements, Volume 3, Robert Calderwood, Page 73, Para 243; Transcript, Robert Calderwood, 30 September 2025, Page 50, Columns 95-96.
[1669] CTI Closing Statement, Glasgow 3, Section 5.2, Page 279, Para 265.
[1670] Transcript, Jane Grant, 23 September 2025, Page 54, Column 103.
[1671] Bundle 14, Volume 1, Document 41, Page 464.
[1672] Transcript, Jane Grant, 23 September 2025, Page 80, Column 156.
[1673] Transcript, Jane Grant, 23 September 2025, Page 80, Column 156.
[1674] Transcript, Jane Grant, 23 September 2025, Page 80, Column 156.

Statement following Glasgow 3[1675].

936. Ms Grant accepted that it was likely the SBAR of 3 October 2017 that prompted Dr Armstrong, Mr Loudon[1676] and others to brief her on the ventilation issues in general[1677] and specifically in Ward 2A[1678], the general wards[1679], and chilled beams[1680].

937. Professor Brown did not know about the issue that people had been complaining about the building and not getting answers until the SBAR of October 2017.[1681] The NHS GGC priority was to focus on getting things sorted or resolved, not on finding out why they had got into that state[1682]. However, he accepted - from the example of Ward 2A - that not getting to the bottom of issues risked short term or piece-meal solutions which may be ineffective.[1683]

938. When pressed on the steps taken following the SBAR of 3 October 2017, Ms Grant did not expressly acknowledge that a more thorough investigation in 2017 might have uncovered issues earlier, but she did repeatedly emphasise moving forward rather than retrospective investigation[1684].However, she relied on professional teams to handle technical and risk assessment processes[1685]. She also acknowledged that the SBAR was genuine whistleblowing,[1686] and a reasonable way to stop the kind of to-ing and fro-ing of who's done things and who's not done things, putting things down on a bit of paper[1687].

939. Mr Hill acknowledged that whistleblowing was a legitimate route for NHS GGC colleagues to take but expressed a preference for resolution through normal line management processes first. He hoped whistleblowers would raise issues

[1675] CTI Closing Statement, Glasgow 3, Section 5.2, Page 305, Paras 350-368.
[1676] Transcript, Jane Grant, 23 September 2025, Page 42, Column 79.
[1677] Transcript, Jane Grant, 23 September 2025, Pages 40 and 44, Columns 75 and 84.
[1678] Transcript, Jane Grant, 23 September 2025, Page 27, Column 49.
[1679] Transcript, Jane Grant, 23 September 2025, Page 34, Column 64.
[1680] Transcript, Jane Grant, 23 September 2025, Page 35, Column 65.
[1681] Transcript, Professor John Brown, 3 October 2025, Page 19, Column 33.
[1682] Transcript, Professor John Brown, 3 October 2025, Pages 31 and 34, Columns 58 and 63.
[1683] Transcript, Professor John Brown, 3 October 2025, Page 55, Column 105.
[1684] Transcript, Jane Grant, 23 September 2025, Page 44, Column 83.
[1685] Transcript, Jane Grant, 23 September 2025, Page 46, Columns 87-88; Glasgow 4, Part 3 - Witness Statements, Volume 4, Jane Grant, Document 1, Page 73, Q60.
[1686] Transcript, Jane Grant, 24 September 2025, Page 30, Column 56.
[1687] Transcript, Jane Grant, 24 September 2025, Page 32, Column 59.

down the hierarchical line, before choosing to use the Whistleblowing policy[1688].

940. Mr Best shared Mr Hill's view of due process being followed. Staff should raise issues through the agreed line management processes[1689]. Mr Best believed that, had issues been raised and escalated via the agreed structure, then many of the concerns would have been dealt with at the time[1690]. While he accepted that whistleblowing should be available to staff, he considered it to be a last resort once other routes have been exhausted[1691].

Ventilation Developments

941. In March 2017, a Bone Marrow Transplantation Options Appraisal paper was issued by Mr Jenkins, seeking a recommendation by the Acute Services Committee to agree the temporary relocation of BMT services to Ward 4B at the QEUH[1692]. The rationale for the paper was to assess the available retained estate on the QEUH campus, in the event the BMT unit might never reach the satisfactory specification for the Infection Control team or the clinical haematologists[1693].

942. Four main options were scored using the Capital Investment Manual agreed criteria: remain at the Beatson, return to Ward 4B at the QEUH, relocate to the roof of the QEUH maternity building, or relocate to the Institute of Neurological Sciences' Neurology Building at QEUH[1694]. The two latter options scored higher in the appraisal process than the Ward 4B option, yet the recommendation was in favour of the Ward 4B option[1695]. It was a complex discussion and ultimately it was the clinical haematologists' view that the QEUH would be preferable to the Beatson, and the other options were too far into the future and would result in patients remaining at the Gartnavel Campus where there was less clinical infrastructure to safely manage their clinical

[1688] Transcript, Kevin Hill, 17 September 2025, Pages 13-15, Columns 22-25.
[1689] Glasgow 4, Part 3 - Witness Statements, Volume 1, Jonathan Best, Document 6, Page 157, Q44.
[1690] Glasgow 4, Part 3 - Witness Statements, Volume 1, Jonathan Best, Document 6, Page 158, Q47.
[1691] Transcript, Jonathan Best, 19 September 2025, Page 100, Column 196.
[1692] A39465085 - Bundle 27, Volume 7, Document 6, Page 158.
[1693] Glasgow 4, Part 3 - Witness Statements, Volume 4, Gary Jenkins, Document 2, Pages 172, Q22.
[1694] A39465085 - Bundle 27, Volume 7, Document 6, Page 162.
[1695] A39465085 - Bundle 27, Volume 7, Document 6, Pages 155-174.

presentation[1696]. The recommendation was made on the basis that the service delivery considerations were prioritised over the Infection Control and Prevention Teams' concerns on meeting national standards and HPS recommendations[1697]. Mr Jenkins explained he had to be explicit in the paper that there was no consensus that all multi-disciplinary colleagues agreed with[1698].

943. Before the BMT Unit returned to Ward 4B in June 2018, Mr Jenkins stated there were a number of detailed 'go' and 'no go' decisions. There were a number of checks to monitor and sample the environment[1699]. There had also been remedial works undertaken during the decant which included: sealing the bedroom and ensuite walls and ceilings, refitting ceilings and performing smoke tests, installing HEPA filtration, sealing light fittings, adding pressure monitors and alarm systems, rebalancing airflow in the pentamidine room, enhanced cleaning schedules and applying anti-fungal coatings[1700]. Mr Jenkins and his colleagues had a level of confidence that the remedial works would create a suitable clinical environment. Although Infection Control had expressed ongoing concerns, advice was sought from HPS and HFS[1701].

Water System Management in 2017[1702]

944. In the latter half of 2017, Ms Kane was told by Mr Loudon that she was not to get involved with any concerns about the QEUH/RHC relating to the ventilation or water systems, due to an ongoing whistleblowing complaint process[1703]. She felt uncomfortable complying with that instruction but was fearful for her continued employment with NHS GGC[1704]. She said she had not obstructed microbiology because she did not have access to the water

[1696] Glasgow 4, Part 3 - Witness Statements, Volume 4, Gary Jenkins, Document 2, Page 173, Q22(c).
[1697] A39465085 - Bundle 27, Volume 7, Document 6, Page 174.
[1698] Glasgow 4, Part 3 - Witness Statements, Volume 4, Gary Jenkins, Document 2, Page 173, Q22(c).
[1699] Glasgow 4, Part 3 - Witness Statements, Volume 4, Gary Jenkins, Document 2, Page 175, Q23(b).
[1700] Glasgow 4, Part 3 - Witness Statements, Volume 4, Gary Jenkins, Document 2, Page 170, Q21(a).
[1701] Glasgow 4, Part 3 - Witness Statements, Volume 4, Gary Jenkins, Document 2, Pages 171-172, Q21(c).
[1702] CTI Closing Statement, Glasgow 3, Pages 314-318, Para 376-387.
[1703] Transcript, Mary Anne Kane, 16 May 2025, Page 59, Column 114.
[1704] Transcript, Mary Anne Kane, 16 May 2025, Page 62, Column 120.

system results[1705] but conceded that her email response to Dr Peters relating to test results was unhelpful[1706]. She did attempt to present reports relating to the built environment and water safety at the BICC meetings, but was told by the Medical Director, Jennifer Armstrong, that it was inappropriate as there were no building experts in the BICC membership. Ms Kane understood that there were no alternative meetings to discuss these water and ventilation issues[1707].

5.8.5 2018

Stage 2 Whistleblow by Dr Redding

945. Ms Grant acknowledged that the whistleblowing process was unclear but there were people that the whistleblowers could have approached[1708]. She accepted some staff felt treated as troublemakers[1709]. When asked why she did not know about the Stage 2 whistleblow by Dr Redding, despite being aware of the SBAR, and being contacted by Dr Redding about whether to go to Stage 2, she acknowledged that she did know about it, as she was probably told by Dr Caestecker or Dr Armstrong[1710]. She emphasised the importance of confidentiality, progression of the issues, and supporting staff who raised concerns[1711]. The evidence of Dr Redding that Ms Grant was trying to discourage her from whistleblowing[1712] is resolved by email correspondence produced by Ms Grant[1713]. On 24 November 2017, Dr Redding told Ms Grant that she might have to go to stage 2. On 29 November Ms Grant tried to encourage her to continue to work via meetings with colleagues, including Dr Green, Dr Armstrong and Professor Jones as the interim Lead ICD. Dr Redding did agree to try one last time (albeit that the meetings had taken a long time to schedule, and Professor Jones had denied

[1705] Transcript, Mary Anne Kane, 16 May 2025, Page 60, Column 115.
[1706] Transcript, Mary Anne Kane, 16 May 2025, Page 79, Column 154.
[1707] Transcript, Mary Anne Kane, 16 May 2025, Page 20, Columns 35-36.
[1708] Transcript, Jane Grant, 23 September 2025, Page 57, Column 109.
[1709] Transcript, Jane Grant, 23 September 2025, Page 82, Column 159.
[1710] Transcript, Jane Grant, 23 September 2025, Pages 70 & 72, Columns 135-136 and 139.
[1711] Transcript, Jane Grant, 23 September 2025, Page 71, Column 137.
[1712] Glasgow 3 - Witness Statements, Volume 3, Dr Penelope Redding, Document 2, Page 98, Para 112.
[1713] A54269726 - Bundle 52, Volume 9, Document 9, Page 18.

he was the Lead ICD but was merely infection control coordinator).

946. Ms Grant was asked to respond to Dr Redding's evidence that, during the whole process, there was no recognition or understanding of the stress experienced by the whistleblowers, and they were treated as troublemakers .[1714] She rejected that evidence in part by stating that:

> " Yes, it's unfortunate that she felt that way but, certainly, we were trying to take on board her concerns as part of that whole process and there was significant effort made by a significant number of people within the Board to try and support her and to communicate with her."[1715]

947. Ms Grant did accept that Dr Redding and Dr Peters might well see the stage 2 report by Dr de Caestecker as them being treated as troublemakers[1716].

The Water Technical Group[1717]

948. In March 2018, Ms Kane joined the Water Incident IMT meetings after both Mr Gallacher and Mr Powrie informed her that there were patient safety concerns being expressed. It was extremely stressful as the Estates team had no knowledge of *Cupriavidus* and other organisms[1718]. There was no reference point to get advice on upper or lower levels. She decided to set up an Operational Estates group to deal with the issue, to talk about technical solutions and potential sources of contamination. This group subsequently became the WTG[1719]. Ms Kane's memory was that the WTG concluded that the water system was contaminated, but they were unable to identify the source[1720].

949. Ms Grant stated that she did not become aware of any significant issues associated with the water supply until these were highlighted to her in March 2018, when the IMT identified a potential link between a number of infections

[1714] Glasgow 3 - Witness Statements, Volume 3, Dr Penelope Redding, Document 2, Page 135, Para 212.
[1715] Transcript, Jane Grant, 24 September 2025, Page 82, Columns 159-160.
[1716] Transcript, Jane Grant, 24 September 2025, Page 82, Column 160.
[1717] CTI Closing Statement, Glasgow 3, Pages 343-356, Paras 468-508.
[1718] Transcript, Mary Anne Kane, 16 May 2025, Page 65, Column 125.
[1719] Transcript, Mary Anne Kane, 16 May 2025, Page 64, Column 124.
[1720] Transcript, Mary Anne Kane, 16 May 2025, Page 64, Column 124.

in Wards 2A/2B and the water supply[1721]. Mr Best stated that Ms Grant gave the Scottish Government regular updates on the issues with the water system[1722]. Ms McQueen stated that on 1 March 2018, HPS notified the Scottish Government of the presence of *Cupriavidus* in water samples taken from Ward 2A[1723].

950. On 18 May 2018, Ms McQueen stated that a report was received from HPS, relating to *Stenotrophomonas* blood stream infections in Wards 2A/2B. There was an understanding amongst some at NHS GGC that the source of gram-negative infections in the Schiehallion Unit was the water system, albeit this was not universally accepted[1724].

The idea of an Executive Control Group[1725]

951. The extent to which there was a role for senior managers in the response to the Water Incident was put to Ms Grant. She described the issue as at which point does it switch from a normal IMT process to something quite different. She did not feel she had fully resolved that issue. The attendance of senior people at an IMT was because of the seriousness of the issues. It enabled them to and informally report to her and other members of the Corporate Management Team to ensure that the big issues were getting dealt with. With hindsight, she felt, for prolonged issues like this, there needs to be thought about how that might be managed, but she explained that she was trying to follow the NIPCM and to stick to the tried and tested processes[1726].

The 'emergence' of the DMA Canyon L8 Risk Assessments[1727]

952. By the time he left in 2017, Mr Calderwood had not seen the 2015 DMA Canyon L8 Risk Assessment.[1728] In April 2017, Ms Grant was unaware of the requirement for an L8 Pre-occupation Risk Assessment to be undertaken in

[1721] Glasgow 4, Part 3 - Witness Statements, Volume 4, Jane Grant, Document 1, Page 25 and 55, Q12 and Q37.
[1722] Glasgow 4, Part 3 - Witness Statement, Volume 1, Jonathan Best, Document 6, Page 147, Q22.
[1723] Glasgow 4, Part 3 - Witness Statements, Volume 2, Fiona McQueen, Document 4, Page 85, Para 40.
[1724] Glasgow 4, Part 3 - Witness Statements, Volume 2, Fiona McQueen, Document 4, Pages 85-86, Para 41.
[1725] CTI Closing Statement, Glasgow 3, Page 361, Paras 519-520.
[1726] Transcript, Jane Grant, 23 September 2025, Pages 102-105, Columns 200-205.
[1727] CTI Closing Statement, Glasgow 3, Pages 374-379, Paras 560-577.
[1728] Transcript, Robert Calderwood, 30 September 2025, Page 17, Column 29.

advance of the QEUH/RHC opening[1729]. She became aware of the existence of the 2015 and 2017 L8 Pre-occupation Risk Assessments at the end of June 2018 following a meeting with Professor Tom Steele, when he provided her with copies[1730]. She sought advice and support from Jim Leiper, an experienced senior technical estates leader, and asked him to review the reports and find out why they were not previously available at a higher level within NHS GGC. She learned from Mr Leiper's investigations that the Estates team had a very large number of issues to deal with following handover and due to pressures of work, the reports had not been fully actioned[1731].

953. Sometime between March and May 2018 Ms Kane became aware the DMA Canyon L8 Risk Assessment had been instructed when she was provided with a copy by, Ms Grant. This surprised Ms Kane. Nobody had raised the matter with her before then. Ms Grant and Ms Kane discussed the steps that needed to be taken as a matter of urgency, and Ms Kane put in place immediate actions with her team to address them, including the appointment of additional expertise[1732]. Ms Grant then made the Medical Director, Dr Armstrong, aware of the existence of the reports. Dr Armstrong brought the existence of the reports to the attention of Dr Inkster and the Infection Control Team.

954. Mr Best's position on when the DMA Risk Assessments came to light was different again. His account was of being made aware of the Risk Assessments and participating in forming an action plan to address them, in 2017. He was told directly by the Chief Executive, Ms Grant. He also appeared to suggest that the existence of the Risk Assessments was already common knowledge by that point, though he himself did not know their detail[1733]. This is difficult to square with the evidence of the Risk Assessments being discovered in 2018. The Inquiry had also heard, during the Glasgow 3 hearings, Professor Steele's account of the report coming to light during the preparation by Mr Storrar of his draft report, at a point between April and June

[1729] Glasgow 4, Part 3 - Witness Statements, Volume 4, Jane Grant, Document 1, Page 27, Q14.
[1730] Glasgow 4, Part 3 - Witness Statements, Volume 4, Jane Grant, Document 1, Page 28 and 56, Q14(a) and Q40.
[1731] Glasgow 4, Part 3 - Witness Statements, Volume 4, Jane Grant, Document 1, Page 57, Q41.
[1732] Glasgow 4, Part 3 - Witness Statements, Volume 4, Jane Grant, Document 1, Page 57, Q41(a).
[1733] Transcript, Jonathan Best, 19 September 2025, Page 86, Columns 167-168.

2018, at which time Mr Steele drew the Risk Assessments to Ms Grant's attention[1734]. Mr Best apologised during his oral evidence for not having given full answers to questions put to him during the preparation of statements[1735]. His attempt to give fuller details on a specific point cannot be reconciled with the evidence of other witnesses.

955. On 3 July 2018, the NHS Board was updated at a Board seminar on the reports[1736]. Ms Kane subsequently was told by Mr Powrie that the 2015 report had been issued to him in 2015[1737]. She recalled reading the 2015 L8 risk assessment report and noting that there were a number of issues that needed to be acted upon quickly - within one month or three months. There were multiple temperature excursions and dead legs that could lead to microbiological proliferation in the water system[1738]. The 2017 L8 risk assessment, was very similar. Ms Kane accepted her lack of awareness in 2018 of the need for annual L8 risk assessments. When she discovered an L8 risk assessment had been instructed in 2017, then she instructed the 2018 risk assessment to address any outstanding issues[1739]. Mr Best stated that he was asked by Ms Grant to oversee the implementation of an action plan to ensure the recommendations were implemented at pace. He chaired a small group which met frequently to monitor progress[1740]. In 2019, Ms Kane moved on to a different role in the Clyde sector. The water issues had not been resolved. Mr O'Donovan's view was that an L8 pre-occupation water risk assessment should be carried out just before putting occupants into the building[1741].

956. A note of a meeting with Jim Leiper and Professor Steele was produced by Professor McQueen along with her draft statement, and not as someone who attended the meeting. The Inquiry now understands that the note is not an NHS GGC document. NHS GGC presume that it was drafted by Sandra

[1734] Transcript, Professor Tom Steele, 4 October 2024, Page 5, Columns 5-6.
[1735] Transcript, Jonathan Best, 19 September 2025, Pages 89-90, Columns 173-175.
[1736] Glasgow 4, Part 3 - Witness Statements, Volume 4, Jane Grant, Document 1, Pages 57-58, Q42.
[1737] Transcript, Mary Anne Kane, 16 May 2025, Pages 27-28, Columns 50-51.
[1738] Transcript, Mary Anne Kane, 16 May 2025, Page 56, Column 108.
[1739] Transcript, Mary Anne Kane, 16 May 2025, Page 55, Column 105.
[1740] Glasgow 4, Part 3 - Witness Statement, Volume 1, Jonathan Best, Document 6, Page 146, Q19.
[1741] Transcript, Robert O'Donovan, 30 May 2025, Page 23, Column 42.

Aitkenhead, who was employed by the Oversight Board. This would appear to explain why the document came to the Inquiry via the Scottish Ministers and not via NHS GGC. The Inquiry does not appear to have been aware of this document prior to July 2025. An apology has been made on behalf of Scottish Ministers for the document not been made available previously. It was not put to Mr Leiper or to Professor Steele when he gave evidence. It is not mentioned in his witness statement.

The decant of Ward 2A patients to Wards 6A and 4B[1742]

957. After Glasgow 3, our submission was that the decision to decant patients from Ward 2A to Ward 6A was made by a group of senior managers including Ms Grant. After being pressed, she accepted that the Water Review Group did make the decision on 18 September 2018, albeit on the recommendation of the IMT[1743].

958. Ms Grant accepted that the decision was made despite knowing the ventilation deficiencies and that it was the same water supply[1744] [1745]. The emphasis was on following the Infection Control advice and being cautious with drains and wash hand basins[1746]. Ms Grant emphasised a forward-looking approach rather than focusing on how the problems originated[1747].

Environmental concerns on Ward 6A[1748]

959. Most of the discussion in our Closing Statement following Glasgow 3 in respect to communication is in Chapter 8. As communication issues were significant in Ward 6A, this is an appropriate time to narrate the evidence of Ms Grant on this topic.

960. Ms Grant could not say what parents were told about the risks of ward 6A but accepted that parents were not told all the risks. It was difficult to be clear on risks when it was not clear to NHS GGC what the risks were[1749]. She

[1742] CTI Closing Statement. Glasgow 3, Section 5.2, Page 387, Paras 608-612.
[1743] Transcript, Jane Grant, 23 September 2025, Pages 105-106, Columns 205-207.
[1744] Transcript, Jane Grant, 24 September 2025, Page 4, Column 3.
[1745] Transcript, Jane Grant, 24 September 2025, Page 5, Column 6.
[1746] Transcript, Jane Grant, 24 September 2025, Page 6, Columns 7-8.
[1747] Transcript, Jane Grant, 24 September 2025, Pages 4-5, Columns 4-5.
[1748] CTI Closing Statement, Glasgow 3, Section 5.2, Page 401, Paras 655-668.
[1749] Transcript, Jane Grant, 24 September 2025, Pages 5-6, Columns 6-8.

acknowledged that some parents believed there was a different water supply in Ward 6A, but this misunderstanding was not clarified[1750]. She recognised the sensitivity of communication and described the difficulty in balancing transparency with uncertainty[1751].

Ventilation in Wards 2A and 2B

961. On 2 November 2018, Dr Hood responded to an email from Dr Inkster relating to the Wards 2A and 2B ventilation strategy review meeting. She had sent copies of the IDS Reports. Dr Hood stated that he found the situation 'frankly unbelievable'. He also questioned why the area had not been designed in the first place, why were the reports' findings not picked up at the commissioning stage, and what other nasty surprises existed in other crucial areas[1752].

Ventilation in Ward 4C[1753]

962. Ms Grant did not know whether those considering whether Ward 4C required to have the ventilation standard for a 'neutropenic ward' in terms of SHTM 03-01, had considered the original COS, had spoken to Doctor Hood or had considered Dr Inkster's SBAR on the ventilation system. She had never seen that SBAR. Clinicians within NHS GGC had advised that Ward 4C was not a 'neutropenic ward'[1754].

Ventilation in Ward 5C/5D

963. On 6 December 2018, Dr Inkster sent an email to Dr Armstrong in which she stated that she has requested additional information on high-risk wards and did some testing with Dr Hood. She found inconsistent pressures in the wards they tested. She warned that this had implications for wards 5C/5D, infectious diseases and level 7 respiratory QEUH[1755].

964. On 13 December 2018, an ICN meeting was held and the minutes confirmed that Dr Hood checked Wards 5C and 5D resulting in a finding of apparent

[1750] Transcript, Jane Grant, 24 September 2025, Page 6, Columns 7-8.
[1751] Transcript, Jane Grant, 24 September 2025, Page 6, Columns 7-8.
[1752] A39465112 - Bundle 14, Volume 1, Document 62, Page 643.
[1753] CTI Closing Statement, Glasgow 3, Section 5.2, Pages 430-481, Paras 751-913,
[1754] Transcript, Jane Grant, 24 September 2025, Pages 9-13, Columns 14-21 and Glasgow 4, Part 3 - Witness Statements, Volume 4, Jane Grant, Document 1, Page 71, Question 57.
[1755] A50093445 - Bundle 27, Volume 9, Document 28, Page 441.

inconsistent pressures[1756].

965. Dr Scott Davidson recalled becoming aware in 2019[1757] that some rooms in the QEUH/RHC did not have 10 ACH as outlined in the specifications. He was involved in discussions around positive and negative pressure rooms at the QEUH/RHC[1758].

5.8.6 2019

Cryptococcus Neoformans Infections[1759]

966. Ms Freeman described meeting Ms Grant, Dr Armstrong and Professor Brown about *Cryptococcus* cases in the QEUH. She was at concerned NHS GGC guardedness and downplaying of the situation. Ms Grant denied this. They were trying to address the issues as they arose in the context of a huge amount of political and media attention. Ms Freeman's evidence that their approach had been effectively, in her words, “Nothing to see here," was put to Ms Grant who did not deny such an approach. She explained that they wanted to try and keep a balanced approach and investigate and not just leap to the view that it was the environment[1760].

967. Ms Grant was asked whether the reason there was lots of media interest in 2019 might be because the discovery of *Cryptococcus* cases was potentially the latest of a number of discovered deficiencies, and, therefore, to some extent, it was the NHS GGC failure to act earlier that was the cause of the attention. Ms Grant would not accept that. Matters were evolving and things were not nearly as clear as that question suggests. She described it as more of an overall issue around infections in the history of the hospital[1761].

Meeting between Professor Cuddihy, Dr Inkster and Mr Redfern[1762]

968. When asked about communication with Professor Cuddihy in the summer of

[1756] A47648681 - Bundle 13, Document 95, Page 720.
[1757] Glasgow 4, Part 3 - Witness Statements, Volume 3, Dr Scott Davidson, Document 2, Page 152, Q15(a).
[1758] Glasgow 4, Part 3 - Witness Statements, Volume 3, Dr Scott Davidson, Document 2, Page 147.
[1759] CTI Closing Statement, Glasgow 3, Section 5.2, Page 417, Paras 711-724.
[1760] Transcript, Jane Grant, 24 September 2025, Pages 13-15, Columns 21-25.
[1761] Transcript, Jane Grant, 24 September 2025, Pages 15-16, Columns 26-27.
[1762] CTI Closing Statement, Glasgow 3, Section 5.2, Paras 828-833, Page 454.

2019, Ms Grant explained that until she wrote to him in September she had not been involved particularly. She did not think it was the Chair's job to report to the Professor the existence of a second case. Mr Hill put a block on Mr Redfern telling the Professor as a genuine attempt to protect confidentiality of the second patient[1763].

Issues in Ward 6A, the GNB IMT and the removal of Dr Inkster

969. In contrast with Glasgow 3 we had relatively few witnesses who could speak to events in the Schiehallion Unit from the decant to CDU to the resignation of Dr Inkster[1764]. The decision to have the short term decant from Ward 6A to the CDU, the closure of Ward 6A to new admissions and the removal of Dr Inkster as IMT chair were raised with Ms Grant.

970. When pressed about her involvement in the decision to decant to the CDU, Ms Grant explained that given the amount of disruption there had been she was concerned that another move was not great and wanted to be certain. Her questions were not reluctance to act but asked out of desire for clarity arising from a genuine concern families would be disrupted. When asked who made the final decision, she explained that there was a recommendation, a discussion and 'we collectively' agreed the decant would have to happen[1765].

971. In respect of the August closure of Ward 6A to new admissions, Ms Grant explained that the IMT discussion of the proposal was raised with corporate directors, and with her, to make sure all angles were covered, particularly how to how engage with Edinburgh and so on. It seems clear that there was senior management involvement in this decision[1766].

972. When asked about the removal of Dr Inkster as IMT Chair, Ms Grant explained she was getting advice from Dr Armstrong, Professor Steele and Mr Hill. Dr Armstrong reported to her that a senior manager (probably Mr Hill) had come to her concerned about style and tone of IMT discussions. Dr Armstrong explained that she was going to pull together a meeting as the IMT

[1763] Transcript, Jane Grant, 24 September 2025, Pages 34-39, Columns 63-74.
[1764] Covered in detail in CTI Closing Statement, Glasgow 3, Section 5.2.
[1765] Transcript, Jane Grant, 24 September 2025, Pages 21-22, Columns 37-40.
[1766] Transcript, Jane Grant, 24 September 2025, Pages 22-24, Columns 40-43.

had been running for a substantial amount of time and if its functioning was not appropriate then she wanted it to be. When pressed as to why Professor Gibson and her colleagues were not asked about the functioning of the IMT, Ms Grant explained that it was the process not the content of the IMT that was the issue, and she assumed that was why the clinical team were not involved[1767].

973. Ms Grant attributed Dr Inkster's resignation to workload, illness and that she had not been invited to go to a visit or something. She felt unable to comment on the validity of the issues raised in Dr Inkster's resignation letter[1768]. When asked whether she thought the resignation of Dr Inkster as Lead ICD could have been avoided Ms Grant, explained that she understood that Dr Inkster considered that she had not been appropriately involved in the decision to remove her and partly conceded that she was not sure that there had been appropriate communication which was something that should be reflected upon. However, she defended the substantive decision to remove Dr Inkster, because of the seriousness of the situation and the need to ensure that the IMT was "functioning properly and that it didn't get distracted by 'the wrong thing'"[1769].

974. Ms Grant accepted that at times before these events relations between Dr Armstrong and Dr Inkster were, from her perspective, good[1770].

Resignation of Dr Inkster as Lead ICD for NHS GGC[1771]

975. We now learn that Professor Brown maintains he was told by Ms Grant, that Dr Inkster resigned as Lead ICD for "personal reasons"[1772]. If that is correct, he is right to say he was misinformed. Ms Grant was asked what she understood of Dr Inkster's reasons from the letter which she saw at the time.[1773] She certainly knew the whole reasons as set out by Dr Inkster.

[1767] Transcript, Jane Grant, 24 September 2025, Page 24-26, Columns 43-48.
[1768] Bundle 14, Volume 2, Document 151, Page 579.
[1769] Transcript, Jane Grant, 24 September 2025, Pages 26-28, Columns 48-52.
[1770] Transcript, Jane Grant, 24 September 2025, Page 29, Column 53.
[1771] CTI Closing Statement, Glasgow 3, Section 5.2, Page 480, Paras, 910-916.
[1772] Transcript, Professor John Brown, 3 October 2025, Page 41, Column 77.
[1773] Transcript, Jane Grant, 24 September 2025, Pages 27-28, Columns 49-52.

Workload

976. Ms Grant was asked if she had any observations about whether the IPC team was operating effectively in the QEUH in the years after it opened. She explained that IPC SMT were managing Infection Control across the whole Board area, but that they did not have the same amount of challenge, and challenges around working relationships, in other places. In her view it was really important that all colleagues – including Dr Inkster, but not exclusively her – had to work in an environment where there is respect and due weight given to all sorts of people's views, whether it is the Estates department, the local managers, the clinicians, Infection Control, Dr Inkster, and that has proven to be quite difficult[1774].

5.9 The management system of NHS GGC

977. Evidence from, amongst others, Mr Calderwood, Professor Steele, and Mr Leiper about the internal management style or systems within NHS GGC has already been described.

978. Ms Grant was asked whether there should be a system for pushing up the visibility of issues such as appointment of an Authorising engineer. She stressed the need for a more structured approach to management, with the right processes in place to ensure greater visibility of the main issues[1775]. She was asked how a culture is created in NHS GGC to foster multidisciplinary discussions. Ms Grant proposed that there should be recognition of the importance of fostering a culture of open dialogue and interdisciplinary working[1776]. When pressed about the absence of records of decisions, she acknowledged that with the benefit of hindsight, better communication and documentation would have improved responses to emerging issues[1777].

979. The issues with exception reporting were put to Professor Brown. He explained that in a large organisation like NHS GGC tiered decision making, and therefore tiered governance is necessary. He talked of the need for an

[1774] Transcript, Jane Grant, 24 September 2025, Pages 29-31, Columns 53-57.
[1775] Transcript, Jane Grant, 23 September 2025, Page 68, Columns 131-132.
[1776] Transcript, Jane Grant, 23 September 2025, Page 30, Columns 55-56.
[1777] Transcript, Jane Grant, 24 September 2025, Page 11, Column 17.

"assurance framework" without really explaining how that would or should work[1778]. He saw a distinction between management and governance, where management is very much about the day-to-day delivery of the services[1779]. He accepted that, in an organisation like NHS GGC, the ability of the Chair to challenge the Chief Executive might be impacted by the amount of information the Chief Executive chooses to give the Chair[1780].

980. Conclusions in the VOLHI Report that managers at different levels within NHS GGC failed in a fundamental aspect of management, namely, to ask questions, were put to Ms Grant. She explained that at the time she and her colleagues were asking quite a lot of questions of Estates and Facilities colleagues about exactly what was happening[1781]. She did not suggest that she and her colleagues had been asking questions along the lines of “why was the hospital was built as it was?” and "why is it that Sector ICDs and microbiologists remain concerned about the impact of these deficiencies in the building on patient safety?"

981. When asked about the culture of a healthcare organisation Malcolm Wright agreed it was important. A Chief Executive should lead by example. 'Culture trumps strategy every time'. He always - having been a CEO - wanted to surround himself with people who were prepared to give him bad news. That was essential[1782].

982. Ms Grant was asked whether, between her return as chief executive and escalation to level four, there was something she should have done differently. Her response focused on whether with the benefit of hindsight action could have been taken sooner, but she was clear that the information was not available to act earlier than 2017.

5.10 NHS GGC's Communications with Patients and Families

983. This topic was covered extensively in Chapter 8 of our Closing Statement

[1778] Transcript, Professor John Brown, 3 October 2025, Page 7, Column 9.
[1779] Transcript, Professor John Brown, 3 October 2025, Page 11, Column 17.
[1780] Transcript, Professor John Brown, 3 October 2025, Page 14, Columns 23-24.
[1781] Transcript, Jane Grant, 24 September 2025, Page 80, Column 156.
[1782] Transcript, Malcolm Wright, 25 September 2025, Pages 70-72, Columns 136-139.

following Glasgow 3.

984. In 2019, a long Q & A document[1783] was prepared by NHS GGC for the families, which covered various issues such as the safety of the ventilation and water systems. Mr Best accepted that this did not state that Ward 2A had not been built in the way NHS GGC had wanted it to be built. He was not sure why, but NHS GGC tried very hard to work with the parents and families[1784] and give as much information as they possibly could, while dealing with press interests, political interests and lots of pressures[1785].

985. Ms Freeman was particularly concerned about NHS GGCs attitude to communications and believed they did not comply with their organisational duty of candour[1786]. She described an occasion when a non-executive Board member referred to the parents Facebook group as "troublesome," at a meeting after the Independent Review had been announced but before escalation to Stage 4[1787].

986. Ms Freeman's position was put to Ms Grant. That was the reason Professor White was asked to help with communications. NHS GGC were doing the best they could in difficult circumstances with the information they had. They should have paused and thought how to deal directly with families earlier. To the suggestion that external communications by NHS GGC in 2018 and 2019 were carefully worded to protect organisational reputation, and not open or transparent enough, Ms Grant explained that they "tried to put out a position that did describe the situation", but that it was difficult to get the balance right[1788].

987. Professor White's criticism of the NHS GGC Duty of Candour Policy as it stood in 2019 was put to Ms Grant in her questionnaire[1789]. In the statement-taking process she was twice asked whether she accepted the criticisms. At the hearing she was asked again. She explained that NHS GGC had sought

[1783] A34259839 - Bundle 6, Document 25, Page 77.
[1784] Transcript, Jonathan Best, 19 September 2025, Page 92, Columns 179-180.
[1785] Transcript, Jonathan Best, 19 September 2025, Page 93, Column 181.
[1786] Transcript, Jeane Freeman, 10 October 2025, Page 44, Column 83.
[1787] Transcript, Jeane Freeman, 10 October 2025, Page 45, Column 86.
[1788] Transcript, Jane Grant, 24 September 2025, Pages 71-73, Columns 137-142.
[1789] Glasgow 4, Part 3 - Witness Statements, Volume 4, Jane Grant, Document 1, Page 52, Question 36.

to make sure the policy was appropriate, that it had been audited and that further national clarity was required, in part because there was difficulty around some of the words and definition of those words. She appeared not to want to face up to NHS GGC's policy incorrectly requiring causation to be determined before a Duty of Candour acknowledgement was required. Ms Grant was unable to say whether she was confident NHS GGC made all the necessary Duty of Candour declarations, or whether they had gone back to whether such declarations should have been made[1790].

988. The evidence of Professor Cuddihy on his experience with NHS GGC corporate services (including the Chief Executive) was put to Ms Grant. She was asked to respond to his assessment that he found senior managers:

> "individually and collectively to be duplicitous, overly defensive, devoid of emotional intelligence and lacking in integrity with concern more for their reputation rather than patient safety"[1791].

989. Ms Grant responded:

> "I think at a corporate level, we didn't stop and look at the issues, and we struggled to put things out into the public domain of which we weren't certain, because … we didn't want to add to the complexity of the situation, and … that, on occasions, didn't help matters.

990. Professor Brown accepted that communications with patients and families could have been better. That was partly due to waiting until all the information was available or waiting until test results were conclusive, before giving information out. Communications would have been better had NHS GGC told people what they did not know - and when they would know it - rather than waiting until they knew things before contacting them[1792].

5.11 Interventions by the Scottish Government

991. Jeane Freeman was Cabinet Minister for Health and Sport from June 2018 to May 2021. She previously provided statements to the Inquiry and had given

[1790] Transcript, Jane Grant, 24 September 2025, Pages 73-75, Columns 142-145.
[1791] Glasgow 1 - Witness Statements, Bundle 6, Document 2, John Cuddihy, Page 142, Para 138.
[1792] Transcript, Professor John Brown, 3 October 2025, Page 45, Column 86.

oral evidence at the Edinburgh 3 hearing about her involvement with the RHCYP in Edinburgh. She had no involvement with QEUH prior to her appointment[1793].

992. Ms Freeman's evidence on the distinction between the Scottish Government's role and that of local health boards, broadly followed that heard from a range of witnesses in the Edinburgh hearings, reflected in the Interim Report. Health Board Chief Executives are accountable both locally to their Board and nationally to NHS Scotland's Chief Executive as Accountable Officers. The dual roles of the Director General and NHS Chief Executive ensure unified policy and operational leadership across Scotland's health system. While local Health Boards have discretion in implementation, they operate under the strategic direction of the Scottish Government, so while they have a degree of autonomy, they are not independent. The Scottish Government should take a direct role in large costly hospital projects, and she criticised the "arm's-length" approach there has been up until now[1794]. This view is underpinned by her own experience with both QEUH and the RHCYP in Edinburgh.

5.11.1 What Scottish Government knew about the ventilation system

993. Ms Freeman first became aware of issues in QEUH via a briefing note in July 2018[1795]. The focus was infections rather than the building itself. She was not aware of ventilation issues at the time of the decant in September 2018 and was not aware that Ward 6A was not compliant with guidance; she assumed that NHS GGC were meeting all necessary standards. Once apprised of the ventilation issues, she expressed concern over retrofitting and questioned why standards were not met initially. She did not order a full investigation into retrofitting general wards, or a risk assessment and conceded this was a "mistake"[1796]. Asked if, in 2018, there were mechanisms in place for the Scottish Government to assure itself that processes like commissioning and

[1793] Glasgow 4, Part 3 - Witness Statements, Volume 5, Jeane Freeman, Document 5, Page 97, Para 4.
[1794] Transcript, Jeane Freeman, 10 October 2025, Page 5, Column 6.
[1795] Bundle 52, Volume 4, Document 4, Page 19.
[1796] Transcript, Jeane Freeman, 10 October 2025, Page 37, Column 70.

validation had been carried out, she replied that it was a system based on trust alone[1797]. If government is to be held accountable it should exercise more oversight. [1798]

994. Professor Fiona McQueen, the Chief Nursing Office instrumental in the escalation of the Board on the national framework, described her state of knowledge regarding issues in the ventilation system, as it developed. The impression received by SG around the emergence of *Cryptococcus* cases at the start of 2019 was initially of a maintenance or cleanliness issue at QEUH, but that they had not been informed of the IMTs, and nobody in ARHAI had been sufficiently concerned to bring the matter to her attention[1799]. She could not recall how concerns around IMTs fitted into her pattern of knowledge as it developed into August 2019, though she did emphasise a distinction between regular difficult meetings which were an internal matter, and the concerns expressed by Dr Inkster in her resignation letter, around resourcing, undermining of, and lack of respect for staff. She recalled meeting with Dr Inkster and accepted that by 4 September 2019 she knew that at least two microbiologists were expressing concerns about the culture at QEUH[1800]. She did not, however, recall being informed by NHS GGC of the resignation, though she also allowed for the possibility that one resignation among the many doctors in NHS GGC may not have been at the forefront of their mind[1801].

995. Professor McQueen convened a meeting on 25 September 2019, partly for information-gathering, and partly because of her concern as to the intolerance of differing views within NHS GGC. She emphasised the need to talk through dissent and to have an open, active conversation - this was an issue of good leadership[1802]. She saw an earlier echo of this in concerns raised with her by doctors in 2018, as to whether or not their concerns had been addressed in the 2017 SBAR process leading to the 27-point action plan in December

[1797] Transcript, Jeane Freeman, 10 October 2025, Page 9, Column 13.
[1798] Transcript, Jeane Freeman, 10 October 2025, Page 9, Column 14.
[1799] Transcript, Fiona McQueen, 2 October 2025, Page 44, Column 83.
[1800] Transcript, Fiona McQueen, 2 October 2025, Page 46, Column 88.
[1801] Transcript, Fiona McQueen, 2 October 2025, Page 48, Column 92.
[1802] Transcript, Fiona McQueen, 2 October 2025, Page 51, Column 97.

2017[1803].

5.11.2 The journey from the Water Incident to Stage 4

996. Professor McQueen described how the 2018 Water Incident came to the Scottish Government's attention. On project delivery, she considered that it would have been inappropriate for civil servants to be offering a view[1804], but that differed from the invocation of the national support framework[1805]. The more serious the level of the framework involved, the more senior the official required. She, as Chief Nursing Officer, was able to invoke Stage 2, whereas Stage 4 required the Director General (with the Cabinet Secretary also having involvement)[1806].

997. In respect of the 2018 Water Incident, Professor McQueen provided a timeline covering progress of the incident which included recording of the escalation process[1807]. It records her invoking Stage 2 on 26 March 2018, following a request from the Health Secretary to have her policy unit co-ordinate with HPS to thoroughly investigate (in particular) shower and tap heads.

998. The invocation was by email on 20 March to Jennifer Armstrong, also recording the latter's request of support from HPS[1808]. Professor McQueen's intention was to "achieve a firmer grip" by NHS GGC on necessary action to ensure patient safety, which she was not sure was in place. She also had in mind that NHS GGC might benefit from access to the greater expertise available at HPS[1809]. At that point her knowledge was limited to infections having occurred and having been informed that Horne taps had been raised as an issue in 2014[1810]. Her impression was that there was not clarity among NHS GGC clinical and management staff that the cause of infection was the water system[1811]. Minutes of the subsequent meeting of the Clinical Care and

[1803] Transcript, Fiona McQueen, 2 October 2025, Page 52, Column 99.
[1804] Transcript, Fiona McQueen, 2 October 2025, Page 15, Column 25.
[1805] Transcript, Fiona McQueen, 2 October 2025, Page 16, Column 27.
[1806] Transcript, Fiona McQueen, 2 October 2025, Page 27, Column 50.
[1807] Bundle 52, Volume 1, Document 37, Page 610.
[1808] Bundle 52, Volume 8, Document 2, Page 39.
[1809] Transcript, Fiona McQueen, 2 October 2025, Page 28, Column 52.
[1810] Transcript, Fiona McQueen, 2 October 2025, Page 29, Column 53.
[1811] Transcript, Fiona McQueen, 2 October 2025, Page 31, Columns 57-58.

Governance Committee[1812] did not record the invocation of the framework process, though she acknowledged that it was possible that it might have been raised during the meeting[1813].

999. Professor McQueen described a different Stage 2 escalation process occurring in 2018, outside the CNO's framework, which she understood to be connected to Performance & Finance rather than Infection Control[1814]. That process also involved the establishing of an oversight board, and in early 2020 that other oversight board absorbed responsibility for assessing culture at QEUH[1815].

1000. Professor McQueen's team, HPS, and NHS GGC maintained regular contact. A report from Annette Rankin dated 31 May 2018 recommended maintaining in place Point of Use Filters as a control measure, and monitoring the situation, including regular updating of HPS and HFS[1816].

1001. A further 'escalation', in terms of bringing the matter directly to the attention of DG Health (as opposed to escalation within the Framework) occurred in September 2018, due to the Deputy CNO having concerns over recording of incidents at NHS GGC[1817].

1002. By the end of 2018 Professor McQueen had been appraised of water as an issue, of the DMA Canyon reports as they emerged in the autumn of 2018, and about Horne taps[1818]. Her view was that the scale and complexity of the Water Incident was beyond what had been envisaged for HFS/HPS, so that reporting which might otherwise be expected in autumn 2018 did not occur. Ms Rankin required extra training to acquire the expertise necessary to deal with what was being observed[1819].

[1812] Bundle 38, Document 7, Page 44.
[1813] Transcript, Fiona McQueen, 2 October 2025, Page 35, Columns 65-66.
[1814] Transcript, Fiona McQueen, 2 October 2025, Page 59, Column 114.
[1815] Transcript, Fiona McQueen, 2 October 2025, Page 69, Column 133.
[1816] Bundle 7, Document 1, Page 3.
[1817] Transcript, Fiona McQueen, 2 October 2025, Page 39, Column 73.
[1818] Transcript, Fiona McQueen, 2 October 2025, Page 40, Column 75.
[1819] Transcript, Fiona McQueen, 2 October 2025, Page 42, Column 79.

The Independent Review

1003. A non-statutory Independent Review was established in January 2019[1820] Its remit was:

> ""To establish whether the design, build, commissioning and maintenance of the Queen Elizabeth University Hospital and Royal Hospital for Children has had an adverse impact on the risk of Healthcare Associated Infection and whether there is wider learning for NHS Scotland"".

1004. Ms Freeman commissioned this in response to the severity of the situation. Its remit was design, procurement, and build issues — not individual patient cases. As a non-statutory review, legal confidentiality prevented it from accessing key documents, but Ms Freeman said she had expected documents to be made available to the Independent Review. She had confidence that they could maintain confidentiality and understand sensitivity. NHS GGC decided that, because there was legal action underway, that it was not possible to disclose those documents to the Review. This created a gap in the Review's conclusions[1821].

1005. The Independent Review report was published in June 2020. Its conclusions bore on matters relating to the governance of the QEUH project, and of QEUH once operational. The Independent Review had access to less material around the contract and procurement than has been available to the Inquiry. Dr Inkster[1822], Dr Redding[1823] and Dr Peters[1824] have also expressed concerns about lack of engagement with them by the Independent Review.

1006. The main findings of the Independent Review[1825] on governance and processes and practices of reporting healthcare associated infections are:

> 2. The QEUH project would have benefitted from greater external expertise and greater uptake of internally available expertise to support decision making on the

[1820] A32385767 - Bundle 27, Volume 9, Document 11, Page 147.
[1821] Transcript, Jeane Freeman, 10 October 2025, Pages 11-13, Columns 18-21.
[1822] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Pages 312-317, Chapter 15.
[1823] Glasgow 3 - Witness Statements, Volume 3, Dr Penelope Redding, Document 2, Pages 84-85, 98, 122-123 and 133, Paras 66, 113, 187-188 and 206.
[1824] Glasgow 3 - Witness Statements, Volume 4, Dr Christine Peters, Document 3, Page 189.
[1825] A32385767 - Bundle 27, Volume 9, Document 11, Pages 149-150.

water and air ventilation systems at key points in the design, build and commissioning phases;

5. The level of independent scrutiny and assurance throughout the design, build and commissioning phases was not sufficient;

6. Governance of the project during design, build, commissioning and maintenance did not adequately take account of the scale and complexity, and specialist nature of the building project;

7. The effectiveness of IP&C advice was undermined by problems within the NHS GG&C IP&C leadership team and internal relationships with the wider IP&C and microbiology cohorts;

8. There were deficiencies in the quality and availability of management and technical information relating to the QEUH project, especially relating to the build and commissioning stages. This constrained the Review and continues to hamper effective running of the QEUH/RHC building;

1007. The Independent Review also noted that issues "arose in the course of the Review such as whistleblowing and duty of candour that were not part of the remit or terms of reference, but which nonetheless had an impact on events". In respect of specific issues:

It found that governance processes "for site selection, and the design stage were strong and ensured wide stakeholder engagement. …. there has been a lack of transparency in decision-making. At times of challenge, there has been a lack of information sharing".[1826]

… the governance structure employed at NHSGGC had failed to secure an appropriate flow of reporting, such that when high-level decisions came to be taken, they were taken in the light of adequate information:

"9.7.9 There was a mismatch, that was substantial by any yardstick, between the infection events that we perceive as serious, the response of management, the capital investment planning, the operational upheaval for patients and clinical teams, and risks that accompanied the refurbishment of the water system. … the

[1826] A32385767 - Bundle 27, Volume 9, Document 11, Page 309.

Board of NHS GGC was not sighted on several aspects in obtaining assurance on the quality of the management plans and approach to safeguarding patient care.

9.7.10. In order to function effectively a Board must conduct its business by means of appropriate delegation through a hierarchy of governance committees and sub-committees. This ...relies on robust reporting mechanisms for seeking and gaining assurance. Inevitably … there can be problems.

9.7.11. These include a perception that reporting is significantly delayed because of the time that it takes issues to be taken through the hierarchy and reporting lacks the detail that is captured in every paper at every level. This can mean that main Board papers in particular can appear high level, lacking in detail and underplaying problems. The knowledge that Board papers are in the public domain also influences how and in what detail they are written. There is a challenge in getting the balance right.

9.7.12…. the Board of NHS GG&C did not achieve this balance. …the Board was unable to consider matters relating to the QEUH project in a suitable level of detail; the Board was disposed to accept assurance given by the project board. In several instances… these assurances have proved unsound."[1827]

1008. The Independent Review drew attention to its concerns about deficient interpersonal behaviour, particularly to the extent to which it may have hindered a response to the key issue of patient safety. However, it stopped short of concluding that there had been institutional bullying:

"9.12.5. The behaviour of individuals has been, at times, inappropriate. Reports of the conduct of the prolonged IMT through much of 2019 illustrates this point. We heard accounts and allegations of bullying behaviour and intimidating conduct at meetings – 'extreme behaviour' in one account. Our observations relate to the behaviour of individuals; we found no evidence of institutionalised bullying in NHS GG&C.

9.12.6. Over several years and particularly more recently, we have heard of allegations of withholding data, callous remarks that question integrity and motives, and threats about the careers of colleagues. There were several occasions where NHS GG&C staff are alleged to have expressed dismissive

[1827] A32385767 - Bundle 27, Volume 9, Document 11, Pages 310-311.

attitudes toward staff and teams in other organisations who had a role in scrutiny and external investigation.

9.12.7. We heard at several interviews of professional staff who believed that their concerns had not been taken sufficiently seriously and, in the view of some, this was linked to gender discrimination. …. we found that examples of discrimination or behaviour… were not confined to a particular gender. We find that inappropriate behaviour, often in a context of high levels of stress and scrutiny, resulted in a lack of focus on the key issues of patient safety and staff welfare, and demonstrated a lack of respect for colleagues.

9.12.8 It will be difficult to make progress in addressing the wider concerns unless all participants acknowledge and address the issues relating to behaviour and practice, and challenge inappropriate behaviour."[1828]

1009. In relation to whistleblowing, the Independent Review considered it "striking" that the whistleblowing process comprising the October 2017 SBAR, and resulting in the 27-point action plan, had concluded apparently without reconciling differing views as to the underlying basis of the complaint.[1829] This had created a snowball effect:

"9.24.8. … as the process progressed and escalated, the levels of discontent and disconnection on the part of the whistleblowers grew. Each escalation was prompted by a feeling that actions were either not being taken or not being taken quickly enough and as the concerns were re-expressed additional concerns came to light."

1010. It concluded that a more developed approach towards whistleblowing was essential, and concurred with the work of Professor Bain:

"9.25.1. Following a whistleblowing incident, NHS management, whistleblowers and the clinical community from which whistleblowers come need to recognise the significance of the event and commit to resolving matters on several levels – the matter of concern itself, the relationships and established management processes that were not used to address concerns, and the culture and practices that may have led to the use of whistleblowing.

[1828] A32385767 - Bundle 27, Volume 9, Document 11, Pages 314-315.
[1829] A32385767 - Bundle 27, Volume 9, Document 11, Page 319.

9.25.2. However damaged and distant the relationships between whistleblower and management, there needs to be an agreed link or contact between the two parties (whistleblower and NHS management) until there is full resolution of the episode.

9.25.3. As part of resolving the concerns, a new improved normality may emerge in which lines of accountability and authority are re-established and relationships with clinical and managerial colleagues are enhanced. This requires commitment on the part of all concerned and a willingness to work through and beyond the issues at hand.

9.25.4. We agree ,,, there is a need for expert organisational development input and we fully support the actions Professor Bain has put in place."[1830]

1011. In respect of a duty of candour, the Independent Review considered adherence to this duty to present an opportunity for wider learning:

"9.28.1. Infection Control specialists should reflect as a group on the development of their role in Duty of Candour relating to HAIs. They should share examples in confidence as a learning process, with a view to sharing experience.

Actions taken by the Cabinet Secretary

1012. Early in 2019, at the request of Anas Sarwar MSP, Ms Freeman met with Dr Peters and Dr Redding. They discussed inadequate infection prevention and control (IPC) within NHS GGC and ventilation non-compliance in various wards[1831]. They also reported their concerns were being ignored. Ms Freeman escalated this to the CNO and DGHSC for investigation. A Healthcare Improvement Scotland (HIS) inspection report was commissioned in January 2019 by the CNO, partly to corroborate the issues raised by Dr Peters and Dr Redding[1832]. Ms Freeman explained that the HIS Report[1833] validated many of these concerns, describing serious IPC failings and unimplemented previous recommendations. Ms Freeman describes the HIS report as "shocking"[1834].

[1830] A32385767 - Bundle 27, Volume 9, Document 11, Pages 332-333.
[1831] CTI Closing Statement, Glasgow 3, Section 5.2, Page 404, Para 671.
[1832] Transcript, Jeane Freeman, 10 October 2025, Pages 15-16, Columns 26-27.
[1833] Bundle 18, Volume 2, Document 128, Page 1490.
[1834] Glasgow 4, Part 3 - Witness Statements, Volume 5, Jeane Freeman, Document 5, Page 103, Para 24.

1013. In January 2019 Ms Freeman (with the Chief Medical Officer and the Director General), met with Ms Grant, Professor Brown, Dr Armstrong, and Professor Steele. Her impression was of surprise and concern about NHS GGC's guardedness and downplaying of the importance of the situation. That caused her to doubt whether or not NHS GGC and its senior team really understood the seriousness of what they were confronting. A visit by such a senior team from Scottish Government was a strong indication of the seriousness of the situation, yet Dr Armstrong asked her why she was there and what it had to do with her. Her concluding impression was that the NHS GGC view was that there was a fuss about nothing and that public confidence was not overly important. They were doing things to address each of discrete area of difficulty, but did not see the cumulative impact on staff, patients, and the wider public[1835].

1014. The former Director General of NHS Scotland, Malcolm Wright, returned to give evidence, having given evidence relating to Edinburgh. He explained that although he had held the title of NHS CEO, he had no line management responsibility for Board CEOs[1836].

1015. When he had arrived in post, he described NHS GGC at Stage 2, heading for 3, of the escalation Framework. It was his decision to escalate to 4. There had been an annual review with NHS GGC in March in which they were told, 'You really need to get on top of this'.

1016. What drove the decision to escalate was a combination. Professor McQueen had met with Drs Peters and Inkster. The Cabinet Secretary met the families. There was feedback from Professor White. The Cabinet Secretary met Professor Cuddihy. They got the AECOM Report. These all combined.[1837] He took the decision but discussed it with the Cabinet Secretary and took the advice of the HSCMB which in turn had a paper from Professor McQueen. The concern had been whether 'NHS GGC had a proper grasp of the issues'.[1838] Professor McQueen spoke of her impression of a culture in NHS

[1835] Glasgow 4, Part 3 - Witness Statements, Volume 5, Jeane Freeman, Volume 5, Document 5, Page 104, Para 27 and Transcript, Jeane Freeman, 10 October 2025, Pages 23-26, Columns 41-47.
[1836] Transcript, Malcolm Wright, 25 September 2025, Page 49, Column 94.
[1837] Transcript, Malcolm Wright, 25 September 2025, Pages 55-56, Columns 106-107.
[1838] Transcript, Malcolm Wright, 25 September 2025, Page 59, Column 113.

GGC of seeking to protect the organisation, and of the conduct of IMTs being an unsatisfactory issue which required resolution. She was concerned that the otherwise admirable inclination to protect staff, and to protect public confidence, had led to NHS GGC becoming defensive and dismissive:

> "openness and transparency is the most important thing you can do when things go wrong, and be honest with staff, be honest with the public, because otherwise it creates a culture of suspicion, and I think that's what I was walking into in - in the late summer, early autumn of [2019]"[1839].

1017. The failure to act on the DMA Canyon reports did not form part of her escalation process - she considered that this, and its impact upon safety issues, was well-known[1840]. Professor McQueen did not think that NHS GGC had been doing the right thing by the whistleblowers and felt that they could have been treated with more empathy and compassion. Before escalation to Stage 4 the perception had been that NHS GGC had matters under control, but that the escalation to Stage 4 meant that was misguided. It was Professor McQueen's view that senior NHS GGS staff genuinely believed they had matters under control. She did not think they knew things but deliberately obscured them[1841].

1018. NHS GGC was escalated from Stage 2 to Stage 4 on 22 November 2019 by Malcolm Wright, initially for IPC and later for full board performance[1842]. Ms Freeman initially supported escalation to Stage 5, but was dissuaded by Mr Wright so as to avoid major disruption and uncertainty which would have affected health services not just in QEUH but across the entire health board[1843]. Mr Wright confirmed that consideration had been given to escalation to Stage 5 where the Board would be removed from control. Asked whether it would be helpful for the government to have power to remove a Chief Executive if they thought that was the issue, he felt that would be

[1839] Transcript, Fiona McQueen, 2 October 2025, Pages 60-61, Columns 115-117.
[1840] Transcript, Fiona McQueen, 2 October 2025, Page 90, Column 176.
[1841] Transcript, Fiona McQueen, 2 October 2025, Columns 177-178.
[1842] Bundle 52, Volume 1, Document 23, Page 310.
[1843] Glasgow 4, Part 3 - Witness Statements, Jeane Freeman, Volume 5, Document 5, Page 114, Para 51.

problematic due to employment law issues[1844].

1019. Ms Freeman said that patients and families were justified in feeling that NHS GGC, and to some extent the government, had failed to protect them, although she did not consider they were owed an apology by the Scottish Government for not acting quicker.[1845] She recommended reviewing government involvement in major capital builds. She also suggested that schemes of delegation within health boards can sometimes act as a barrier to accountability[1846].

5.11.3 The Oversight Board

1020. On 22 November 2019, NHS GGC was escalated to Stage 4 of the National Framework. The decision was communicated to the Chair (Professor Brown) and Chief Executive (Ms Grant) of NHS GGC by letter of that date,[1847] which explains that:

> In light of the on-going issues around the systems, processes and governance in relation to infection prevention, management and control at the QEUH and the RHC and the associated communication and public engagement issues, I have concluded that further action is necessary to support the Board to ensure appropriate governance is in place to increase public confidence in these matters and therefore that for this specific issue the Board will be escalated to Stage 4 of our performance framework. This stage is defined as 'significant risks to delivery, quality, financial performance or safety; senior level external transformational support required.'
>
> The intention of the escalation would ensure appropriate governance is in place to increase public confidence and strengthen current approaches that are in place to mitigate avoidable harms.

The scope of the work of the Oversight Board

1021. The Oversight Board was led by Professor McQueen and officials from Scottish Government, NHS Trusts, and a families' representative. Other

[1844] Transcript, Malcolm Wright, 25 September 2025, Page 67, Column 130.
[1845] Transcript, Jeane Freeman, 10 October 2025, Page 71, Column 137.
[1846] Transcript, Jeane Freeman, 10 October 2025, Page 71, Column 138.
[1847] A50967356 - Bundle 52, Volume 1, Document 23, Page 310.

contributors attended meetings as required. The Oversight Board explained what happened in its report:

> "(The) decision was taken in response to critical issues relating to the operation of infection prevention and control, governance, and communication and engagement with respect to the Queen Elizabeth University Hospital and the handling of infection incidents affecting children, young people and their families within the paediatric haemato-oncology service. "[1848]

> " Stage 5 is the most serious stage; Stage 4 is defined as "significant risks to delivery, quality, financial performance or safety, (and) senior level external transformational support (is) required." It is applied where the Scottish Government believes that an NHS Board requires enhancement to address local issues and additional direct management or transformation support may be required."[1849]

1022. The Oversight Board recorded a key question to be addressed as:

> "is the governance structure in NHS GGC adequate to pick up and address infection risks?"[1850]

1023. It recorded its primary task as having been to address the management of risk events at QEUH through prevention, governance, and engagement:

> "The core of the Oversight Board's work has been the issue of assurance. Escalation arose from a history of complex issues that the Health Board had been experiencing since at least the opening of the QEUH, but the primary matter that gave rise to Stage 4 was a question of the 'fitness of purpose' of NHS GGC with respect to how IPC has been conducted in the QEUH, the way that governance has operated in relation to these infection incidents and the communication and engagement approach that has been placed under scrutiny by these events."[1851]

1024. The Oversight Board was divided into subgroups focusing on:

a. Infection Prevention and Control (IPC) Governance: Addressing failures in infection control systems.

[1848] A33448010 - Bundle 6, Document 36, Page 798.
[1849] A33448010 - Bundle 6, Document 36, Page 801.
[1850] A33448010 - Bundle 6, Document 36, Page 801.
[1851] A33448010 - Bundle 6, Document 36, Page 872.

b. Technical Issues: Examining hospital infrastructure, including water safety and ventilation systems.

c. Communication and Engagement: Evaluating and improving interactions with families affected by the issues, with a view to rebuilding trust with families and stakeholders.

1025. Professor McQueen said that the escalation process had been unusual, in that it was targeted in a way that previous escalations had not been:

> "When boards had been escalated in the past, it had always been around-- or almost always around performance and finance, and it was almost always the whole board. … In the pre-November reflections and discussions … the idea of … escalating to Level 4 for IPC in Schiehallion-- and putting an Oversight Board in place to oversee the corrective action, if identified, which it was, that was needed to provide safe and effective care. … It was the first time, as far as I am aware, that a section of the board was escalated rather than the whole board, and it was for Infection Prevention and Control "[1852]

1026. Probably her most significant comment was that, from talking to NHS GGC senior management, she gained the clear impression that they did not think they needed support[1853] (something Malcom Wright would later describe as a 'red flag'[1854].)

1027. Professor McQueen, in response to a suggestion that the Oversight Board could have usefully addressed a broader range of issues, more akin to the scope of this Inquiry, made clear that in putting the Oversight Board together the focus had been on the haemato-oncology children:

> " It wouldn't necessarily have been for me to then expand that to say, "I want to look at the whole of the building of the Queen Elizabeth and all the remediation work." That would have lain with the team within the finance directorate to do that because I think there's probably a number of areas there. So, was it about the maintenance of the ventilation? Was it the quality of the ventilation that had been fitted, or was it the air changes itself that was the problem of that? So, I fully accept that the air changes should have been six, but I didn't see it that time and I

[1852] Transcript, Fiona McQueen, 2 October 2025, Page 65, Columns 125-126.
[1853] Transcript, Fiona McQueen, 2 October 2025, Page 36, Column 67.
[1854] Transcript, Malcolm Wright, 25 September 2025, Page 72, Column 140.

don’t know that it would have been my Oversight Board that would have dealt with it. I think it would have been either in the Oversight Board-- the fuller escalation for-- that put GG&C to Stage 4 for everything may have been appropriate, or a separate bespoke arrangement from the finance directorate. I don’t think it was for my directorate. [Are you effectively saying that your focus was on Schiehallion?] Yes."[1855]

1028. Ms Freeman explained that the Oversight Board's role was to support, collaborate and seek assurance, and it could not direct or order GGC's actions.[1856] It was put to her that the remit of the Oversight Board was limited, in that it did not cover the entire water and ventilation systems, which she conceded, although she was unable to recall why this was.[1857] She also conceded that the Oversight Board had not managed to resolve the issues with culture with NHS GGC although it was unfair to expect a time limited group to have much effect on long-standing issues.[1858] Ms Freeman was frustrated at what she called NHS GGC's "nothing to see here" approach, and reluctance to fully engage with families and whistle-blowers .[1859] Problems with culture within NHS GGC was a recurring theme; even after escalation she saw resistance and a sense that they were being treated unfairly, from NHS GGC[1860].

1029. Professor Marion Bain gave evidence which covered several areas. She was, for a limited time, in charge of IPC at NHS GGC. Oddly, and contrary to other evidence, Professor Brown insisted that the view of the NHS GGC Board was that, once the Oversight Board was in place, NHS GGC had no responsibility for IPC.[1861] Professor Bain attended, and participated in discussions at, the Oversight Board. She was the 'sponsor' of the CNR.[1862]

[1855] Transcript, Fiona McQueen, 2 October 2025, Page 63, Column 122.
[1856] Glasgow 4, Part 3 - Witness Statements, Volume 5, Jeane Freeman, Document 5, Page 118, Para 63.
[1857] Transcript, Jeane Freeman, 10 October 2025, Page 71, Column 137.
[1858] Transcript, Jeane Freeman, 10 October 2025, Page 56, Column 107.
[1859] Glasgow 4, Part 3 - Witness Statements, Volume 5, Jeane Freeman, Document 5, Pages 119-120, Para 65.
[1860] Glasgow 4, Part 3 - Witness Statements, Volume 5, Jeane Freeman, Document 5, Page 115, Para 54.
[1861] Transcript, Professor John Brown, 3 October 2025, Page 62, Column 119.
[1862] Transcript, Professor Marion Bain, 25 September 2025, Page 40, Column 76.

1030. On IPC, although she insisted that her role was 'forward facing'[1863], she ultimately agreed that she needed to understand the past. She nevertheless maintained that she did not feel able to reach conclusions on events which had occurred prior to her appointment. Her other main conclusion was that, notwithstanding adherence to manuals etc, unusual circumstances required broader thinking.[1864] She agreed NHS GGC thought they did not need help.

1031. On the CNR - and clearly as its sponsor she was in a good position to comment - she felt the view taken on the 30% probably connected to the environment was 'the ask' i.e. the central finding.[1865] She described the CNR work as 'comprehensive' and agreed with its findings.[1866] She had not been aware until involvement in the Inquiry that NHS GGC apparently rejected that conclusion.[1867]

The final report of the Oversight Board

1032. The Oversight Board's final report in March 2021 underscored the importance of robust infection control systems, transparent governance, and effective communication strategies. However, some of the key people involved in the IPC events in the Schiehallion Unit and wider QEUH from 2015 feel strongly that they were not adequately consulted by the Oversight Board. The value of the conclusions of the Oversight Board's final report in March 2021 has been challenged on the ground of a lack of interaction with Dr Peters[1868] and Dr Inkster[1869]. The patients and families' representative on the Oversight Board – Professor Cuddihy – had concerns about some lines of work not being completed satisfactorily, it being too reliant on NHS GGC not been followed though by NHS GGC.[1870]

1033. In respect of the Water Incident, the Oversight Board saw a tension between

[1863] Transcript, Professor Marion Bain, 25 September 2025, Page 16, Column 28.
[1864] Transcript, Professor Marion Bain, 25 September 2025, Pages 23-24, Columns 42-43.
[1865] Transcript, Professor Marion Bain, 25 September 2025, Page 41, Column 78.
[1866] Transcript, Professor Marion Bain, 25 September 2025, Page 43, Column 81.
[1867] Transcript, Professor Marion Bain, 25 September 2025, Page 47, Column 90.
[1868] Glasgow 3 - Witness Statements, Volume 4, Dr Christine Peters, Document 3, Pages 136, 182, 187, 190 and 195-197, Paras 95, 258-259, 280, 289-290 and 312-316.
[1869] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Pages 144, 295-319 and 321-323, Paras 434-435, 940-1034 and 1045-1053.
[1870] A34975863 - Glasgow 1 - Witness Statements, Bundle 6, Professor John Cuddihy, Document 2, Pages 81-82, 131, 134 and 141, Paras 95, 280, 289-290 and 313.

desire on the part of clinical staff to have matters solved swiftly, and a desire on the part of NHS GGC to ensure that such measures as had been put in place had a chance to work:

> "50 … the recurrence of infection suggested that all of these actions may not have been sufficient. Frustration was particularly expressed by clinicians. Early in 2018, exasperation was evident among some clinicians that concerns about the building and environment had been raised before, but not addressed (as noted in an October 2017 SBAR, described in detail later). … This persisted into 2019 – for example, at an IMT in August, it was noted that: "[Clinicians] feel that it has been over a year since this has been highlighted and the problem still exists even after moving into Ward 6A, QEUH. Clinicians think the control measures are not working and it is still unclear what the underlying problem results in these Gram-negative bacteria." …
>
> 51. Ultimately, in September 2018, the proliferation of cases and the need to work on the affected wards led to the decision to de-cant the patients of Wards 2A and 2B in the RHC to Wards 4A and 6B in the QEUH. … the action is notable in the context of IPC for several reasons. … First, it demonstrated the importance of patient safety that the Health Board continued to prioritise through these incidents … Second, such a major step could be seen as an admission that other IPC measures were not working sufficiently to address the issues, and that the last recourse for the Health Board was to remove the patients from the immediate environment."[1871]

1034. The Oversight Board saw the 2019 ventilation incident as different, with negative effects upon staff cohesion, and difficulty in taking an overview which might have identified a global source of the problem, as opposed to addressing incidents one-by-one:

> "55. Several points are striking about what took place in 2019. The context was a set of infection incidents showing a similar scale and diversity of environmental-related bacteria to what had occurred to the same patient group before the de-cant in the RHC. Sources of the infections were proving very difficult to identify, frustrating to both the clinicians working with the patient group (as already highlighted) and the microbiologists seeking to understand what was happening.

[1871] A33448010 - Bundle 6, Document 36, Page 823.

The continuing uncertainty – and increasing media focus on what was happening – created a highly pressured climate for staff grappling with an elusive, complex problem. Despite this, the IMT was responsive to the immediate infection issues, not simply in terms of actions to address the environment of Ward 6A, but identification of alternative accommodation as well.

56. However, despite the consistent commitment of staff to determining the sources and providing the best care to the patients, what was notable about the IMTs during this period – and the staff working together on IPC and the consequences of the outbreaks – was an increasing lack of cohesion and disintegrating working relationships between some staff, which seemed to spill out over into the conduct of the IMT meetings….

57. What remained – and could not be discounted – was the persistent possibility of a link to the building. While actions in response to individual incidents appeared robust and appropriate, there continued to be a lack of an explanation for the source of these infections. This is not unusual for infection incidents, and the Health Board cannot be faulted for the efforts put in place to try to understand what was happening. However, by 2019, it was becoming clear that the question of whether the infections should be more systematically considered as a whole rather than individually should have been pressing."[1872]

1035. Ultimately the Oversight Board identified a fracturing of workplace relationships and information-sharing procedures as a key failing at QEUH:

"66. However, the Oversight Board concludes that the Health Board's responsiveness was limited by problems in how different sources of information were being brought together to examine an ever more complex problem. The failure to share the DMA Canyon reports compromised the ability of IMTs and the IPC Team to act because key information was not available. The concerns raised by some staff before the October 2017 SBAR did not lead to full consideration of the emerging problems with the building in the appropriate committees. Staffing tensions and problems in working relationships seemed to make it difficult for relevant information to come together and consensus decisions on action to be taken consistently."[1873]

[1872] A33448010 - Bundle 6, Document 36, Page 825.
[1873] A33448010 - Bundle 6, Document 36, Page 827.

1036. Similarly, the Oversight Board expressed concern around the extent to which, where staff had succeeded in addressing issues, there had been any systematic efforts to consolidate learning from that experience:

> "3.4 Learning from the Experience
>
> 89. With such a prolonged series of incidents, expectations are that the Health Board would learn from the experience, developing new ways of addressing the issues that were arising and ensuring the 'lessons learned' reflection was systematically undertaken. Certainly, evidence of learning is apparent across the period. …
>
> 91. However, the evidence of explicit and systematic reflection has not been apparent across the period."[1874]

1037. A similar failure to learn from adverse experience was identified by the Oversight Board with respect to the ignoring, and subsequent rediscovery in 2018, of the 2015 DMA Canyon water report, as described above. They stated:

> "120. While it is clear that these reports were taken 'seriously' [in 2018] … it was not clear to the Oversight Board the extent to which the implications for governance were shared with IMTs or discussed by the relevant committees … issues of transparency remained even on the 'discovery' of the reports during 2018, as the Oversight Board understands that the reports were not shared with relevant IPC staff and microbiologists or IMTs at that stage …
>
> 121. … the receipt of the 2015 DMA Canyon report should have alerted senior management within the Health Board at that time to the fact that there were potentially serious issues …
>
> 122. … a more systematic questioning of how such relevant environmental information was being conveyed within the organisation (and indeed, escalated) seems warranted, but absent. In essence, this can be characterised by the question: was the right information being provided to the right point in the governance of IPC to allow assurance to take place?

[1874] A33448010 - Bundle 6, Document 36, Page 834.

123. …

124. … the later discovery of the reports should have prompted more formal and visible reflection by relevant committees, and indeed, by the full Board itself. As noted, the Chief Executive commissioned a series of reports as part of a review of a number of concerns at the QEUH, which were presented to the full Board in December 2019 – an exercise that the Oversight Board commends. However, a 'lessons learned' exercise that ensured all the key failures in governance related to the 2015 DMA Canyon report had been identified and addressed has not taken place …." [1875]

1038. The lack of a wider view was a concern of the Oversight Board when it came to consider the response to the 2018 water incident:

"136. … there did not appear to be a strategic overview that considered all these risks and responses to water contamination as a whole, not least their inter-dependencies. Such an approach would have necessarily spanned the whole governance framework of the Health Board.

137. T …there did not appear to be consideration of the wider risks that the incidents suggested and which the succession of outbreaks demanded. It was not just a question of the 'long view' of the succession of incidents, but the 'wider view' of what that might mean across the Health Board's operations." [1876]

1039. When considering the decant from Wards 2A and 2B, the Oversight Board's concern appears to have been the tendency to resist escalation of the incident, in favour of pursuing local action:

"144. … At its meeting on 16 July 2019, the Acute Infection Control Committee was informed that while the QEUH chlorination system had been fully fitted and Gram-negative counts had fallen, the mycobacteria issue had recently re-emerged despite the dosing. Such concerns posed risks to the strategy being pursued by the Health Board to addressing potential environment risks. On 29 July, similar concerns were noted at the Board Infection Control Committee, but no specific action seems to have been taken.

[1875] A33448010 - Bundle 6, Document 36, Page 846.
[1876] A33448010 - Bundle 6, Document 36, Page 850.

145. … However, the complexity of these issues did not seem reflected fully to more senior levels of governance, and there was insufficient recognition of the concerns around environmental risks – not least with respect to the de-canted wards in the QEUH – continually raised by some clinicians.

146. Issues about escalation were also apparent in the handling of Mycobacterium Chelonae cases …

147. In the Oversight Board's view, both instances warranted being brought to the full Board's attention in a consistent manner that noted the issue of apparent recurrence. … ." [1877]

1040. Overall:

"150. … the Oversight Board is not satisfied that the full Board was appraised of all the relevant issues. In part this may reflect what was presented to these Committees, and the absence of important information (such as the loss of the DMA Canyon reports). There was also no systematic review of the implications of water contamination presented to – or indeed, requested by – the full Board." [1878]

1041. The Oversight Board also went on to consider candour in general and the organisational duty of candour in particular and the inconsistencies between NHS GGC policy in this area and the requirements of legislation. This, unsurprisingly, mirrors Professor White's evidence in Glasgow 3.[1879]

The Oversight Board, Culture and the 'Whistleblowers'

1042. Professor McQueen initially saw culture as part of her remit in the Oversight Board: "for me, for things to be fixed, there was the Oversight Board and the governance arrangements; so attitudes about empathy and compassion, particularly in the communication subgroup and openness and transparency"[1880], but once the Oversight Board on performance and finance[1881] was established, culture was part of its coverage and so responsibility for culture moved over to there[1882]. This was logical as that

[1877] A33448010 - Bundle 6, Document 36, Page 853.
[1878] A33448010 - Bundle 6, Document 36, Pages 853-854.
[1879] Transcript, Professor Craig White, 24 October 2024, Pages 43-49, Columns 82-93.
[1880] Transcript, Fiona McQueen, 2 October 2025, Page 68, Column 132.
[1881] Bundle 52, Volume 10, Document 40, Page 128.
[1882] Transcript, Fiona McQueen, 2 October 2025, Page 69, Column 133.

other Board had a broader scope, whereas the Oversight Board which Professor McQueen was concerned with was specifically interested in IPC[1883].

1043. Ultimately, she reached the view that whistleblowers ought to have been treated better[1884].

1044. Professor Bain was involved with the Oversight Board. She was not a full member but did attend meetings, as a 'full member' of its Infection Prevention and Control and Governance sub-group[1885]. She was responsible for delivering the CNR to Professor McQueen[1886]. Her impression of the culture within NHS GGC was that there was a degree of futility in attempting to engage with them.

1045. While she did not consider her remit to be primarily about culture (at least insofar as her CNR involvement extended), she did recognise that it was necessary to form a view She reached a strong view that working arrangements had resulted in some of those involved not feeling adequately listened to[1887].

1046. Dr Inkster in her Statement was highly critical of the culture which she experienced in NHS GGC around that time. She referred to the unusual degree of undermining and lack of respect which she felt arose during the 2018 water incident[1888]. She had, for example, been told not to put concerns in writing during an (unminuted) meeting in December 2018[1889]. In January 2019 she was concerned that her expertise regarding *Cryptococcus* was facing continual challenge[1890], and contrasted this with more recent experience with ARHAI in a *Cryptococcus* matter where investigations took place candidly[1891].

1047. She met initially with Professor McQueen in September 2019 to discuss her

[1883] Transcript, Fiona McQueen, 2 October 2025, Page 76, Column 148.
[1884] Transcript, Fiona McQueen, 2 October 2025, Page 91, Column 177.
[1885] Transcript, Marion Bain, 25 September 2025, Page 34, Column 64.
[1886] Transcript, Marion Bain, 25 September 2025, Page 35, Column 65.
[1887] Transcript, Marion Bain, 25 September 2025, Page 39, Columns 73-74.
[1888] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Page 28, Para 62.
[1889] Bundle 14, Volume 2, Document 103, Page 258.
[1890] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Page 230, Para 698.
[1891] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Pages 243 and 333, Paras 737 and 1066.

concerns. While she had been listened to, she felt that she had not been taken seriously[1892], and was concerned that she (and Dr Peters) were viewed as 'troublemakers'[1893]. She was separately in contact with the Cabinet Secretary[1894]. She was concerned about the neutrality of appointees by the Oversight Board due to their reporting to Ms Grant[1895]. She had particular issues with Jenny Copeland, whom she did not trust due to her reporting line. Dr Inkster was particularly concerned at what she took to be criticism directed at her by Ms Copeland[1896].

1048. Dr Inkster was also critical of the Oversight Board's work in a number of other aspects, including achieving proper progress[1897], as well as a more technical matter of not having verified with her testing data obtained from NHS GGC regarding the 2018 water incident[1898].

1049. The Oversight Board did not cover remediation. Professor McQueen considered that that would have been an unwarranted expansion of the Board's remit, given its focus on haemato-oncological child patients, and the fact that by that time an Independent Review was in place and the Inquiry itself was being set up[1899].

5.11.4 The Case Notes Review

1050. The background to the CNR and its establishment and operations is covered extensively in our Closing Statement following Glasgow 3[1900]. This section addresses related issues that arose in Glasgow 4, Part 3.

The design and scope of the CNR

1051. Professor McQueen speculated that a broader remit for the CNR may have

[1892] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Page 298, Para 949.
[1893] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Pages 298-299, Para 951.
[1894] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Page 300, Para 955.
[1895] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Page 301, Para 959.
[1896] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Pages 304-306, Paras 976-981.
[1897] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Page 304, Para 974.
[1898] Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Page 144, Para 435.
[1899] Transcript, Fiona McQueen, 2 October 2025, Page 62, Column 122.
[1900] CTI Closing Statement, Glasgow 3, Section 2.1, Page 15, Section 3.9, Page 119 and Section 3.10, Page 127.

assisted the Inquiry, but at the time she saw the exercise as one of engaging experts to reach a view, in each individual case, as to whether or not the relevant infection had been contracted from the building[1901]. Her expectation was for NHS GGC to accept the findings - the data came from them, and the methodology was known to them[1902]. She believed they had been accepted - had they not been, she would have considered further action such as escalation to Stage 5[1903].

Involvement of NHS GGC in the establishment of the CNR

1052. Ms Grant explained that NHS GGC had limited involvement in the establishment, processes or progress of the CNR, the main input being the provision of information at a very detailed level. NHS GGC was not provided with the detailed outcome of each patient's review or the methodology associated with that conclusion.[1904] She accepted that NHS GGC knew at the outset that they would not get this and did not challenge that. At the time they were at Level 4 Escalation, so it was a challenging time to make observations[1905].

NHS GGC acceptance or otherwise of the conclusions

1053. Professor Brown was clear that, as far as he and the NHS GGC Board were concerned, the conclusions and findings of the CNR had been accepted. Nothing to the contrary had ever come to him[1906].

1054. Ms Grant was aware of the detailed response produced by NHS GGC staff[1907] to the draft CNR Overview Report in February 2021.[1908] She wrote to Professor Stevens twice, on 1 March 2021[1909] and 5 March 2021[1910]. In response to Professor Stevens's concerns about this second letter, Ms Grant

[1901] Transcript, Fiona McQueen, 2 October 2025, Page 78, Column 151.
[1902] Transcript, Fiona McQueen, 2 October 2025, Page 78, Column 152.
[1903] Transcript, Fiona McQueen, 2 October 2025, Page 81, Column 158.
[1904] Glasgow 4, Part 3 - Witness Statements, Volume 4, Jane Grant, Document 1, Page 80, Question 72.
[1905] Transcript, Jane Grant, 24 September 2025, Pages 49-51, Columns 93-98.
[1906] Transcript, Professor John Brown, 3 October 2025, Pages 64-65, Columns 124-125.
[1907] The terms of the NHS response can be the first three columns of the CNR Team Rebuttal to the NHS GGC Consultation Response (Bundle 25, Document 5, Page 157).
[1908] Bundle 25, Document 2, Page 45.
[1909] Bundle 25, Document 3, Page 151.
[1910] Bundle 25, Document 4, Page 155.

explained that they wanted to summarise what had been discussed and she considered sending the letter entirely normal. As she pointed, out that the first paragraph states “We entirely understand this is an independent report and it is for you to consider the content."[1911]

1055. Ms Grant was asked whether NHS GGC accepted the conclusions of the CNR on connection to the environment. On each of four occasions she was asked, she said that NHS GGC accepted the recommendations, but she did not answer the question of whether the conclusions were accepted. Her position seemed to be that they decided that it was not appropriate to have an ongoing discussion about the conclusions, partly because they were at Level 4 escalation and so it was decided to focus on the recommendations[1912]. Mr Grant did, however, accept the characterisation that in March 2021 NHS GGC had decided to reserve its position on whether to accept the conclusions[1913].

1056. When asked what a parent of a patient was to make of the NHS GGC public statement,[1914] she did not have an answer other than to return to NHS GGC's commitment to implement the recommendations. The statement contains an apology:

> “For those whose infection episodes were judged by the Case Note Review panel to be possibly or probably linked to the hospital environment, we apologise unreservedly.”

1057. Asked whether such an apology, on that basis, amounts to an acceptance of the conclusions, Ms Grant asserted that they wanted to acknowledge that there had been upset and stress for patients and their families, and were apologising for the fact that it appeared from the CNR report that some patients had been affected. She absolutely did not provide an apology for harm that might have occurred to patients[1915].

1058. Asked whether, by taking this approach, NHS GGC had lost the right to later turn around and reject the conclusions of the CNR, Ms Grant explained that

[1911] Transcript, Jane Grant, 24 September 2025, Pages 51-53, Columns 98-102.
[1912] Transcript, Jane Grant, 24 September 2025, Pages 53-55, Columns 102-105.
[1913] Transcript, Jane Grant, 24 September 2025, Page 60, Column 116.
[1914] Bundle 25, Document 61, Page 1260.
[1915] Transcript, Jane Grant, 24 September 2025, Pages 55-58, Columns 105-111.

new information had come to light in the form of the Reports by Professor Leanord and Mr Brown, three reports by Professor Evans and the HAD Report. Although she could not initially explain how the HAD Report came to be instructed,[1916] she justified obtaining it to get some additional advice, because of WGS and the whole thing was still a bit uncertain[1917].

1059. Ms Grant mentioned a briefing of some of the Executive team about WGS by Professor Leonard at which Professor McQueen was present[1918]. We put that to Ms McQueen and she placed the meeting before the CNR were told about Professor Leonard's work[1919]. Since we know that took place in December 2020, it must be the case that Ms Grant and the executive team knew about the WGS evidence well before the CNR report was published.

1060. When Professor Brown's position was put to her, Ms Grant oddly did not remember whether she discussed any of these issues with Professor Brown before he retired[1920].

1061. Ms Freeman initiated the CNR to provide patients and families with an independent expert view in individual cases[1921]. She did not accept that there were individual, confidential, reports allowed NHS GGC to later reject the findings of the CNR on infection link[1922]. She was critical of NHS GGCs subsequent change of position.[1923] Had NHS GGC rejected the findings at the time without evidence she implied that she would have considered firing the Chair and the Chief Executive.[1924]

1062. While he had retired by the time the CNR Overview Report was published, Mr Wright would have expected NHS GGC to accept it. There would be a high bar if they sought not to.[1925] Pressed on what would have happened, that

[1916] Transcript, Jane Grant, 24 September 2025, Pages 58-61, Columns 111-117.
[1917] Transcript, Jane Grant, 24 September 2025, Page 68, Column 131.
[1918] Transcript, Jane Grant, 24 September 2025, Page 67, Column 130.
[1919] Transcript, Fiona McQueen, 2 October 2025, Page 82, Column 159.
[1920] Transcript, Jane Grant, 24 September 2025, Page 61, Column 117.
[1921] Glasgow 4, Part 3 - Witness Statements, Volume 5, Jeane Freeman, Document 5, Page 125, Para 76.
[1922] Transcript, Jeane Freeman, 10 October 2025, Page 69, Column 134.
[1923] Glasgow 4, Part 3 - Witness Statements, Volume 5, Jeane Freeman, Document 5, Page 127, Para 81.
[1924] Transcript, Jeane Freeman, 10 October 2025, Page 70, Column 136.
[1925] Transcript, Malcolm Wright, 25 September 2025, Page 74, Column 143.

would have been a decision for the Cabinet Secretary. However, it would not have 'led to good outcomes'[1926].

The extent of Board approval for the approach taken.

1063. When shown her report[1927] to the Board meeting on 27 April 2021, and the formal minute,[1928] Ms Grant described notification to the board and that two board seminars took place in the weeks following the publication of the CNR Overview Report and the Oversight Board final report. She maintained that she had briefed the Board about concerns about the accuracy of the CNR but was unable to explain why the minute reported nothing more than that the Board had noted her report. When it was put to Ms Grant that she needed to obtain the approval of, or be accountable to the board for, the decision taken not to address the question of conclusions she explained that 'they did not really discuss it in that way'. As she put it:

> "We focused our mind on not arguing about whether the conclusions were right or wrong, but how to move forwards"[1929]

1064. The Inquiry Team has considered the relevant papers supplied by NHS GGC and has found no recorded decision on the acceptance or rejection of the conclusion of the CNR on infection link in the minutes or papers of the Clinical Care and Governance Committee or the Board proper, from March 2021 to after December 2022.

The recommendations of the CNR

1065. The key areas of concern for the CNR Expert panel are summarised in Chapter 8 of their Overview Report[1930]. Those that relate to the Remit and Terms of Reference of the Inquiry were:

    a. Data Availability, Data Quality and access to Data Systems particularly around location data for samples, patients and works carried out and the availability of such records to Microbiologist IPC team members in real

[1926] Transcript, Malcolm Wright, 25 September 2025, Page 76, Column 147.
[1927] Bundle 37, Document 59, Page 1068.
[1928] Bundle 37, Document 58, Page 1049.
[1929] Transcript, Jane Grant, 24 September 2025, Pages 61-64, Columns 117-123.
[1930] Bundle 6, Document 38, Pages 1058-1084.

time.

b. The management, investigation and reporting of infection outbreaks and unusual infections within the hospital, within NHS GGC and to HPS/AR

1066. The CNR Recommendations directly relevant to TOR 9 relate to (a) quality of data and (b) communication within and outwith the IPC team in the QEUH, both to ARHAI and to other colleagues in NHS GGC. It might be said that the criticism from the CNR is that NHS GGC did not, in respect of Schiehallion Patients, from 2015-2020 know what was going on in its hospital, was not collecting reliable data, did not ensure that all relevant people had access to data - and as a result there was an impact on patient outcomes.

5.12 Response to Local Recommendations

5.12.1 Implementation by NHS GGC

1067. The principal evidence at the Glasgow 3 hearing on this topic came from Professor Angela Wallace[1931]. She said that all the recommendations had been carried through. Each action was assigned an executive lead and operational lead to implement the actions. An audit system was implemented in 2022 and remained live in 2024, with implementation of recommendations completed in August 2024. A monitoring audit report was completed with details of the recommendation, actions taken, and changes made. The Board produced their 'Action Plan' which recorded this information[1932]. Finally, a spreadsheet, the AARG Evidence Log[1933], was created by NHS GGC to record each recommendation, who it was allocated to, what was to be done and the result[1934].

Board Reporting

1068. NHS GGC updated their Board regularly on implementation between 23 February 2021 and 28 June 2022[1935]. Throughout 2021, significant progress

[1931] Glasgow 3 - Witness Statements, Volume 10, Professor Angela Wallace, Document 7, Page 443, Paras 28-41.
[1932] Bundle 27, Volume 14, Document 5, Page 31.
[1933] Bundle 49, Document 17, Page 138.
[1934] Transcript, Angela Wallace, 25 October 2024, Pages 14-15, Columns 24-25.
[1935] Bundle 37, Documents 56-73, Pages 939-1266.

was reported to the Board, and by November 2021 the following was reported:

a. Independent review – 40 of 41 actions complete, 98% complete;

b. Oversight Board – 21 of 24 actions complete, 88% complete;

c. CNR – 43 of 43 actions complete, 100% complete.

1069. By 26 April 2022[1936], it was reported to the Board that all actions in response to the 108 recommendations from the Oversight Board, the CNR and the Independent Review had been completed.

5.12.2 Establishment of Advice, Assurance & Review Group (AARG)

1070. As part of the response to the recommendations of the Oversight Board, Independent Review, and CNR, an Advice, Assurance & Review Group (AARG) was established by Scottish Government to oversee the implementation of the corrective actions recommended. The group consisted of senior and executive leadership from Scottish Government (SG) and NHS Greater Glasgow & Clyde (NHS GGC). AARG was chaired by a representative from Scottish Government. NHS GGC representation included Jane Grant, Chief Executive and corporate colleagues responsible for the delivery of the recommendations across the reports.

1071. The AARG Terms of Reference[1937] were to provide advice, assurance and review of all reports, recommendations and closed actions, based on NHS GGC's overarching action plan, whilst respecting the role of the Chief Executive and her team to take operational decisions. This included the following:

a. Undertake an initial formal review of progress.

b. Implement the recommendations within the action plans and the reports relating to improvement.

c. NHS GGC to establish an ongoing and regular monitoring process of the plan within the Board and update AARG accordingly.

[1936] Bundle 37, Documents 70 and 71, Pages 1219 and 1237.
[1937] Bundle 27, Volume 12, Document 35, Page 364.

d. Provide advice regarding weekly progress meetings between SG Lead and NHS GGC, including on further interventions, if appropriate.

e. Consider and provide advice to CNO in her discussions/liaison with SG colleagues.

f. Undertake a timely formal review and produce a briefing with recommendations for the CNO to take to the Chief Executive of NHS Scotland/Director General of Health and Social Care regarding the level of escalation and any recommendations in relation to this.

g. Progress that review with CNO and the Chief Executive of NHS Scotland/Director General of Health and Social Care to inform a meeting with the Cabinet Secretary.

Meetings of AARG

1072. The AARG met on four occasions.

a. Meeting 1 - 7 June 2021[1938]. – Chaired by Amanda Croft, Chief Nursing Officer (CNO)

b. Meeting 2 – 19 August 2021[1939] - Chaired by John Burns, Chief Operating Officer (COO) for NHS Scotland

c. Meeting 3 - 17 December 2021[1940] – Chaired by Professor Alex (Alexander) McMahon, Chief Nursing Officer (CNO)

d. Meeting 4 – 28 February 2022[1941] – Chaired by Professor Alex McMahon (CNO)

Perspective of Professor McMahon and Christine Ward

1073. In their joint evidence, Professor McMahon and Christine Ward[1942] described how the Scottish Government, through the AARG, sought to ensure that the findings of the CNR and the two other major reviews, the Independent Review

[1938] Bundle 27, Volume 12, Document 36, Page 368.
[1939] A49650695 - Bundle 27, Volume 12, Document 38, Page 390.
[1940] A49436531 - Bundle 49, Document 21, Page 166.
[1941] A51217019 - Bundle 49, Document 22, Page 170.
[1942] Deputy Director, Health and Social care Information Scrutiny and Governance, reporting to the Director General for Health and Social care.

and the Oversight Board Report, were properly implemented by NHS GGC. Both witnesses gave evidence from a position of assurance and governance rather than reinvestigation. Their process focussed on verifying that the Health Board's response to the CNR was thorough, accountable and demonstrably effective in addressing the issues it identified[1943]. At the meeting on 19 August 2021 NHS GGC staff ,made a series of presentations and referenced progress against the Board Action Plan[1944] as recorded in the minute.[1945] This included work by the NHS GGC Water Safety Group, the independent Authorising Engineer and changes to Estates systems to include the location of any water sample taken for microbiological surveillance[1946].

1074. Once Interim CNO Professor McMahon took over the chair. By August 2021 only two actions remained for him to oversee, the opening of Ward 2A/B and the appointment of the Associate Directors for IPC[1947].

1075. Ms Ward explained that the AARG had been established to provide confidence to Ministers that the 108 recommendations arising from the three reviews were being acted upon. The group's role was to scrutinise evidence of implementation supplied by NHS GGC, to test the robustness of that evidence, and to seek further information or clarification where necessary. The AARG did not replicate the work of the Oversight Board, which had involved direct site visits, but operated as a structured forum for professional and managerial challenge[1948]. NHS GGC was understood to have accepted the recommendations of the CNR in full. No indication was ever received that the Board rejected the Review's conclusions on environmental links to infection. Had such a position been known, Ms Ward said, CNO Directorate would have intervened and sought immediate clarification[1949].

1076. Professor McMahon, was likewise unaware of any suggestion that NHS GGC

[1943] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Page 6, Column 8.
[1944] Bundle 27, Volume 14, Document 5, Page 31.
[1945] Bundle 27, Volume 12, Document 38, Page 390.
[1946] A54450036 - Glasgow 4, Part 3 - Witness Statements, Volume 8, Christine Ward, Document 2, Page 7.
[1947] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Page 17, Column 29.
[1948] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Page 7, Column 10.
[1949] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Page 51, Column 97.

disputed the conclusions of the CNR[1950]. In his view, acceptance of both conclusions and recommendations was essential if genuine learning and improvement were to follow. Had disagreement been expressed, it would have required a formal explanation and supporting evidence from NHS GGC.

1077. Professor McMahon claimed the AARG's approach was one of active interrogation rather than passive receipt of information. They sought corroboration for the progress claimed by NHS GGC and challenged where the evidence presented as incomplete or insufficiently detailed[1951]. He regarded the assurance process as rigorous and effective, noting that it provided Ministers with confidence that the Review's recommendations had been implemented and that improvements were being embedded in clinical and governance practice[1952].

1078. They agreed that the AARG's function was not to reopen substantive findings but to confirm that recommendations had been implemented appropriately. By the time the group concluded its work, 104 of the 108 recommendations from all three reviews had been signed off, with only four – relating to the refurbishment of Wards 2A and 2B – remaining subject to further oversight through NHS Assure[1953]. Both witnesses expressed satisfaction that the CNR had been treated as an accepted and integral component of the overall improvement programme[1954].

AARG approval of the NHS GGC Incident Management Process Framework

1079. In light of the evidence of Ms Imrie, we asked Ms Ward about the IPC HAI Reporting SOP or Framework referred to in the Scottish Government Corporate Statement.[1955] Her evidence was that it was approved in the run up to 19 August 2021, after it had been agreed to by Irene Barkby as part of her

[1950] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Pages 51-52, Columns 97-100.
[1951] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Pages 47-48, Columns 90-91.
[1952] Glasgow 4, Part 3 - Witness Statements, Volume 5, Professor Alex McMahon, Document 3, Pages 59-60.
[1953] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Page 44, Column 84.
[1954] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Pages 48, 52-53, Columns 91, 100-101.
[1955] Glasgow 4, Part 3 - Witness Statements, Volume 5, Scottish Government AARG Corporate, Document 2, Page 43, Para 4.

review of IPC documentation. However, in her supplementary statement, Ms Ward reports having been in contact with Ms Barkby and reports that:

> "A version of this document was requested by, and provided to, the Scottish Government. Ms Barkby, however, advises that she did not personally review the IMPF referred to in Counsel to the Inquiry's question. The IMPF was approved by NHSGGC. This approval was recorded by NHSGGC as an update to the "Action Plan". The IMPF was referred to within a presentation to the AARG by Angela Wallace on how NHSGGC had made progress against various action points. The copy of the IMPF was requested by the Scottish Government and provided by NHSGGC as an illustrative piece of evidence to support/corroborate the presentation update provided by Ms Wallace."[1956]

1080. Ms Barkby was then a member of the HCAI Policy Unit within CNOD, providing professional leadership, advice and guidance within and beyond the Policy Unit, having previously held the role of Board Executive Nurse Director and HAI Exec Lead in NHS Lanarkshire[1957]. She was not part of AHRAI.

1081. Ms Ward was unaware that this version of the Framework was not in compliance with Chapter 3 of NICPM[1958]. It does appear that the AARG 'approved' a version of the framework that five years later ARHAI would challenge.

AARG scrutiny of the refurbishment of Ward 2A/2B

1082. Ms Ward explained that despite assurances given at the 19 August 2021 meeting, of an October 2021 opening date,[1959] the refurbishment of Wards 2A and 2B were proving more challenging than initially thought. Intervention from NHS Assure and HPS was needed. Her team were shown the results of a walkaround at the start of August 2021 carried out by Mr Beattie, Senior Engineer, HPS.[1960] It showed that things were not to the standard that the Scottish Government would have expected. Ms Ward appeared to explain the

[1956] A54450036 - Glasgow 4, Part 3 - Witness Statements, Volume 8, Christine Ward, Document 2, Page 12, Para 16.
[1957] A54450036 - Glasgow 4, Part 3 - Witness Statements, Volume 8, Christine Ward, Document 2, Page 13, Para 17.
[1958] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Pages 13-15, Columns 22-25.
[1959] Bundle 49, Document 20, Page 156.
[1960] Bundle 52, Volume 2, Document 9, Page 82.

AARG relied on colleagues in the Finance Governance Team, led by Alan Morrison, to support the AARG's scripting on Wards 2A/2B[1961], but in her supplementary statement she said that this Directorate did not oversee this work given its technical nature[1962].

1083. Notwithstanding the slippage of the opening date, the assurances received from NHS GGC and SG colleagues satisfied the Chair of the AARG[1963]. After the August 2021 meeting the AARG were less concerned about the delay and more concerned about getting it right, not only for the process itself, but also for the patients and families that would then be occupying those wards. Her evidence that there was some involvement from NHS Assure, and Professor McMahon explained it as to provide an extra layer of assurance that the works met the necessary requirements. He described it as almost an external verification/validation of the works[1964]. In her supplementary statement Ms Ward explained that the Scottish Government received a briefing from NHS Assure on 22 February 2022 that confirmed that:

> Therefore, NHSS Assure based on the comprehensive information presented to us, are able to support the reopening of wards 2A and 2B at QEUH, subject to NHSGGC confirmation (received in the joint meeting on 24th February) of their action plan and commitment to address the issues identified[1965].

1084. The reopening of Wards 2AB was discussed at the fourth meeting of AARG on 28 February 2022. The minutes record the involvement of NHS ASSURE[1966].

1085. When asked about the paper in 'Water Research' by Dr Chaput et al entitled "Reversing and controlling microbial proliferation in the water system of a high-risk hospital ward after extended closure and reconstruction,"[1967]

[1961] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Pages 14, 35 and 42, Columns 24, 65,66 and 79.
[1962] A54450036 - Glasgow 4, Part 3 - Witness Statements, Volume 8, Christine Ward, Document 2, Page 9, Para 7.
[1963] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Pages 17-22, Columns 29-39.
[1964] See email from Ms Critchley of NHS Assure from 18 February 2022: Bundle 52, Volume 5, Document 17, Page 84 and Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Pages 31-32, Columns 58-59.
[1965]A54450036 - Glasgow 4, Part 3 - Witness Statements, Volume 8, Christine Ward, Document 2, Pages 9-10, Para 11.
[1966] Bundle 49, Document 22, Page 170.
[1967] Bundle 44, Volume 8, Document 6, Page 141.

Professor McMahon and Ms Ward explained that they were unaware of an issue with microbial proliferation in the water system of Ward 2A in late 2021, but Ms Ward was told that taps needed to be replaced[1968].

1086. Neither Professor Alex McMahon nor Ms Ward knew whether the AARG was aware of the need to have validation of the ventilation system[1969].

Appointment of a Director of IPC

1087. Professor Alex McMahon explained why he considered recruitment of an Associate Director of IPC as a significant step change in addressing the recommendations. He saw it as representing a managerial and leadership change in IPC at NHS GGC.[1970] When asked if he saw any positives or negatives in the appointment of an internal candidate, he responded robustly that it would not be possible to restrict the appointment to an external candidate[1971].

5.12.3 The Perspective of NHS Assure on the Ward 2A/2B refit.

1088. Ms Critchley explained that their involvement in the Ward 2A refurbishment arose because NHS GGC wanted the assistance of a particular individual, previously employed by NHS GGC's advisors, AECOM. The meetings envisaged in the original arrangement were not, in, attended by them. The individual did do some walkarounds and report on them. However, were not signing off on anything.[1972]

1089. They did provide a series of questions in spreadsheet format which they felt were useful for NHS GGC to be able to answer, but they were not checking the answers.[1973] On ventilation they had no mandate to get involved, notwithstanding the background,[1974]although they could have asked. They did

[1968] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Pages 28-30, Columns 51-55.
[1969] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Page 35, Columns 65-66.
[1970] Glasgow 4, Part 3 - Witness Statements, Volume 5, Professor Alex McMahon, Document 3, Page 60, Para 134.
[1971] Transcript, Professor Alex McMahon and Christine Ward, 7 October 2025, Pages 36-40, Columns 67-75.
[1972] Transcript, Julie Critchley, 8 October 2025, Pages 10-12, Columns 15-20.
[1973] Transcript, Julie Critchley, 8 October 2025, Page 16, Column 27.
[1974] Transcript, Julie Critchley, 8 October 2025, Page 16, Column 28.

suggest a short-life working group, but this was rejected by Professor Steele due to what was said to be a lack of time[1975](although Ms Critchley aid it could have been set up very quickly).[1976] Ms Critchley confirmed that if the AARG thought ASSURE were on top of all aspects of the refurbishment of Ward 2A that would be wrong.[1977]

1090. Ms Critchley also gave evidence about the wider role of NHS ASSURE, an organisation created in the aftermath of the issues at the QEUH. They were not a regulator.[1978] However, their KSAR and NDAP processes were well able to cope with an organisation which might be seen to be just paying 'lip service'.[1979] Faced with an organisation adopting a 'we know best' approach, that would lead them to designate the project as 'unsupported'.[1980] Among other things the DL of 2023[1981] meant that it was not possible to open for patients until the project got supported status.[1982] She did think the two processes would have picked up many of the issues which emerged at the QEUH.[1983]

1091. Ms Critchley's evidence extended to an explanation of how to ensure lessons were learned from issues arising in projects. ASSURE provided lots of seminars, had a Learning Network, held a National Conference, made presentations at other groups, and gave informal training. They were looking at extending this to private sector audiences.[1984]

1092. In terms of governance, Thomas Rodger of NHS Assure identified modern procedures, named Key Stage Assurance Review and NHS Scotland Design Assessment Process, which, had they been in place in 2009, would likely have "raised observations" around Wards 2A and 4B, in relation to their design, construction, commissioning and validation, and handover. He also observed, however, that the decisions on which solutions to implement would

[1975] Transcript, Julie Critchley, 8 October 2025, Page 22, Column 40.
[1976] Transcript, Julie Critchley, 8 October 2025, Page 24, Column 44.
[1977] Transcript, Julie Critchley, 8 October 2025, Page 25, Column 46.
[1978] Transcript, Julie Critchley, 8 October 2025, Page 59, Column 114.
[1979] Transcript, Julie Critchley, 8 October 2025, Page 29, Column 53.
[1980] Transcript, Julie Critchley, 8 October 2025, Page 35, Column 65.
[1981] Bundle 52, Volume 2, Document 14, Page 180.
[1982] Transcript, Julie Critchley, 8 October 2025, Page 37, Column 69.
[1983] Transcript, Julie Critchley, 8 October 2025, Page 70, Column 126.
[1984] Transcript, Julie Critchley, 8 October 2025, Pages 54-58, Columns 104-111.

remain matters for NHS GGC[1985].

5.12.4 The decision to de-escalate

1093. Malcolm Wright described his impression of NHS GGC's keenness to assist the Oversight Board and to achieve de-escalation. He emphasised that the performance framework was to be understood as a dynamic system where a referred Board can go up and down the levels, with in extremis a Level 5 escalation being possible, and indeed that had been considered by the Minister at the time that the framework was invoked. The regular contact between NHS GGC and the Oversight Board was an important part of achieving the necessary effective co-operation during the Level 4 process, such that the power of direction was not required[1986].

1094. Professor McQueen was clear that, had there been an indication that the CNR conclusions had not been accepted, then that might have had a bearing on the decision of whether or not to de-escalate, independent of whether the recommendations were being implemented. A decision by NHS GGC to keep the subject 'ambivalent' would have been misleading[1987].

1095. Ultimately, the decision to de-escalate NHS GGC followed the Oversight Board confirming that it had carried out satisfactory implementation of the recommendations[1988]. Caroline Lamb wrote to Ms Grant on 13 June 2022, noting that robust measures would remain for Scottish Government officials to provide direct support to NHS GGC, and reminding her that the Stage 4 escalation had been in response to concerns raised in relation to patient safety and healthcare associated infections at the Queen Elizabeth University Hospital (QEUH) and Royal Hospital for Children (RHC)." [1989]

1096. The de-escalation was welcomed publicly at cabinet level. Health Secretary Humza Yousaf said:

[1985] Glasgow 4, Part 3 - Witness Statements, Volume 6, Thomas Rodger, Document 1, Pages 3-4.
[1986] Transcript, Malcolm Wright, 25 September 2025, Pages 63-65, Columns 121-125.
[1987] Transcript, Fiona McQueen, 2 October 2025, Pages 92-93, Columns 180-182.
[1988] Transcript, Professor John Brown, 3 October 2025, Page 80, Column 156.
[1989] A51217034 - Bundle 52, Volume 11, Document 7, Page 83.

"The de-escalation of NHS GGC to Stage 2 is a positive step forward and highlights the significant progress the board has made in meeting all recommendations, set out by the reviews, to improve performance.

"I would like to thank all staff at NHS Greater Glasgow and Clyde who have continued to support the improvement work while delivering high quality patient care. I also want to acknowledge and thank the patients and families for their patience and understanding during what I know has been a challenging time.

"We will work closely with and support the Board over the coming months as it continues to provide high quality services.""[1990]

5.12.5 The management of the water system today

1097. Andrew Poplett returned to give evidence on 19 September 2025, having on 20 August 2025 completed a 'one-off' audit review of the water system at QEUH[1991]. The audit was undertaken over a period of three days from 23-25 June 2025 and involved Mr Poplett visiting the site.

1098. The purpose of the audit was to seek assurance that the current management and maintenance of the domestic hot and cold water systems at QEUH are being safely and appropriately operated. Mr Poplett undertook to establish the level of compliance with current standards, being Health and Safety Executive L8 ACOP, current NHS best practice, and SHTM 04-01 Part B Operational Management for water systems and the management of Legionella. He described an authorising engineer audit as 'a snapshot,' designed to provide assurance to the Board either that the current management of the water system is "safe, appropriate or where there are areas for improvement"[1992].

1099. Mr Poplett assessed whether appropriate controls exist, whether those standards were adhered to and to what level. He conducted interviews and examined policies, procedures, inspection records and other documentation. He also conducted sampling to ensure that actual practice conformed to what was documented for the systems. He carried out visual inspection of major

[1990] A51690056 - Bundle 52, Volume 11, Document 8, Page 86.
[1991] Bundle 53, Document 3, Page 14.
[1992] Transcript, Andrew Poplett, 19 September 2025, Pages 4-5, Columns 4-5.

plant.[1993] His process included checking to see whether previously-identified issues had been "mitigated, managed or eliminated" in the meantime – the audit should be understood as a check on the management of the system, rather than on its design[1994].

1100. His overall conclusion was positive:

> "the audit has demonstrated that the site staff have a very good level of understanding of the requirements to achieve compliance to the current SHTM … and NHS best practice ...
>
> Good evidence is available to provide assurance for the documented maintenance systems, however there are a small number of areas which require improvement or consideration. Many … are understood to be in hand, although some others may need escalation"[1995]

1101. The audit assessed Findings and Risk Ratings under a number of heads, including 'Personnel & Water Safety Groups'[1996], 'Water Hygiene Training'[1997], 'Water System Details'[1998], 'Maintenance'[1999] and 'Inspection & Verification'[2000].

1102. He identified the following areas for improvement:

1) Communication and Personnel – while most relationships are good, the relationship between the Capital Projects team and the Operational Maintenance and IPC teams requires further awareness-raising and potentially an increase in resources;

2) Effective Management of Derogations – remains a source of tension, with a need to review formal procedures to ensure improvement of ongoing management; Mr Poplett emphasised the need for ongoing review;

3) Staff Awareness Training and Validation Process – the handover process,

[1993] Bundle 53, Document 3, Page 18.
[1994] Transcript, Andrew Poplett, 19 September 2025, Page 8, Column 12.
[1995] Bundle 53, Document 3, Page 16.
[1996] Bundle 53, Document 3, Pages 19-20.
[1997] Bundle 53, Document 3, Pages 21-26.
[1998] Bundle 53, Document 3, Pages 27-28.
[1999] Bundle 53, Document 3, Pages 29-31.
[2000] Bundle 53, Document 3, Page 32.

and monitoring of any significant changes made, require further awareness training in order to achieve greater levels of support.[2001]

1103. All areas were assessed as overall 'Low Risk', indicating minimal risk (of injury, HSE investigation, loss of service) in the event of a failure. He set out an Action Plan[2002], with timescale, in order to address recommended improvements:

Issue	Risk Rating			Timescale for Action
	Impact	Likelihood	Risk	
Review and expand formal protocol/procedure for the agreement and on-going management of derogations.	4	2	8	6 months
Ensure all Project Managers have sufficient water awareness training.	3	2	6	12 months
Consider allocation at Business Case development stage for dedicated resource allocation for both IPC and Operational AP(W) reviews and input to Projects.	3	2	6	12 months
Ensure identified and current AP(W)s and CP(W)s complete suitable refresher training and re-assessments/re-appointments as planned	2	1	2	6 months
Review current WRAs to ensure all 'open water' systems are suitably identified and assessed (chilled beams, air conditioning units, etc.)	2	2	4	12 months
Complete SOP for the management (deployment & removal) of POU filters, understood to be nearing completion.	2	2	4	12 months
Consider review of permit to work process flow diagram/forms to simplify current process.	1	1	1	12 months

1104. In oral evidence Mr Poplett was very positive about the system, consistent with the table above being entirely in green (indicating low risk), stating that

[2001] Bundle 53, Document 3, Pages 34-35.
[2002] Bundle 53, Document 3, Page 38.

"the system is currently extremely well managed"[2003]. He observed that the POU Filters remained present, and despite providing reassurance of water delivery they did also create a potential issue by inhibiting flow and therefore increasing potential for stagnation. A protocol for removing them was believed to be underway, which involved obtaining three clear tests before removing a filter[2004].

1105. He stressed that his audit should be understood as an assessment of the system in its totality, rather than as an investigation into any specific area[2005].

1106. Mr Poplett also gave his views on the testing regime at QEUH in January-February 2015, prior to opening. He identified timing as a flaw in the results – proper practice would involve allowing a period to elapse between carrying out 'sterilisation' and testing, to ensure that what was being tested was not overly-influenced by the presence of disinfectant. Instead "they appear, if the dates are accurate, to have not allowed that sufficient fallow period between disinfection and sampling, which may have impacted the results."[2006].

1107. He was also concerned that insufficient testing had been carried out before allowing the system to proceed to operation:

> "Given the high-risk clinical profile of the patients, I would normally have recommended more than a single satisfactory test result before taking the systems into operation, and that is indeed reflected by the current water management arrangements within the hospital of requiring at least three clear standards prior to removal of the point-of-use filter or putting it back under normal levels of control."[2007]

1108. Testing is an issue which he had encountered before:

> "it's certainly water sampling and issues that I've experienced over my career that have caused issues and problems, which is why these would be the recommended tests for projects prior to handover".[2008]

[2003] Transcript, Andrew Poplett, 19 September 2025, Page 18, Column 31.
[2004] Transcript, Andrew Poplett, 19 September 2025, Page 19, Column 33.
[2005] Transcript, Andrew Poplett, 19 September 2025, Page 20, Column 36.
[2006] Transcript, Andrew Poplett, 19 September 2025, Pages 28-30, Columns 52-56.
[2007] Transcript, Andrew Poplett, 19 September 2025, Pages 32-33, Columns 60-61.
[2008] Transcript, Andrew Poplett, 19 September 2025, Page 33, Column 62.

1109. Overall, had he been engaged in 2015, he would have raised serious reservations and concerns about occupying the hospital, on the basis of the water risk assessment, lack of scheduled maintenance and PPM, and the water test results. His view was that the review and AE engagement (or at least engagement of appropriate specialists) should have taken place at design stage, rather than at occupation[2009].

5.12.6 The management of the ventilation system today

1110. Mr Poplett also undertook a July 2025 Audit of the Ventilation Systems at QEUH[2010]. His conclusion was that the ventilation systems are safe and being appropriately managed. Staff demonstrated a very good level of understanding of the requirements of SHTM 03-01 Part B, and of NHS best practice[2011].

1111. He considered there to be scope for improvement in a small number of areas, which he understood to be in hand, being:

- In Communication, the improvement of the relationship between the Capital Projects team and the Operational Maintenance and IPC teams;

- Addressing tension around the complex areas of derogation management;

- Handover processes.

He also recommended that a single Comprehensive Operational Procedure document should be produced[2012].

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5.13 HAI Reporting in compliance with the NIPCM

1112. Focusing on written material in the 2021 AARG Action Plan,[2013] NHS GGC insisted to the AARG that it was collaborating with national agencies to enhance reporting across Scotland,[2014] and an NHS GGC IPC Surveillance review group was in place and reporting through the IPC Governance

[2009] Transcript, Andrew Poplett, 19 September 2025, Page 45, Columns 85-86.
[2010] Bundle 53, Document 3, Page 40.
[2011] Bundle 53, Document 3, Page 42.
[2012] Bundle 53, Document 3, Page 43.
[2013] A37370185 - Bundle 27, Volume 14, Document 5, Page 25 - dated to 2021.
[2014] Bundle 27, Volume 14, Document 5, Page 31.

structures. Updates to the NIPCM were tabled at every meeting of the IPC governance groups.

1113. As part of the preparation for the Glasgow 4, parts 2 and 3, hearings the Inquiry Team received a draft statement from Ms Imrie in which she explained the concern that ARHAI had that NHS GGC was not reporting HAIs in compliance with Chapter 3 of NIPCM. This arose out of the evidence of Professor Wallace in Glasgow 3, when she had referred to an NHS GGC SOP or Framework on HAI Reporting[2015]. We raised this issue with Ms Devine, and she answered a question in her statement as a consequential witness in Glasgow 4, Part 2[2016] and then provided a Supplementary Statement[2017]. Ms Devine's position appeared to be one of deflection. She argued that the section of the framework that concerned ARHAI was compliant with Chapter 3 of NIPCM, as the definitions were open to interpretation. Moreover, this was entirely consistent with national guidance on the management of public health incidents[2018], which she appeared to consider had been used to as a source for NICPM. It is unclear why she did not choose to tell the Inquiry that NHS GGC had by then changed its SOP or Framework on HAI Reporting in April 2025. to a version clearly in compliance with Chapter 3 of NIPCM.

1114. Ms Imrie returned to explain that ARHAI is the body given the remit of putting the National Infection Prevention Control Manual (NIPCM)[2019] together[2020]. It is a live document reviewed regularly every three years following a formal systematic literature review, and a robust consultation process with other stakeholders such as other experts, Public Health Scotland and health boards (including an oversight group chaired by Professor Evans)[2021].

1115. Ms Imrie said that Appendix 13 of NIPCM[2022] provided a non-exhaustive list of alert organism conditions, and each organisation can create its own triggers

[2015] Bundle 27, Volume 17, Document 28, Page 315.
[2016] Glasgow 4, Part 2 - Witness Statements, Volume 1, Sandra Devine, Document 10, Page 77, Q19.
[2017] Glasgow 4, Part 2 - Witness Statements, Volume 3, Sandra Devine, Document 2, Pages 13-14, Paras 1-5.
[2018] Bundle 27, Volume 14, Document 18, Page 113.
[2019] Bundle 27, Volume 4, Document 16, Page 165.
[2020] Transcript, Laura Imrie, 26 September 2025, Pages 3-4, Columns 2-3.
[2021] Transcript, Laura Imrie, 26 September 2025, Page 4, Columns 3-4.
[2022] Bundle 27, Volume 4, Document 16, Page 178.

which should prompt an investigation being started. A trigger does not mean there is an incident[2023]. If there is a trigger, then the local team will review and check if it meets the criteria. The patient's notes would record the investigations and actions taken. A HIIAT assessment would then give a green, amber or red outcome. Ms Imrie thought a green outcome became reportable in 2016[2024] . Not all infections needed to be reported. There are hundreds of infections happening every day in hospitals, and many from the patients' own intrinsic factors[2025].

1116. Ms Imrie confirmed that a HIIAT assessment results in a report if the criteria is met[2026]. Information can be reported while still carrying out investigations or, following further investigation, decide not to report as only one case[2027]. Ms Imrie thought the NHS GGC SOP or Framework on HAI reporting[2028] was very subjective, as it is unclear whether an assessment has been carried out and there was no definition or criteria for how the risk had been assessed[2029]. The failure to report infections would be a loss of intelligence at a national level, as something insignificant to a board when collated with other boards may take on national significance[2030]. ARHAI report all red, amber and any greens (where they are providing support to boards) to the Chief Nursing Officer's Directorate[2031].

1117. Ms Imrie clarified that a PAG would not necessarily mean there was an outbreak, and it might be asked for to get additional input or to undertake a full assessment[2032]. A case could trigger multiple triggers, and a trigger could be triggered but still not meet the definition in chapter 3.1. She concluded that Ms Devine had misinterpreted the ARHAI environmental pathogens surveillance pilot[2033].

[2023] Transcript, Laura Imrie, 26 September 2025, Page 5, Columns 5-6.
[2024] Transcript, Laura Imrie, 26 September 2025, Page 6, Column 7.
[2025] Transcript, Laura Imrie, 26 September 2025, Page 7, Column 9.
[2026] Transcript, Laura Imrie, 26 September 2025, Page 8, Column 12.
[2027] Transcript, Laura Imrie, 26 September 2025, Page 9, Columns 13-14.
[2028] Bundle 27, Volume 17, Document 28, Pages 315 and 317.
[2029] Transcript, Laura Imrie, 26 September 2025, Page 10, Columns 15-16.
[2030] Transcript, Laura Imrie, 26 September 2025, Page 10, Columns 15-16.
[2031] Transcript, Laura Imrie, 26 September 2025, Page 11, Columns 17-18.
[2032] Transcript, Laura Imrie, 26 September 2025, Page 13, Columns 21-22.
[2033] Transcript, Laura Imrie, 26 September 2025, Page 15, Columns 25-26 and Environmental pathogens surveillance pilot, Bundle 44, Volume 2, Document 47, Page 79.

1118. Ms Imrie confirmed that NHS GGC had updated their SOP in April 2025 and it is now aligned with Chapter 3[2034]. The SOP that NHS GGC was using until April 2025 was non-compliant [2035]. A board is not obliged to share its policies with ARHAI[2036]. She confirmed, contrary to Ms Devine's view, that she did not want boards to report all triggers, that HIIAT should not be conducted for all triggers, and that HIIAT does not require a multidisciplinary team to make all decisions as to whether to report to AHRAI[2037].

1119. When asked about the *Cryptococcus* cases identified by the Inquiry at the end of Glasgow 3, Ms Imrie confirmed she was only aware of one *Cryptococcus* case in NHS GGC until recently when she was told there were seven cases from 2020 to 2025. They then decided to look across Scotland for *Cryptococcus* cases, but were unable to carry out the work as NHG GGC had only provided anonymised data, which risked duplication of patients[2038]. A response from NHS GGC in December 2024 was not anonymised, but she did not ultimately get the data she needed until 20 July 2025. ARHAI had produced the correspondence[2039]. She was surprised by the length of time it had taken as the assessment had been carried out in November by NHS GGC. She had never seen that assessment[2040].

1120. The letter from DG Health and Social Care to Professor Gardner on 20 August 2025[2041] and the reply of 26 August 2025, were put to Ms Imrie along with the attached SBAR[2042]. The SBAR contained commentary that stated ARHAI were trying to sensationalise anything to do with *Cryptococcus* or another infection. Ms Imrie said that ARHAI act on behalf of the CNO Directorate, and were responding to evidence from an expert witness. The role and remit of ARHAI is to investigate where they think there could be increased incidents of infection and explore what controls have been put in place for patient

[2034] Transcript, Laura Imrie, 26 September 2025, Page 15, Columns 25-26.
[2035] Transcript, Laura Imrie, 26 September 2025, Page 16, Column 27.
[2036] Transcript, Laura Imrie, 26 September 2025, Page 16, Column 28.
[2037] Transcript, Laura Imrie, 26 September 2025, Page 17, Columns 29-30.
[2038] Transcript, Laura Imrie, 26 September 2025, Page 21, Columns 37-38.
[2039] Bundle 52, Volume 4, Document 9, Page 77.
[2040] Transcript, Laura Imrie, 26 September 2025, Pages 22-23, Columns 39-42.
[2041] Bundle 52, Volume 5, Document 31, Page 144.
[2042] Bundle 52, Volume 5, Document 32, Page 146.

safety[2043].

1121. Ms Imrie explained that an individual patient with *Cryptococcus* would be a trigger, but it would not need to be reported in, although a look back exercise might be carried out to see if there were other cases. Consideration would be given to the amount of time the patient had spent in hospital, if they are immunosuppressed and the patient group. Ms Imrie said that a reason to report in an infection, would be if there was a pattern of infections that it was considered should be investigated further[2044]. There was clearly a disagreement with NHS GGC IPC team about whether there was a cluster of cases of *Cryptococcus*, but she thought it met Chapter 3.1 of NIPCM on more than one criterion[2045]. Ms Imrie confirmed that *Cryptococcus*, *Aspergillus* and *Cupriavidus* were already in Chapter 4 of the NIPCM[2046]. In Dr Kennedy's report on Cryptococcus cases from 2019 produced at the request of Dr Armstrong,[2047] no renal patients in the Glasgow area had had *Cryptococcus* for many years[2048].

1122. There were subsequent letters on 4 September 2025 from DG Health and Social Care to Mary Morgan, Chief Executive of NHS NSS[2049] and to Professor Gardner,[2050] and then a Joint letter from Ms Morgan of NHS NSS and Professor Gardner on 9 September 2025[2051]. Ms Imrie was asked about the undertaking to reinstate weekly operational meetings. She confirmed that her regular meetings with Ms Devine were stopped in November 2024 by Ms Devine as she said they no longer served a purpose although Ms Imrie found them useful[2052]. At the beginning of 2023, the weekly meetings had started when there had been emails direct to the Scottish Government from the Lead ICD in NHS GGC, who had said that ARHAI were misinterpreting what NHS GGC were saying. Ms Urquhart contacted Ms Imrie and Ms Devine and said

[2043] Transcript, Laura Imrie, 26 September 2025, Page 25, Column 45.
[2044] Transcript, Laura Imrie, 26 September 2025, Page 26, Columns 47-48.
[2045] Transcript, Laura Imrie, 26 September 2025, Page 27, Column 50.
[2046] Transcript, Laura Imrie, 26 September 2025, Page 29, Columns 53-54.
[2047] Bundle 24, Volume 3, Document 3, Page 19.
[2048] Transcript, Laura Imrie, 26 September 2025, Page 25, Column 46.
[2049] Bundle 52, Volume 6, Document 3, Page 48.
[2050] Bundle 52, Volume 6, Document 4, Page 49.
[2051] Bundle 52, Volume 7, Document 51, Page 453.
[2052] Transcript, Laura Imrie, 26 September 2025, Page 39, Column 73.

'sort this out' between the two organisations[2053]. Training sessions had been undertaken with ICNs in Glasgow on how to report things in and requesting information from ICDs when reporting incidents. Ms Imrie felt that the meetings with Ms Devine did help a lot[2054]. However, Ms Imrie when the meetings with Ms Devine had stopped, there was a change in who was reporting in incidents. It was more ICNs than ICDs. They were not seeing the same incidents[2055].

1123. Ms Imrie commented on an SBAR that was produced at two meetings[2056] on 10 and 15 September[2057] and said that the SBAR set the agenda for facilitated workings and any changes that need to take place in the relationship between ARHAI and NHS GGC IPC

1124. Between November 2024 and September 2025, Ms Imrie said there was still an issue that needed to be addressed between ARHAI and NHS GGC, and that is why ARHAI had suggested facilitated development sessions are held[2058]. Ms Imrie felt it would be better if it was meetings between the wider team, not just her and Ms Devine[2059]. She was optimistic that if people are in the same room and listen to challenges then they move forward and build relationships[2060]. If NHS GGC follow Version 3 of the SOP, then they should be reporting in against the manual. However, the assessment of the *Cryptococcus* cases has made her more aware that there are more subjective views around how we fit that into criterion and work will need to be done in development sessions around that[2061].

1125. She said it was a trust relationship where ARHAI provide guidance and work in collaboration with the boards to make guidance both evidence-based and pragmatic. She said ARHAI expect everyone to follow the guidance. She did highlight that she had questions when it was difficult to get information from

[2053] Transcript, Laura Imrie, 26 September 2025, Page 39, Column 74.
[2054] Transcript, Laura Imrie, 26 September 2025, Page 40, Columns 75-76.
[2055] Transcript, Laura Imrie, 26 September 2025, Page 41, Columns 77-78.
[2056] A54160931 - Bundle 52, Volume 7, Document 60, Page 843.
[2057] Transcript, Laura Imrie, 26 September 2025, Page 42, Column 79.
[2058] Transcript, Laura Imrie, 26 September 2025, Page 41, Columns 77-78.
[2059] Transcript, Laura Imrie, 26 September 2025, Page 41, Column 78.
[2060] Transcript, Laura Imrie, 26 September 2025, Page 42, Column 79.
[2061] Transcript, Laura Imrie, 26 September 2025, Page 43, Column 82.

GGC. She also said there were times when GGC had no reported in as expected but because she did not know their internal guidance as wasn't shared then not in a position to comment[2062].

1126. When asked about potential recommendations Ms Imrie explained that ARHAI supports the boards and works in collaboration with the Infection Control service. If ARHAI was turned into a scrutiny organisation, then that support would be lost as boards would not be keen for ARHAI to attend IMTs etc[2063].

1127. NHS GGC Medical Director Dr Davidson was asked about HAI Reporting and the extent to which he had been following the exchanges between NHS GGC and AHRHAI since his appointment as Medical Director in October 2024. He could not explain why when challenged about the use of Version 2 the NHS GGC SOP or Framework on HAI reporting[2064] NHS GGC had not simply produced Version 3[2065] that had been in use since April[2066]. He did explain that his involvement with the issue around the disclosure of information about the *Cryptococcus* identified by the Inquiry in Glasgow 3 was to respond to a call from the Medical Director of NHS NSS, Dr Hilton-Christie, who contacted him to help resolve matters[2067].

1128. When ask whether public, ARHAI and the Scottish Government HAI Policy Unit can have confidence that NHS GGC is and will continue to report HAIs in accordance with Chapter 3 of the NIPCM explained that he had met with his IPC colleagues, knows that they come to work to do the best they can, and has been assured that they do report in line with Chapter 3. He believes they are highly qualified and report in line with the policy. He had no awareness of previous times where NHS GGC has not reported in accordance with the manual, including back in 2015[2068].

1129. Ms Grant was asked about the SBAR dated 20 November 2024,[2069] attached to Professor Gardner's letter to Ms Lamb on 26 September 2025. She

[2062] Transcript, Laura Imrie, 26 September 2025, Page 44, Columns 83-84.
[2063] Transcript, Laura Imrie, 26 September 2025, Page 44, Columns 55-56.
[2064] Bundle 27, Volume 17, Document 28, Pages 315 and 317.
[2065] Bundle 52, Volume 7, Document 60, Page 486.
[2066] Transcript, Dr Scott Davidson, 9 October 2025, Page 21, Columns 37-38.
[2067] Transcript, Dr Scott Davidson, 9 October 2025, Pages 21-22, Columns 38-39.
[2068] Transcript, Dr Scott Davidson, 9 October 2025, Page 22, Columns 39-40.
[2069] Bundle 52, Volume 5, Document 32, Page 148.

considered that the way motivations were ascribed to ARHAI, the whistleblowers and the Inquiry's experts, reflected the Infection Control team's anxiety about the need for balance in the discussion. She had asked Professor Wallace to consider the language within that SBAR, and also to engage with colleagues in HPS to try and make sure that everybody had agreed a way forward.

1130. Ms Critchley explained that they reported to the Chief Nursing Officer's Directorate Healthcare Infections Policy Unit.[2070] She explained the history and origins of reporting and how important it was to the Scottish Government.[2071]

1131. Her evidence on reporting issues with NHS GGC followed on from that of Laura Imrie. Meetings which had been held for a time between Ms Imrie and Ms Devine - and then stopped by NHS GGC - had been helpful.[2072] A difference on approach to reporting had been flagged, which was important given the need to see the national picture. She did not agree reports should bypass AARHAI given their expertise.[2073]

1132. The issues focussed on non-compliant SOP's, versions 1 and 2 (versions 3 and 4 being compliant) and over whether the NICPM should be the governing document.[2074] Matters had led to a letter from Caroline Lamb at NHS to Professor Gardner at NHS GGC.[2075]There was a reply from Professor Gardner, which included an SBAR making various allegations.[2076](so far as directed at AARHAI, Ms Critchley's view was that the allegations were not well-founded, either in respect of lack of impartiality or sensationalism.)[2077] The net result was a Joint Letter[2078] which demonstrated an accord had been reached. Given, in particular, some of the allegations which had been made and the continued presence in NHS GGC at senior level of many of the

[2070] Transcript, Julie Critchley, 8 October 2025, Page 5, Column 6.
[2071] Transcript, Julie Critchley, 8 October 2025, Pages 7-8, Columns 9-12.
[2072] Transcript, Julie Critchley, 8 October 2025, Page 41, Column 78.
[2073] Transcript, Julie Critchley, 8 October 2025, Pages 43-44, Columns 81-84.
[2074] Transcript, Julie Critchley, 8 October 2025, Page 45, Column 86.
[2075] Bundle 52, Volume 4, Document 31, Page 144.
[2076] Bundle 52, Volume 4, Document 32, Page 148.
[2077] Transcript, Julie Critchley, 8 October 2025, Page 53, Column 102.
[2078] Bundle 52, Volume 7, Document 51, Page 453.

participants, Ms Critchley agreed that trust would need to build over time.[2079]

5.14 Developments in NHS GGC relevant to whistleblowing

1133. Professor Brown's view was that requiring someone to go through the management process to raise their concerns was unreasonable.[2080] He also thought that whistleblowing was there for people that do not feel confident to go through the management chain[2081]. He saw whistleblowing as a 'good thing' and a 'necessary thing' which should be supported[2082]. He acknowledged there were concerns that the whistleblowing process was not something people were being encouraged to use and that was why he instructed the review by Charles Vincent[2083].

1134. The inclusion of Mr Vincent Review in an inquiry bundle prompted Dr Peters to draw to our attention that a former colleague of hers, Dr Jenkins have been a Stage 3 whistleblower and was concerned that her stage 3 whistleblow was not included in Mr Vincent's review[2084]. Dr Jenkins is deceased, so we obtained a statement from her husband[2085]. It is not for this inquiry to investigate the substantive reasons behind Dr Jenkins' whistleblow. Before Mr Rough's statement was published the Inquiry understood from Dr Jenkin's emails[2086] that her whistleblow may well not have been included in Mr Vincent's review. Since his statement was published information supplied to us by NHS GGC suggest it may well be the case that information of its existence was passed to Mr Vincent[2087].

1135. On 27 March 2025 Health Improvement Scotland (HIS) published a review of the emergency departments at the Queen Elizabeth University Hospital, Glasgow Royal Infirmary and the Royal Alexandra Hospital (NHS Greater

[2079] Transcript, Julie Critchley, 8 October 2025, Page 50, Column 95.
[2080] Transcript, Professor John Brown, 3 October 2025, Page 18, Column 31.
[2081] Transcript, Professor John Brown, 3 October 2025, Page 16, Column 28.
[2082] Transcript, Professor John Brown, 3 October 2025, Page 16, Column 28.
[2083] Transcript, Professor John Brown, 3 October 2025, Page 16, Column 28.
[2084] Bundle 27, Volume 4, Document 13, Page 131; See her email of 24 March 2023: Bundle 52, Volume 8, Document 4, Page 47 and email of 5 May 2023: Bundle 52, Volume 5, Document 18 at Page 94.
[2085] Glasgow 4, Part 3 - Witness Statements, Volume 6, Andrew Rough, Document 2.
[2086] Bundle 52, Volume 5, Document 18, Page 94.
[2087] A54680896 - Bundle 52, Volume 11, Document 4 and Glasgow 4, Part 3, Witness Statements, Volume 8, Elaine Vanhegan, Document 7.

Glasgow and Clyde Emergency Department Review Final Report March 2025) ("the HIS Review")[2088] which included consideration of issues raised between 2021 and 2023 in a series of written and in-person exchanges between the emergency medicine consultants and NHS GGC senior management which ultimately led to the escalation to HIS of concerns over "Leadership and Culture". With its report HIS published a statement[2089] in which it reported that it had found:

> "A lack of compassionate, respectful and positive leadership at all levels of the organisation, especially in responding to concerns by staff."

1136. NHS GGC issued a press release on the day of the publication of the review[2090] in which it was reported that the new Medical Director, Dr Scott Davidson, Nurse Director Professor Angela Wallace and the new Chief Executive Professor Gardner had "pledged to listen to staff and to work collaboratively and respectfully to tackle the challenges we face and to build trust between staff of all levels".

1137. At an Additional Board Meeting of NHS GGC on 23 April 2025 Professor Gardner presented a paper[2091] for what was described as a "new strategic improvement programme – The GGC Way Forward Programme". The draft minutes of the of 23 April 2025 record an apology from the Chair of NHS GGC, Dr Lesley Thomson KC that it was "wholly unacceptable" that emergency medicine consultants were required to raise issues externally in May 2023 and an apology from you that "the organisation did not respond more effectively when concerns were raised and staff had to escalate concerns".[2092]

5.15 The Evidence of Professor Gardner on 9 October 2025

1138. On the penultimate day of evidence, the new Chief Executive of NHS GGC, Professor Jann Gardner, gave evidence. Professor Gardner's position on many of the issues considered by the Inquiry was strikingly different from that

[2088] Bundle 51, Volume 1, Document 7, Page 904.
[2089] Bundle 52 Volume 7, Document 50, Page 450.
[2090] Bundle 52, Volume 2, Document 40, Page 572.
[2091] Bundle 52, Volume 2, Document 36, Pages 549 and 552.
[2092] Bundle 52, Volume 2, Document 37, Page 559.

taken by earlier NHS GGC witnesses. Given the significance of her evidence, we summarise it here.

5.15.1 Management and Assurance

1139. Professor Gardner took up her post in February 2025, having previously held senior leadership roles in several other health boards[2093]. She was aware of the issues in NHS GGC before she accepted the post[2094], but explained that whilst the ongoing public inquiry and issues with QEUH were in the spotlight, there were many other challenges. NHS GGC is the largest NHS board in Scotland, serving 1.5 million patients, and containing national as well as regional services[2095]. Her role involved building public confidence and creating a supportive environment for staff, while overseeing the four key aspects of workforce, finance, performance and clinical safety[2096].

1140. When it was suggested to her that there had been a practice in NHS GGC that a general manager would work on the basis that, if matters were not reported to them by their reporting lines, then nothing was wrong, she was clear that assurance was both proactive and reactive, the former involving regular monitoring and reporting, and the latter requiring escalation procedures when issues arise. She received assurance through documented evidence, data monitoring, and scheduled reporting. When an issue arises that cannot be resolved at a lower level it is escalated through management tiers to executive or board level for decision or intervention. Both aspects of assurance were part of the governance structure, she was operating at NHS GGC[2097].

5.15.2 Reporting of HAIs to NHS Assure

1141. Professor Gardner first became aware of issues with IPC reporting to ARHAI in April 2025, when it transpired that NHS GGC were using a version of the Incident Management Process Framework which did not align with the

[2093] Transcript, Professor Jann Gardner, 9 October 2025, Page 30, Column 56.
[2094] Transcript, Professor Jann Gardner, 9 October 2025, Page 28, Column 52.
[2095] Transcript, Professor Jann Gardner, 9 October 2025, Page 29, Columns 53-54.
[2096] Transcript, Professor Jann Gardner, 9 October 2025, Page 28, Column 52.
[2097] Transcript, Professor Jann Gardner, 9 October 2025, Pages 32-35, Columns 59-66.

National IPC Manual[2098]. This was the point when Version 3[2099] of the NHS GGC IPC Framework replaced Version 2[2100].This was resolved, but in July 2025, she learned from Dr Davidson that ARHAI had requested detailed information on *Cryptococcus* cases (which had been the subject of evidence in this Inquiry in November 2024), which had been delayed for several months; Dr Davidson having been contacted by the Medical Director of NSS. Professor Gardner queried why it had taken so long for NHS GGC to respond, and asked Professor Wallace to expedite the return of the information required. She was unable to obtain a clear, good, explanation why it took an intervention from both Dr Davidson and her for the return to be made. While there were concerns being raised within the team, they were not reasonable[2101].

1142. In August 2025 Professor Gardner received a letter from Caroline Lamb, the Director General of Health and Social Care[2102], expressing concern that NHS GGC had not reported these *Cryptococcus* cases to ARHAI, requesting further information and assurance that the matter had been escalated properly to the board, requesting assurance that reporting complied with the national IPC manual, and recommending root cause analysis to identify a potential cluster. Professor Gardner then asked more questions of her colleagues to understand better the circumstances and to assure herself that the root cause had been considered. In her response to the DG[2103], Professor Gardner sought to explain the delay and to reassure ARHAI that clinicians were involved in the decision-making and data collection, as well as to explain that due to the hospital's patient population, sporadic *Cryptococcus* cases could occur. She attached an SBAR prepared by the NHS GGC IPC Team from November 2024[2104], which was critical of "the whistleblowers, ARHAI and experts appointed by the Public Inquiry" for "sensationalising" these *Cryptococcus* cases. She maintained that she had sent the SBAR to Caroline

[2098] Transcript, Professor Jann Gardner, 9 October 2025, Pages 38-39, Columns 72-74.
[2099] Bundle 52, Volume 7, Document 61, Page 486.
[2100] Bundle 27, Volume 17, Document 28, Page 315.
[2101] Transcript, Professor Jann Gardner, 9 October 2025, Pages 40-41, Columns 75-78.
[2102] Bundle 52, Volume 5, Document 31, Page 145.
[2103] Bundle 52, Volume 5, Document 32, Page 146.
[2104] Bundle 52, Volume 5, Document 32, Page 148.

Lamb for 'transparency,' but acknowledged that the tone was undiplomatic and that this could have damaged trust, albeit this was not her intention.

1143. The 2018 work of Dr Kennedy on *Cryptococcus* infections[2105] was put to her, showing that there had been no cases of *Cryptococcus* in the renal population of NHS GGC over a nine-year period. This was contrasted with the terms of her letter which stated that "The occurrences of spread of *Cryptococcus* in specific patient cohorts on this campus are expected, although occur infrequently." She accepted that this should have been clarified and that she would now write the letter differently. [2106]

1144. Professor Gardner repeatedly acknowledged that these events disclosed tension between the IPCT team and ARHAI[2107], that these were concerning and need to be resolved. To counter this she explained that NHS GGC were working on version 4 of the IPC Framework and, following the agreement between her and the Chief Executive of NSS[2108], had instigated weekly meetings with ARHAI which had resulted in the SBAR of 19th September 2025[2109]. There was also a programme of restorative organisational development. To be effective this must be sensitive, skilful, and make use of external support.[2110]

5.15.3 Whistleblowing and Term of Reference 4

1145. When asked about the criticism of "the whistleblowers" in the November 2024 SBAR, Professor Gardner recognised that NHS GGC has experts in different parts of its system, that they have had different professional opinions expressed through this period, and that NHS GGC needs to listen to people. She did not condone the tone or content of what was said in the SBAR[2111], but when asked whether attaching this SBAR to a letter to the DG would actually create more distrust between NHS GGC and the whistleblowers she

[2105] Bundle 24, Volume 3, Document 3, Page 19.
[2106] Transcript, Professor Jann Gardner, 9 October 2025, Pages 42-57, Columns 79-110.
[2107] Transcript, Professor Jann Gardner, 9 October 2025, Pages 36, 52-54 and 68, Columns 68, 99, 102-104 and 131.
[2108] Bundle 52, Volume 7, Document 48, Page 453.
[2109] Bundle 52, Volume 7, Document 60, Page 483.
[2110] Transcript, Professor Jann Gardner, 9 October 2025, Pages 57-61, Columns 109-117.
[2111] Transcript, Professor Jann Gardner, 9 October 2025, Page 54, Column 103.

did not appear to accept that proposition[2112]. When asked whether it was valid for Dr Peters, Dr Redding, Dr Peters and others to raise the patient safety issues they had, Professor Gardner sought to frame the response by reference to scientific experts being brought in to try to help understand the picture[2113]. Since taking up her appointment, Professor Gardner had not attempted to speak to any of the whistleblowers because of the existence of the Inquiry, but maintained that she had:

> "… been trying to understand the different component parts of this. We're working through what is right today in terms of making sure our system is safe, but I think that is a piece that will absolutely have to be addressed as part of this, and I would intend to do so as part of this as we go forward."[2114]

1146. In March 2025, shortly after Professor Gardner took up her post, Health Improvement Scotland (HIS) published a review of the emergency departments at the Queen Elizabeth University Hospital, Glasgow Royal Infirmary and the Royal Alexandra Hospital.[2115] The report noted failings in leadership and culture. NHS GGC made a number of responses to the Review, including a press release on the day of its publication[2116], a paper to the NHS GGC Board on 23 April 2025[2117], and a "new strategic improvement programme – The GGC Way Forward Programme". A press release was then issued[2118]. The draft minutes of the Additional Board Meeting of 23 April 2025 record an apology from the Chair, Dr Lesley Thomson KC, that it was "wholly unacceptable" that emergency medicine consultants were required to raise issues externally in May 2023, and an apology from Professor Gardner that "the organisation did not respond more effectively when concerns were raised and staff had to escalate concerns"[2119].

1147. Professor Gardner accepted that there were parallels between the events

[2112] Transcript, Professor Jann Gardner, 9 October 2025, Pages 62-63, Columns 119-121.
[2113] Transcript, Professor Jann Gardner, 9 October 2025, Pages 64-66, Columns 123-128.
[2114] Transcript, Professor Jann Gardner, 9 October 2025, Page 68, Column 131.
[2115] Bundle 51, Volume 1, Document 7, Page 904.
[2116] Bundle 52, Volume 2, Document 40, Page 572.
[2117] Bundle 52, Volume 2, Document 36, Page 549.
[2118] Bundle 52, Volume 2, Document 38, Page 566.
[2119] Bundle 32, Volume 2, Document 37, Page 559.

leading up to the HIS report and the events surrounding the whistleblow[2120] She said:

> "the fact that people can't be heard in their own organisation and have to either whistleblow or indeed go to Health Improvement Scotland, or any other, shows some level of failing of us as an organisation, that we have not been able to adequately support our staff to raise points and to be heard to a level that is satisfactory."[2121]

1148. Professor Gardner also saw it as important that those who raise concerns are involved in the implementation of actions to address those concerns, and that it is not acceptable for an organisation to just say, "We know about that. We're in the process of doing something."[2122]

1149. She described the NHS GGC Way Forward Programme as a multi-layer programme that reflects a collective commitment to learning, improvement, and building a stronger, more compassionate NHS Greater Glasgow and Clyde. An essential component of the programme is the commissioning of external expertise to help to improve culture, trust, professional relationships and leadership culture. This includes psychological support and/or occupational health referral where appropriate as well as facilitation, mediation and career conversations.[2123]

1150. Professor Gardner acknowledged that Dr Redding and the other whistleblowers had raised serious safety issues and expressed regret that they had felt unheard and unsupported over several years[2124]. When asked, she personally apologised to the whistle-blowers, recognising the distress caused to them, although she did not have the authority to issue a formal apology on behalf of the full board[2125]. She also acknowledged past communication failures and described ongoing efforts to improve this[2126].

[2120] Glasgow 4, Part 3 - Witness Statements, Volume 2, Professor Jann Gardner, Document 2, Page 52, response to Q1.
[2121] Transcript, Professor Jann Gardner, 9 October 2025, Page 78, Column 151.
[2122] Transcript, Professor Jann Gardner, 9 October 2025, Pages 79-80, Columns 154-156.
[2123] Glasgow 4, Part 3 - Witness Statements, Volume 2, Professor Jann Gardner, Document 2, Page 52, response to Q1.
[2124] Transcript, Professor Jann Gardner, 9 October 2025, Page 81, Columns 157-158.
[2125] Transcript, Professor Jann Gardner, 9 October 2025, Pages 82-83, Columns 159-162.
[2126] Transcript, Professor Jann Gardner, 9 October 2025, Page 99, Column 193.

5.15.4 The NHS GGC attitude to the CNR

1151. As described in detail elsewhere, the CNR concluded that a significant number of infections were possibly or probably linked to the built environment, while also making a series of recommendations. Professor Gardner's understanding was that that NHS GGC accepted the findings of the CNR, as well as the recommendations, citing Professor Stevens' comments that that while definitive sources were lacking, the strong possibility of a link was undeniable[2127]. It was put to her that NHS GGC did not accept these findings, and that, according to their Positioning Paper from April 2023,[2128] there were only two cases which they accepted could be linked to the environment. Professor Gardner acknowledged that parents had not been informed, and that, when she assumed her role, she was not told that NHS GGC did not accept the CNR findings[2129]. When asked if it was still the NHS GGC position that only two discrete infections were linked to the built environment,[2130] Professor Gardner said that neither the CNR nor the HAD report came to a clear position, and it was necessary to define the different elements from both.[2131]

1152. When asked about the instruction of the HAD Report, Professor Gardner considered that it was a reasonable and prudent step to take, both for legal reasons and for patient safety. It was intended to complement, not to replace the CNR and to provide technical assurance of the risk. She acknowledged that the omission of consideration of control measures was a limitation[2132]. She also acknowledged the potential for causing distress to families but insisted this was not intentional and that NHS GGC were acting in good faith to promote patient safety.[2133]

5.15.5 Closing Remarks

1153. Professor Gardner asked to make closing remarks. She expressed

[2127] Transcript, Professor Jann Gardner, 9 October 2025, Pages 84 and 88, Columns 163 and 171.
[2128] Bundle 25, Document 9, Page 345.
[2129] Transcript, Professor Jann Gardner, 9 October 2025, Pages 85-87, Columns 165-170.
[2130] Bundle 25, Document 9, Page 345.
[2131] Transcript, Professor Jann Gardner, 9 October 2025, Page 98, Column 191.
[2132] Transcript, Professor Jann Gardner, 9 October 2025, Page 89, Column 173.
[2133] Transcript, Professor Jann Gardner, 9 October 2025, Page 87, Column 169.

appreciation for the work of the Inquiry in public accountability and transparency during a challenging period. She acknowledged the stress and distress experienced by families, staff, and especially whistleblowers, and emphasised that in 2025 NHS GGC had become more humble, diligent, and committed to improvement.[2134] She repeated her support for national surveillance via ARHAI, and a standardised reporting system for the built environment to enable comparisons across Scotland. While issues in Glasgow are serious, they are not isolated, and better support systems are needed for whistleblowers and staff. She praised the clinical excellence of NHS Greater Glasgow and Clyde (GGC) and expressed hope that the Inquiry will help restore public trust.[2135]

[2134] Transcript, Professor Jann Gardner, 9 October 2025, Page 101, Column 197.
[2135] Transcript, Professor Jann Gardner, 9 October 2025, Page 101, Column 197.

6. CHAPTER 6 - STATUTORY REGULATION AND GUIDANCE

6.1 Introduction

1154. Term of Reference 1B for the Inquiry requires consideration of key building systems which were defective, in the sense of not conforming to relevant statutory regulation and other applicable recommendations, guidance, and good practice. The purpose of this chapter is to identify the statutory regulation and other applicable recommendations, guidance, and good practice, other than those set out in evidence of expert or skilled witnesses in the Inquiry hearings, that apply to the water and ventilation systems of the QEUH/RHC, before and during its construction and whilst it is being operated.

1155. Whilst some of this material in respect of ventilation systems has been considered in the Interim Report, all references in this chapter have been adjusted to refer to Glasgow Hearing Bundles, where possible.

1156. Whether there has been a failure to comply with relevant statutory regulations and other applicable recommendations, guidance, and good practice and whether that has, or may adversely impact on patient safety and care, by increasing the risk of infection to certain groups of patients, is considered in subsequent chapters.

6.1.1 Scottish Health Technical Memoranda

1157. The principal series of guidance documents that apply to both, the water and ventilation systems of the QEUH/RHC, are Scottish Health Technical Memoranda. This section is taken from paragraphs 5.53 to 5.56 as to the basis and origin of these documents.

1158. NHS guidance documents setting national built environment quality standards for a general hospital have a history almost as old as the NHS itself. Currently, the principal examples of such documents for Scotland are, the Scottish Health Technical Memoranda (SHTMs), a suite of publications issued and from time to time revised and reissued by HFS[2136]. There is also a series of

[2136] Edinburgh 2 - Witness Statements, Bundle 13, Document 20, Pages 454-457, Paras 12-20.

engineering-specific SHTMs. The series is introduced by SHTM 00: Best practice guidance for healthcare engineering. In the preface to the February 2013 version,[2137] it is explained that:

> "Scottish Health Technical Memoranda…give comprehensive advice and guidance on the design, installation and operation of specialised building and engineering technology used in the delivery of healthcare. The focus of SHTM guidance remains on healthcare-specific elements of standards, policies and up-to-date established best practice. They are applicable to new and existing sites and are for use at various stages during the whole building life cycle. The focus of SHTM guidance remains on healthcare-specific elements of standards, policies and up-to-date established best practice. Healthcare providers have a duty of care to ensure that appropriate engineering governance arrangements are in place and are managed effectively. The Scottish (Engineering) Health Technical Memoranda [series] provides best practice engineering standards and policy to enable management of this duty of care … Healthcare-specific technical engineering guidance is a vital tool in the safe and efficient operation of healthcare facilities. Scottish Health Technical Memoranda guidance is the main source of specific healthcare-related guidance for estates and facilities professionals".

1159. SHTM 00 continues:

> "Only by having a knowledge of these requirements can the healthcare organisation's Board and senior managers understand their duty of care to provide safe, efficient, effective and reliable systems which are critical in supporting direct patient care. When this understanding is achieved, it is expected that (in line with integrated governance proposals) appropriate governance arrangements would be put in place, supported by access to suitably qualified staff to provide this 'informed client' role, which reflect these responsibilities."

1160. In the Edinburgh 1 hearing, Mr Edward McLaughlan gave evidence as to how SHTMs are developed. He is the former Assistant Director of HFS. The process involves cooperation between HFS and the equivalent bodies in England, Wales and Northern Ireland. Most frequently, the relevant guidance originates with Health Technical Memoranda produced on behalf of the Department of Health in England, but in other instances HFS may take the

[2137] Edinburgh 2 - Bundle 1, Document 1, Page 3.

lead. To produce guidance, the best expertise is recruited. Drafting tends to be in the hands of authorising engineers, but other relevant disciplines are also involved, both in drafting and carrying out the underlying research. Approval of guidance is through stakeholder groups, by representing the best expertise available to NHS Scotland on each topic. There are currently four stakeholder groups: one each for Heating and Ventilation, Water, Electrical, and Medical Gases. Members of the groups are nominated by engineering leads for each territorial health board, through the Scottish Engineering Technology Advisory Group. In addition, the groups are at liberty to recruit anyone else they see fit. Once a draft has been approved by the relevant stakeholder group, with or without modification, it is put out for wider consultation, following which a final version is put to the stakeholder group for final agreement.[2138] Ms Critchley confirmed that NHS Assure are working on a review of SHTM 03-01 and 04 01. While they are collaborating with colleagues in other parts of the UK, they would not feel vetoed from issuing their revised version(s) first.[2139]

6.2 Hospital water systems

1161. The water system in place at QEUH and RHC was the subject of considerable expert evidence during the hearings at the Glasgow 3 phase of this Inquiry, and our submissions following Glasgow 3 included discussion of regulation guidance, good practice,[2140] and the administration of the water system in the period after handover in 2015[2141]. This chapter does not intend to repeat that work. Its purpose is to present an overview of the requirements imposed by regulations and guidance on the functioning of the water system.

6.2.1 Regulation: Water

1162. In Scotland, the requirement on delivery of water is that it be “wholesome”, defined as 'water fit to use for drinking, cooking, food preparation or washing

[2138] Edinburgh 1 - Witness Statements, Edward McLaughlan, Document 2, Page 15, Paragraphs 17-26. Further detail on the process of developing SHTMs is provided in NHS Scotland Assure Response 12 February 2024 - Edinburgh 3 - Bundle 13, Volume 10, Document 25, Page 299.
[2139] Transcript, Julie Critchley, 8 October 2025, Page 69, Columns 133-134.
[2140] CTI Closing Statement, Glasgow 3, Chapter 7.1, Pages 549-582.
[2141] CTI Closing Statement, Glasgow 3, Page 564, Para 128 onwards.

without any potential danger to human health'.[2142]

1163. The design, maintenance and operation of the water system within a hospital is subject to specific detailed regulation and guidance, including Scottish Health Technical Memorandum ("SHTM") 04-01, parts A to G, issued by Health Facilities Scotland ("HFS"), discussed below. However, such a system is also subject to regulatory controls which exist more widely, and these include:

    a. Legionnaires' disease, the control of *legionella* bacteria in water systems, Approved Code of Practice and guidance on regulations, L8, issued by the Health and Safety Executive ("HSE");

1164. HSG274, Legionnaires' disease Part 2: The control of *legionella* bacteria in hot and cold water systems, also issued by the HSE; and

    a. The Health and Safety at Work Act 1974.

6.2.2 Guidance: Water systems

1165. The NHS produces specific standards for the management of water systems in healthcare settings, being titled as SHTM 04-01 in Scotland, with an equivalent HTM 04-01 applying in England & Wales. Together, these draw the areas described below, with the mechanism being minimisation of risks to health, via the implementation of specific recommendations, and management of a system via key institutions of Water Safety Groups (WSGs) as well as Water Safety Plans (WSPs), and together these synchronise the general legislative guidance of L8 (2013) and HSG 274 with the healthcare specific standards of HTM 04-01[2143].

1166. As the knowledge surrounding operation of, and risks arising from water systems has developed, the SHTM guidance regime has consolidated. NHS Scotland maintains guidance for Scottish hospitals to assess the risks of waterborne pathogens such as *Legionella* and *Pseudomonas aeruginosa*. That guidance is to be found in documents providing comprehensive advice

[2142] Water Supply (Water Quality) (Scotland) Regulations 2001, Reg. 4 (revoked by the Public Water Supplies (Scotland) Regulations 2014, Reg.50(1)(b) as of 1 January 2015).
[2143] Bundle 21, Volume 1, Document 6, Section 3, Pages 354, 370.

and guidance about the governance, legal requirements, design applications, maintenance and operation of hot and cold-water supply, storage and distribution systems including the risk from outlets in hospitals[2144].

1167. It is recognised that, while hospital water supplies will not be sterile, systems should be designed, controlled and managed in such a way as to prevent waterborne infections. Failures to take such measures have been identified as contributory factors in past outbreaks of Legionnaires' disease[2145].

1168. In his evidence, during hearings that concerned the Edinburgh hospitals, the expert witness Mr Poplett set out his view as to how, in general, the English HTM guidance should be treated:

> "I believe that the HTMs in various elements serve as both best practice and minimum standards. Overall, I personally consider them as an approved code of practice. So, in my expectation and experience, again going back to the water equivalent, I would consider the HTMs to be of equivalent standing to L8 is in water; so it's not legislative, it's not mandatory in and of itself, however you need to be able to demonstrate compliance or a reason for non-compliance and measures that have been taken equal or better than the standard."[2146]

1169. The HTM guidance is published on an approximately ten-year cycle, with scope for an addendum to be published in the event of a particularly significant development, such as the one that followed the Northern Irish *Pseudomonas* outbreak in 2011-12, leading to a *Pseudomonas* addendum and to subsequent publication of the water HTM guidance in three parts rather than two[2147].

1170. In Scotland, SHTM 04-01 was first published in 2006, having been preceded by SHTM 2027 from June 2001, on Overview and management responsibilities of hot and cold water supply, storage and mains services, and by SHTM 2040 from December 1999, on Overview and management responsibilities on the control of *Legionella* in healthcare premises.

[2144] Bundle 21, Volume 1, Document 5, Section 2.3, Page 197.
[2145] Bundle 21, Volume 1, Document 5, Section 2.3, Page 197.
[2146] Transcript, Andrew Poplett, 10 May 2022, Pages 48-49, Columns 92-93.
[2147] Edinburgh 1 - Bundle 6, Document 4, Page 97, Para 66.

1171. Duties in respect of water systems under the guidance fall on Management (defined as 'the owner, occupier, employer, general manager, chief executive or other person who is ultimately accountable'). Management has the overall responsibility for the implementation of procedures, ensuring the operation of a safe, reliable hot and cold water supply, storage and distribution system, and is also responsible for the provision of a wholesome water supply in the relevant premises, under its authority.

1172. All premises are required to have a *Legionella* risk assessment and a written scheme for controlling any identified risks in accordance with the Health and Safety Executive's Approved Code of Practice L8.[2148]

1173. Management is required to appoint, amongst others:

    a. a 'Designated Person';

    b. an 'Authorising Engineer' to provide an annual audit to the Designated Person; and

    c. a 'Legionella Risk Assessor' to provide a *Legionella* Risk Assessment which should be reviewed on an annual basis.

1174. A WSG and a WSP are to be in place, including a risk assessment which should be reviewed on an annual basis.[2149]

1175. The WSG is a multi-disciplinary group of those involved in the management of water systems, typically including the Director/Head of Estates, the Estates Responsible Person (Water) and other key representatives as and when required.[2150]

1176. The WSP is a series of modules providing guidance and procedures for the effective management of hospital water systems. A Water Safety Plan (WSP) provides information on matters such as Legionnaires Disease, Pontiac fever, the relationship between waterborne pathogens and temperature, who is at risk and legal responsibilities. The WSP also typically contains guidance relating to "*Pseudomonas aeruginosa*", and advice for augmented care

[2148] Bundle 15, Document 5, Pages 394 and 405, Paras 2.1 and 5.1.
[2149] Bundle 15, Document 5, Page 414, Para 5.28.
[2150] Bundle 21, Volume 1, Document 6, Page 387, Para 3.1.3.

units.[2151]

6.3 Hospital Ventilation Systems

1177. Chapter 5 of the Interim Report considered Ventilation in Healthcare Premises and reviewed the legislation and guidance relevant to the provision of ventilation systems in hospitals[2152]. It is not intended to revisit this, other than to the extent necessary to take account of the guidance that was in place at the time the QEUH/RHC was being procured, designed and built (and only to the extent that this differs from what was applicable to the RHYCP in Edinburgh.)

6.3.1 Regulation: Ventilation

1178. Hospital ventilation systems are the subject of detailed regulation. This includes:

a. Control of Substances Hazardous to Health Regulations 2002 ("COSHH")

b. Management of Health and Safety at Work Regulations 1999

c. The Workplace (Health, Safety and Welfare) Regulations 1992

d. The Provision and Use of Work Equipment Regulations 1998

e. Building (Scotland) Regulations 2004

f. Mechanical Ventilation, Environment (Non-domestic buildings) Technical Handbook 2017, and

g. The Health and Safety at Work Act 1974 ("HASWA 1974").

1179. The HASWA 1974 is the core legislation that applies to ventilation systems[2153].

1180. The COSSH regulations place obligations upon management to ensure that suitable measures are in place to protect staff, and others affected by work activity. These measures may include both, safe systems of work and the

[2151] Bundle 21, Volume 1, Document 6, Page 388, Para 3.1.4.
[2152] Scottish Hospitals Inquiry Interim Report - The Royal Hospital for Children and Young People and Department of Clinical Neuroscience, Edinburgh, 3 March 2025, Chapters 5.38-5.56, Pages 128-134.
[2153] Bundle 16, Document 5, Page 352, Para 1.7.

provision of a specialist ventilation system. Where specialist ventilation plant is provided as part of protection measures, there is a statutory requirement that it be correctly designed, installed, commissioned, operated and maintained [2154].

1181. As explained in paragraph 5.41 of the Interim Report, The Building (Scotland) Regulations 2004 set standards for buildings in Scotland. Building Standard 3.14 concerns Ventilation which states that:

> "Every building must be designed and constructed in a way that ventilation is provided so that the air quality inside the building is not a threat to the building or the health of the occupants".

1182. In Scotland, section 3.14.5 of the Mechanical Ventilation, Environment (Non-domestic buildings) Technical Handbook 2017, provides that at least eight litres/second of fresh air per occupant should be provided. There is no further specification as to the air quality for a building such as a hospital. The Buildings Standards Technical Handbook does not contain any references to published guidance or associated standards. That contrasts with the regime in England, where, the Building Regulations 2010 introduce the concept of "Approved Documents". These set out, in ordinary circumstances, what may be accepted as one way to comply with the Building Regulations. For example, Approved Document Part F, "Ventilation requirements vol 2", contains specific reference to published guidance such as Health Technical Memorandums as a method of complying with the Building Regulations.

1183. The 'eight litres/second of fresh air per occupant' standard has the potential to be of significance in the context of QEUH/RHC, in a way that did not apply to the RHCYP in Edinburgh. This is because the single-patient rooms of the hospital were, as a consequence of the Agreed Ventilation Derogation, supplied with air at 40 litres per second. Fiona McCluskey, Senior Nurse Advisor to the Project Team, explained in her evidence that, just days before the derogation was approved, she was asked to provide a nursing assessment of how many people could be in a ward bedroom at any given time. After discussion, she "came up with a sort of average of five". Five

[2154] Bundle 16, Document 5, Page 352, Para 353, Para 1.10.

people in such a room would amount to a supply of eight litres/second of fresh air per occupant. With more than five occupants, the supply would fall below that required by the Mechanical Ventilation, Environment (Non-domestic buildings) Technical Handbook 2017.

6.3.2 Guidance: Ventilation

1184. Relevant guidance that applies to the ventilation systems of hospitals includes:

a. SHPN 04: In-patient accommodation: Options for choice (May 2000)[2155]

b. SHPN 54 Facilities for Cancer Care Centres (January 2002)[2156]

c. SHPN 04 Supplement 1: Isolation facilities in acute settings (September 2008)[2157]

d. Draft SHTM 03-01 (January 2009) Part A[2158];

e. Draft SHTM 03-01 (January 2010) Part B[2159];

f. Approved Code of Practice on the Prevention or Control of *Legionellosis* published by the Health and Safety Commission and Scottish Health Technical Memorandum SHTM 04-01 – The control of *Legionella*, hygiene, “safe” hot water, cold water and drinking water systems.

1185. The Draft SHTM 03-01 (January 2009) was incorporated into the contract by the ERs, which expressly stated that Multiplex shall comply with the documents listed as 'NHS Mandatory Documentation' and have regard to 'NHS Guidance Documentation'. The draft SHTM 03-01 Part A, SHTM 03-01 Part B and SHFN 30 were listed under 'NHS Mandatory Documentation'[2160].

1186. It is also highlighted that ventilation systems are intended to prevent contamination, closely control the environment, dilute contaminants, or contain hazards, and that the very presence of ventilation systems indicates

[2155] Bundle 16, Document 1, Page 4.
[2156] Bundle 16, Document 2, Page 102.
[2157] Edinburgh 3 - Bundle 13, Volume 3, Document 10, Page 290.
[2158] Bundle 16, Document 5, Page 342.
[2159] Bundle 46, Volume 3, Document 3.1.2, Page 663.
[2160] Bundle 46, Volume 3, Document 1, Page 29, Clause 5.1.2.

that risks to health have been identified[2161]. One of the factors to determine the ventilation requirements of a workspace is dilution and control of airborne pathogenic material[2162].

1187. All ventilation systems should conform to the principles set out in the 'Approved Code of Practice on the Prevention or Control of *Legionellosis'* published by the Health and Safety Commission, and Scottish Health Technical Memorandum SHTM 04-01 – The control of *Legionella*, hygiene, "safe" hot water, cold water and drinking water systems[2163].

SHTM 2025

1188. Ventilation began to be considered within healthcare in the 1960s, which resulted in an HBN being produced at that time for England and Wales[2164]. Work was then undertaken by Dr Lidwell on ventilation in healthcare settings, in the 1970s. By 1983, a publication called DV4 was issued that covered ventilation for operating departments and was the precursor to HTM 2025[2165].

1189. In 1994, an HTM 2025 was published in England and Wales. SHTM 2025, published in Scotland in the same year, and updated as version 2.0 in June 2001, was the first Scottish guidance relating to ventilation in a healthcare setting. While containing detailed information concerning operating theatres, it also provided more general guidance in relation to hospital ventilation systems.

1190. From 1990s onwards, the guidance has been updated on a periodic basis to take into account technological changes, practice changes and clinical activity changes[2166]. While there was no specific reference ACH in SHTM 2025, it did state that specific requirements for individual spaces and departments were included in the "Activity Database (ADB) A-Sheets".[2167]

1191. SHTM 2025 was superseded by SHTM 03-01 for Part A in February 2013 and

[2161] Bundle 46, Volume 3, Document 2.1, Page 250, Clause 1.7.
[2162] Bundle 46, Volume 3, Document 2.1, Page 252, Clause 1.20.
[2163] Bundle 16, Document 5, Page 353, Para 1.12.
[2164] Transcript, Andrew Popplett, 10 May 2022, Page 41, Column 78.
[2165] Transcript, Andrew Popplett, 10 May 2022, Page 41, Column 78.
[2166] Transcript, Andrew Popplett, 10 May 2022, Page 42, Column 79.
[2167] CTI Closing Statement, Edinburgh, Page 17, Para 50.

Part B in October 2011. However, a draft of SHTM 03-01 was in existence in 2009 for consultation and was included as applicable guidance in the contract for the construction of the QEUH/RHC[2168].

SHPN 04

1192. The Scottish Health Planning Note In-patient accommodation: Options for choice ("SHPN 04") was applicable from May 2000, until it was archived in October 2010. It provided guidance on the planning and design of hospital accommodation for people with acute illness or who required an acute intervention. The purpose of SHPN 04 was to inform decisions made during the planning of a project or for evaluating a design solution[2169]. It stated that immuno-compromised patients may require to be nursed in a positively pressured environment, while patients who present a risk of infection to others would normally be nursed in a negatively pressured environment[2170]. Single rooms were required to show the pressurisation status of each room and allow local control to alter the pressurisation of each room from positive to negative[2171].

SHPN 54

1193. The Scottish Health Planning Note 54: Facilities for Cancer Care Centres ("SHPN Note 54"), required air-conditioning to be capable of at least 7 ACH[2172].

SHPN 04 Supp 1

1194. The Scottish Health Planning Note 04 Inpatient Accommodation: Options for Choice Supplement 1: Isolation Facilities in Acute Settings ("SHPN 04 Supp 1"), was issued by HFS in September 2008[2173]. It provided guidance regarding the provision of single rooms within general wards, so as to allow the isolation of patients, for reasons which include both where the patient is susceptible to infection from other sources and where a patient presents an

[2168] Edinburgh 1 - Bundle 6, Documents 3 and 4, Pages 72 and Page 101, Para 9.
[2169] Bundle 16, Document 1, Page 11, Para 1.1.
[2170] Bundle 16, Document 1, Page 19, Para 2.24.
[2171] Bundle 16, Document 1, Page 58, Para 5.33.
[2172] Bundle 16, Document 2, Page 225.
[2173] Bundle 23, Document 94, Page 945.

infection risk to others. It recommended 10 ACH,[2174] and (in respect of a new build) a lobby between the bedroom and the ward corridor, maintained at 10 pascals of positive pressure relative to both, the bedroom and the corridor[2175]. However, it contained an explicit exclusion that:

> This Supplement does not describe the specialist facilities required in infectious disease units or on wards where severely immunocompromised patients are nursed.

1195. SHPN Note 04 Supp 1 then explained that guidance was to follow in a further supplement, but no further supplement was ever issued. SHPN Note 04 Supp 1 covers some of the same ground as a Department of Health Paper, HBN 04-01 Supplement 1: Isolation facilities for infectious patients in acute settings,[2176] which also contains exclusions that are relevant to the situation faced by the designers of the QEUH/RHC[2177] :

> This Heath Building Note does not describe the specialist facilities required in high security infectious diseases units, isolation wards for cohorting groups of infectious patients, protective isolation for severely immuno-compromised patients, critical care areas and special care baby units.

1196. As will become apparent when reviewing the Multiplex tender submission, and in particular, Specification for Ventilating Systems within Volume 4,[2178] there is no such document as 'SHBN 04' that might be relevant to Isolation Rooms.

Draft SHTM 03-01 Parts A (2009) and Draft SHTM 03-01 Part B (2010)

1197. Mr Poplett considered HTMs and their Scottish counterparts SHTMs to serve as best practice and minimum standards. He considered them as an approved code of practice, albeit not mandatory in and of themselves[2179]. Mr Bennett explained that there should be some form of written evidence, and a rationale, for any decision that has an impact on infection control or the design, and the cost of the hospital building. In his view, the HTM 03-01/SHTM 03-01

[2174] Edinburgh 2 - Bundle 1, Document 5, Page 534.
[2175] Edinburgh 2 - Bundle 1, Document 5, Page 518.
[2176] Edinburgh 1 - Bundle 2, Document 11, Page 859.
[2177] Edinburgh 1 - Bundle 2, Document 11, Page 868, Para 1.6.
[2178] Bundle 17, Document 10, Page 456.
[2179] Transcript, Andrew Poplett, 10 May 2022, Pages 48-49, Columns 91-93.

guidance is the bible and should be followed[2180]. He further argued that anyone building a hospital ventilation system would be using the SHTM 03-01 or HTM 03-01. If, a different approach were taken than set out in the guidance, then in Mr Bennett's view, an explanation for the differences would be required[2181].

1198. SHTM 03-01 is the technical memorandum which deals with the design, installation, testing and validation of ventilation systems. In light of the overview of engineering services guidance provided in chapter 2 of SHTM 00, it is "best practice guidance on the design and installation of ventilation systems and the close control (mechanical cooling or air conditioning) of general and 'specialised' healthcare environments."[2182]

1199. During the QEUH and RHC project, SHTM 2025 was in force, but NHS GGC chose to apply the draft SHTM 03-01 Draft for Consultation to the project. After that consultation, SHTM 03-01 was ultimately issued in October 2011. Design parameters for new installations of ventilation systems (whether in new hospitals or existing buildings) are set out in Part A. Part B deals with the operational management of systems. For present purposes, therefore, the draft 2009 version of Part A is the most relevant. The intent is that, Parts A and B together lay out "comprehensive advice and guidance to healthcare management, design engineers, estate managers and operations managers on the legal requirements, design implications, maintenance and operation of general and specialised ventilation in all types of healthcare premises."[2183]

1200. Part A deals with design and validation of ventilation systems both generally and in relation to "specialised ventilation," where certain activities require the provision of equipment with features that enable the achievement and maintenance of specific conditions. This may be required, for example, to remove smells, dilute contaminants and ensure that a supply of 'fresh air enters a space.' Among the departments listed as requiring specialised ventilation are, critical areas, high-dependency units of any type, and isolation

[2180] Transcript, Allan Bennett, 31 October 2024, Page 28, Column 52.
[2181] Transcript, Allan Bennett, 31 October 2024, Page 25, Column 46.
[2182] Edinburgh 2 - Bundle 1, Document 1, Page 16, Para 2.9.
[2183] Edinburgh 1 - Bundle 1, Document 9, Page 627.

facilities[2184].

Appendix 1 – Table A1

Application	Ventilation	AC/Hour	Pressure (Pascals)	Supply Filter	Noise (NR)	Temp (oC)	Comments For further information see Section 6
General ward	S / N	6	-	G4	33	18-28	
Communal ward toilet	E	10	-ve	-	45	-	
Single room	S / E / N	6	0 or –ve	G4	33	18-28	
Single room WC	E	3	-ve	-	45	-	
Clean utility	S	6	+ve	G4	45	18-28	
Dirty utility	E	6	-ve	-	45	-	
Ward Isolation room	-	-	-	-	-	-	See HBN 4; Supplement 1
Infectious disease Iso room	E	10	-5	G4	33	18-28	Extract filtration may be required
Neutropeanic patient ward	S	10	+10	H12	33	18-28	
ITU / HDU	S	10	+10	G7	33	*18-25*	Isolation room may be –ve press
Maternity delivery room	S & E	15	-ve	G4	45	*18-25*	Provide clean air flow path
SCBU	S	6	+ve	F7	33	*18-25*	Isolation room may be –ve press
Preparation room (Lay up)	S	>25	35	F7*	50	*18-25*	*H12 if a lay up for a UCV Theatre
Preparation room / bay (SPS)	S	25	25	F7	50*	*18-25*	*55NR if a bay in a UCV Theatre
Operating theatre	S	25	25	F7	50	*18-25*	
UCV Operating theatre	S	25	25	H12	55	*18-25*	Fresh air rate; excludes re-circulation
Anaesthetic room	S & E	15	12	F7	50	*18-25*	Provide clean air flow path
Sluice	E	>20	-5	-	50	-	
Recovery room	S & E	15	0	F7	45	*18-25*	Provide clean air flow path
Cardiac catheterisation lab	S	15	+ve	F7	50	*18-22*	
Endoscopy room	S	15	+ve	F7	50	*18-25*	
Endoscopy cleaning	E	>10	-ve	-	50	-	

[2184] Bundle 16, Document 5, Page 483.

1201. As can be seen, Table A1 is presented in the form of a grid. Twenty-nine possible applications for spaces within a hospital (of which nineteen appear in the above extract from the table) are listed vertically. Against each application, six design parameters are set out, together with related comments for some of the applications. The design parameters are: ventilation (in the sense of being one or more of supply ("S"), extract ("E"), natural ("N") or a combination of these); ACH; pressure (expressed as a differential from an adjacent space); type of filter on the supply; noise rating; and temperature. The ventilation for a "General ward" is supply and extract, with an air-change rate 6 ac/h and no pressure differential. For a "Single room," ventilation is supply, extract and natural, with an air change rate of 6 ac/h and a balanced or negative pressure differential. Among the other applications, "Ward isolation room" has no figures for air-change rate or pressure differential set against it in the respective parameters, but a reference in the comments section "see SHPN 4: Supplement 1". "Infection disease iso room" has extract ventilation, 10 ac/h and 5 pascals of negative pressure; "Neutropenic patient ward" has supply ventilation, 10 ac/h and 10 pascals of positive pressure; and "Critical Care Areas" have supply ventilation, 10 ac/h and 10 pascals of positive pressure[2185].

1202. The inclusion of specific air change rates was an innovation in SHTM 03-01. The table reproduced above did not appear in SHTM 2025. It was introduced in the draft March 2009 SHTM 03-01 (subsequently published in October 2011) that specific ACH for particular spaces in a hospital were set out in Scottish guidance. In that sense, the concept of air change rates may be thought to have been new in the Scottish context at the time of the QEUH and RHC project. However, it was already being used in a wider UK context. HTM 03-01 (the equivalent of SHTM 03-01 issued by the (English) Department of Health)[2186], which incorporated at Appendix 2 a table almost identical to the one contained in SHTM 03-01, had been published in 2007. The table and specification of air change rates set out in the draft SHTM 03-01 (2009),

[2185] Bundle 16, Document 5, Page 483.
[2186] Bundle 19, Document 36, Page 712.

incorporated into the ERs of the contract between NHS GGC and Multiplex could not, therefore, have come as a surprise to those working in the industry.

1203. Part B of SHTM 03-01 provides for annual inspection and verification of ventilation systems. It is specifically written for the operation of all ventilation systems, irrespective of age or design standard. It is about how those systems are operated rather than whether the original installation was compliant[2187]. It is Part B of SHTM 03-01 that sets out the standard against which Mr Poplett conducted his Authorising Engineer Audit in respect of the ventilation system.

1204. As part of the criteria for that, Part B refers back to Table A1 in Part A and states that, on periodic inspection and verification, critical ventilation systems (which include those in critical care departments) should achieve not less than 75% of the design air change rate given in Table A1, or its original design parameters[2188].

6.4 Infection Prevention and Control Guidance

1205. As explained in Chapter 7 of the Interim Report, the Healthcare Associated Infection System for Controlling Risk in the Built Environment (HAI-SCRIBE) provides a framework around which potential infection risks associated with a proposed site development, design and planning, construction or refurbishment and ongoing maintenance of healthcare facilities can be identified, assessed and subsequently managed or mitigated[2189].

1206. There is a distinction between the versions of the HAI-SCRIBE that applied to the RHCYP/DCN and those that applied to the new SGH Project.

1207. SHFN 30 Version 3 "Infection Control in the Built Environment: Design and Planning[2190] was issued in June 2007 and was in force during Stages 1 and 2 of the Construction Contract. SHFN 30 (2007) contains the explanation that it should also be seen as a reference guide, for use in conjunction with the HAI-SCRIBE (Healthcare Associated Infection System for Controlling Risk in the

[2187] Transcript, Andrew Poplett, 16 September 2025, Page 21, Column 38.
[2188] Bundle 46, Volume 3, Document 3.1.2, Page 690, Paras 4.16-4.18.
[2189] Scottish Hospitals Inquiry Interim Report - The Royal Hospital for Children and Young People and Department of Clinical Neuroscience, Edinburgh, 3 March 2025, Section 7.69.
[2190] Edinburgh 3 - Bundle 13, Volume 3, Document 16, Page 553.

Built Environment) then being updated[2191] which is Version 2, June 2007[2192].

1208. The use of HAI-SCRIBE was mandated by CEL 18 (2007) dated 13 December 2007[2193]. This stated that “SHFN 30 [and] HAI-SCRIBE…is a mandatory requirement for all NHS Scotland capital projects and maintenance/refurbishment projects. This requirement takes immediate effect.” SHFN 30 was also listed in 'NHS Mandatory Documentation' in the ERs for the new SGH[2194].

6.4.1 SHFN 30 Version 3[2195]

1209. The purpose of the Note is clear:

> 1.1 This document is a revision of Scottish Health Facilities Note 30 (SHFN 30): ‘Infection Control in the built environment: design and planning’ which was published in 2002. The need for a revised document has become increasingly apparent in light of the determined focus being applied to reducing Healthcare Associated Infections (HAIs). This focus has highlighted the need for initial, rigorous examination of proposals for new build healthcare facilities, extensions to healthcare facilities, and refurbishment of healthcare facilities in relation to prevention and control of infection. Having highlighted the need for a rigorous examination of proposals in relation to new healthcare facilities, good practice also requires an ongoing audit of existing healthcare facilities.
>
> 1.2 SHFN 30 is intended to guide and stimulate thinking on the planning and execution of new construction and refurbishment works in all types of healthcare facilities.
>
> 1.3 The document is aimed at all those involved in the provision of new or refurbished facilities and aims to ensure that prevention and control of infection issues are identified, analysed and planned for at the earliest stage of a project.

1210. The section entitled "Purpose of this document" explains:

[2191] Edinburgh 3 - Bundle 13, Volume 3, Document 16, Page 559, Para 1.5.
[2192] Bundle 27, Volume 6, Document 3, Page 29.
[2193] Edinburgh 3 - Bundle 13, Volume 3, Document 16, Page 553.
[2194] Bundle 46, Volume 3, Document 1, Page 29, Clause 5.1.2.
[2195] Edinburgh 3 - Bundle 13, Volume 3, Document 16, Page 554.

> 2.10 The document's principal aim is to provide information on the prevention and control of infection, and on the prevention of cross-infection and cross contamination in healthcare facilities, to those responsible for the planning, design, and maintenance of such facilities. It is imperative that those involved in these processes have a sound knowledge of prevention and control of infection in the built environment.

1211. In our Closing Statement following Glasgow 3, we discussed the requirement to carry out a HAI-Scribe at commissioning and expressed the view that there is an expectation or requirement that an HAI-Scribe process will be carried out on the commissioning of a new building[2196]. We did not reach the conclusion as to whether a Stage 4 HAI-Scribe for the new QEUH/RHC was completed at or around handover.

1212. Section 3 of SHFN 30 (2007) identified the different roles in the project team by reference to the Scottish Capital Investment Manual (SCIM). It had a section entitled " Importance of experience and understanding of prevention and control of infection in the Project Team," which begins with this clear statement:

> 3.4 Due to its multi-factorial nature, knowledge and understanding of HAI is not only necessary for Infection Control Specialists. There is a necessity for all staff involved in the procurement, design, construction and maintenance of the healthcare facility to be appropriately educated in prevention and control of infection.

1213. Three reasons are given for the importance of IPC input. They are that such input will help ensure that:

> • health and safety needs in terms of limiting the risk of infection of the occupants, healthcare workers and building contractors, are met during the project;
>
> • the building design features will minimise the risk of transmission of infection;
>
> • important design issues are considered at the project planning stage to avoid costly modification at a later stage.

[2196] CTI Closing Statement, Glasgow 3, Section 3.10, Page 207, Paras 39-40.

1214. Topics addressed in SHFN 30 (2007) include:

a. exposure to airborne micro-organisms such as *Aspergillus*[2197],

b. proper design and maintenance of ventilation systems[2198];

c. provision, where appropriate, of negative pressure ventilation[2199];

1215. There is a specific section which deals with the roles and responsibilities of the project team and others[2200]. Sections of SHFN 30 provide specific guidance on 'Evaluation of site for development'[2201], 'Design and planning stage'[2202], and 'Construction/Refurbishment Stage'.[2203]

6.4.2 HAI-SCRIBE (Healthcare Associated Infection System for Controlling Risk in the Built Environment), Version 2, January 2007[2204]

1216. In respect of its relevance to new building projects such as the new hospital, the introduction is absolutely clear:

> … The built environment includes existing buildings used for healthcare purposes and new build projects, and the intention is to apply HAI-SCRIBE from the design and planning through to the occupation and operation of the facility.
>
> There are three key stages involved in HAI-SCRIBE:
>
> • identify the hazard;
>
> • assess the risk from the identified hazard;
>
> • manage the risk to eliminate or minimise its impact.
>
> The application of the three key stages of HAI-SCRIBE are aided by a range of questions which are appropriate for particular development stages of the

[2197] Edinburgh 3 - Bundle 13, Volume 3, Document 16, Page 567, Para 3.9.
[2198] Edinburgh 3 - Bundle 13, Volume 3, Document 16, Page 569, Para 3.15.
[2199] Edinburgh 3 - Bundle 13, Volume 3, Document 16, Page 569, Para 3.15.
[2200] Edinburgh 3 - Bundle 13, Volume 3, Document 16, Page 570, Paras 3.20-3.22.
[2201] Edinburgh 3 - Bundle 13, Volume 3, Document 16, Pages 582-584, Chapter 8.
[2202] Edinburgh 3 - Bundle 13, Volume 3, Document 16, Pages 585-629, Chapter 9.
[2203] Edinburgh 3 - Bundle 13, Volume 3, Document 16, Pages 630-638, Chapter 10.
[2204] Bundle 27, Volume 6, Document 3, Page 29.

healthcare facility. The scenarios within the development and maintenance of the healthcare facility to which the question sets apply are:

• proposed site for development;

• design and planning;

• construction and refurbishment;

• ongoing maintenance.

Care needs to be taken to ensure that the System does not become a mechanical 'box-ticking' exercise, but rather a rigorous questioning and auditing of proposals and of operating facilities.

In assessing the risk from the identified hazards, and in determining how to manage the risk to eliminate or minimise its impact, the nature of exposed population is a critical consideration.[2205]

1217. The document describes four stages in the delivery of a new build project, identifies key issues and lists questions to be considered when carrying out an HAI-SCRIBE at each stage. It does not allocate responsibility for the implementation of HAI-SCRIBE to any individual at any particular stage. Arguably, it diffuses responsibility by stating that:

Implementation of HAI-SCRIBE should be the responsibility of a multidisciplinary team of specialists with appropriate skills, and may include:

• an architect;

• a building services engineer;

• an infection control specialist;

• a risk manager;

• an estates/facilities manager;

• other appropriate specialists.[2206]

[2205] Bundle 27, Volume 6, Document 3, Page 32.
[2206] Bundle 27, Volume 6, Document 3, Page 33.

6.4.3 Updated version of SHFN 30 Part B, Version 3.0, October 2014[2207]

1218. The updated version of HAI-SCRIBE is substantially clearer. It provides clearer questions, template questionnaires and allocates responsibility directly to key people. It states that the Project Owner/Sponsor is the responsible officer for the Stage 1 HAI-SCRIBE at "Initial Brief and proposed site for development", and that the Project Manager is the responsible officer for the remaining HAI-SCRIBE stages, including Stage 4[2208].

[2207] Bundle 27, Volume 4, Document 35, Page 365.
[2208] Bundle 27, Volume 4, Document 35, Page 379, Section 2.2.

7. CHAPTER 7 - POTENTIALLY DEFICIENT FEATURES OF THE HOSPITAL

7.1 Selection of Potentially Deficient Features

1219. Term of Reference 1 requires the Inquiry to consider "key building systems which were defective in the sense of (a) not achieving the outcome or was capable of the function for which it was intended, or (b) not conforming to relevant statutory regulation and other applicable recommendations, guidance, and good practice". Those key building systems are the Potentially Deficient Features ("PDF"), initially described in Direction 5 and further identified in Sections 7.1 and 7.2 of our Closing Statement following the Glasgow 3 hearing; PPP 11: Potentially Deficient Features of the water system of the QEUH and the RHC[2209], PPP 12: Potentially Deficient Features of the ventilation system of the QEUH and the RHC[2210] and PPP 14: QEUH/RHC Isolation Rooms[2211].

1220. In the contract between NHS GGC and other parties, to plan, design, construct and commission the hospital, 'defect' is a term defined as a part of the works which is not in accordance with the Works Information, or part of the works designed by the Contractor, not in accordance with the applicable law or the Contractor's design which the Employer's Project Manager has accepted[2212]. That definition is therefore different from the concept of a PDF.

1221. Whilst the Inquiry Team has considered a wide range of PDFs, we now focus on a subset of those PDFs that have the potential to be particularly significant in respect of the impact they appear to have had on patient safety and care. Whether they actually have impacted on patient safety and care, and whether they did or do provide a suitable environment for the delivery of safe, effective person-centred care is discussed in Chapter 10.

7.2 Potentially Deficient Features of the Water System

1222. The water system was the subject of considerable expert evidence during

[2209] Bundle 26, Document 1, Page 3.
[2210] Bundle 26, Document 2, Page 113.
[2211] Bundle 26, Document 4, Page 271.
[2212] Bundle 17, Document 13, Page 756.

the hearings at the Glasgow 3 phase of this Inquiry. Our submissions following Glasgow 3 included observations and submissions on that evidence[2213], as well as on the substantive evidence given by witnesses as to the operation of, and observations on, the water system in practice. Topics covered included the effect of the build phase, methods of controlling microbial growth, the administration of the system, materials and features used in it, and overall safety[2214].

1223. The whole of the new build QEUH/RHC was, and remains, supplied by a single domestic water system. The identified PDFs of the water system comprise a mix of design features, failures of control or management before handover, and failures of control or management after handover. The PDFs are considered in those groups.

7.2.1 Design features as Potentially Deficient Features

Size of water system

1224. In our submissions following the Glasgow 3 hearings,[2215] we identified the very size of a water system as raising complexities of its own, because it increases complexity, which is further increased by the single-room philosophy increasing the number of outlets.[2216] It brings with it a need to distinguish between patient cohorts to identify those more vulnerable and in more need of protection.[2217]

1225. The size of the system increased the 'dead legs' issue where the 'last two metres' of any system present a risk of stagnation.[2218] The hot water system, in particular, posed an issue due to the length of spurs from the circulating loops to outlets, and time taken for those to clear and hot water to flow.[2219] Similar difficulties arose for control, particularly where thousands of outlets

[2213] CTI Closing Statement, Glasgow 3, Chapter 7.1, Pages 549-582.
[2214] CTI Closing Statement, Glasgow 3, Pages 552, 557, 564, 570 and 577 respectively.
[2215] CTI Closing Statement, Glasgow 3, Page 570, Paras 153-158.
[2216] Transcript, Dr Thomas Makin, 27 August 2024, Pages 21 and 28, Columns 37-38 and 52.
[2217] Transcript, Dr James Walker, 6 November 2024, Page 48, Column 92.
[2218] Transcript, Dr James Walker, 6 November 2024, Page 83, Column 162.
[2219] Transcript, Dr James Walker, 6 November 2024, Page 71, Column 138 and Transcript, Andrew Poplett, 8 November 2024, Page 34, Column 63.

were involved,[2220] and multiple systems might allow for better control, particularly where high-risk patients are involved.[2221]

1226. A single system, such as at QEUH, carried benefits by reducing the need for storage (and thereby locus for contamination) or for ancillary facilities, but introduced the risk of a single point of failure, as well as raising the issue of a vastly increased number of outlets, carrying a consequent risk of disused outlets or dead legs, each being potential sites for contamination. The 'single room' philosophy at QEUH also carried inefficiencies in terms of numbers of staff required for.[2222]

Use of copper for pipework instead of stainless steel

1227. The specification for the water system was stainless steel pipework, to reflect SHTM guidance. However, there was visible copper pipework in the form of 'tails'/'spurs'. This was a relatively small part of the overall pipework, the majority being behind walls.[2223] [2224] It seems probably that these were ultimately removed by some point in 2018 as part of the process of following up the outstanding issues in the 2015 DMA Canyon L8 Risk Assessment[2225].

1228. Pitting is a type of corrosion that can be found in in copper pipes, which creates small but deep cavities linked to soft water and sediment, which encouraged microbial biofilms and accelerated corrosion.[2226] These risks prompted guidance to replace copper with stainless steel in healthcare water system.[2227]

Use of EPDM Flexible hoses

1229. These are a method of connection between fixed pipework and outlets, particularly moveable equipment such as showers. Although prohibited in the QEUH, they were found to be present[2228]. The specific problem was that

[2220] Transcript, Susanne Lee, 10 September 2024, Pages 55-56, Columns 106-108.
[2221] Transcript, Susanne Lee, 10 September 2024, Page 56, Column 108.
[2222] Transcript, Andrew Poplett, 8 November 2024, Pages 8-9, Columns 11-14.
[2223] Transcript, Dr James Walker, 6 November 2024, Pages 13-16, Columns 22-27 and Bundle 6, Document 30, Page 416.
[2224] CTI Closing Statement, Glasgow 3, Page 571, Para 159.
[2225] Transcript, Melville MacMillan, 5 September 2024, Page 42, Column 79.
[2226] Bundle 21, Volume 1, Document 5, Page 267.
[2227] Bundle 21, Volume 1, Document 5, Page 224.
[2228] Transcript, Andrew Poplett, 8 November 2024, Page 40, Column 76.

flexible fabric, a black rubberised carbon material called EPDM, served as a locus of growth for bio-organisms, due to its rougher surfaces providing gaps and holes for organic material to colonise, and certain ingredients within the material itself serving as nutrition.[2229]

One way Expansion vessels

1230. The expansion vessels in the hot water system were made of the same EDPM material present in flexible hoses and were designed so as to form dead-ends in the system[2230] [2231]. These were found to be "heavily, heavily contaminated," including with biofilm.[2232] Routine work was underway to replace these in 2023[2233] and remained outstanding in January 2024[2234], but appears to have been completed between then and July 2025[2235].

Use of Horne Optitherm Taps

1231. Around 2012 Dr Walker was a senior water expert within Public Health England dealing with water microbiology, and risk related to water systems within buildings. He was approached to assist with an outbreak of *Pseudomonas aeruginosa* in Northern Ireland, specifically by investigating internal tap components. He expressed concerns about components which increased surface area available for organisms to grow. Flow straighteners and aerators were specifically identified. As well as providing a high surface area, they also trapped debris, providing nutrition and locus for biofilm. Water flow then acted to distribute this when the taps were switched on.[2236] He was present at the 6 June 2014 meeting about the Horne Optitherm Taps.[2237]

1232. The specific problems which he identified were:

- the presence of flow straighteners within the taps, complicated plastic devices with a large surface area upon which organisms could grow, this

[2229] Transcript, Dr James Walker, 6 November 2024, Pages 20-23, Columns 36-41.
[2230] Bundle 21, Volume 1, Document 6, Page 421, Para 5.11.18.
[2231] CTI Closing Statement, Glasgow 3, Page 572, Para 160.
[2232] Transcript, Dr James Walker, 6 November 2024, Pages 73 and 80, Columns 142 and 156.
[2233] Bundle 26, Document 1, Page 65, Section 13.8.
[2234] Bundle 27, Volume 1, Document 18, Page 255.
[2235] Bundle 53, Document 3, Page 29.
[2236] Transcript, Dr James Walker, 6 November 2024, Pages 4-5, Columns 4-6.
[2237] Bundle 15, Document 9, Page 692.

being in particular a risk for *Pseudomonas*, as well as a trap for debris;[2238] and

- the specific mechanism within the Horne taps, whereby the mixing arrangement created a significant risk that the cold water channel would remain largely unused, and hence effectively a deadleg, with consequent risk of biofilm.[2239]

1233. Dr Walker's view was that those problems could be addressed via risk management arrangements, such as regular flushing, but in the event, he was unaware of it being discussed in the meeting around his presentation, although "They decided to retain the taps, and therefore they would have had to implement some form of control strategy".[2240]

1234. Mr Poplett's evidence on taps was relatively straightforward. The principal risk factor was in taps being over-complicated, by containing components or fittings which created a risk of colonisation by micro-organisms.[2241]

1235. Dr Surman-Lee noted that soap residue on tap outlets or point-of-use filters can act as a nutrient source for *Pseudomonas* and other organisms, increasing the risk of microbial growth and contamination.[2242]

1236. Tap risk is a matter of consensus. As early as February 2012 the Chief Medical Officer identified flushing of taps as among the measures required to address the risk of *Pseudomonas* from hand washing facilities[2243]. In March 2013, the Department of Health issued a specific addendum to HTM 04-01 which inter alia expressly mentioned the risk posed by the greater surface area of incorporated flow straighteners serving as a locus for colonisation and growth of organisms[2244]. In 2018 HPS guidance specifically identified thermostatic mixing devices and automated taps as types whose complex internal structuring risked harbouring micro-organisms and biofilm[2245].

[2238] Transcript, Dr James Walker, 6 November 2024, Pages 26 and 28-30, Columns 48 and 52-56.
[2239] Transcript, Dr James Walker, 6 November 2024, Pages 31-35, Columns 58-65.
[2240] Transcript, Dr James Walker, 6 November 2024, Page 39, Column 74.
[2241] Bundle 21, Volume 1, Document 6, Pages 417-421, Paras 5.11.13 - 5.11.16.
[2242] Glasgow 3 - Witness Statements, Volume 4, Dr Susanne Lee, Document 2, Page 37.
[2243] Bundle 27, Volume 3, Document 36, Page 622.
[2244] Bundle 44, Volume 4, Document 4, Page 32, Para 3.9.
[2245] Bundle 18, Volume 2, Document 74, Page 111.

7.2.2 Failures of control or management before handover as Potentially Deficient Features

Absence of precautions during build phase

1237. In their 2015 Legionella Risk Assessment, DMA Canyon identified a number of errors during the build phase, which had led to waterborne pathogens becoming present in the water system, including pipe ends being left uncapped.[2246] This was also a hypothesis identified in at least three HPS and HFS reports prepared after the start of the Water Incident[2247].

1238. The issue of whether 'Contamination' was the right word to describe what was found during the investigations in the Water Incident in 2018, and therefore what took place during the build phase is discussed in some detail in Chapter 4. Prior to handover the concern is both the possibility that external material such as debris or sediment was introduced, and a further concern that, due to lack of proper management, microorganisms were allowed to proliferate beyond the expected level at which they might be expected to be there:

> "[wholesome water becomes contaminated] where it's not managed, where the risk assessments are not implemented, where the planned preventive maintenance is not undertaken, where the staff are not trained, where there's a lack of communication between staff, then the risks which have been identified in the system are not addressed … Where the line crosses is where you provide opportunities for growth of those organisms … where you provide nutrient sources which otherwise would not have been there and you provide temperatures for the optimal growth of those micro-organisms, you will raise the level of number and concentration of bacteria to a level that would be considered unsafe"[2248]

1239. Keeping pipework capped appropriately is "basic stuff."[2249] Pipes should be sealed rather than left open to the elements:

[2246] Bundle 21, Volume 1, Document 5, Pages 205-207, Table 2.
[2247] Bundle 7, Document 1, Page 3, Page 10; Bundle 7, Document 2, Page 32, Page 46; Document 4, Page 70, Page 145.
[2248] Transcript, Dr James Walker, 6 November 2024, Pages 55-57, Columns 106-109.
[2249] Transcript, Andrew Poplett, 8 November 2024, Page 44, Column 83.

> "It shouldn't be left outside in the mud and contaminated. Once installed, at the end of each period of installation, ends should be, again, sealed ... The biggest problem is soil, which is absolutely laden with bacteria, but also open ends. Where you are doing other building works in the area, you will create dust, you will release fungal spores, you will potentially open it to any manner of contaminants."[2250]

1240. Leaving pipes open-ended during a build phase:

> "…means they're not actually looking after the components that they're going to be building the system with, and it allows for dust, nutrients, insects, potential rodents to get into the pipework and leave nutrients behind, and those nutrients then will provide a food source for bacteria and other microorganisms to feed on."[2251]

1241. There have been numerous examples of the water system being left open in hospital build phases, resulting in contamination with proliferation occurring as soon as water is introduced, with problems emerging after around three years, as happened at the QEUH.[2252] In its 2018 reports HPS considered that contamination at installation due to the presence of contaminated pipework or outlets was a plausible hypothesis for the cause of widespread contamination of the water system[2253].

1242. It therefore appears likely that practices during construction with regard to maintenance/storage of pipes did contribute to contamination of the water system at QEUH. The expert witnesses and the Reports by HPS separately described the mechanism by which various sources of microbial organisms, and nutrients to enable growth, might have been allowed to enter the pipework.

Early filling of water system

1243. Filling a water system too early is known to create problems:

> "pre-filling water systems leads to contamination of the water system, leads to stagnation because these systems are traditionally filled but they're not flushed ...

[2250] Transcript, Andrew Poplett, 8 November 2024, Page 43, Columns 81-82.
[2251] Transcript, Susanne Lee, 10 September 2024, Page 68, Column 132.
[2252] Transcript, Dr Thomas Makin, 27 August 2024, Page 12, Column 19.
[2253] Bundle 7, Documents 1-2, Pages 10 and 46.

if it's just a stagnated system, then you have an ideal opportunity for areas of the system to provide areas where microbial growth will occur"[2254]

1244. A 'damp' system, namely one which had been wetted and then dried, is more likely to encourage proliferation than a completely wetted environment:

"Once the system is wetted, it should be kept wet, and we then use flushing to basically replicate the system being in use. So as soon as you've wetted the system, it then goes into a programme of all outlets being flushed on a regular basis to ensure avoidance of stagnation. There are no records present to say that that was undertaken during the construction stage having wetted the system, and, indeed, the system was wetted, drained, left for an extended period of time and re-wetted."[2255]

1245. A 'shock disinfection' should be carried out upon first wetting in order that the system start clean.[2256]

1246. This accorded with Mr Powrie's recall in Glasgow 3, of being concerned at the filling having happened nine months early, without filters, his feeling being that chemical treatment ought also to have been in place at that time.[2257]

1247. Dr Makin noted that twelve months was an "unusually long time" to have a water system filled in advance – not only did this allow contamination to occur, but it also allowed for the contamination to become established in the form of biofilm, which was particularly difficult to remove.[2258]

1248. Professor Steele described, upon his appointment in 2019, having reviewed the period of commissioning and concluding that the system had been compromised at the filling stage, being stagnant for a period thereby compromising the sterility of the pipework.[2259]

1249. The expert evidence in Glasgow 3 was unanimous that the early filling of the system, compounded by a lack of proper management between that point

[2254] Transcript, Dr James Walker, 6 November 2024, Page 75, Column 145.
[2255] Transcript, Andrew Poplett, 8 November 2024, Pages 42-43, Columns 80-81.
[2256] Transcript, Andrew Poplett, 8 November 2024, Page 49, Column 93.
[2257] Transcript, Ian Powrie, 22 August 2024, Page 23, Column 42.
[2258] Transcript, Dr Thomas Makin, 27 August 2024, Page 30, Column 55.
[2259] Transcript, Professor Thomas Steele, 4 October 2024, Page 55, Column 106.

and handover, resulted in the system suffering from contamination that would be the expected outcome[2260] [2261] [2262].

1250. Mr Poplett, in his July 2025 report on the water tests carried out by H&V in December 2014 and January 2015, reached the view that the approach taken towards filling the system, and testing it early in its wet state, was "sub-optimal and cannot be relied upon to provide appropriate assurance that the water systems were not potentially contaminated at the point of handover/disinfection". However, he also noted that due to the relative lack of testing results, it was ultimately not possible to reach a conclusion on the question of contamination at that stage[2263].

Lack of proper management of the filled water system prior to handover

1251. It was Mr Poplett's evidence in Glasgow 3, that best practice would be not to fill the system until all of the relevant maintenance processes were in place, the individuals who would be undertaking those processes up to handover had been suitably trained, records produced, and a water risk assessment (similar to what was carried out by DMA Canyon after handover) was in place[2264].

1252. There was no evidence that any of this was done. It appears to be the view of Multiplex and its contractors that it was the responsibility of NHS GGC to carry out a pre-occupation water risk assessment, and that the flushing systems and routines described by Mr O'Donovan[2265] were more than sufficient.

7.2.3 Failures of control or management after handover

1253. This has already been covered in some detail in Chapter 5 of the CTI Closing Statement follow Glasgow 3[2266].

[2260] Transcript, Andrew Poplett, 8 November 2024, Page 49, Column 93.
[2261] Transcript, Dr James Walker, 6 November 2024, Page 74, Column 144.
[2262] Transcript, Dr Thomas Makin, 27 August 2024, Page 11, Column 18.
[2263] Bundle 52, Document 3, Page 14, Paras 1.14.1-1.14.5.
[2264] Transcript, Andrew Poplett, 19 September 2025, Page 37, Column 69.
[2265] Transcript, Robert O'Donovan, 30 May 2025, Pages 29-30, Columns 38-39.
[2266] CTI Closing Statement, Glasgow 3, Chapter 5, Pages 215-223, Paras 57- 76.

Ineffective control of microbial growth within the water system

1254. The growth of biofilm is a constant hazard in a water system. The expert evidence in Glasgow 3, was that a water system is primarily controlled by a combination of temperature and movement, but that the larger the water system, the more difficult it is to control, which may suggest the use of a secondary control such as a biocide [2267]. The use of chemical agents to act against proliferation of micro-organism is not universally favoured - they can bring problems in terms of flexibility and longevity[2268], though they are becoming used more and more frequently in UK hospitals[2269] [2270] (which is consistent with the approach taken by DMA Canyon in their 2015 DMA Canyon L8 Risk Assessment)[2271].

1255. As we have previously noted, management of a water system is essential[2272], the key points being to keep hot and cold water within their respective temperature bands (above 55-60°C[2273]and below 20°C respectively[2274]) and to keep water moving (thereby removing water where proliferation may have occurred[2275]). Temperature alone is not sufficient to control *Pseudomonas aeruginosa*, which therefore necessitates regular flushing to remove contaminated water from the system.[2276] In general, flushing is a necessary measure[2277]. Dump valves could achieve this but had been identified as non-operational by DMA Canyon.[2278]

1256. Temperature control within the hot water system was an issue in 2015.[2279] There was a separate problem in the hot water 'control' system (i.e. the loop 'fuelling' the calorifiers, rather than the water destined for the outlets), which

[2267] CTI Closing Statement, Glasgow 3, Pages 557-559, Paras 99-106, Page 205, Para 32, Page 218, Paras 61-64.
[2268] Transcript, Andrew Poplett, 8 November 2024, Page 24, Column 44.
[2269] Transcript, Dr Thomas Makin, 27 August 2024, Page 9, Column 14.
[2270] Transcript, Dr Thomas Makin, 27 August 2024, Pages 9-10, Columns 13-15.
[2271] Transcript, David Watson, 19 August 2024, Pages 34-35, Columns 64-65.
[2272] Transcript, Dr James Walker, 6 November 2024, Pages 11-12, Columns 17-20.
[2273] Transcript, Dr James Walker, 6 November 2024, Page 13, Column 21.
[2274] Transcript, Dr James Walker, 6 November 2024, Page 13, Column 21.
[2275] Transcript, Dr James Walker, 6 November 2024, Pages 17-19, Columns 29-33.
[2276] Transcript, Andrew Poplett, 8 November 2024, Page 23, Column 42.
[2277] Transcript, Andrew Poplett, 8 November 2024, Page 25, Column 46.
[2278] Transcript, Dr James Walker, 6 November 2024, Page 69, Column 134.
[2279] Transcript, Dr James Walker, 6 November 2024, Page 70, Column 136: Transcript, Andrew Poplett, 8 November 2024, Page 35, Column 66.

at times failed to reach designed temperatures, hindering proper operation of air and water heating.[2280]

1257. One biocide, chlorine dioxide, works through physical contact with the organism, by penetrating bacterial and fungal cellular wall and denaturing viral proteins. If the organism is protected by being located within biofilm, the biocide is reduced in effectiveness[2281]. Biocides are used up by contact with the target, and hence movement of the water is essential to continually replenish with new water in which biocide levels are maintained[2282]. Although biocide measures can be 'highly effective', they remove flexibility to relax the use of other control measures and can damage pipework[2283]. Appropriate management is required, and particular care is needed in specialist areas where they can be harmful, such as in baby formula[2284].

1258. Once the decision was made to have temperature control as the primary control mechanism in this large water system, the failure to properly achieve that as identified by DMA Canyon in 2015 becomes, along with the decision not to fit a chemical dosing system as a secondary control system at the start, a potentially deficient feature.

Bypass pipe

1259. A bypass pipe was in place around the entry filtration system over a period of some months before April 2015, running from the mains supply into a point above the booster pipes, thereby allowing water intake to bypass filtration and storage tanks and allowing sediment, debris and bacteria into the water system.[2285] The purpose of the pipe is not clear.[2286] It may have been an ineffective means of filling the upper floors within the hospital, creating the risk of a prolonged period of stagnancy in those areas. [2287]

[2280] Transcript, Matthew Lambert, 21 August 2024, Page 60, Columns 115-116.
[2281] Transcript, Tim Wafer, 8 October 2024, Pages 57-58, Columns 110-112.
[2282] Transcript, Dr James Walker, 6 November 2024, Page 19, Column 33; Bundle 6, Document 29, Page 155.
[2283] Transcript, Kerr Clarkson, 20 August 2024, Page 20, Column 36; Transcript, Ian Powrie, 22 August 2024, Page 56, Column 108.
[2284]Transcript, Andrew Poplett, Glasgow 3, Pages 24-25, Columns 44-45; Transcript, Tom Makin, 27 August 2024, Page 52, Column 99.
[2285] Transcript, Dr James Walker, 6 November 2024, Pages 65-68, Columns 126-127 and 130-131.
[2286] Transcript, Andrew Poplett, 8 November 2024, Pages 27-28, Columns 50-51.
[2287] Transcript, Andrew Poplett, 8 November 2024, Page 59, Column 113.

1260. Due to the potential to allow contamination to get into the water system, and because of the potential Impact of stagnation on the upper floors, the use of the bypass pipe was a PDF.

Absence of a Water Safety Plan, Water Safety Group, Written Scheme

1261. In May 2015, the Board Infection Control Committee and SCART Steering Group approved a Water Systems Safety Policy. It allocated the senior roles and responsibilities to specific office-holders, such that the Chief Executive would act as Duty Holder, the Director of Facilities would act as Designated Person for Water, and so on[2288].

1262. The functions allocated to those roles were delineated in a sub-section for each role. These include responsibilities for particular pieces of guidance, specific tasks to be carried out, and relations with other designated roles and interested parties[2289].

1263. During the course of the Glasgow 3 hearing, the Inquiry learned of engagement between NHS GGC and DMA Canyon in the period 2015-2017. As part of that engagement DMA Canyon noted that no written scheme or water safety plan was in place[2290], and produced written scheme guidance[2291] [2292], but that was not implemented by NHS GGC, despite that being a key part of water system management[2293].

1264. The appointment of a site Water Safety Group, with responsibility for writing a Water Safety Plan, is an essential part of managing a water system[2294]. The Water Safety Group should be a nexus of executive individuals and operational staff[2295], co-ordinating responses as issues arise and keeping abreast of modifications.[2296] QEUH did not have those measures properly in place at the time of the 2015 and 2017 DMA Canyon L8 risk assessment

[2288] Bundle 27, Volume 1, Document 1, Page 5.
[2289] Bundle 27, Volume 1, Document 1, Page 7, Sections 3.1-3.10.
[2290] CTI Closing Statement, Glasgow 3, Page 217, Para 60.
[2291] Bundle 6, Document 29, Page 347, Section 10 'Written Scheme Guidance'.
[2292] Bundle 6, Document 30, Page 609.
[2293] CTI Closing Statement, Glasgow 3, Pages 564-565, Paras 128-130.
[2294] Transcript, Dr James Walker, 6 November 2024, Pages 46-47, Columns 88-90.
[2295] Transcript, Andrew Poplett, 8 November 2024, Page 17, Columns 29-30.
[2296] Transcript, Andrew Poplett, 8 November 2024, Page 17, Columns 29-30.

reports.

1265. A Written Scheme should set parameters for the water system , provide a pattern for checks and maintenance and be prepared as soon as the system is filled[2297], with the absence of the Scheme indicating that nobody was taking proper responsibility for its operation.[2298] The Written Scheme is now in place and comprehensive[2299].

1266. The Inquiry heard evidence during the Glasgow 3 hearing on the merging of the Water Safety Plan with the Written Scheme for water, to create a comprehensive Written Scheme[2300]. A series of updates to that scheme have been made, continuing up to the present day, with Mr Clarkson being of the view that the NHS GGC scheme now exceeded the required standard[2301].

1267. There was no Authorised Person for the QEUH/RHC as late as 2017.[2302] The responsibility for the water system lies in the first instance upon the Duty Holder; if delegated to a Designated Person, that person should be at Board level, with responsibility to ensure that the other appointees are appointed. The Water Safety Group and both its co-chairs had not taken note of the absence.[2303]

1268. We have already extensively covered this potentially deficient feature in CTI's Closing Statement following Glasgow 3. That the system had been operated for three years without formal assessment of competency of those involved, raised doubts around the satisfactoriness of maintenance activities, monitoring, and allocation of responsibility during that time[2304]. In light of Mr Calderwood's evidence about his lack of knowledge of his responsibility as Duty Holder for water for NHS GGC, the failure by the Board Water Safety Group, both its Co-Chairs and Mr Gallacher to appoint a site Water Safety

[2297] Transcript, David Watson, 19 August 2024, Pages 55, Column 106.
[2298] Transcript, David Watson, 19 August 2024, Pages 12-13, Columns 19 and 22.
[2299] Transcript, Andrew Poplett, 8 November 2024, Pages 61-62, Columns 117-120.
[2300] CTI Closing Statement, Glasgow 3, Page 565, Para 131.
[2301] CTI Closing Statement, Glasgow 3, Page 518, Para 1034.
[2302] Transcript, Dr James Walker, 6 November 2024, Page 75, Column 146.
[2303] Transcript, Andrew Poplett, 8 November 2024, Pages 20-21, Columns 36-37.
[2304] Transcript, Andrew Poplett, 8 November 2024, Page 64, Column 123; Transcript, Dennis Kelly, 27 August 2024, Page 75, Column 145; Transcript, Colin Purdon, 20 August 2024, Page 64, Column 124.

Group, and to ensure a site Water Safety Plan or Written Scheme existed is a significant potentially deficient feature of the QEUH/RHC.

The 2015 DMA Canyon L8 Risk Assessment

1269. The level of defects in the 2015 DMA Canyon L8 Risk Assessment was described as “completely unacceptable … The fact is that, in a brand-new system, there shouldn't have been issues to be addressed”.[2305] The 2017 DMA Canyon L8 Risk Assessment recorded many of the same issues as had already been flagged by DMA in their 2015 Risk Assessment.[2306] – the system was “improved, but still not compliant”, compounded by the negative reports from 2018 throughout RHC and QEUH creating a picture of systemic contamination and unsafeness in.[2307] A great number of issues identified in the 2015 DMA Canyon L8 Risk Assessment remained unaddressed at that time, when they should have been actioned before occupation.[2308]

1270. As discussed extensively in our Closing Statement following Glasgow 3, the failure to implement the recommendations of the 2015 DMA Canyon L8 Risk Assessment was a PDF of the management of the water system.

Lack of record-keeping

1271. This arose in a number of ways. DMA Canyon identified that the absence of records meant it was not possible for the managers of a system to demonstrate that it was being operated properly.[2309] They also never succeeded in obtaining from NHS GGC full records of commissioning of the water system.[2310] There was a lack of records relating to training and competency,[2311] and a lack of recording of remedial action and temperature recording.[2312] 'Haphazard' recording also meant an inability to satisfy the reader that tasks had been carried out properly to ensure a safe system, such

[2305] Transcript, Andrew Poplett, 8 November 2024, Page 45, Column 86.
[2306] Transcript, Dr James Walker, 6 November 2024, Page 76, Column 147.
[2307] Transcript, Dr James Walker, 6 November 2024, Page 78, Column 151.
[2308] Transcript, Kerr Clarkson, 20 August 2024, Page 14, Columns 23-24.
[2309] Transcript, David Watson, 19 August 2024, Page 55, Columns 106.
[2310] Transcript, David Watson, 19 August 2024, Page 16, Columns 27-28.
[2311] Bundle 21, Volume 1, Document 5, Page 285, Para 6.2.1.
[2312] Bundle 21, Volume 1, Document 5, Page 293, Para 6.7.1.

as with *Legionella* sampling at QEUH to 2017.[2313]

Asset register, Planned Preventative Maintenance ('PPM')

1272. Proper PPM requires that those doing servicing know where all the items to be serviced are, with guidance requiring that an asset register checklist be maintained for all associated plant, pumps, strainers, outlets and other relevant items.[2314] At QEUH, 'asset tagging', which allows tracking of individual items, was not completed until 2017, meaning that PPM took longer and became more difficult to do.[2315] Just as with lack of record keeping, the failure to operate an accurate asset register or a comprehensive system of PPM is a PDF of the management of the water system.

7.3 Potentially Deficient Features of the Ventilation System

1273. The ventilation system supplied air to different parts of the hospital in different ways. The ventilation requirements depend on how the space is used[2316]. A ventilation system which is critical to the effective operation of a given area is a specialised ventilation system[2317]. A special ventilation system is ventilation equipment with additional special features to achieve and maintain specific conditions[2318]. An example of using a specialised ventilation system, would be areas accommodating neutropenic patients with weakened immune systems who are vulnerable to infection[2319].

1274. The potentially deficient features are ultimately reviewed below by considering each ward in turn (in similar manner to the approach followed in the review of potentially deficient features in PPPs 12 and 14).

    a. The ventilation of different parts of the QEUH/RHC delivers different outputs. It is of assistance to consider the ventilation systems of:

[2313] Transcript, Dennis Kelly, 27 August 2024, Page 85, Column 165.
[2314] Transcript, Dr James Walker, 6 November 2024, Page 48, Column 91: Bundle 21, Volume 1, Document 5, Page 303, Para 6.14.
[2315] Transcript, Ian Powrie, 22 August 2024, Page 26, Column 47; Transcript, Ian Powrie, 22 August 2024, Page 26, Column 47.
[2316] Transcript, Andrew Poplett, 10 May 2022, Page 10, Column 16.
[2317] Transcript, Andrew Poplett, 10 May 2022, Page 13, Columns 21-22.
[2318] A33010802 - Bundle 16, Document 5, Page 356, Para 1.25.
[2319] Transcript, Andrew Poplett, 10 May 2022, Page 14, Column 23.

b. The General Wards in QEUH/RHC

c. Ward 2A (the Schiehallion Unit) RHC

d. Ward 2B (the Schiehallion Unit, day cases) RHC

e. Paediatric Intensive Care Unit (PICU) on the 1st floor of the RHC

f. Ward 6A when used by the Schiehallion Unit

g. Ward 4B (Adult BMT) QEUH

h. Ward 4C (Adult haematology and renal) QEUH

i. The PPVL Isolation Rooms

1275. However, it is first necessary understand the aspects of the system and how they might impact on patient safety and care by identifying and describing those features.

7.3.1 Aspects of the ventilation systems to be considered

HEPA Filtration

1276. HEPA stands for High Efficiency Particulate Air. A HEPA filter is a special kind of filter designed to trap very tiny particles down to 0.3 or 0.4 microns. It is a net of fibrous material in a frame which can capture 99.9% of particles. HEPA filters do not filter out gases or odours[2320]. There are differing grades of filters, with the lowest being G2 to G4 and the highest being HEPA (H14)[2321]. HEPA filters should be validated at installation[2322].

1277. HEPA filters can remove practically all significant levels of particles, such as viruses, bacteria and fungal spores, to provide a clean environment[2323]. Immunocompromised and neutropenic areas of a hospital require HEPA filtration[2324]. *Cryptococcus* is a yeast found in soil throughout the world, particularly soil contaminated with pigeon guano. Cryptococcal spores can

[2320] Transcript, Andrew Poplett, 10 May 2022, Page 31, Column 57; See also Provisional Position Paper 12, Bundle 26, Document 2, Page 134; Bundle 21, Volume 1, Document 7, Page 512.
[2321] Bundle 26, Document 2, Page 135.
[2322] A33010802 - Bundle 16, Document 5, Page 401.
[2323] Bundle 21, Volume 1, Document 7, Page 512.
[2324] Bundle 26, Document 2, Page 135.

evade most filters apart from HEPA filters[2325]. *Aspergillus* is a fungus found widely in the environment which can put immunocompromised patients at risk of *Aspergillosis*. Entry of *Aspergillus* into a ventilated room can be prevented by HEPA filtration[2326].

Air Locks

1278. An 'airlock' door barrier system is designed to control the flow of air between two adjoining spaces, particularly in environments where maintaining specific air quality or pressure is critical. The primary purpose is to prevent the uncontrolled exchange of air and contaminants between two areas. The key features are two doors in close proximity, with one leading in and another leading out. The doors do not open simultaneously, to minimise a direct path for air to flow between two spaces[2327].

Air Change Rates

1279. Air Change Rate is measured in ACH; i.e. how many times the air in a room is completely replaced with fresh air in one hour. The ACH specified for the UK have been in place and remained stable since 2007, at 6 ACH for wards/single rooms[2328]. This means that air in such a room/ward is replaced six times every hour, which helps to dilute and remove germs, dust and other particles from the air. Six ACH removes 99.8% of any residual airborne contamination[2329].

1280. The Air Change Rate for a given hospital ward or room is set out in Table 1A in Appendix 1 of the SHTM 03-01 (Draft 2009),[2330] but this is general guidance, and the number of ACHs would ultimately be a matter of clinical opinion[2331]. However, the table is a helpful summary. For example, a room to house a patient with neutropenia should have 10 ACH[2332].

1281. Whether the ACH set out in Table A1 applied to a room or a ward, was an

[2325] Bundle 21, Volume 1, Document 4, Page 168.
[2326] Bundle 21, Volume 1, Document 4, Page 174.
[2327] Bundle 26, Document 2, Page 138.
[2328] Bundle 21, Volume 1, Document 7, Page 490, Para 5.38.
[2329] Transcript, Andrew Poplett, 10 May 2022, Page 17, Column 29.
[2330] A33010802 - Bundle 16, Document 5, Page 483.
[2331] Transcript, Andrew Poplett, 10 May 2022, Page 66, Column 128.
[2332] A37527894 - Edinburgh 1 - Bundle 6, Document 1, Page 25.

issue that arose in the hearings. Dr Inkster stated that there was a problem with the interpretation of SHTM 03-01 and the reference in the table to 'neutropenic ward'. Most people at the time were interpreting that to mean 'neutropenic rooms',[2333] because of the lack of specification in the SHTM 03-01. It did not discuss lobbies, double-door entry, application of positive or negative pressure to different areas, and the application of HEPA filtration. She cited the example of positive pressure and stated that not all areas in a 'neutropenic ward' can be positive pressure[2334]. It is possible to have the ACH, positive pressure and other parameters for a whole ward, but it would be a major construction project requiring HAI-SCRIBE and various control measures[2335]. The concept of a neutropenic ward was also challenged by Dr Inkster because there are often different types of patients within a haemato-oncology ward. She cited the example of Ward 2A, which had a proportion of bone marrow transplant rooms, but it was not a full neutropenic ward because many of the patients were not in fact neutropenic[2336]. However, she ultimately concluded, from her experience, that there needs to be contingency if a neutropenic patient's room is no longer available, for example due to maintenance. In her view the contingency is having the whole ward at a standard for neutropenic patients[2337].

1282. Ms Dempster considered that a 'neutropenic ward' did not mean a ward where the patients were always neutropenic, because there will be groups of patients such as haematology oncology patients and transplant patients who will end up in in other parts of the hospital for clinical reasons[2338]. Her opinion was that Ward 2A would be a 'neutropenic ward', because the children and young people on the ward would probably come out of their rooms and mix in different areas[2339]. She agreed with Dr Mumford that the whole of Ward 4B would be a 'neutropenic ward' for broadly the same

[2333] Transcript, Dr Teresa Inkster, 01 October 2024, Page 8, Column 32.
[2334] Transcript, Dr Teresa Inkster, 01 October 2024, Page 21, Column 37.
[2335] Transcript, Dr Teresa Inkster, 01 October 2024, Page 21, Column 37.
[2336] Transcript, Dr Teresa Inkster, 01 October 2024, Pages 23-34, Columns 42-43.
[2337] Transcript, Dr Teresa Inkster, 01 October 2024, Page 25, Column 45.
[2338] Transcript, Dr Sara Mumford and Linda Dempster, 12 November 2024, Page 66, Column 127.
[2339] Transcript, Dr Sara Mumford and Linda Dempster, 12 November 2024, Page 67, Column 129.

reasons[2340].

1283. Professor Humphreys stated there was a risk with a reduction in ACH but was unable to determine how significant that risk would be[2341]. Mr Hoffman took a different view and considered, when there is HEPA filtration, ACH to be for comfort and irrelevant for patient safety[2342], since he claimed that there is no aerosol risk of infection from people entering a patient's room[2343]. Dr Inkster considered that to reduce the ACH from the recommended rate would require a patient risk assessment to be undertaken,[2344] and in the absence of one then she would not accept a reduced ACH from the recommended rate[2345]. She disagreed with Mr Hoffman that ACH was irrelevant to the prevention of infection, and cited the example of a staff member with a respiratory virus potentially contaminating air in a patient's room without dilution from appropriate ACH. Dr Inkster considered ACH to be important where there is ingress of potentially contaminated air and activity in the room presenting a risk of infection[2346]. A drop from 6 ACH to 2.5 ACH would mean any aerosols generated within a room would take 2.4 times longer to be removed, extending the risk to the patient from contaminated material[2347].

Chilled Beam Units ("CBUs")

1284. A Chilled Beam Unit ("CBU") is an air conditioning system used in buildings to control temperature. It is normally mounted on the ceiling. Warm air rises and meets the chilled beam, which cools the air and moves it towards the floor. The air moves in a cycle by convection. There are two types of CBU: active and passive. An active CBU is the same as a passive CBU but can include a degree of fresh air supply provided by a duct to the CBU[2348]. The

[2340] Transcript, Dr Sara Mumford and Linda Dempster, 12 November 2024, Page 66, Columns 129-130.
[2341] Transcript, Hilary Humprheys, 12 May 2022, Page 26, Columns 47-48.
[2342] Transcript, Peter Hoffman, 26 September 2024, Pages 18 and 53, Columns 32 and 102.
[2343] Transcript, Peter Hoffman, 26 September 2024, Pages 31-32, Columns 58-59.
[2344] Transcript, Dr Teresa Inkster, 01 October 2024, Page 55, Column 105.
[2345] Transcript, Dr Teresa Inkster, 01 October 2024, Page 56, Column 108.
[2346] Transcript, Dr Teresa Inkster, 02 October 2024, Page 4, Column 4.
[2347] A48460335 - Bundle 21, Volume 1, Document 4, Page 153.
[2348] Bundle 26, Document 2, Page 137, Para 5.19.

CBUs in the QEUH/RHC were passive rather than active[2349].

1285. The SHTM 03-01 (Draft 2009) required that if using CBUs they should be positioned carefully to avoid cold draughts[2350]. Control settings ensure that the CBUs' external elements are always above dewpoint and should be easily accessible for maintenance[2351].

1286. Over 1,500 chilled beams (Swegon Parasol ceiling mounted heating/cooling terminal unit) were installed in the QEUH and RHC. Though these are referred to throughout as 'CBUs', they are technically 'comfort modules' rather than CBUs[2352]. The CBUs provided fresh air, heating, and cooling. The air enters the room via the CBU and is then extracted through a door mounted grille in the en-suite bathroom and returned to the Air Handling Unit ("AHU")[2353]. The Swegon Parasol CBUs were limited in size and were designed to accommodate a fresh air supply of 40 l/s (a typical ACH of 2.5-3)[2354]. They did not have dew point control[2355].

1287. CBUs were installed at handover. They will naturally condense moisture from the air and promote the proliferation of micro-organisms. Additionally, CBUs require inspection and cleaning on (at least) a quarterly basis to keep them operating in a satisfactory condition. Maintenance personnel are a risk to patients due to potential contamination[2356]. The maintenance may have to be carried out with the patient present, and the maintenance activity may introduce sources of contamination[2357].

1288. Mr Poplett would not recommend using chilled beams in treatment clinical areas, such as bedroom spaces or treatment spaces, because of moisture and potential wet surfaces causing potential proliferation of fungal or

[2349] Transcript, Ian Powrie, 22 August 2024, Page 30, Column 56.
[2350] A33010802 - Bundle 16, Document 5, Page 371, Para 2.39.
[2351] A33010802 - Bundle 16, Document 5, Page 371, Para 2.39.
[2352] A32310960 - Bundle 6, Document 34, Page 666.
[2353] Bundle 21, Volume 1, Document 7, Page 499, Para 6.2.
[2354] Bundle 21, Volume 1, Document 7, Page 501, Para 6.9.
[2355] A32310960 - Bundle 6, Document 34, Page 695; A41602105 - Bundle 23, Document 89, Page 883.
[2356] Transcript, Andrew Poplett, 10 May 2022, Pages 29-30, Columns 54-55.
[2357] Transcript, Andrew Poplett, 7 November 2024, Page 21, Column 38, Transcript, Lynn Pritchard, 20 September 2024, Pages 76-77, Columns 148-150 and Transcript, David Brattey, 20 September 2024, Page 22, Column 40.

microbiological airborne activity[2358]. CBUs will always produce an elevated risk due to condensation potentially leading to fungal spore or bacterial proliferation. While CBUs were not explicitly excluded, recirculating air conditioning units were not recommended in HTM 2025,[2359] and SHTM 2025 stated that due to the nature of the use of mechanical ventilation systems within healthcare buildings, there are few opportunities for the application of recirculation air systems[2360].

1289. There was evidence in the 1990s that CBUs had risks associated with them[2361]. The use of CBUs influenced sub-optimal airflow performances, as they could not operate at 6ACH or more and added an avoidable risk[2362]. It was observed that dust collected very quickly on surfaces so there is a potential infection risk from chilled beams[2363]. Air is recycled unfiltered through the CBU, potentially allowing airborne pathogens to be recirculated and particulate matter to stick to the metal surface[2364].In the QEUH and RHC the CBUs were located above the patients' beds, resulting in the risk of condensation dripping onto the patient, and the potential of contaminated recirculated air immediately above the patient. Adding an extra water supply created a foreseeable risk, for example leaking[2365]. Dr Mumford and Ms Dempster stated that condensation encourages mould and bacterial growth potentially creating a reservoir of opportunistic pathogens within patient rooms directly above a patient's bed[2366]. A further problem with CBUs is they restrict the possible ACH[2367]. Mr Hoffman's view was CBUs should not be used in hospitals because of the infection risk[2368].

1290. However following the events at the QEUH, the Interim Version of SHTM 03-01 in February 2022[2369] now states:

[2358] Transcript, Andrew Poplett, 10 May 2022, Page 30, Columns 55-56.
[2359] Transcript, Andrew Poplett, 7 November 2024, Page 6, Column 7.
[2360] Bundle 19, Document 39, Page 791.
[2361] Transcript, Andrew Poplett, 7 November 2024, Page 6, Column 7.
[2362] Transcript, Andrew Poplett, 7 November 2024, Pages 8 and 12, Columns 12 and 19.
[2363] Transcript, Dr Teresa Inkster, 02 October 2024, Page 75, Column 145.
[2364] A48460335 - Bundle 21, Volume 1, Document 4, Page 154, Para 9.80.
[2365] CTI Closing Statement, Glasgow 3, Chapter 5, Page 599, Para 257.
[2366] A48460335 - Bundle 21, Volume 1, Document 4, Page 154, Para 9.81.
[2367] CTI Closing Statement, Glasgow 3, Chapter 5, Page 590, Para 229.
[2368] CTI Closing Statement, Glasgow 3, Chapter 5, Page 269, Para 225.
[2369] Edinburgh 1 - Bundle 1, Doc 10, Page 839, Para 5.18.

'Chilled beams should not be installed in clinical areas[2370] without the agreement in writing of the VSG'.

1291. Where the 'VSG' is the Ventilation Safety Group.

Air Pressure Differentials

1292. Air pressure differentials can be used in hospitals to control the direction in which air moves.

a. Positive pressure ventilation is used for protecting very vulnerable patients and is known as protective isolation. This is required to protect neutropenic patients, such as those undergoing chemotherapy or organ transplantation, from exposure to airborne environmental pathogens. The air in these patients' rooms should be at higher pressure (for example, 5 or 10 Pa) so that it moves out to surrounding clinical areas. This prevents the ingress of air with potential airborne pathogens from the rest of the ward[2371].

b. In some circumstances negative ventilation pressure may be used to prevent infection. This type is used where the patient has a transmissible airborne infection (source isolation), and there is a risk of aerosol transmission from a patient spreading to other patients in a ward. In other words, the air does not spread from the isolation room to the surrounding ward as the air pressure is negative there compared to other clinical areas nearby. A patient with a serious lung infection such as tuberculosis would fall into this category of a patient requiring negative pressure[2372].

Sealed Bedrooms / Ensuites

1293. Where a pressure differential is required, the room requires to be sealed. Most significantly in modern hospital buildings the ceiling requires to be sealed. Ceilings in modern hospitals are generally suspended to allow a space above the ceiling panels for ventilation and electricity supplies. If the room is to be pressurised there requires to be a sealed ceiling system that is

[2370] Defined as including patient bedrooms.
[2371] Bundle 26, Document 2, Page 136.
[2372] Bundle 26, Document 2, Page 136.

designed to be airtight, which should be smooth, jointless and impervious[2373].

Backup Air Handling Units ("AHUs")

1294. An Air Handling Unit ("AHU") is a large piece of machinery located in a plant room which circulates and regulates air as part of a ventilation system. The primary purpose of a backup AHU is to take over the functions of a primary AHU in case of failure or scheduled maintenance. AHUs play a crucial role in maintaining air quality, controlling infection risk, and creating a comfortable and safe environment for patients, hospital staff, and visitors[2374].

Pressure Monitoring Systems

1295. A pressure monitoring system is a set of tools and devices required to monitor specific pressures within a healthcare setting. The purpose of the system is to inform relevant people immediately if the ventilation system is operating out of specification, for example, by being alarmed to a nursing station[2375].

1296. SHPN 04 Supplement 1[2376] required that room differential pressures in the isolation rooms should have a system installed at the nursing station in the ward that monitors the differential pressures and gives the nurses on duty an indication if differential pressures are not being maintained[2377].

1297. Mr Hoffman suggested that electronic gauges be used with a local display outside the bedroom, but also an audible alarm to the nurses' station so something of clinical relevance can be acted upon immediately[2378]. It is implied from the recommendations (and the fact that pressure monitoring was installed in 2019[2379]) that an absence of pressure monitoring presented an increased risk to patients. This is a potentially deficient feature.

[2373] Bundle 26, Document 2, Page 137.
[2374] Bundle 26, Document 2, Page 138.
[2375] Bundle 26, Document 2, Page 138.
[2376] Edinburgh 2 - Bundle 1, Document 5, Page 534.
[2377] Edinburgh 2 - Bundle 1, Document 5, Page 549.
[2378] Transcript, Peter Hoffman, 26 September 2024, Page 14, Column 24.
[2379] Bundle 21, Volume 1, Document 7, Page 506, Para 7.5.

Validation

1298. Before a building's ventilation system can be accepted by the owner from the builder, it must be commissioned. This is a process carried out by specialist commissioning contractors who will work alongside equipment installers. The responsibility to commission will normally sit with the main contractor or mechanical sub-contractor[2380]. The commissioning process is to make sure that all of the individual engineering elements work as they have been designed[2381].

1299. Once commissioning has been done, the ventilation system must be independently validated by a suitably qualified Authorised Engineer[2382] against the original ventilation strategy, acknowledging and accepting any changes (or derogations) to ensure that the building engineering services interact with one another as they should[2383] and are in keeping with the parameters set out within SHTM 03-01 in relation to ACH etc[2384]. The system will only be acceptable to the client at the time of validation if it is considered fit for purpose and will only require routine maintenance to remain so for its projected life[2385]. A full report detailing the findings should be produced,[2386] and should conclude with a clear statement as to whether the ventilation system achieved or did not achieve the required standard. A copy of the report should be lodged with the user department, infection control (if required) and Estates & Facilities.

1300. In 2018, when Mr Conner moved into his role as Estates Manager, he found no validation records for any aspect of the ventilation system[2387]. Professor Steele also was not aware of any validation records for the ventilation system,[2388] but acknowledged that NHS GGC was required to undertake

[2380] Bundle 21, Volume 1, Document 7, Page 522, Para 8.1.
[2381] Bundle 21, Volume 1, Document 7, Page 522, Para 8.5.
[2382] A33010802 - Bundle 16, Document 5, Page 457.
[2383] Bundle 21, Volume 1, Document 7, Page 523, Para 8.8.
[2384] Transcript, Darryl Conner, 28 August 2024, Page 10, Column 16.
[2385] Bundle 21, Volume 1, Document 7, Page 523, Para 8.6.
[2386] Bundle 21, Volume 1, Document 7, Page 523, Para 8.6; A33010802 - Bundle 16, Document 5, Page 468, Para 8.64.
[2387] Transcript, Darryl Conner, 28 August 2024, Page 11, Columns 17-18.
[2388] Transcript, Professor Thomas Steele, 4 October 2024, Pages 8-9, Column 12-13.

validation in accordance with SHMT 03-01[2389].

7.3.2 General Wards

1301. The majority of the wards in the QEUH/RHC were general wards and had general ventilation systems installed, rather than a specialist ventilation system. A general ward should not be used for immunocompromised patients, without significant mitigation deployed to address the increased infection risk,[2390] and therefore this analysis considers the ventilation system for a general ward that is not used for immunocompromised patients.

HEPA Filtration

1302. The absence of HEPA filtration in the general wards is not a potentially deficient feature since it was not required by SHTM 03-01 (Draft 2009)[2391]. No HEPA filters are currently installed in general wards within QEUH/RHC.

Air Change Rates

1303. The Table A1 in Appendix 1 of the SHTM 03-01 (Draft 2009) set out, amongst other things, the required air change rate for general wards was 6 ACH,[2392] but as a consequence of the Agreed Ventilation Derogation at handover the ACH in general wards was approximately 2.5 ACH. This is a potentially deficient feature.

Chilled Beams ("CBUs")

1304. CBUs (with no dew point control) were installed at handover[2393] directly above the patients' beds, resulting in the risk of condensation dripping onto the patient and the potential of contaminated recirculated air immediately above the patient (since there were no air filters within the CBUs). CBUs cannot operate at 6ACH or more so the existence of CBUs in a general ward will result in non-compliant ACH. The CBUs are also a source of contamination due to maintenance activity and the collection of dust on the

[2389] Transcript, Professor Thomas Steele, 4 October 2024, Page 41, Column 78.
[2390] Transcript, Andrew Poplett, 7 November 2024, Page 26, Column 48.
[2391] A33010802 - Bundle 16, Document 5, Page 483.
[2392] A33010802 - Bundle 16, Document 5, Page 483.
[2393] Bundle 23, Document 89, Page 883.

CBUs. Room Air Pressure

1305. SHTM 03-01 (Draft 2009) required room air pressure for general wards to be "0 or -ve" for a single room[2394]. At handover in 2015, the room pressure was "0 or slightly -ve relative to the corridors"[2395].

Validation

1306. No validation of the ventilation system had been carried out at handover in 2015[2396] when validation should be done[2397]. This is a potentially deficient feature.

Post-Handover

1307. No works were carried out post-handover to general wards. The low air change rate and the use CBUs remain Potentially Deficient Features.

7.3.3 Ward 2A

1308. Ward 2A is the ward for children's haemato-oncology, also known as the Schiehallion Unit and located in the RHC. The ward accommodated patients with haematological malignancy, non-haematological malignancy and benign haematology[2398]. A significant number of patients receive chemotherapy which renders them immunocompromised, or neutropenic which leaves them potentially vulnerable to infection[2399].

1309. Ward 2A is comprised of a general high dependency in-patient ward and the Scottish Paediatric Bone Marrow Transplant Unit ("BMT Unit")[2400]. This ward required specialist ventilation[2401] as it was a neutropenic ward[2402]. It had 25 single rooms with ensuite toilet, wash basin and shower[2403]. It had 8 PPVL

[2394] A33010802 - Bundle 16, Document 5, Page 483.
[2395] Bundle 26, Document 2, Page 140, Para 6.11; A38662495 - Bundle 4, Document 31 - Page 132.
[2396] A44943356 - Bundle 23, Document 97, Page 1001.
[2397] Transcript, Darryl Conner, 28 August 2024, Page 12, Column 19.
[2398] Bundle 16, Document 16, Page 1599.
[2399] Transcript, Dr Sara Mumford and Linda Dempster, 12 November 2024, Pages 66-67, Columns 127-130.
[2400] A38694862 - Bundle 4, Document 23, Page 113.
[2401] Bundle 16, Document 16, Page 1599; Bundle 16, Document 5, Page 342.
[2402] Transcript, Dr Sara Mumford and Linda Dempster, 12 November 2024, Page 67, Columns 129-130.
[2403] A43158622 - Bundle 52, Volume 10, Document 37, Page 103.

rooms in the ward at handover[2404]. The remaining 25 rooms were made up of 4 TCT rooms and 13 Haemato-oncology rooms[2405]. The ward had two distinct areas, the BMT bedrooms and the remaining TCT (Teenage Cancer Trust) and haemato-oncology rooms[2406].

1310. Yorkhill was built in approximately 1965[2407]. It had HEPA filtered corridors[2408], HEPA filtered wards, and double door access[2409]. The ward had single bedrooms with one exception that had two beds within it. Rooms were positive pressurised[2410]. Dr Inkster stated that Yorkhill had eight isolation rooms which were HEPA filtered but the rest of the ward was not filtered[2411]. Mr Hill expected that the ventilation system in Ward 2A/2B would be at a minimum equivalent standard of that installed in the Schiehallion Unit at Yorkhill[2412].

HEPA Filtration

1311. At handover in January 2015, Ward 2A's ventilation system required to have H12 HEPA filtration[2413] since it was a neutropenic ward, but it did not[2414]. However, the COS for Ward 2A did not have an express requirement for HEPA filtration[2415].

Air Lock

1312. The COS for Ward 2A did have a requirement for a double-door barrier system[2416] which was similar to the specification in the Beatson West of

[2404] A46059364 - Bundle 23, Document 96, Page 997.
[2405] A43158622 - Bundle 52, Volume 10, Document 37, Page 103.
[2406] A43158622 - Bundle 52, Volume 10, Document 37, Page 105.
[2407] Transcript, Pamela Joannidis, 30 August 2024, Pages 67-68, Columns 130-131.
[2408] A43158622 - Bundle 52, Volume 10, Document 37, Page 109.
[2409] Transcript, Professor Brenda Gibson, 19 August 2025, Page 19, Column 34; Transcript, Pamela Joannidis, 30 August 2024, Page 55, Column 67.
[2410] Transcript, Professor Brenda Gibson, 19 August 2025, Page 21, Column 37; Transcript, Pamela Joannidis, 30 August 2024, Page 55, Column 67.
[2411] Bundle 14, Volume 1, Document 8, Page 200.
[2412] Glasgow 4, Part 3 - Witness Statements, Volume 5, Kevin Hill, Document 1, Page 14, Q11(a).
[2413] A33010802 - Bundle 16, Document 5, Page 483.
[2414] Transcript, Dr Jennifer Armstrong, 10 October 2024, Page 13, Column 22; Transcript, Matthew Lambert, 21 August 2024, Page 51, Column 98.
[2415] Bundle 16, Document 16, Page 1599.
[2416] Bundle 16, Document 16, Page 1604.

Scotland Cancer Centre[2417] and the previous Schiehallion Unit in Yorkhill.[2418] There was no double-door barrier system in Ward 2A at handover[2419].

Air Change Rate

1313. Since Ward 2A was a neutropenic ward, it required to have 10 ACH[2420]. At handover[2421], the air change rate was approximately 2.8[2422].

Chilled Beams ("CBUs")

1314. The SHTM 03-01 (Draft 2009) required that if using CBUs they should be positioned carefully to avoid cold draughts[2423]. Control settings should ensure that the CBUs' external elements are always above dewpoint and should be easily accessible for maintenance[2424].

1315. CBUs were installed at handover[2425], did not have dew point control[2426] and were situated over patient's beds. In or around 20 July 2016, there were reports of discoloured water dripping from a CBU, with 4 rooms (not BMT rooms) in Ward 2A affected and later in April 2018 two rooms affected[2427]. The condensation was due to high humidity[2428]. There were also reports of mould in Ward 2A[2429].

1316. The CBUs created the potential for contaminated recirculated air immediately above the patient (since there were no air filters within the CBUs). CBUs cannot operate at 6ACH or more so the existence of CBUs in a general ward will result in non-compliant ACH. The CBUs are also a source of contamination due to maintenance activity and the collection of dust on

[2417] Bundle 21, Volume 1, Document 7, Page 680.
[2418] Bundle 21, Volume 1, Document 7, Page 683.
[2419] Transcript, Pamela Joannidis, 30 August 2024, Page 39, Column 74.
[2420] A33010802 - Bundle 16, Document 5, Page 483.
[2421] Bundle 6, Document 34, Page 689.
[2422] Transcript, Matthew Lambert, 21 August 2024, Page 35, Column 66.
[2423] A33010802 - Bundle 16, Document 5, Page 371, Para 2.39.
[2424] A33010802 - Bundle 16, Document 5, Page 371, Para 2.39.
[2425] Transcript, Pamela Joannidis, 30 August 2024, Page 19, Column 34; A32310960 - Bundle 6, Document 34, Page 666; Transcript, Matthew Lambert, 21 August 2024, Pages 39-40, Columns 74-75.
[2426] A32310960 - Bundle 6, Document 34, Page 695; A41602105 - Bundle 23, Document 89, Page 883.
[2427] A41745773 - Bundle 12, Document 153, Page 1251.
[2428] A41601693 - Bundle 23, Document 85, Page 839.
[2429] CTI Closing Statement, Glasgow 3, Page 35, Para 35; Page 321, Para 401; Page 405, Para 676.

the CBUs.

Room Air Pressure

1317. SHTM 03-01 (Draft 2009) required room air pressure of "+10 Pa" for a neutropenic patient ward[2430]. However, the RHC COS referred to the ward benefitting from "low positive pressure"[2431]. At handover in 2015, the room air pressure for this ward was found to be "0 or slightly negative relative to the corridor"[2432] and this included the isolation rooms[2433]. The corridor was not positively pressured to the rest of the hospital[2434].

1318. A sealed ceiling is required for the required air pressure. At handover in 2015, the ward's bedrooms and ensuites were not sealed[2435] with light fittings not sealed, dust on the fittings, and the void not sealed off[2436]. Emma White described the Ward 2A drawings as having an exposed ceiling grid[2437]. Mr Lambert described the ward as having a suspended ceiling grid, but it required a sealed space to achieve positive pressure[2438]. A room could not be positively pressurised if air was escaping from the space[2439]. The Innovated Designs Solution report recommended that each envelope was appropriately sealed as necessary to afford sufficient pressure differential between the bedroom and adjacent corridor[2440].

1319. On 14 August 2015, the air permeability tests in Ward 2A showed there was not total sealing and that gaps in the rooms' integrity that was 'not good news'[2441].

Pressure Monitoring System

1320. The COS did not specify a pressure monitoring system for the ward[2442]. At

[2430] Bundle 16, Document 5, Page 483.
[2431] Bundle 16, Document 16, Page 1599.
[2432] A38662495 - Bundle 4, Document 31, Page 132; A32310960 - Bundle 6, Document 34, Page 680.
[2433] Transcript, Dr Teresa Inkster, 01 October 2024, Page 61, Column 118.
[2434] A38694862 - Bundle 4, Document 23, Page 114.
[2435] A38694862 - Bundle 4, Document 23, Page 114.
[2436] A49378414 - Bundle 23, Document 114, Page 1079.
[2437] Transcript, Emma White, 13 May 2025, Page 37, Column 69.
[2438] Transcript, Matthew Lambert, 21 August 2024, Page 50, Columns 95.
[2439] Transcript, Matthew Lambert, 21 August 2024, Page 49, Columns 94.
[2440] A32310960 - Bundle 6, Document 34, Page 694.
[2441] A33794564 - Bundle 12, Document 43, Page 293.
[2442] Bundle 16, Document 16, Page 1599.

handover in 2015, a pressure monitoring system was not installed[2443]. However, the Innovated Design Solutions report for Ward 2A recommended that pressure differential sensors be installed. It was further recommended that consideration be given to providing alarms to notify nursing staff should bedroom doors be inadvertently left open to the corridor. In addition, it was recommended consideration be given to interfacing any alarms with the Building Management System ("BMS"), to facilitate future monitoring/logging[2444].

Backup Air Handling Unit ("AHU")

1321. In Mr Lambert's view there should have been a dedicated ventilation system for Ward 2A, separate from other areas of the hospital with filtration and its own backup AHU[2445]. His view was informed by SHTM 03-01[2446] but there was no specific resilience and diversity section for critical healthcare areas in the Draft 2009 version. It follows that his view is informed by the SHTM 03-01 (February 2022 version)[2447].

1322. Mr Poplett identified the AHU operating close to capacity, and no backup AHU, as a key issue with the ventilation system[2448]. During annual verification, maintenance, and unplanned failures, the AHU for Ward 2A would need to be shut down, and this would impact on the ability of the ward to provide the required airflow necessary for safe patient care[2449].

1323. Although not a requirement of SHTM 03-01 (Draft 2009) at the time, the failure to have a backup AHU would impact on safe patient care and the absence of a backup AHU is a potentially deficient feature. Mr Lambert confirmed that if there were any failures with the AHU such as a heating coil bursting then there would be prolonged downtime undertaking remedial works, and in that time, there is no fresh air supply so all the patients would

[2443] A32310960 - Bundle 6, Document 34, Page 695.
[2444] A32310960 - Bundle 6, Document 34, Page 695.
[2445] Transcript, Matthew Lambert, 21 August 2024, Page 40, Column 76.
[2446] Transcript, Matthew Lambert, 21 August 2024, Page 40, Column 76.
[2447] A37301627 - Bundle 19, Document 40, Page 940.
[2448] Bundle 21, Volume 1, Document 7, Page 501, Para 6.7.
[2449] Bundle 21, Volume 1, Document 7, Page 503, Para 6.16.

have to move out[2450].

PPVL Isolation Rooms in Ward 2A

1324. At handover in January 2015, the eight PPVL isolation rooms[2451] in Ward 2A should have had HEPA filtration but did not[2452] which was not in accordance with SHPN 04 Supplement 1[2453]. The SHTM 03-01 (Draft 2009)[2454] required a neutropenic ward to have H12 HEPA filtration and accordingly the PPVL isolation rooms should have had a similar level of HEPA filtration.

1325. Mr Poplett stated that PPVL rooms could be used for BMT units, but it would depend on the air supply[2455]. Immunosuppressed patients would need the supply air to the PPVL room to be HEPA filtered[2456].

1326. It is specified in SHPN 04 Supplement 1 that the isolation rooms should be of solid construction with either solid ceilings or sealed joints. If the ceiling is not sealed, then there is the potential for the exchange of air from the void above the ceiling into the isolation room and for contaminated air to enter the isolation room. It will be impossible for the room to meet the required room permeability test standards. If the rooms are not sealed, then it may be more difficult to control the pressure of the room[2457].

1327. The PPVL rooms were not suitable for providing protective isolation to patients in Ward 2A as the room was not positively pressured due to the extract grille in the patient bedroom, it did not have 10 ACH, no HEPA filters[2458], the walls and ceilings were not sealed, and there was no pressure gauge between the room and the corridor[2459].

Validation

1328. At handover in 2015, there was no validation of the ventilation system for

[2450] Transcript, Matthew Lambert, 21 August 2024, Page 65, Column 126.
[2451] A46059364 - Bundle 23, Document 96, Page 997.
[2452] Transcript, Ian Powrie, 22 August 2024, Page 26, Column 48.
[2453] Edinburgh 2 - Bundle 1, Document 5, Page 549.
[2454] A33010802 - Bundle 16, Document 5, Page 483.
[2455] Transcript, Andrew Poplett, 7 November 2024, Page 30, Column 55.
[2456] Transcript, Andrew Poplett, 7 November 2024, Page 29, Column 54.
[2457] A48142378 - Bundle 21, Volume 1, Document 8, Page 712, Para 8.83.
[2458] Bundle 23, Document 122, Page 1112.
[2459] A32310961 - Bundle 3, Document 8, Page 62.

Ward 2A[2460]. The room air permeability had not been validated for the isolation rooms and when they were eventually done, the isolation rooms failed the tests[2461].

Post-Handover

1329. The Potentially Deficient Features of the ventilation system in Ward 2A at handover were:

a. Low Air Change Rate (3 rather than 10 ACH) across the whole ward.

b. The lack of an airlock at the entrances to the ward.

c. The use of CBUs.

d. The lack of a room air pressure differential of “+10 Pa”.

e. The absence of a pressure monitoring system.

f. The lack of a backup AHU.

g. The use of PPVL rooms as BMT isolation rooms.

h. The absence of HEPA filters in the BMT isolation rooms (remedied in June 2015 on the weekend before patients were due to arrive)[2462].

i. Unsealed light fittings in the eight BMT rooms that were sealed after discovery in September 2015[2463] [2464].

j. The lack of validation of the ventilation system prior to the arrival of patients.

Remediation in Ward 2A: First Attempt

1330. The first attempt at remediation of the Ward 2A ventilation system began early in 2017. It was focused solely on the Eight BMT rooms.

1331. In March 2017, a QEUH and RHC Isolation Review prepared by Hulley and Kirkwood Consulting Engineers Limited ("Hulley & Kirkwood") included the

[2460] A44943356 - Bundle 23, Document 97, Page 1001.
[2461] A41602105 - Bundle 23, Document 89, Page 889.
[2462] Transcript, Mary Anne Kane, 16 May 2025, Page 44, Columns 83-84.
[2463] A41601693 - Bundle 23, Document 85, Page 839.
[2464] A34465787 - Bundle 12, Document 59, Page 440.

scope to review "changing 4 No. PPVL isolation rooms (17, 18, 19, & 20) within Ward 2A to PPIR for the continued use for transplant and severely immune-compromised patients"[2465]. The PPVL rooms were not in compliance with SHPN 04: Supplement 1 because the majority of the extract ventilation was taken from the bedroom at ceiling level with a lesser volume extracted from the en-suite at ceiling level. All extract should have been taken from the en-suite unless clinical requirements determine that some extracts should be taken from low level at the bedhead[2466]. There were also no low-level air transfer grilles installed within the door to the en-suite.[2467]

1332. Hulley & Kirkwood noted there were excessive access hatches on the supply and extract ductwork (which were not identified as a biohazard). There was no gas tight shut off damper or spectacle plate on the extract systems prior to the extract fans. There were no audio and visual alarms located outside the room lobbies to warn staff of unsafe conditions. There was no common alarm panel at the nurse station. The supply and extract plant and duct systems had not been identified with the rooms they serve. Where safe change filter housings as opposed to vertical discharges, they had not been installed external to the building. The external dial pressure gauges monitoring lobby positive pressure were inappropriate for monitoring a 10 Pa pressure differential. No envelope permeability test had been carried out[2468].

1333. The proposals from Hulley & Kirkwood to modify the existing PPVL rooms and ventilation system were:

(1) to modify the existing supply system to relocate the HEPA filtered supply terminal to the bedroom.

(2) to reverse the pressure stabiliser damper installed over the 'lobby to bedroom' door to allow air flow from the room to the lobby at a 10 Pa pressure differential.

[2465] A41601693 - Bundle 23, Document 85, Page 840.
[2466] A41602399 - Bundle 23, Document 81, Page 791.
[2467] A41602399 - Bundle 23, Document 81, Page 791.
[2468] A41602399 - Bundle 23, Document 81, Page 791.

(3) to install a new pressure stabiliser (sized for 10 Pa pressure differential in the wall between the lobby and the corridor which will provide 20 Pa between the bedroom and the corridor.

(4) to alter the extract system to divert the extract duct that was extracting air from the bedroom to instead extract from the corridor.

(5) to replace the extract terminals in PPVL rooms with terminals that have integrated volume control dampers accessible through the grilles so that existing duct mounted volume control dampers can be removed with any associated ceiling access hatches.

(6) to replace existing dial pressure gauges with a 30/0/30Pa scale.

(7) to replace room side impulse tube from lobby to patient bedroom to give a visual indication of the maintained positive pressure within the bedroom to the corridor[2469].

1334. On 30 May 2017, a tender for the conversion of PPVL to PPIR isolations rooms was issued[2470]. The tender incorporated the proposals made by Hulley & Kirkwood in their Isolation Rooms Review issued in March 2017, but also included a requirement for the contractor to carry out room air leakage testing via air permeability specialists[2471].

1335. On 3 August 2017, the modifications to the isolation rooms and ventilation system were carried out[2472].

1336. On 14 February 2018, Rooms 19 and 20 in Ward 2A were converted from PPVL isolation rooms to PPIR isolation rooms[2473]. On 14 March 2018, rooms 17 and 18 in Ward, converted to Positively Pressured Isolation Rooms ("PPIR") were commissioned and validated by H&V Commissioning Services Ltd[2474].

[2469] A41602399 - Bundle 23, Document 81, Page 792.
[2470] A41601693 - Bundle 23, Document 85, Page 840; A41602401 - Bundle 23, Document 83, Page 800.
[2471] A41602401 - Bundle 23, Document 83, Pages 819, 820 and 822.
[2472] A41601693 - Bundle 23, Document 85, Page 840.
[2473] A41601693 - Bundle 23, Document 85, Page 841.
[2474] A41602393 - Bundle 23, Document 87, Page 846; A41601693 - Bundle 23, Document 85, Page 841.

1337. The conversion from a PPVL room to a PPIR room involved the extract grille in the bedroom being moved to the corridor and the supply grille in the lobby being moved to the bedroom with the en-suite extract remaining unaltered[2475].

1338. By the time patients had been decanted on 26 September 2018 the Potentially Deficient Features of the ventilation system in Ward 2A at handover related to the PPVL rooms had been partially removed by the conversion of 4 PPVL rooms in Ward 2A to PPIR. The feasibility of changing 3 further PPVL rooms in RHC was being considered[2476].

Remediation in Ward 2A: Second Attempt

1339. On 26 September 2018, the BMT patients from Ward 2A were decanted to Ward 4B and the other patients to Ward 6A[2477].

1340. In late September 2018, Mr Lambert of Innovated Design Solutions ("IDS") was asked at a meeting with Ms O' Kane and Mr Gallacher to produce reports on Wards 2A and 2B,[2478] investigating whether it was possible to increase ACH from 3 to 6[2479].

1341. On 24 October 2018, IDS issued their Feasibility Study Regarding Increasing Ventilation Air Change Rates within Ward 2A Report ("the 2A Report"). The supply ACH in Ward 2A for existing bedrooms was in the region of 3 ACH[2480]. The AHU which supplied air to Ward 2A was located in Plant Room 41 on the 4th Floor Level. This AHU also provided mechanical supply and extract ventilation to numerous other areas/facilities within the building located on level 3 (Ward 3A), Level 1 (23hr Ward 1A), and Ground Floor Level (OPD - ENT/GP out of hours)[2481]. Bedrooms were operating at a slightly negative pressure relative to adjacent corridors[2482]. Mr Lambert explained that he thought the air was going in the wrong direction because it

[2475] A44943477 - Bundle 23, Document 84, Page 835.
[2476] A38759215 - Bundle 13, Document 15, Page 111.
[2477] Bundle 21, Volume 1, Document 8, Page 692; A40732035 - Bundle 7, Document 5, Page 196.
[2478] Transcript, Matthew Lambert, 21 August 2024, Page 57, Column 110.
[2479] Transcript, Matthew Lambert, 21 August 2024, Page 66, Column 127.
[2480] A32310960 - Bundle 6, Document 34, Page 676.
[2481] A32310960 - Bundle 6, Document 34, Page 678.
[2482] A32310960 - Bundle 6, Document 34, Page 680.

was going towards the immunocompromised patient rather than away from the immunocompromised patient[2483].

1342. The 2A Report described the primary air supply being delivered into each bedroom space from a ceiling mounted double type Swegon Parasol heating/cooling comfort module, apparently supplying 40 litres/second in the majority of instances.[2484]. It further described the air being extracted from each bedroom's en-suite via a ceiling mounted circular valve type terminal[2485]. It concluded that air was likely being pulled into bedrooms from the adjacent circulation spaces[2486]. Mr Lambert explained in evidence that the air was being pulled from the corridor into the bedroom and ultimately the en-suite[2487]. The majority of existing supply and extract ductwork distribution within level 2 ceiling voids was inadequate to facilitate the desired increase in air volumes to support 6 ACH[2488].

1343. The 2A Report described the works required to facilitate an increase in air volume flow rates to achieve 6 ACH. The existing ceilings and fixtures/fittings would require to be removed and reinstated. Potentially relocation or temporary removal of existing services located within the ceiling voids to facilitate the works. New AHU supply and extract fan motors would be required together with associated pulleys/belts. The inverter drives would likely require to be replaced. The existing heating and chilled water valves would require to be replaced[2489].

1344. Furthermore, the supply and extract ductwork would require to be completely replaced within the 2nd Floor Level ceiling voids. The main supply of air ductwork distribution between the AHU and Level 2 would require to be replaced. Additional air supply terminals within each bedroom with associated supplementary primary air conditioning would require to be installed. New transfer grilles between each bedroom and en-suite would

[2483] Transcript, Matthew Lambert, 21 August 2024, Page 11, Column 18.
[2484] A32310960 - Bundle 6, Document 34, Page 687.
[2485] A32310960 - Bundle 6, Document 34, Page 688.
[2486] A32310960 - Bundle 6, Document 34, Page 689.
[2487] Transcript, Matthew Lambert, 21 August 2024, Page 39, Column 74.
[2488] A32310960 - Bundle 6, Document 34, Page 690.
[2489] A32310960 - Bundle 6, Document 34, Page 691.

also require to be installed[2490]. Finally, there would require to be balancing, commissioning and cleaning works[2491].

1345. The 2A Report recommended that the upper Ward 2A facilities (which excludes the BMT isolation rooms) be separated from the existing centralised plant/system with a new dedicated AHU plant distribution installed. Enhanced Single Rooms (Positive Pressure) should be provided which create a positive pressure directly in each bedroom space, by the delivery of supply air into each bedroom, with air moving into the adjacent corridors where a lower pressure would be maintained, while extracting a proportion of air via the associated en-suite. This would involve air transfer facilities between the TCT area and Ward 2A corridors. The Enhanced Single Rooms (Positive Pressure) would not be completely appropriate to provide adequate protection for use by immunocompromised patients[2492].

1346. Provision of a backup AHU was also recommended by the 2A Report. Each envelope should be appropriately sealed to ensure sufficient pressure differential between the bedroom and the adjacent corridor. This might involve replacing existing suspended ceilings with solid ceilings, ensuring internal/external windows are adequately sealed, modification/replacement of services installations (i.e. ceiling mounted light fittings), and potentially replacing doors/door seals.

1347. The bedroom supply air induction modules (in other words, the chilled beams) would also require to be replaced[2493]. HEPA filters could potentially be used and installed centrally within the AHU or locally to each supply air terminal[2494]. It was further recommended that new transfer grilles be installed between the bedroom and en-suite spaces. The final recommendation was that pressure differential sensors be installed to ensure corridor/bedroom pressure differentials are maintained ,and consideration be given to providing alarms to notify nursing staff should bedroom doors be inadvertently left open to the corridor, with alarms interfacing with the BMS to

[2490] A32310960 - Bundle 6, Document 34, Page 691.
[2491] A32310960 - Bundle 6, Document 34, Page 692.
[2492] A32310960 - Bundle 6, Document 34, Page 693.
[2493] A32310960 - Bundle 6, Document 34, Page 694.
[2494] A32310960 - Bundle 6, Document 34, Page 695.

facilitate monitoring/logging[2495].

1348. Mr Lambert observed that air was being extracted from dirty areas in the ward such as toilets, shower rooms, dirty utility rooms, and disposal rooms. This dirty air was then sent back to AHU, which would go through a thermal wheel where there was a risk of cross-contamination to the fresh air supply being brought in[2496].

1349. On 12 November 2018, an SBAR entitled 'Ward 2A/2B Ventilation review' was issued which described the potential for cross-contamination between single room suites. It was recommended that patients be decanted to allow re-design and tender specification to meet the requirements of neutropenic patients. The recommended works would include new supply and extract plant (including HEPA), distribution ducting and associated heating and cooling circuit to allow for suitable comfortable and protective patient environment at +10 Pa, 10 ACH, removal of CBUs, and separation of supply and extract systems with new dedicated general and sanitary extract systems[2497].

1350. On 10 December 2018, the Ward 2A Refurbishment Project was established, and the lead consultant appointment brief, was issued to ensure the upper portion of Ward 2A (Mid-Ward and TCT) was suitable for use by immunocompromised patients. This involved existing accommodation being converted to enhanced positive pressure single rooms with en-suite facilities providing 10 ACH and +10 Pa within each bedroom space, and ensuring the bedrooms are at +10 Pa relative to the adjacent corridors[2498]. It is noted that the works must be undertaken in accordance with SHTM 03-01, with installation of backup AHUs, supply air equipped with H12 HEPA filtration, fabric upgraded and sealed to ensure +10 Pa and monitoring of pressure differentials[2499].In the Additional Works Scope document, the BMT facilities of Ward 2A and all other rooms in Ward 2A were to be afforded H12 HEPA

[2495] A32310960 - Bundle 6, Document 34, Page 695.
[2496] Transcript, Matthew Lambert, 21 August 2024, Page 37, Columns 69-70.
[2497] A38662495 - Bundle 4, Document 31, Page 132.
[2498] Bundle 27, Volume 1, Document 15, Page 43.
[2499] Bundle 27, Volume 1, Document 15, Pages 43-44.

filtration[2500].

1351. By June 2019, a dew point control had been fitted to the central system of the CBUs in Ward 2A to alleviate the issue of condensation and dripping from CBUs[2501].

1352. In September 2019, the tender for the Ward 2A upgrade works was issued. The tender required main bedroom suites and associate main accommodation areas to be effectively positively pressured, with central station HEPA filtered air, and an appropriate pressure cascade system adopted which included a ward isolation facility lobby. Ward 2A would also be supplied with a duplicate supply and extract AHU facility. In the BMT area, a ward isolation facility lobby would be located where the ward meets the rest of the hospital. A negative pressure ventilation lobby facility ("NPVL") was also to be installed for infectious immunocompromised patients[2502]. The ACH for the Ward 2A bedrooms and corridors was to be 10 ACH, except the bedroom with ensuite and TCT bedroom ensuite which were 5 ACH. The pressure differentials were all above 10 Pa, except the bedroom ensuite which was to be 5 Pa and the ward corridor which was to be 0[2503]. It was proposed that the ceiling mounted active chilled beams be removed from Ward 2A[2504] and they subsequently were removed[2505]. Two new AHUs with HEPA filter (H12/H13) housed on the 4th floor were to be installed[2506]. HEPA filters would be installed in the AHU on the supply section[2507].

1353. In 2019 upgrade works were carried out on Wards 2A and 2B. They works increased the ACH from 2.5 ACH to 10 ACH, room pressure was increased to +10 Pa. The works also removed the CBUs and sealing the ceilings. They installed an airlock at the entrance to the ward, a backup AHU and a pressure monitoring system[2508].

[2500] Bundle 27, Volume 1, Document 15, Page 50.
[2501] A40732035 - Bundle 7, Document 5, Page 198.
[2502] A41602092 - Bundle 20, Document 53, Page 1032.
[2503] A41602092 - Bundle 20, Document 53, Page 1038.
[2504] A41602092 - Bundle 20, Document 53, Page 1041.
[2505] A47960466 - Bundle 21, Volume 1, Document 7, Page 506.
[2506] A41602092 - Bundle 20, Document 53, Page 1050.
[2507] A41602092 - Bundle 20, Document 53, Page 1051.
[2508] Bundle 26, Document 2, Page 144; A47960466 - Bundle 21, Volume 1, Document 7, Page 506.

1354. In February 2022, the Ventilation Validation Report[2509] was issued by Sutton Service International for the refurbishment of Ward 2A. It showed that all the single bedrooms have greater than 10 ACH (with a range of 13-18) and the en-suites varying from 9 to 15 ACH. All rooms were found to be within the specified positive pressure (+8 Pa to +12 Pa), ranging from +9.1 to +11.3 Pa. On the assumption filter testing and sealability testing has been undertaken then these rooms in Ward 2A meet the specification set out in HTM 03-01 and SHTM 03-01[2510].

1355. From 2019, all 8 AHUs serving the Ward 2A isolation rooms were refurbished. One of the remaining 4 PPVL rooms was converted into a Negatively Pressured Ventilation Lobby ("NPVL") room[2511]. The Ward 2A isolation rooms are now 3 PPVL, 1 NPVL, and 4 PPIR[2512]. Between 2019 and 2022, HEPA filters were installed within Ward 2A[2513].

1356. On 9 March 2022, patients moved back to Ward 2A from Ward 6A[2514].

1357. The 2019 upgrade works brought Ward 2A in line with SHTM 03-01 (Draft 2009) and the 2022 version. The redesign of the ventilation system serving Wards 2A and 2B, involved the installation of separate supply and extract systems, which removed the risk of cross-contamination from other zones and other levels[2515]. In addition, the provision of duty/standby arrangements added resilience to the system and allowed for planned maintenance of the AHUs to be undertaken without impacting the patient group. The new design provided HEPA filtered air to Wards 2A and 2B and achieved a pressure cascade from clean to less clean areas. The MIBG (Meta-iodobenzyiguanidine) suite was also provided with its own dedicated ventilation system providing HEPA filtered air. Furthermore, extraction systems were separated from the main ward areas[2516].

1358. This updated/revised design approach is considered appropriate for the

[2509] Bundle 52, Volume 10, Document 45, Page 225.
[2510] A48142378 - Bundle 21, Volume 1, Document 8, Page 687.
[2511] A44943477 - Bundle 23, Document 84, Page 835.
[2512] A44943477 - Bundle 23, Document 84, Page 835.
[2513] A44943564 - Bundle 52, Volume 11, Document 12, Page 94.
[2514] A41602083 - Bundle 23, Document 90, Page 901.
[2515] Bundle 21, Volume 1, Document 7, Page 577, Para 10.39.
[2516] Bundle 21, Volume 1, Document 7, Page 578, Paras 10.40-10.42.

clinical group being cared for/treated there[2517]. Mr Poplett stated that PPVL rooms can now potentially be used for both immunocompromised and infectious patients, so long as the PPVL has been laid out in the HBN 04-01 then the PPVL will operate the room at neutral pressure. The extent to which a PPVL room is appropriate for immunocompromised patients will depend on the quality of the supply air filtration requiring it to be HEPA filtered. Mr Poplett confirmed that a PPVL design would be appropriate for a specialist BMT Unit. However, the PPVL rooms have not been validated in accordance with HBN 04-01 Supplement 1 but rather based on the SHPN 04 Supplement 1 and SHTM 03-01[2518]. Given the validation of the Scottish equivalent of HBN 04-01 and the provision of HEPA filtered air, then it cannot be clearly stated that the PPVL rooms are deficient subject to air permeability and filters testing being passed[2519]. Mr Hoffman's observations must be acknowledged, however that the guidance applicable to either Scotland or England does not apply to highly neutropenic patients[2520] and to protect this group of patients there must be HEPA filtering and positive pressure so the room leaks outwards[2521]. Accordingly, there are currently no potentially deficient features in Ward 2A.

7.3.4 Ward 2B

1359. Ward 2B is the Schiehallion Day Care Unit in the RHC. Since the patients stay overnight and only receive treatment on an outpatient basis during the day it does not fall within the category of a neutropenic ward. Ultimately the requirements would need to be defined by clinical IPC by assessment of the patient groups and their risk requirements[2522]. The ward consists of five consultation rooms and two 4-bed-bay areas. There is a main waiting area at the reception of the ward with a TCT waiting area beside the TCT bay area. The ward cares for children with haemato-oncology and haematology

[2517] Bundle 21, Volume 1, Document 7, Page 578, Para 10.43.
[2518] A41602098 - Bundle 52, Volume 10, Document 45, Page 225.
[2519] A48142378 - Bundle 21, Volume 1, Document 8, Page 685, Para 8.14.
[2520] A49073232 - Bundle 23, Document 17, Page 201.
[2521] A48375995 - Bundle 23, Document 14, Page 194.
[2522] A47540479 - Bundle 26, Document 2, Pages 145-146, Para 6.47.

disorders on a Monday to Friday day care basis[2523].

HEPA Filtration

1360. The lack of HEPA filters in Ward 2B[2524] at handover was not a potentially deficient feature because there were no neutropenic patients within the Day Care Unit and no patients stayed overnight. Thus, because patients are out in the general community then they are not given specialist precautions, even though they are still immunocompromised and at an elevated risk of infection[2525].

Airlock

1361. The RHC Haematology and Oncology COS did not require an air lock entrance to the ward in Ward 2B and there was no airlock in place at handover in 2015[2526].

Air Change Rates

1362. The required number of ACH in accordance with the SHTM 03-01 (Draft 2009) for general wards was 6 ACH[2527] but at handover the air change rate in Ward 2B was 2.5 – 3 ACH[2528]. T

Chilled Beams ("CBUs")

1363. The NHS guidance did not prohibit CBUs, and these were installed in Ward 2B at handover in 2015[2529]. Air was supplied at 40 litres/second to Ward 2B by ceiling mounted Swegon Parasol heating/cooling comfort modules (referred to as CBUs) which were mounted on the ceiling to distribute primary supply air into the occupied space while tempering air supplies utilising integral heating and cooling facilities. Air was extracted from the ward via a single ceiling mounted diffuser[2530].

[2523] A40732035 - Bundle 7, Document 5, Page 197.
[2524] A47540479 - Bundle 26, Document 2, Page 146, Para 6.50.
[2525] Transcript, Andrew Poplett, 7 November 2024, Page 25, Column 45.
[2526] CTI Closing Statement, Glasgow 3, Page 235, Para 112.
[2527] A33010802 - Bundle 16, Document 5, Page 483.
[2528] A41602390 - Bundle 6, Document 33, Pages 660-661.
[2529] A41602390 - Bundle 6, Document 32, Pages 659-660.
[2530] A41602390 - Bundle 6, Document 32, Pages 659-660; Transcript, Matthew Lambert, 21 August 2024, Page 26, Column 47.

1364. However, the CBUs created the potential for contaminated recirculated air immediately above the patient (since there were no air filters within the CBUs). CBUs cannot operate at 6ACH or more so the existence of CBUs in a general ward will result in non-compliant ACH. The CBUs are also a source of contamination due to maintenance activity and the collection of dust on the CBUs.

Room Air Pressure

1365. The IDS Report into Ward 2A recorded that the ward areas appeared to have been commissioned to operate at a slightly negative pressure and there was a risk of air being pulled into the [2531]wards via the adjacent corridor[2532]. Mr Lambert reported the air change was going in the wrong direction towards the immunocompromised patients instead of away from them[2533].

Validation

1366. At handover in 2015 there was no validation for the ventilation system in Ward 2B[2534].

Post-Handover

1367. Given Ward 2B did not accommodate patients overnight the PDFs at handover were the low air change rate, use of CBU and lack of validation, but the room air pressure differential discovered by IDS should be added to that list.

Remediation of Ward 2B

1368. On 15 October 2018, IDS issued their report on Ward 2B's ventilation system. The purpose of the report was to determine the viability of increasing mechanical supply and extract ACH up to 6 ACH within the Day Care Unit[2535].

[2531] Transcript, Matthew Lambert, 21 August 2024, Page 15, Column 26.
[2532] A41602390 - Bundle 6, Document 32, Page 667.
[2533] Transcript, Matthew Lambert, 21 August 2024, Page 11, Column 18.
[2534] CTI Closing Statement, Glasgow 3, Page 228, Paras 91-92; A44943356 - Bundle 23, Document 97, Page 1001.
[2535] A41602390 - Bundle 6, Document 32, Page 659.

1369. IDS recommended that the following works be carried out in Ward 2B:

(1) Removal and reinstatement of existing ceilings and all associated fixtures (i.e. light fittings, fire alarms etc).

(2) Possible relocation or temporary removal of elements of existing services located within the ceiling voids to facilitate the works.

(3) The replacement of the AHU supply and extract fan assemblies.

(4) Replacement of inverter drives assuming they are matched.

(5) Replacement of existing heating and chilled water balancing valves serving the AHU coils. Works will also necessitate recommissioning of associated pumps.

(6) Installation of new supply and extract ductwork distribution within 2nd floor level ceiling voids and the main vertical riser between 2nd and 4th floor levels.

(7) Installation of additional air supply terminals within each ward with associated supplementary primary air conditioned accordingly.

(8) Replacement of existing extract terminal plenum boxes.

(9) Balancing, commissioning and cleaning works[2536]

1370. On 12 November 2018, an SBAR entitled 'Ward 2A/2B Ventilation review' described the potential for cross-contamination between single room suites. It was recommended that patients be decanted to re-design and tender specification to meet the requirements of neutropenic patients. The recommended works would include new supply and extract plant (including HEPA), distribution ducting and associated heating and cooling circuit to allow for suitable comfortable and protective patient environment at +10 Pa, 10 ACH, removal of CBUs, and separation of supply and extract systems with new dedicated general and sanitary extract systems.[2537]

1371. In 2019, HEPA filters were installed in Ward 2B in the corridor and an airlock installed[2538]. Between 2019 and 2022, Ward 2B was disconnected from the

[2536] A41602390 - Bundle 6, Document 32, Page 669.
[2537] A38662495 - Bundle 4, Document 31, Page 132.
[2538] Bundle 21, Volume 1, Document 7, Page 507, Para 7.8.

ductwork which had been providing ventilation to it and Ward 2A, level 1, and level 3[2539]. Plantroom 41A was remodelled to provide a new ventilation system to Ward 2B. A new supply ventilation system was installed in plantroom 41 to serve BMT Ward 2A and Ward 2B. The air delivered from the unit is HEPA filtered and is provided to Ward 2B by ceiling mounted grilles and CBUs. There is a backup AHU for Ward 2B located in plantroom 41B. A new toilet extract system was installed in plantroom 41 to extract ventilation from WCs, dirty utility rooms and cleaners stores etc. A new supply ventilation system was installed in plantroom 41B which serves Ward 2A but also TCT in Ward 2B via ceiling mounted supply grilles which incorporate HEPA filters[2540].

1372. The work done to Ward 2B has resulted in substantial improvements, but it remains the case that at 2.5 ACH the air change rate is well below the required 6 ACH, and this remains a potentially deficient feature.

7.3.5 PICU

1373. The Paediatric Intensive Care Unit ("PICU") is located within level 1 of the RHC. It has two single rooms, four 4 bedded spaces, 3 PPVL isolation rooms, one negative pressure room (room 5)[2541], two prep rooms, two dirty utility rooms, office and support rooms. It is a 22 bedded area[2542]. If PICU is identified as an ITU/HDU then, in terms of SHTM 03-01, it should meet the same criteria as Adult ICU (i.e. a positively pressured space with 10+ and 10 ACH). The area is served by two AHUs located in plantroom 41. The secondary filter in the AHUs was upgraded from F7 to F9[2543].

HEPA Filtration

1374. The PICU ward had no HEPA filters installed at handover, but this was not a potentially deficient feature, because the ward had been designed as a critical care ward, and HEPA filters were not required by SHTM 03-01 (Draft

[2539] Bundle 21, Volume 1, Document 7, Page 507, Para 7.8.
[2540] Bundle 21, Volume 1, Document 7, Page 576, Para 10.38.
[2541] Bundle 4, Document 40, Page 162.
[2542] A32700341 - Bundle 3, Document 19, Page 139.
[2543] A44943484 - Bundle 52, Volume 11, Document 9, Page 88.

2009) unless a need is identified through clinical assessment[2544].

Air Lock

1375. The PICU ward had no air lock at handover in 2015 and did not require one.

Air Change Rates ("ACH")

1376. The required number of ACH in accordance with SHTM 03-01 (Draft 2009) for ITU/HDU was 10 ACH[2545] but at handover the ACH was less than the required 10 ACH[2546]. This was a potentially deficient feature.

Chilled Beams ("CBUs")

1377. PICU used chilled beams just like the rest of the hospital. The CBUs created the potential for contaminated recirculated air immediately above the patient (since there were no air filters within the CBUs). CBUs cannot operate at 6ACH or more so the existence of CBUs in a general ward will result in non-compliant ACH. The CBUs are a source of contamination due to maintenance activity and the collection of dust on the CBUs. This is a potentially deficient feature.

Room Air Pressure

1378. The room air pressure required to be +10 Pa since it was a critical care area (ITU/HDU),[2547] but the pressure cascades failed to meet that standard at handover in 2015[2548]. This was a potentially deficient feature.

Backup Air Handling Unit ("AHU")

1379. There was no backup AHU so any filter changes and maintenance would result in a significant impact on the critical ventilation system and pressure differentials for the duration of the downtime[2549]. This is a potentially deficient feature.

[2544] A33010802 - Bundle 16, Document 5, Page 483; See also Transcript, Andrew Poplett, 7 November 2024, Page 55, Column 104.
[2545] A33010802 - Bundle 16, Document 5, Page 483.
[2546] A44943484 - Bundle 52, Volume 11, Document 9, Page 88.
[2547] A33010802 - Bundle 16, Document 5, Page 483.
[2548] A44943484 - Bundle 52, Volume 11, Document 9, Page 88.
[2549] A38694853 - Bundle 4, Document 40, Page 162.

PPVL Isolation Rooms

1380. At handover in 2015, there were 4 PPVL rooms in the PICU ward which did not have the required 10ACH and +10 Pa[2550]. None of the PPVL rooms in the QEUH and RHC had HEPA filtered air supply at handover[2551].

Validation

1381. At handover in 2015 there was no validation for the ventilation system in the PICU ward[2552].

Post-Handover

1382. In light of PICU's status its potentially deficient features at handover were the lack of 10 ACH and a +10 pa pressure differential along with the use of CDUs, no backup air handling unit and an absence of validation.

Remediation

1383. In April 2019 the two PPVL isolation rooms within the PICU ward were reviewed to check if compliant[2553]. It was recorded that the PPVL rooms did not have HEPA filtration.

1384. On 21 July 2019, it was recorded that ACH calculations were within 75% of the design of 10 ACH and pressure was between -1 and 1 Pa[2554]. HEPA filters were fitted to the three PPVL rooms (12, 17, and 18)[2555].

1385. In 2019 following adjustments to the relevant AHU plant and ventilation diffusers, the 4 bed wards now appear to achieve the required +10 Pa and 10 ACH in some rooms but only +2 Pa and 10 ACH in others[2556]. There is no further data in relation to the two single isolation rooms.

1386. On 12 October 2020 it was confirmed that ceiling ventilation grilles ("CVGs")

[2550] A38694853 - Bundle 4, Document 40, Page 163.
[2551] CTI Closing Statement, Glasgow 3, Chapter 5, Page 228, Para 91.
[2552] CTI Closing Statement, Glasgow 3, Page 228, Paras 91-92; A44943356 - Bundle 23, Document 97, Page 1001; A49398246 - Bundle 26, Document 4, Pages 349 and 358.
[2553] A41602399 - Bundle 23, Document 81, Page 790; Bundle 4, Document 51, Page 224.
[2554] A38694853 - Bundle 4, Document 40, Page 163.
[2555] A38759230 - Bundle 4, Document 51, Page 224; A49398246 - Bundle 26, Document 4, Pages 349 and 360.
[2556] Bundle 12, Document 150, Page 1269.

had been removed[2557]. The current ACH was at the rate set out in the recent ventilation verification (10ACH) and the remaining patient 4 bedded room has been rebalanced to achieve a compliant ACH while having a +2 Pa pressure cascade from room to corridor[2558].

1387. By 8 June 2021, HEPA filters had been installed in the PICU ward[2559].

7.3.6 Ward 6A

1388. Ward 6A was originally used to accommodate adult rheumatology patients. It had a general ward design with 2.5 ACH and CBUs like similar general wards[2560]. In that role it had no more potential deficient features than other general awards.

1389. However, on 26 September 2018, patients from Ward 2A moved to Ward 6A[2561]. On 9 March 2022, the paediatric patients moved back to Ward 2A. As a consequence the potentially deficient features identified for Ward 2A at handover outside the BMT isolation rooms also applied to Ward 6A in September 2018.

1390. In 2019, portable HEPA filter units were placed within three rooms in Ward 6A (rooms 20, 21 and 23). Camfil recirculating scrubbers were also installed in the ceilings of ensuites[2562]. On 2 September 2019, flexible push connectors were changed relating to the CBUs[2563]. This may have increased the air quality in ward 6 A, but it cannot be said that their provision entirely removed the potentially deficient features or the lack of HEPA filtration

Current Position

1391. Ward 6 a has returned to accommodating adult patients. It therefore has the same potentially deficient features as other general wards.

[2557] Bundle 12, Document 150, Page 1269.
[2558] A34027936 - Bundle 12, Document 155, Pages 1269-1270; A34027938 - Bundle 12, Document 157, Pages 1280-1281.
[2559] A38759230 - Bundle 4, Document 51, Page 220.
[2560] A47960466 - Bundle 21, Volume 1, Document 7, Page 509.
[2561] A47960466 - Bundle 21, Volume 1, Document 7, Page 509.
[2562] A47960466 - Bundle 21, Volume 1, Document 7, Page 510.
[2563] A47540479 - Bundle 26, Document 2, Page 163, Para 6.148.

7.3.7 Ward 4B, QEUH

1392. Ward 4B was built to house bone marrow transplant patients who need protective isolation due to being severely immunocompromised[2564]. The BMT unit was not part of the original design of the hospital but was included in 2013 following a change order[2565].

1393. In June 2015, patients transferred from Ward 4B to after concern that the ventilation standards in the patient rooms and corridor spaces did not meet the required standard for BMT accommodation. The primary issues were the air change rate, pressure cascades in rooms and corridors, and the room permeability. Patients were transferred back to the Beatson in July 2015[2566].

HEPA Filtration

1394. Ward 4B lacked HEPA filters in the ward corridor (or ancillary spaces) at handover[2567] which was a potentially deficient feature because the ward housed patients who were frequently neutropenic, and an absence of HEPA filters was not compliant with Appendix 1A of SHTM 03-01 (Draft 2009) nor with the previous Adult Haemato-oncology COS which required "all highly filtered air >90%, probably best HEPA" [2568]. The HEPA filters were installed in the ceiling diffusers in the patient bedrooms[2569].

Airlock

1395. The previous COS for Adult Haemato-oncology did not have a requirement for a double-door barrier[2570] and there was none in Ward 4B at handover[2571]. The previous unit Beatson had an airlock[2572] and the requirement for a pressure differential to the rest of the hospital would require a double door barrier to work.

[2564] A33680944 - Bundle 3, Document 5, Page 45.
[2565] See Chapter 5.
[2566] A44943548 - Bundle 23, Document 67, Page 718.
[2567] A40241476 - Bundle 23, Document 22, Page 220.
[2568] Bundle 26, Document 2, Page 153; A35184640 - Bundle 16, Document 15, Page 1595.
[2569] A47960466 - Bundle 21, Volume 1, Document 7, Page 508.
[2570] A35184640 - Bundle 16, Document 15, Page 1595.
[2571] A47960466 - Bundle 21, Volume 1, Document 7, Page 508.
[2572] A47960466 - Bundle 21, Volume 1, Document 7, Page 507.

Air Change Rates

1396. The air change rate specified in SHTM 03-01 (Draft 2009) for neutropenic wards was 10 ACH,[2573] similar to the Beatson,[2574] but at handover the ACH in Ward 4B was 6 ACH[2575].

Chilled Beams ("CBUs")

1397. At handover in 2015 there were no CBUs installed in Ward 4B[2576].

Room Air Pressure

1398. The room air pressure required to be +10 Pa in accordance with SHTM 03-01 (Draft 2009),[2577] similar to the Beatson,[2578] since it was a neutropenic ward but only ranged between 0 to +4 Pa[2579]. The previous Adult Haematology and Oncology COS referred to the requirement for "positive pressure to the rest of the hospital[2580]".

1399. There was also a requirement that the Pentamidine treatment room should have negative air pressure. It did not at handover[2581].

Sealed Bedrooms / Ensuites

1400. The COS for Adult Haemato-oncology required the space to be sealed,[2582] which replicated the position in the Beatson[2583]. The bedrooms were to be sealed with no ability to open windows[2584]. At handover in 2015, the bedrooms were not sealed [2585].

[2573] A33010802 - Bundle 16, Document 5, Page 483.
[2574] A47960466 - Bundle 21, Volume 1, Document 7, Page 507.
[2575] A36372554 - Bundle 23, Document 61, Page 668; A47960466 - Bundle 21, Volume 1, Document 7, Page 508.
[2576] A36372554 - Bundle 23, Document 61, Page 668; A48142378 - Bundle 21, Volume 1, Document 8, Page 687, Para 8.19; A47540479 - Bundle 26, Document 2, Pages 153, Para 6.94.
[2577] A33010802 - Bundle 16, Document 5, Page 483.
[2578] A47960466 - Bundle 21, Volume 1, Document 7, Page 507.
[2579] A47960466 - Bundle 21, Volume 1, Document 7, Page 508.
[2580] A35184640 - Bundle 16, Document 15, Page 1595.
[2581] Bundle 13, Document 116, Page 840.
[2582] A35184640 - Bundle 16, Document 15, Page 1595.
[2583] A47960466 - Bundle 21, Volume 1, Document 7, Page 508.
[2584] A38029602 - Bundle 23, Document 18, Pages 203 and 205.
[2585] A47960466 - Bundle 21, Volume 1, Document 7, Page 508, Para 7.13.

Backup Air Handling Unit ("AHU")

1401. There was no requirement for a backup AHU at handover in 2015 but in October 2017, it was identified that only one AHU served the BMT isolation rooms which could result in patients being relocated in event of failures[2586]. Mr Poplett stated that where there is no backup, then in the event of a shutdown of the sole AHU, this would impact on the ability of the ward to provide the required airflow necessary for safe patient care[2587].

BMT Isolation Rooms

1402. The original Haemato-oncology COS required an adequate number of positive pressure sealed HEPA filtered side rooms for neutropenic patients, as in the Beatson[2588]. At handover in 2015, there were 24 isolation rooms, which only had 6ACH rather than the required 10ACH[2589].

Validation

1403. At handover in 2015 there was no validation for the ventilation system in Ward 4B[2590].

Pressure Monitoring System

1404. To ensure safety of patients, there required to be a monitoring system which would allow regular monitoring of the pressure. This must have an alarm which will alert a drop in pressure after a reasonable time lag such as five minutes[2591].

1405. At handover in 2015, unlike the Beatson, there was no pressure monitoring system[2592]. Such a system was installed during the 2015 upgrade works[2593].

Post-Handover

[2586] A38029521 - Bundle 3, Document 7, Page 60.
[2587] A47960466 - Bundle 21, Volume 1, Document 7, Page 503, Para 6.16.
[2588] A35184640 - Bundle 16, Document 15, Page 1595.
[2589] A47960466 - Bundle 21, Volume 1, Document 7, Page 508.
[2590] CTI Closing Statement, Glasgow 3, Page 228, Paras 91-92; A44943356 - Bundle 23, Document 97, Page 1001.
[2591] A38029602 - Bundle 23, Document 18, Page 203.
[2592] A47960466 - Bundle 21, Volume 1, Document 7, Page 508.
[2593] A47540479 - Bundle 26, Document 2, Page 154, Para 6.99.

1406. For the reasons of clinical safety, identified by Mr Jenkins and the others involved in the decision to return the BMT Unit back to the Beatson on 8 July 2015,[2594] the following features at handover are potentially deficient features:

a. Lack of HEPA filtration

b. The low air change rate

c. The pressure differentials, lack of a double entry door to the ward and failure to seal rooms

d. The absence of a back-up AHU

e. The absence of a pressure monitoring system

f. The lack of validation

Partial Remediation of Ward 4B

1407. In July 2015, upgrade works were undertaken in Ward 4B which resulted in some changes to ventilation [2595]. The works to upgrade the 24 bedrooms in Ward 4B were completed in October 2015. The primary change was the installation of a more powerful fan motor, increasing the volume of air delivered to the space. This assisted in delivering room pressure differentials of between 5 and 10 Pa between bedrooms and corridors. There was also positive pressure from the corridor to the rest of the hospital[2596]. To provide a sealed room, an MF plasterboard ceiling had been installed within the 24 bedrooms. The ceiling has been taped, painted and sealed at all interfaces with adjoining walls and services. The en-suite grid and tile ceiling has been retiled, but with the services and tiles silicon sealed. Multiplex carried out room air permeability testing[2597] to the parameters set out in SHPN 04-01 Supplement 1[2598]. The air delivery into the rooms was via HEPA terminal grilles and all HEPA terminal filters were replaced on completion of the works[2599].Digital gauges were fitted external to the rooms and alarms were

[2594] Bundle 13, Document 116, Page 840.
[2595] A47540479 - Bundle 26, Document 2, Page 154, Para 6.102; A41683249 - Bundle 20, Document 56, Page 1212.
[2596] A41683247 - Bundle 20, Document 57, Page 1230.
[2597] A41683247 - Bundle 20, Document 57, Page 1230.
[2598] A40165237 - Bundle 23, Document 94, Page 975.
[2599] A44943548 - Bundle 23, Document 67, Pages 718-719.

fitted at the nurse station[2600].

1408. On completion of the works, the rooms were validated and offered to NHS GGC for use. Following the validation in October 2015, microbiologists requested air sampling and were not satisfied with the outcomes. On 27 October 2015, RSK Environmental Ltd carried out air permeability testing on the isolation rooms, with the measured leakage rates being within the 5% required by HBN 04 Supplement 1 - Isolation Facilities in Acute Settings[2601].

1409. The intended patient group remained at the Beatson. In December 2015, an SBAR[2602] was issued by HPS which recommended the following:

(1) HEPA filtered air into the rooms

(2) Ideally the corridor should be supplied with HEPA filtered air

(3) 10 ACH

(4) 10 Pa

(5) Sealed ceilings within the bedrooms and en-suites; and

(6) continuous monitoring systems.

1410. On 23 March 2016, Mr Loudon issued PMI 471 to Multiplex to carry out further works. The PMI required Multiplex to achieve 6 ACH, room pressures of +2.5 to +8 Pa, HEPA filtered corridors, and the entrance to the ward to be airlocked[2603].

1411. In September 2017, further upgrade works resulted in the ensuites being sealed by plasterboard[2604].

1412. In October 2017, an SBAR was raised by microbiologists[2605]. The SBAR contained the same recommendations as the December 2015 recommendations, but also assessed that extract ventilation ductwork to be

[2600] A41683247 - Bundle 20, Document 57, Page 1230.
[2601] A41683247 - Bundle 20, Document 57, Page 1233.
[2602] A33680939 - Bundle 3, Document 4, Pages 38-39.
[2603] CTI Closing Statement, Glasgow 3, Chapter 5, Pages 251-252, Para 169.
[2604] A47540479 - Bundle 26, Document 2, Page 154, Para 6.105.
[2605] A38029521 - Bundle 3, Document 7, Page 57.

separate in accordance with SHPN 04 Supplement 1[2606].

1413. The works included ceilings within the en-suites being upgraded from ceiling tile grids to solid plasterboard ceilings. This work was undertaken in several phases, and the rooms and spaces were finally validated in November 2017[2607]. The validation report notes that the air supply volumes and ACH all achieve or are acceptable to the required specification. The room pressures were recorded at 5.5 Pa[2608]. The HEPA filters were changed in each individual isolation room and old filters replaced[2609]. A pressure monitoring system was in place[2610]. The ACH and pressure cascades recorded were accepted by microbiologists, but further air sampling was requested to ensure the area was suitable for the patient group to be returned from the Beatson. In June 2018, the patients returned to Ward 4B from the Beatson[2611].

1414. In 2019, the ceiling ventilation grilles were removed from the corridor area of Ward 4B[2612]. An airlock has also been introduced[2613].

1415. The rooms now operate at 10+ Pa but are still at 6ACH[2614]. This is a potentially deficient feature. The corridors are still not HEPA filtered[2615] but as the rooms have positive pressure then this is less critical and is not a potentially deficient feature[2616]. The lack of a backup AHU is a potentially deficient feature[2617].

7.3.8 Ward 4C

1416. Ward 4C was intended to care house renal and renal oncology patients in the QEUH. It is located on the 4th floor and is supplied with air by 3 AHUs in

[2606] A38029521 - Bundle 3, Document 7, Page 58.
[2607] A38029704 - Bundle 23, Document 69, Page 721.
[2608] A47960466 - Bundle 21, Volume 1, Document 7, Page 508.
[2609] A38029704 - Bundle 23, Document 69, Page 724.
[2610] A47960466 - Bundle 21, Volume 1, Document 7, Page 508.
[2611] A44943548 - Bundle 23, Document 67, Page 719.
[2612] A44943548 - Bundle 23, Document 67, Page 719; A41686378 - Bundle 23, Document 68, Page 720.
[2613] A47960466 - Bundle 21, Volume 1, Document 7, Page 508, Para 7.15.
[2614] A47960466 - Bundle 21, Volume 1, Document 7, Page 508, Para 7.15.
[2615] A47540479 - Bundle 26, Document 2, Page 156, Para 6.108.
[2616] A33680939 - Bundle 3, Document 4, Page 38.
[2617] CTI Closing Statement, Glasgow 3, Chapter 5, Page 584, Para 211.

plantroom 124 on level 12[2618]. It is a 10 single room (now with ensuites) unit now caring for haemato-oncology patients including those suffering from acute myeloid and lymphoblastic leukaemia. These patients typically endure long periods of neutropenia following intensive chemotherapy[2619].

1417. As a consequence of the 2013 decision to convert Ward 4B into an adult BMT Ward and move the Adult Haemato-oncology cohort to 4C, original 4B COS[2620] applied to the ward. This included the requirement for highly filtered air and positively pressured sealed HEPA side rooms for neutropenic patients[2621].

HEPA Filtration

1418. Ward 4C was designed as a general ward and therefore did not have HEPA filtration at handover[2622]. If it is to be considered as a 'Neutropenic Ward', then HEPA filtration would be required by Appendix 1A of SHTM 03-01 (Draft 2009)[2623], however in any event it was required by the Adult Haemato-oncology COS[2624].

1419. In January 2019, recirculating Camfil HEPA filter units were installed in the ceiling of the ensuites. Mr Bennet explains that since the en-suites are at negative pressure to the patient room this unit will not reduce contamination for the patient except for the limited time when they use the ensuite[2625].

Air Lock

1420. The COS for Adult Haemato-oncology did not have a requirement for a double-door barrier[2626] and there was no double-door barrier system in Ward 4C at handover[2627]. However, the requirement for a pressure differential to the rest of the hospital in the COS would require a double door barrier to

[2618] A44943543 - Bundle 20, Document 1, Page 10.
[2619] A41791405 - Bundle 20, Document 62, Page 1428.
[2620] Bundle 16, Document 14, Page 1595.
[2621] A47960466 - Bundle 21, Volume 1, Document 7, Page 509.
[2622] A47960466 - Bundle 21, Volume 1, Document 7, Page 509, Para 7.19.
[2623] A33010802 - Bundle 16, Document 5, Page 483.
[2624] Bundle 16, Document 14, Page 1595.
[2625] Bundle 21, Volume 1, Document 8, Page 690, Para. 8.28.
[2626] A35184640 - Bundle 16, Document 14, Page 1595.
[2627] A47960466 - Bundle 21, Volume 1, Document 7, Page 509.

work.

Air Change Rates ("ACH")

1421. The required ACH in accordance with SHTM 03-01 (Draft 2009) for neutropenic wards was 10 ACH,[2628] but at handover the ACH in Ward 4C was 2.5ACH[2629].

Chilled Beams ("CBUs")

1422. CBUs were installed at handover[2630], did not have dew point control[2631] and were situated over patient's beds.

1423. The CBUs created the potential for contaminated recirculated air immediately above the patient (since there were no air filters within the CBUs). CBUs cannot operate at 6ACH or more so the existence of CBUs in a general ward will result in non-compliant ACH. The CBUs are also a source of contamination due to maintenance activity and the collection of dust on the CBUs. This is a potentially deficient feature.

Room Air Pressure

1424. The Adult Haematology and Oncology COS referred to the requirement for "positive pressure to the rest of the hospital[2632]". At handover in 2015, the rooms were at neutral pressure rather than the required positive pressure[2633].

Sealed Bedrooms / Ensuites

1425. The COS for Adult Haemato-oncology required the space to be sealed[2634] which replicated the position in the Beatson[2635]. At handover in 2015, the

[2628] A33010802 - Bundle 16, Document 5, Page 483.
[2629] A47960466 - Bundle 21, Volume 1, Document 7, Page 509, Para 7.19.
[2630] Transcript, Pamela Joannidis, 30 August 2024, Page 19, Column 34; A32310960 - Bundle 6, Document 34, Page 666; Transcript, Matthew Lambert, 21 August 2024, Pages 39-40, Columns 74-75.
[2631] A32310960 - Bundle 6, Document 34, Page 695; A41602105 - Bundle 23, Document 89, Page 883.
[2632] A35184640 - Bundle 16, Document 15, Page 1595.
[2633] A47960466 - Bundle 21, Volume 1, Document 7, Page 509, Para 7.19.
[2634] A35184640 - Bundle 16, Document 15, Page 1595.
[2635] A47960466 - Bundle 21, Volume 1, Document 7, Page 508, Para 7.13.

bedrooms were not sealed[2636].

Backup Air Handling Unit ("AHU")

1426. There was no requirement for a backup AHU at handover. Where there is no backup AHU then in the event of a shutdown of the sole AHU, this would impact on the ability of the ward to provide the required airflow necessary for safe patient care[2637].

Pressure Monitoring System

1427. At handover in 2015 there was no pressure monitoring system2638. However, this ward should have had +10 Pa due to the neutropenic patient group, which would require pressure monitoring.

Validation

1428. At handover in 2015 there was no validation for the ventilation system in Ward 4C[2639].

Post-Handover

1429. Without entering the debate on whether Ward 4C is a neutropenic ward its ventilation system clearly did not comply with the 2009 COS for the adult haematology ward. The main potentially deficient features are the lack of HEPA filtration, the lack of a positive pressure to the rest of the hospital, the presence of chilled beams, the failure to seal the rooms correctly, the absence of a backup air handling, the absence of a pressure monitoring system and the failure to validate the system. If one does consider the ward to be a 'neutropenic ward' in terms of SHTM 03-01 then one would add the air change rate.

Remediation

1430. In October and November 2018, the AHU plant was recalibrated and the

[2636] A41791079 - Bundle 20, Document 73, Page 1534.
[2637] A47960466 - Bundle 21, Volume 1, Document 7, Page 503, Para 6.16.
[2638] A47960466 - Bundle 21, Volume 1, Document 7, Page 508, Para 7.13.
[2639] CTI Closing Statement, Glasgow 3, Page 228, Paras 91-92; A44943356 - Bundle 23, Document 97, Page 1001.

ventilation system balanced to achieve nominally positive pressure differentials from bedroom to the corridor[2640]. Mr Bennett reports that in 2020 and 2022 the ten rooms intended for the most immunosuppressed patients (Rooms 66 to 75) had pressure differentials of 0.1 to 1.0 Pa) [2641].

1431. On 3 December 2018, a report was issued for Ward 4C which indicated a pressure differential of 1 Pa or more had been achieved by increasing the extraction fan speed and adjustment of the dampers within the ductwork[2642].

1432. In January 2019, portable HEPA filters were used, but since they still allowed unfiltered air to enter the patient bedroom then their efficacy is in doubt[2643]. In the same month, the ceiling ventilation grilles were removed and replaced with a standard ceiling tile to reduce the risk of particulate moving from the corridor ceiling void into the corridor transfer area and rooms. Between January 2019 and March 2019, the F7 secondary filters within the AHUs serving Ward 4C were replaced with a higher grade F9 filter to improve the source air quality delivered to Ward 4C and other wards served by the AHUs[2644].

1433. In the period between October and December 2020, HEPA filtered air scrubbers were installed within the ceiling voids of the ensuites in all 28 patient rooms within Ward 4C. These units recirculate air within the ensuite space through HEPA filtration improving the air quality within the space[2645].

1434. A risk assessment was carried out in Ward 4C on 28 February 2020,[2646] which confirmed that the rooms have 3 ACH, 6 ACH in the ensuite, bedroom to corridor nominal positive pressure, and negative pressure from the ensuite to the room[2647].

1435. Mr Bennett reports that in 2020 and 2022 the ten rooms intended for the

[2640] A41791405 - Bundle 20, Document 62, Page 1429.
[2641] Bundle 21, Volume 1, Document 8, Page 689, Para. 8.27.
[2642] A44943543 - Bundle 20, Document 1, Page 10.
[2643] Bundle 21, Volume 1, Document 7, Page 502; A44943543 - Bundle 20, Document 1, Page 10; A41791405 - Bundle 20, Document 62, Page 1429.
[2644] A44943543 - Bundle 20, Document 1, Page 10; A41791405 - Bundle 20, Document 62, Page 1429.
[2645] A44943543 - Bundle 20, Document 1, Page 10.
[2646] Transcript, Dr Scott Davidson, 09 October 2025, Page 12, Column 19.
[2647] A41791405 - Bundle 20, Document 62, Page 1430.

most immunosuppressed patients (Rooms 66 to 75) operate at air change rates in the range of 2.8 to 3.3ACH[2648].

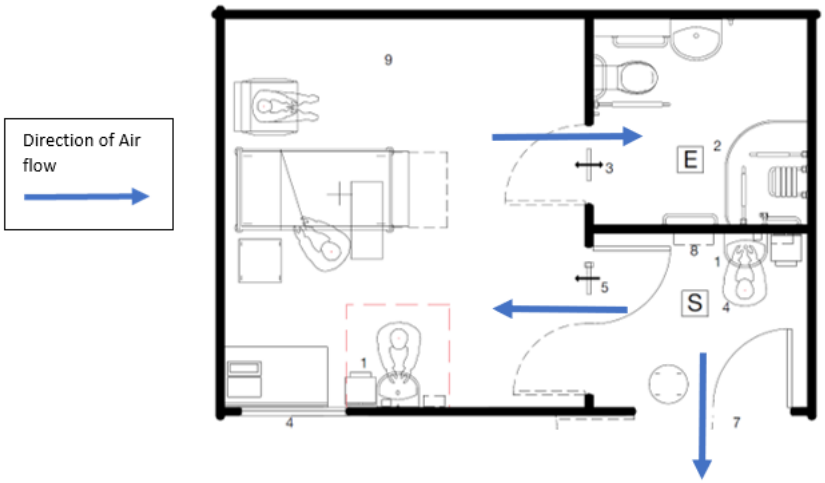
1436. Ward 4C continues to have 2.-3 ACH, there are no HEPA filtered rooms (although there are mobile HEPA units)[2649], the rooms remain at neutral pressure, CBUs remain in place[2650], and the bedrooms and ensuites remain unsealed2651. These remain potentially deficient features.

7.3.9 PPVL Isolation Rooms

1437. A PPVL room Is a particular type of isolation room, described in HBN 4 Supplement 1: Isolation Facilities in Acute Settings and SHPN 04 Supplement 1 (2008)[2652]. PPVL rooms were developed to be an isolation room in an acute general setting with a bedroom, an en-suite shower and toilet space with a ventilation lobby through which the room is accessed from the rest of the ward[2653].

1438. As shown in the diagram below, PPVL rooms should have a lobby. Air is supplied to the lobby from the lobby ceiling grill via HEPA filters. The air in the bedroom is supplied from the lobby. Air does not pass from the corridor directly to the bedroom due to the lobby being at a positive pressure to the corridor and the bedroom. There is an extract in the en-suite bathroom which pulls air from the bedroom and bathroom to the outside[2654].

[2648] Bundle 21, Volume 1, Document 8, Page 689, Para. 8.27.
[2649] CTI Closing Statement, Glasgow 3, Page 595, Chapter 5, Para 244.
[2650] A41791405 - Bundle 20, Document 62, Page 1430.
[2651] A47960466 - Bundle 21, Document 7, Page 509, Para 7.20.
[2652] Bundle 16, Document 4, Page 314; Bundle 23, Document 94, Page 945.
[2653] Bundle 23, Document 94, Pages 950-951, Paras 2.5-2.10.
[2654] A34735209 - Bundle 52, Volume 11, Document 6, Page 82.



1439. As built, all the lobbied isolation rooms in the QEUH/RHC were PPVL rooms with their own dedicated ventilation system with extracts from both the bedroom and the en-suite. As noted elsewhere in a discussion with Dr Inkster via email in November 2012, Mr Hoffman stated that he was not entirely happy with PPVL rooms. They also required design parameters precisely the same as the test set up used to prove the PPVL room concept worked. The test dimensions have never been published, and rooms have been sized to varying dimensions. He was also concerned about leakage from the patient bedroom since it will be either positive or negative pressure even if it is described as "neutral." He also confirmed that protection of highly neutropenic patients is excluded from the NHS guidance[2655].

1440. Mr Powrie stated that there was an extract in the patient bedrooms of the PPVL and a smaller extract in the en-suite. The room was not in accordance with the guidance intent within SHPN 04 Supplement 1[2656]. Mr Poplett stated that the point of a PPVL room is to have neutral pressure to the surrounding areas other than the lobby or the en-suite. The goal is to balance the amount of air blown in with the amount of air being sucked out[2657]. However, Dr Inkster expressed concern that a neutral room is never really neutral, as it is either positive or negative due to leakage and that could potentially put immunosuppressed patients at risk. This accorded with Mr Hoffman's

[2655] Bundle 23, Document 14, Page 194.
[2656] Transcript, Ian Powrie, 22 August 2024, Pages 75-76, Columns 146-147.
[2657] Transcript, Andrew Poplett, 7 November 2024, Page 58, Column 112.

view[2658].

1441. Mr Leiper's report identified that the extract grille in the PPVL room was positioned on the ceiling in the bedroom with a further extract within the ensuite. The position of the extract grille on the ceiling of the patient's bedroom might lead to an airflow which does not effectively flow over the patient. In circumstances where source isolation of infectious patients is necessary, the protection of staff caring for the patient may be compromised[2659]. If grilles are located in different places in the PPVL room, then that could affect its efficacy[2660].

1442. At handover in the RHC there were 8 PPVL isolation rooms in Ward 2A and 24 PPVL isolation rooms in total[2661]. The breakdown of the PPVL isolation rooms elsewhere in the RHC was as follows:

No.	Ward (RHC)	No. of PPVL Rooms
1.	2A	8
2.	Clinical Decision Unit (CDU)[2662]	2
3.	Cardiology[2663]	2
4.	Paediatric Intensive Care Unit (PICU)[2664]	4
5.	Acute Receiving[2665]	2
6.	Level 3[2666]	6

1443. At handover none of the RHC PPVL isolation rooms had HEPA filters. In June 2015, prior to the patients moving in, HEPA filtration was installed in the supply grilles of the lobbies of the PPVL isolation rooms in Ward 2A[2667].

1444. At handover in the QEUH there were 12 PPVL isolation rooms which were as follows[2668]:

[2658] Transcript, Dr Teresa Inkster, 01 October 2024, Page 11, Columns 17-18.
[2659] A41602105 - Bundle 23, Document 89, Page 884.
[2660] Transcript, Andrew Poplett, 7 November 2024, Page 58, Column 112.
[2661] A46059364 - Bundle 23, Document 96, Page 997
[2662] A44943477 - Bundle 23, Document 84, Page 835.
[2663] A44943477 - Bundle 23, Document 84, Page 836.
[2664] A44943477 - Bundle 23, Document 84, Page 836.
[2665] A44943477 - Bundle 23, Document 84, Page 837.
[2666] A44943477 - Bundle 23, Document 84, Page 838.
[2667] A44943477 - Bundle 23, Document 84, Page 835.
[2668] A44943366 - Bundle 52, Volume 11, Document 11, Page 92.

No.	Ward (QEUH)	No. of PPVL Rooms
1.	Intensive Care Unit (ICU)	5
2.	High Dependency Unit (HDU)	5
3.	Renal (4A)	2

1445. None of the QEUH PPVL Isolation Rooms had HEPA filters at handover. Subsequently between September 2015 and June 2021, 7 of the 12 PPVL isolation rooms have been fitted with HEPA filters (3 HDU, 3 ICU, 1 4A). The remaining 5 isolation rooms are a room in Ward 4A, 2 rooms in HDU and 2 rooms in ICU. The room in Ward 4A does not have HEPA filtration[2669].

1446. The various steps taken to convert some PPVL rooms to positive and negative pressure rooms are narrated in Chapter 5 of these submissions in the section that deals with events in 2015 entitled, " Concern about the choice of PPVL Rooms for all isolation rooms".

1447. The current status of isolation rooms in relation to both the RHC and QEUH is set out in the below table:

No.	Ward (RHC)	Isolation Rooms (2025)
1.	2A	3, PPVL, 4 PPIR, 1 NPVL
2.	Clinical Decisions Unit (CDU)	1 PPVL & 1 NPIR
3.	Cardiology	2 PPVL
4.	Paediatric Intensive Care Unit (PICU)	3 PPVL & 1 NPIR
5.	Acute Receiving	1 PPVL & 1 NPIR
6.	Level 3	6 PPVL

No.	Ward (QEUH)	Isolation Rooms (2025)
1.	Intensive Care Unit (ICU)	3 PPVL & 2 NPIR
2.	High Dependency Unit (HDU)	3 PPVL & 2 NPIR
3.	Renal (4A)	2 PPVL
4.	4B	24 PPIR[2670]

1448. Given the caveats in HBN 4 Supplement 1[2671] and the SHPN 04 Supplement 1[2672] about the unsuitability of PPVL rooms for severely immunocompromised or highly infectious patients, having all the isolation

[2669] A44943366 - Bundle 52, Volume 11, Document 11, Page 92.
[2670] Bundle 23, Document 126, Page 1122.
[2671] Bundle 16, Document 4, Page 314.
[2672] Bundle 23, Document 94, Page 945.

rooms in the hospital as PPVL rooms was a PDF.

8. CHAPTER 8 - WHY CERTAIN EVENTS OCCURRED AS THEY DID

8.1 Introduction

1449. This chapter considers the evidence. We attempt to resolve inconsistencies, propose what evidence should be accepted, and identify and explain inferences we submit should be drawn. The first part of the chapter focuses on the procurement, design and construction of the hospital, largely addressed by witnesses in Glasgow 4, Part 1, and Glasgow 4, Part 3, and covered by PPP13 and PPP15. The second part revisits Chapter 6 of our Closing Statement following Glasgow 3, and further develops the seven questions asked in that chapter, in light of submissions made by CPs in closing statements following Glasgow 3, and evidence led, or documents reviewed, recovered, or understood since the end of the Glasgow 3 hearing.

8.2 The Contract to build the QEUH/RHC

1450. While we have explained below the scope of PPP13, what follows is intended to assist the Chair by providing specific references to contract provisions which may play a part in discussion of contentious issues.

1451. To make an introductory point, unlike some other suites of standard-form contract terms, NEC3 is not written solely and specifically for a design and build approach. Whether design is included will depend on whether - as in the contract for the construction of the QEUH/RHC - design is specified as part of the contractor's responsibility.

8.2.1 <u>Provisions of the Contract Agreement itself</u>

1452. Preamble - the works are to comprise 'the management and delivery of design and construction services' for stages of work including:

> 2 - Detailed Design of the New Adult Acute and New Children's Hospitals to Full Business Case Submission, and
>
> 3 - Design and Construction of New Adult Acute and New Children's Hospitals and Energy Centre.

So, as is uncontentious, design is the contractor's responsibility.

1453. Clause 5 - the contractor is only authorised to proceed with Stage 3 upon written authority in a prescribed form (attached to the contract as Appendix 2) being provided by the Employer.

Again, this references evidence about a two-stage contract.

1454. Appendix 1, clause 4 - the 'overriding Objective is by working together….to achieve the successful delivery by the Contractor of the works'-

> 4.1 to the standard and functionality defined or as reasonably inferred from the Employer's Requirements set out in the Works Information to a quality which meets or exceeds these requirements.

1455. This is quoted largely to confirm, if confirmation was needed, the key role intended to be played by the ERs.

8.2.2 The NEC3 Conditions of Contract

1456. The key defined participants are the Employer, the Contractor, the Project Manager and the Supervisor.

> 10.1 The Employer, the Contractor, the Project Manager and the Supervisor shall act …in a spirit of mutual trust and cooperation.

1457. This provision is relevant to evidence given on working relationships and to a discussion below on how far, in practice, that cooperation extends.

> 11.2(2) Completion is when the Contractor has done all the work which the Works Information states he is to do by the Completion Date….
>
> 11.2(39) (a bespoke clause added by the Agreement) "Employer's Requirements" is the description of the Employer's technical requirements for the works supplemented and amended by the Logs.

1458. The above is quoted to provide a source of definition for the ERs:

> 14.1 The Project Manager's or the Supervisor's acceptance of a communication from the Contractor or of his work does not change the Contractor's responsibility to provide the Works or his liability for his design.

1459. This picks up comments in evidence on where design responsibility lies and

has relevance for the design review provisions discussed below.

> 14.2 The Project Manager…. may delegate any of their actions…

1460. Evidence was given by Mr Hall that signing authority had been delegated to him by Mr Moir.

> 14.3 The Project Manager may give an instruction to the Contractor which changes the Works Information….
>
> 20.1 The Contractor provides the Works in accordance with the Works Information.
>
> 21.1 The Contractor designs the parts of the works which the Works Information states he is to design.
>
> 21.2 The Contractor submits the particulars of his design as the Works Information requires to the Project Manager for acceptance……. the Contractor does not proceed with the relevant work until the Project Manager has accepted his design.

1461. Identified given the terms of clause 14.1 mentioned above, and the Design Review process discussed later.

> 60 This clause and its sub-parts contain detailed arrangements defining Compensation Events and their consequences.

1462. The above reference is inserted purely due to evidence on compensation events in various circumstances.

8.2.3 The Works Information

1463. This includes (a) the ERs (which in turn includes the COSs and list of Guidance which it is compulsory to follow), the Contractor's Proposals (by Stage 3, as developed) and the Logs (as updated by Stage 3).

Design Process

1464. This material is referenced to enable the extensive evidence and discussion on the design process to be set against the background of the relevant contract provisions.

1465. Contract Data, Part One, Appendix 5, (final para) states -

The process for review of design to be submitted by the Contractor in relation to Contractor's Proposals to ensure that it meets the Employer's Requirements is appended to this document as Appendix A.

1466. This is an important provision. It records the contractual intention that, notwithstanding ultimate responsibility for design resting with the Contractor, it was intended that there should be a process aimed at 'ensuring' compliance with the ERs. It may anticipate the availability of sufficient knowledge by participants, both of the ERs and the technical contents of any proposals, to enable the 'assurance' to be achieved. It is a broad, and arguably ambitious, aim. So far as has been ascertained by the Inquiry Team, what then follows is the whole of the contract material written to meet that objective.

1467. The document appended is labelled Appendix 1 rather than A. It is titled 'Reviewable Design Data'. For ease it is reproduced below.

Reviewable Design Data

Within the Design Development process all information will be subject to review in three categories:

- For approval
- For acceptance
- For comment

The procedure to be adopted will be used to review and approve/accept/comment, as appropriate, a range of deliverables such as clinical functionality at department and room level, specifications including finishes, colour schemes, and materials and components.

Pro-formas, based upon the attached example will be provided for each category and these will be utilised to record the design development process.

Clinical functionality* both at department level and for individual room layouts will typically follow a staged process of review and sign-off, in line with the Stage 2 Design Development Programme.

Items such as finishes, colour scheme and materials will similarly follow a staged process, however, it is envisaged, that they could be concluded in less iterations.

Components and specifications for acceptance will typically follow a two stage process of submission/comment/re-submission/acceptance.

The pro-formas will be set-out to record the history of the Design Review Process and it is envisaged that each drawing, specification or schedule will have its own sheet to record and sign off where appropriate the contractor's design.

At each review the Board will consider the design information provided by the contractor, against the Works Information, and will respond within the Stage 2 programme timescales, confirming the level of approval/acceptance/comment and providing supporting narrative or marked up drawings with status coded as follows:

A - no comment proceed to construction

B - comments but proceed to construction taking comments on board and

C - comments resubmit with amendments.

D - rejected

The Board will ensure that all responses are signed off by the appropriate staff, to record user and managerial acceptance of the design element under review.

The data set out in the attached table 1 indicates the proposed extent for Approval and Acceptance with all other data being for comment. The list is not however exhaustive and a final agreed list will be prepared jointly within 2 calendar months of contract execution, on the understanding that table 1 is a minimum requirement.

1468. As can be seen, the Appendix provides that the process will be used ‘to review and approve/accept/comment, as appropriate, a range of deliverables such as clinical functionality at department and room level, specifications including finishes, colour schemes and materials and components'.

1469. The use of ‘such as’ suggests the items listed are merely examples.

1470. ‘Clinical functionality’ is a term defined by a separate narrative (reproduced in full below - the definition was mentioned by Mr Hall in evidence).

1471. As the narrative goes on to confirm, the Board will ‘consider the design information provided by the contractor against the Works Information’.

1472. Responses are to be status-coded

‘A - no comment, proceed to construction.

B - comments but proceed to construction taking comments on board.

C - comments resubmit with amendments.

D - rejected’.

1473. As the Appendix provides, the Board is to ‘ensure that all responses are signed off by the appropriate staff, to record user and managerial acceptance of the design element under review.’

1474. That final comment on ‘user and managerial acceptance’ returns to the question of responsibility for what results (as well as expertise required to make an informed decision).

1475. A data list is attached. That is reproduced below in full and discussed. It is said to represent the ’proposed extent for Approval and Comment ‘, all other data being for comment.

Clinical Functionality

1476. As stated above, this concept is defined. For ease the full definition is set out here.

*Clinical Functionality

a) the following matters as shown on the 1 :500 scale adjacency layouts

I. the points of access to and within the Sites and the buildings:

II. the relationship between one or more buildings that comprise the development:

III. the adjacencies between different Hospital departments:

b) The following matters as shown on 1 :200 scale departmental layouts

I. The points of access to and within the Site and the buildings

II. The relationship between one or more buildings

III. The adjacencies between different Hospital departments

IV. The adjacencies between rooms within the Hospital departments

c) The quantity, description and areas (in square metres) of those rooms and spaces shown on the agreed schedules of accommodation.

d) The location and relationship of equipment, furniture, fittings and user terminals as shown on the 1 :50 loaded room plans in respect of:

I. All bed and trolley positions

II. Internal room elevations

III. Actual ceiling layouts

e) The location of and the inter-relationships between rooms within a department as shown on the 1 :200 departmental layouts

f) The fire strategy

g) Infection control

But only insofar as each of the matters listed in (a) to (g) above relate to or affect clinical use.

1477. It is unnecessary to analyse the entire definition. The focus on the concept of clinical functionality is generally consistent with suggestions, particularly by Mr Hall, that this was the ambit of the sole role of NHS GGC and their advisers in the process. In addition, the topics listed – adjacencies, location of fittings, bed positions etc - all match points made by various witnesses. Perhaps it is less clear how, if at all, that can be done without discussion of the special requirements (including protective environment) of the occupants of some wards.

1478. The final category is g) infection control. There was no significant evidence of the involvement of IPC in the detail of the design process.

1479. Finally, lest everything so far seem clear, what precisely is to be made of the

final sentence? All the categories - from adjacencies to infection control - fall within definition only insofar as they 'relate to or affect clinical use'. In the absence of further narrative or guidance the objective - the broad aim - mentioned earlier seems challenging.

Table 1 - List of data for Review

1480. Finally, the 'attached Table 1' This is again reproduced in full for ease.

NEW SOUTH GLASGOW HOSPITALS
List of Data for Review
TABLE 1

Drawn Information		
Scale	Content	Aspect of review
1:500	Block plans noting 1. The point of access to and within the Site and the buildings; 2. The relationship between one or more buildings that comprise the development; 3. The location of and adjancencies between different hospital departments and corridors	Site and whole hospital operation relationship to existing site operations.
1:200	Departmental layouts and floor plans noting 1. The adjacencies between different hospital departments and corridors; 2. The quantity, description and areas (in square metres) of these rooms and spaces shown on the Accommodation Schedule; 3. The location of the inter-relationships between rooms within a department	Clinical functionality, room relationships within departments
1:50	Room layout drawings including 1. The location and relationship of equipment, (i) Group 1 and group 2 equipment (ii) Internal room elevations (iii) actual ceiling layouts (iv) all bed and trolley positive Departmental plans to show building systems	Clinical functionality, location of equipment
	Equipment 1. Items of equipment as shown on the Equipment Schedule incorporated into the Room data Sheets and the operational temperature tolerances.	

Design Information	
Item	**Aspects (specification including)**
External Finishes	Lifecycle, maintenance, H&S
Hard Landscaping	Colour, layout, maintenance, lifecycle, H&S.
Soft Landscaping	Colour, layout, maintenance, lifecycle, H&S.
External furniture	Colour, maintenance, lifecycle, H&S.
Interior design public space	Colour schemes, layout, wayfinding, maintenance, lifecycle.
Interior design public corridors	Colour schemes, layout, wayfinding, maintenance, lifecycle.
Wall finishes	Colour, maintenance, lifecycle, H&S.
Wall protection, handrails balustrades	Colour, maintenance, lifecycle, H&S.
Floor finishes	Colour, maintenance, lifecycle, H&S.
Plumbing fittings/tapware	Colour, maintenance, lifecycle, H&S.
Sanitaryware/IPS panels	Colour, maintenance, lifecycle, H&S.
WC cubicles and prefab partitions	Colour, maintenance, lifecycle, H&S.
External and Internal doors, door furniture and ironmongery including schedules	Colour, maintenance, lifecycle, H&S. Glazing, door protection, door configuration.
Light fittings all areas	Colour, maintenance, lifecycle, H&S.
Ceiling layouts	Colour, maintenance, lifecycle, H&S.
Nurses stations	Colour, layout, maintenance, lifecycle, H&S.
Reception desks	Colour, layout, maintenance, lifecycle, H&S.
Blinds and curtains	Colour, maintenance, lifecycle, H&S.
Lifts	Colour, maintenance, lifecycle, H&S.
Group 1 fitted furniture	design, materials for construction, colour, maintenance
Schedules of components for M&E systems	Colour, maintenance, lifecycle, H&S.
Bedhead layouts	Colour, service layout,maintenance, lifecycle, H&S.
Public lighting design	Colour, layout, maintenance, lifecycle, H&S.
Public art	Art strategy
External and internal signage	Colour, maintenance, lifecycle, H&S.
Electrical fittings	Colour, maintenance, lifecycle, H&S.
Mechanical & Electrical drawings To reflect architects 1:50's for rooms and departments	Review against Room Data Sheets, project specification and architects 1:50 drawings

The above are in addition to key design requirements as set out in SHTM's and advisory documentation as included in Volume 7.

1481. At first glance, the first part of the Table dealing with Drawn Information, setting out both drawing content and aspect of review, is both consistent with

(and indeed largely repetitive of) what has already been seen. There is a (no doubt unintentionally) cryptic reference to ‘Departmental plans to show building systems’, with no associated ‘aspect of review’. While one aspect of review is ‘location of equipment’, the reference to ‘operational temperature tolerances’ is opaque (at least to these ex post facto readers who were, no doubt, not the intended audience.)

1482. As can be seen, the second part of the Table, headed Design Information, largely comprises items and aspects generally consistent with evidence focussing on clinical functionality – colour of wall finishes, maintenance of floor finishes, H&S aspects of doors. Making allowance for abbreviating concepts, what was likely to be considered when the item was ‘Schedules of components for M&E systems’, and the aspect was ‘colour, maintenance, lifecycle, H&S’, may have been clear to the drafter, whatever obscurity surrounds it now.

1483. Pause for a moment before completing the tour of these short documents. Remember both the broad aim and the evidence suggesting clinical functionality as a sole focus. Now turn to the final four lines of Table 1.

1484. ‘M&E Drawings’ appears as a single unadorned item, with the laconic instruction to ‘Review against Room Data Sheets, project specification and architect’s 1:50 drawings’. No further direction is given. That reference is not consistent with the ‘sole focus' on clinical functionality. It is given no particular prominence.

1485. A further note at the foot then adds -

> ‘The above are in addition to key design requirements as set out in SHTM’s and advisory documentation as included in Volume 7.’

1486. Again, to an outside reader at least, the unearthing of the ‘key design requirements' from a formidable list of material is challenging. What was intended to be done with it, when found? Presumably that returns to the broad aim.

Conclusion

1487. A challenging task – achieving the broad aim of compliance with ERs – was set by the drafter. It is debateable whether what has been written is easily understood as a road map to achievement.

8.3 Why the procurement produced the hospital it did

8.3.1 Introduction

1488. These submissions arise primarily from evidence at Glasgow 4, Part 1, (both oral and in witness statements) together with relevant documents. Readers should have in mind that PPP13[2673] contains a review of the contract materials. Nothing in evidence changes our conclusion that that PPP is (with only minor exceptions) a good descriptor of the Key Features of the contract structure relating to the building of the QEUH/RHC.

1489. It would be otiose to repeat the detail of PPP 13 here. However, as context, in Part 2 of that PPP, we set out key dates, including signature of the contract on 18th December 2009[2674], as well as what the signed contract contained (including the then current versions of the Clarification Log and M&E Clarification Log). After the Project had passed FBC approval, the next key date noted was 16th December 2010, when authorisation to proceed to construction was given by NHS GGC.[2675] At that point versions of the logs marked 'FINAL' were included.

1490. The PPP discusses what documents formed part of the contract, the selection of the contractor's task as design and construction, and the stages in which events would proceed. The PPP goes on[2676] to explore the various defined terms, the key concepts which emerge from them, what documents are incorporated and issues such as contractual hierarchy. Thereafter, it discusses those terms which may have relevance to the Potentially Deficient Features previously identified, including the design process, and explores

[2673] Bundle 26, Document 3, Page 168.
[2674] Bundle 26, Document 3, Page 183.
[2675] Bundle 26, Document 3, Page 184.
[2676] Bundle 26, Document 3, Page 188.

these along with, for instance, the ERs.

1491. PPP15[2677] contains a review of Governance arrangements, including a factual and document narrative on the Agreed Ventilation Derogation.

1492. As has been said repeatedly, it is not a part of the Inquiry's role to determine issues of contractual liability. That should be borne in mind when reading what follows. The aim is to focus on the Inquiry's Terms of Reference, the Potentially Deficient Features previously identified, and, where possible, how things might have been done better. Other topics are covered which have been raised as the Inquiry has progressed.

1493. In relation to the Glasgow 4, Part 1, Hearing, we conclude that, subject in some cases to the inevitable challenges of recalling events many years ago, witnesses were largely doing their best to assist the Inquiry and to give what they believed was a true account of events. Where issues arise with any particular piece of evidence, then (assuming it to be relevant) we deal with it below.

8.3.2 The form of the contract between NHS GGC and Brookfield Europe (Multiplex)

1494. For full details of the contract process, we refer readers to PPP13, and to the introduction to this chapter. However, to provide further assistance to understanding of what follows (and the contract processes we mention), we outline in a more general way the most significant features which play a role in that narrative. We stress, as always, that determining contractual liability is not the Inquiry's function.

General Types of Contract

1495. At the risk of oversimplifying, a traditional construction contract requires the client to specify, often in great detail, what is to be built. The client thus designs the building (usually with the assistance, among others, of an architect). It is then the obligation of the contractor to build what was been specified.

[2677] Bundle 26, Document 3, Page 168.

1496. In contrast, in a Design and Build contract, the client sets out more broadly what they want – in the case of the QEUH this was described as Employer's Requirements ("ERs") - but, as the name suggests, moves the obligation to design (and build) a building to meet those requirements onto the contractor. The ERs were usefully described (by Mr Hall [2678]) as setting out 'what not how'.

1497. That is said to allow for innovation by the contractor, in the sense that there may be several ways in which what the client wants can be achieved. It can also lead to tensions over contractual responsibility – often dealt with in detailed contract provisions – when discussion takes place over a design detail with which the client is unhappy, and an exchange has followed. Ultimately design responsibility still rests (as Ms White helpfully agreed[2679]) with the contractor, if it has taken on board responsibility for design.

NEC3

1498. Most construction contracts deploy a standard set of terms produced by a relevant institution, with added bespoke provisions or amendments, to a greater or lesser degree, depending on the parties' approach. The contract deployed on a design and build basis for the QEUH/RHC was NEC3[2680]. That is a form of issued under the aegis of the Institution of Civil Engineers. It was then relatively new (having been introduced in 1993). In this form of contract, the Employer's Requirements (as they were described in the QEUH) are called the Works Information. NEC3 contains particular features, including a strong emphasis on Project Management, and provision for the sharing of risk and reward. As discussed later, it also contains reference to an obligation to cooperate. Clause 10.1 provides that –

> 'The Employer, the Contractor, the Project Manager and the Supervisor shall act……in a spirit of mutual trust and cooperation.'

1499. The only other relevant phrase which appeared in the evidence was

[2678] Transcript, David Hall, 22 May 2025, Page 26, Column 47.
[2679] Strictly in relation to M&E design, Transcript, Emma White, 13 May 2025, Page 12, Column 20.
[2680] To be precise the NEC3 Option C: Target Contract with Activity Schedule, June 2005. Bundle 17, Document 13, Page 749.

'Compensation Event'[2681]. There are very detailed provisions which may lead to additional payment to the contractor, including circumstances where the client (through the Project Manager, as he is the person given that power under this contract form) instructs a change in what is to be built (described as a change in the Works information).

The Novelty of NEC3

1500. On a project as significant as the new SGH Project, it was interesting that an NEC3 contract had been selected, of which almost no one involved had any practical experience[2682]. Some had heard of it, but none had experience of working it through. Such training as participants had, appeared to be seminars of perhaps one or two days (possibly delivered by seminar leaders with little practical experience of the contract in operation). Late in the Inquiry,[2683] it was revealed that, although there was no direct experience in Scotland, a National Construction Framework had been developed through Health Facilities Scotland. That was based on previous experience in England and a model there called Procure 21. Accordingly, although the QEUH project lay outside the National Construction Framework, it was said advice could have been available through HFS.[2684] That was disputed by Mr Seabourne.[2685] As there was no evidence that any such advice was given, the point is noted but not developed further. In fact, the Inquiry does not have material from which an analysis could properly be made of all the factors bearing on selection of different contractual forms. However, two different points arising from the selection of NEC3 may turn out to have had some influence on events.

1501. The less critical is, ironically, the NEC emphasis on cooperation. Witnesses were keen to tell the Inquiry not only how good the working relationships were during construction, but also of their awareness of the requirement for cooperation in the contract. Mr Seabourne said it had been stressed to him

[2681] Bundle 17, Document 13, Page 769.
[2682] As discussed in Chapter 5 and including both Mr Seabourne and Mr Moir - Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 38.
[2683] Transcript, Mike Baxter, 16 September 2025, Page 14, Columns 23-24.
[2684] Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 38.
[2685] Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 38.

that what was to be avoided was an adversarial relationship which had troubled other NHS construction contracts.[2686] It would be wrong to criticise such a positive approach to getting the job done. Perhaps it did have a real impact on the fact that the contract was completed broadly on time and on budget.

1502. However, there was at the time (and the position is not much more advanced now), little to guide participants on what the boundaries were for the obligation of cooperation. How far did it require them to go? Was there any shared understanding on the point? To take an example, a cohort of patients had a designed protective environment in the original version of Ward 4B and were to be moved to what most understood to be a general ward in Ward 4C. No one seems to have mentioned recreating the originally defined protective environment for that same cohort. Should the obligation of cooperation have led someone to question that? Would one party assume that, if there was an issue, their cooperative co-participant would mention it?

1503. Two other examples occur to us. First, (see later discussion) when the proposal to move the BMT unit into Ward 4B was advanced, it was already the case that the requested 10 ACH could not be provided with the existing plant. There is no record of any discussion and work simply proceeded. Would the obligation of cooperation extend to pointing out that this potentially critical feature had not been addressed or debated? If it had been, some of the unpleasant surprises encountered when the patients arrived from the Beatson in 2015 might have been avoided.

1504. The other example relates to validation. There were varying degrees of understanding on the contractor side of the purpose of the requirement of validation. It ought, in fact, to have been clear that the purpose was to determine whether a particular area was acceptable to the client. Had a ‘cooperative' discussion taken place on when validation was to be done, what impact might it have had? Depending on the report of the validation process, the result might have been different.

[2686] Transcript, Alan Seabourne, 29 May 2025, Page 6, Column 7.

1505. The point is simply that, if an assumption develops that one's cooperative participants will point things out, and then that is not done, consequences may follow. Participants may be lulled into a false sense of security. Unfortunately, there is insufficient material available to the Inquiry to reach a definitive conclusion, but users of NEC3 unfamiliar with the boundaries of the cooperation obligation might benefit from guidance.

1506. A second contract feature has a more direct connection to the major impacts discussed below. While the role of an employer's agent (or similar functionary) under many building contract forms, might have been tolerably clear to those members of the Project Team with significant project experience, to what extent was there a clear understanding of the likely practical operation of the Supervisor (a defined term) under NEC3? The contractual requirements made – or not made - of the selected Supervisor, Capita, are discussed later, but, given the outcomes, a lack of a full understanding of precisely what an NEC3 Supervisor was likely in practice to do (or not do) may have contributed to adverse outcomes.

Design and Build and the Employers Requirements

1507. This point is a lot less subtle. It was raised with several witnesses without any clear answer emerging. Our own answer is inferred from a wider consideration of events as they emerged. In our submission it is not clear at all that non-construction specialists (outwith the Project Team) involved in the huge (and prolonged) labour of producing the ERs, would have understood that, under the type of design and build contract envisaged, at any time prior to contract signature any of things described as ‘requirements’ could be altered or removed. One suspects a straw poll would have revealed they thought precisely the opposite. If misunderstandings of that fundamental kind exist – and we suggest they may have existed here – they can have a deep impact on how matters proceed.

Specifying guidance?

1508. In the Interim Report there is discussion[2687] of consequences which may

[2687] Scottish Hospitals Inquiry Interim Report - The Royal Hospital for Children and Young People and Department of Clinical Neuroscience, Edinburgh, 3 March 2025, Pages 13-14.

flow from the apparent enthusiasm for including multiple guidance documents among the compulsory material for a contractor to follow. As the issue is considered, and at least provisionally decided upon, in the Interim Report we need do no more than make a brief mention of it here. There was an effort made in the QEUH project to select, and then specify, guidance for the contractor (and indeed to split that guidance into compulsory material and that merely to be considered). When looking for features which may have contributed to unsatisfactory outcomes, a lack of emphasis on ascertaining as clearly as possible what features of any guidance document or what requirements set out in it were critical, we argue, contributed to the result. Indeed, Alan Seabourne felt the ERs were 'light on design and information' generally.[2688]

8.3.3 The Change of the Maximum Temperature Variant

1509. This topic is dealt with first, for reasons which will become obvious when we turn to the Agreed Ventilation Derogation. This change was labelled the 'first derogation' by Mr Seabourne.[2689] Notwithstanding it had not been so labelled previously, that is an apt description. While it was not accompanied – apparently – by any of the process which might be thought appropriate to investigate, assess and record a departure from requirements in guidance contractually treated as compulsory, it did depart from the maximum temperature – 28 degrees - specified in SHTM-03 01.[2690]

1510. It was introduced in July 2009[2691] as a change to ERs.[2692] This proceeded under the name of Director of Facilities, Mr McIntyre. Unfortunately, he was unable to shed much light on reasoning or process in his witness statement[2693]. Several witnesses assumed Wallace Whittle (in the shape of Mr McKechnie) had been involved. He too was unable to assist. He did not recall having been involved.

[2688] Transcript, Alan Seabourne, 29 May 2025, Pages 17-18, Columns 29-32.
[2689] Transcript, Alan Seabourne, 29 May 2025, Page 23, Column 41.
[2690] Bundle 1, Document 5, Page 1173.
[2691] Bundle 43, Volume 6, Document 27, Pages 478 and 484.
[2692] Bundle 17, Document 26, Page 1063.
[2693] Glasgow 4, Part 1 - Witness Statements, Volume 3, Alex McIntyre, Document 12, Pages 388 and 390.

1511. The Inquiry is accordingly left to glean information from secondary sources, such as the Witness Statement of Susan Logan[2694] (of Ecoteric, the NHS GGC energy consultants). From these sources, the story was tolerably clear. In previous NHS GGC projects (at Stobhill and the New Victoria), with significant areas of glass, complaints had arisen about areas overheating. The intention was to apply that learning to the QEUH building. There is no evidence of any more technical analysis, consideration of possible cost consequences, or risk assessment, nor of who might have been consulted about or involved in such steps. Mr Gallagher (the NHS GGC Acute Finance Director) thought the absence of cost consideration might have been because, at that stage, bids had not been finalised.[2695] He had a recollection of seeing a paper on the topic going to a committee, but the Inquiry Team has not located any Committee discussion.

1512. For a decision which - as it turns out – may have played a key role in events leading to the present Inquiry, what is more remarkable is that there is no record of the possible consequences of such a decision being debated or assessed. There are, no doubt, many means which can be deployed to reduce the temperature in a building. Ventilation is one. However, general building design, quantity of glass, types of external surfaces or coatings are all possibilities. None of these, we should make clear, were examined in detail in the Hearings. They do however allow the point to be made that the possible solutions were unknown when the decision was made. Emma White of Nightingales, the lead architect and consultant, thought it might not be obvious to someone making a decision on temperature that there would, or could be, knock-on effects.[2696] Alan Seabourne's view was that it had not been thought about.[2697] Our view, inevitably with the benefit of hindsight, is that it should have been fully analysed and assessed at the time.

8.3.4 The Agreed Ventilation Derogation - Is it a derogation?

1513. The facts and documents (largely from the period in December 2009 before

[2694] Glasgow 4, Part 1 - Witness Statements, Volume 3, Susan Logan, Document 15, Page 476.
[2695] Transcript, Peter Gallagher, 18 September 2025, Page 58, Columns 111-112.
[2696] Transcript, Emma White, 13 May 2025, Page 69, Column 133.
[2697] Transcript, Alan Seabourne, 29 May 2025, Page 25, Column 43.

contract signature) are fully narrated in PPP15 and sections 5.4 and 5.6 of these submissions. They are not repeated here. The Inquiry has labelled the move from 6ACH to 2.5-3 ACH (the latter usually, and confusingly, recorded as 40/l/sec), supplied by chilled beams, as the Agreed Ventilation Derogation. There is no doubt it was agreed and that it relates to ventilation. Is it a derogation?

1514. There are arguments to suggest that it is not. Firstly, it was not so labelled at the time. That may be so, but to accept that argument would be to elevate form over substance. Likewise, the type of process which expert witnesses, such as Mr Poplett, thought should be undertaken before a derogation is agreed were not undertaken. Again, that distracts from the substance.

1515. Mr Seabourne would describe it as an 'alternative design solution'.[2698] So, it may be, but, if so, it is a design solution which departs from guidance planned to be compulsory in the ERs. Mr McKechnie said that it did not 'strictly comply' with guidance.[2699] That is not an argument which is well founded. His label appeared to be based on the view that an occupancy-based alternative approach could be discerned from SHTM 03-01. While the guidance does contain a very brief discussion of occupancy, it is not easy to ascertain any basis for an alternative approach which, for instance, removes the recommended ACH of 6 from single rooms.

1516. Most witnesses, for what that is worth, seemed content to describe the change as a derogation. It is perhaps more notable that much of the initial comment on behalf of NHS GGC refers to a proposal which is 'not compliant' with guidance. As the ultimate agreement provides that the SHTM 03-01 recommended air change rate will not be provided in patient bedrooms, it is submitted that it is indeed a derogation.

What was the driver for the decision?

1517. During the Inquiry a number of candidates have been suggested for this role.

[2698] Transcript, Alan Seabourne, 29 May 2025, Page 71, Column 137.
[2699] Transcript, Stewart McKechnie, 27 May 2025, Page 77, Column 149.

BREEAM[2700] - or more properly targeting the 'BREEAM excellent' label - appeared at one stage to be a front runner. However, that runner was, in our submission, unseated early in the race. Witnesses achieved a rare consensus that BREEAM was not a main driver and that achieving that target would never be prioritised over patient safety.[2701] While the derogation would no doubt assist in achieving BREEAM excellent, that was not the reason for the derogation. BREEAM assessment was a complex process, and other features of the building could have been targeted to achieve the objective.

1518. Another possible driver was the target of 80 cubic metres of CO2 per metre square. The evidence indicated that it might have been challenging to achieve the target without the derogation. Whether the challenge could have, in fact, been met is unknown. No doubt again the derogation will have assisted, but analysis of the available material does not indicate that it was a key driving factor.

1519. A late runner was cost. Among the materials recovered by the Inquiry was a document during exchanges on value engineering (a process by which it was expected that the contractor would give continual attention to the possibility of saving money). The significance of that document was that it mentioned possibly reducing ACH. That at least indicates that potential financial ramifications were in the minds of the designers.[2702] Mr Pardy was asked about the topic and gave a lengthy response in his witness statement,[2703] the general effect of which that was that it played no role in the ultimate discussions. That does not necessarily mean, of course, that those instructing or participating in the exchanges were not aware of how the financial calculations would play out. However, the topic does not appear overtly in the discussions over the derogation shortly before contract signature on 18th December 2009. On that basis it is fair to set it aside as a

[2700] Building Research Establishment Environmental Assessment Method, rating the sustainability of buildings.
[2701] Transcript, Emma White, 13 May 2025, Page 72, Column 139; Transcript, Alan Seabourne, 29 May 2025, Page 33, Column 61, and Glasgow 4, Part 1 - Witness Statements, Volume 3, Susan Logan, Document 15, Page 481.
[2702] Bundle 43, Volume 1, Document 11, Page 35.
[2703] Glasgow 4, Part 1 - Witness Statements, Volume 3, Steve Pardy, Document 1, Page 340.

candidate.

1520. What then was decisive? Based on the available material, it was what was described by Mr Seabourne as the first derogation i.e. the reduction in permitted maximum temperature from 28 degrees to 26 degrees. Mr Pardy recalled that NHS GGC seemed particularly keen to achieve this objective.[2704]

1521. Thermal modelling was carried out for ZBP which revealed that the 28 degrees target could be met with 6 ACH. However, that modelling also appeared to show that the 26 degrees target could not. It is submitted that, on the best reconciliation of all the evidence, it was the perceived need to change to meet the 26 degrees figure which was ultimately decisive.

How – and when – was the Derogation agreed?

1522. Taking the latter point first, none of the witnesses were able to pinpoint a precise moment where the NHS GGC position changed from a relatively firm 'No - this is not compliant with guidance', to a position of agreement.[2705] It must have been on or after 16th December 2009, just before contract signature on the 18th. Mr Seabourne explained that that was how these kinds of contracts worked - lots of things got done at the last minute.[2706] He could have declined to sign, but, based on what he was told, saw no need to.

1523. The emails in the middle of December 2009 - which need not be repeated here, being set out in the narrative of PPP15 - were close to being the only record of what advice was tendered, to whom, what debate took place and what triggered the ultimate decision. The recollection of witnesses such as Mr Hall (who thought he was largely being copied into emails for information),[2707] and Mr Baird (who did not recollect being present at meetings and argued he was, in effect, simply an organiser or facilitator rather than a substantive participant),[2708] did not advance matters greatly.

[2704] Transcript, Steve Pardy, 27 May 2025, Page 8, Column 12.
[2705] NHS GGC had been warned by a dissatisfied bidder that guidance ACH would not be met with chilled beams but there is no evidence of this comment being taken on board - Bundle 43, Volume 1, Document 13, Pages 42-43.
[2706] Transcript, Alan Seabourne, 29 May 2025, Page 36, Column 67.
[2707] Transcript, David Hall, 22 May 2025, Page 54, Columns 103-104.
[2708] Transcript, Mark Baird, 28 May 2025, Pages 13-14, Columns 22-23.

There is a debate as to whether Currie & Brown were (perhaps unintentionally) downplaying the significance of their project management role, but they argued that they regarded themselves as having an informed and experienced client in the shape of the Project Team. The resolution of that debate is not necessary for present purposes.

1524. Mr McKechnie of Wallace Whittle also appeared to downplay his role. He was merely tendering advice. It was not his job to come up with solutions. He was merely passing advice to Currie & Brown. Be that is it may, he was the expert on the spot at the key time (albeit, as he said, he believed he had an informed client).[2709] He probably had some discussion with Mr Pardy, the details of which are obscure. Some calculations appear to have been done. There was discussion over numbers of persons potentially present in a patient bedroom. There is debate over whether Peter Hoffmann was involved. In his evidence he denied involvement in 2009, there is no record of his involvement at the time, and the better view is that witnesses may be confusing a 2010 involvement in a renal outpatients' discussion.[2710] Ultimately, Mr McKechnie's recorded view was that the ZBP proposal was a 'sensible practical suggestion'.

Other issues over the discussions leading to the Agreement.

1525. There is the ZBP Ventilation Strategy Paper.[2711] The obvious question is why? Why then? Why in that format? Why was it produced at all? It is remarkably short and limited for an expert presentation. Appearing on the scene around December 15th, in contract discussions which had concluded by the 18th, seems odd timing, especially for something described as a 'strategy document'. Recollections over why it was produced at that stage are now far from clear. A cynic would suggest that someone has belatedly realised that the topic under discussion might be important, and there was nothing on paper to sit behind it. Resolving that conundrum is not possible with any degree of certainty on the evidence available. There is little or no

[2709] Transcript, Stewart McKechnie, 27 May 2025, Pages 73-74, Columns 142-143.
[2710] Mr Seabourne regarded what was said by Mr Hoffman in 2010 as a vindication of the derogation decision - Transcript, Alan Seabourne, 29 May 2025, Pages 89-90, Columns 173-175.
[2711] Bundle 16, Document 21, Page 1657.

record of any analysis of that paper by anyone for NHS GGC (nor would that have been feasible in the time available).

1526. The content of the ZBP Paper, such as it is, contains points which justify brief assessment. As will have become known to Mr Pardy, none of those with expertise who examined the Paper from 2018 on (whether instructed by the Inquiry or by NHS GGC) were impressed by, or agreed with, it. Possibly the most controversial statement coming from ZBP (in the M&E Clarification Log not the Paper) was that 6 ACH was 'unnecessary'.[2712] Whatever views are held about SHTM 03-01 guidance, dismissing a requirement for air change rate in single rooms so summarily is surprising. Mr Pardy accepted that it was not happily worded.[2713] It may have been intended to express the view that the alternative ventilation proposal meant that the rate was not required.

1527. Without taking every word and subjecting it to analysis, it is also of note that the ZBP Ventilation Strategy Paper appears to place reliance on the fact that single rooms are envisaged. SHTM 03-01 specifically applies the 6 ACH figure to single rooms. Mr Pardy appeared to accept that referring to single rooms accordingly did not assist in supporting the argument for the derogation. Likewise, that the strategy would meet requirements laid down by Building Regulations and BICSE, seems to have been used as an argument in support. Accepting that these provisions laid down minimum requirements not focused on healthcare uses, Mr Pardy argued that they were simply mentioned 'for information'.[2714] None of these exchanges give much confidence that the arguments in the Paper in favour of the derogation were substantial (temperature variant apart).

1528. On or around 8th December 2009, a comment attributed to John Bushfield[2715] of Wallace Whittle notes that the proposed derogation was not acceptable, and that IPC sign off would be required. Mr Bushfield denies that he made that comment, and it somewhat oddly appears in a section of the log dealing with Multiplex comments. Neither of these points matter. What is,

[2712] Transcript, Steve Pardy, 27 May 2025, Page 17, Column 30.
[2713] Transcript, Steve Pardy, 27 May 2025, Page 17, Column 30.
[2714] Transcript, Steve Pardy, 27 May 2025, Page 18, Column 31.
[2715] Bundle 43, Volume 2, Document 21, Page 311.

with the benefit of hindsight, and at this remove, difficult to understand are two things, first, that such a straightforward statement – where the word ‘unacceptable’ is hardly open to misunderstanding - does not feature in later discussions as far as we know. Secondly, the need – not the option – for IPC sign-off, which had clearly been identified, again does not appear anywhere in what we know of later discussions. The answer as to why they do not remain I rather think is obscure. Whose job was it to make sure that these were picked up? Was it the Project Team or the project managers? Somebody should, for instance, have either ensured that IPC sign off was obtained, or recorded a good reason as to why it was not in fact, required. On balance, ensuring that that happened – as opposed to carrying it out - most obviously falls within the remit of those ‘project managing’ the tasks i.e. Currie & Brown.

1529. Faced with an apparent dilemma caused by the change in the maximum temperature requirement, it is not clear why alternatives to the non-compliant strategy were not discussed. No doubt there are other ways in which temperature could be reduced. Even a compromise over maximum temperature might have been available, if pursued. Based largely on Mr Seabourne's testimony, the best explanation seems to be that, since he did not believe the proposed solution was problematic or risky, and the deadline for contract signature was upon him, no reason for delay for alternative discussions occurred to him.[2716]

A Temporary Solution?

1530. During the evidence of Mr Hall, and to the surprise of the Inquiry, the notion was introduced that, after all, the derogation was only provisional because it could be changed during the design process. It was only ‘a line in the sand’[2717] (perhaps an odd metaphor given the usual use of that phrase to describe a point beyond which proceeding is prohibited without adverse consequences). According to this proposition (which was also touched on both by Mr Baird and Mr Seabourne), later change would trigger a

[2716] Transcript, Alan Seabourne, 29 May 2025, Pages 22-24, Columns 40-44.
[2717] Transcript, David Hall, 22 May 2025, Pages 36-37, Columns 68-69.

Compensation Event, which might be positive or negative.

1531. Why was this a surprise? Firstly, because there is not a hint of any such proposition in the contemporaneous documentation (nor indeed in any later documentation which refers to the derogation). Nor is there any real indication of this potentially important argument in the witness statements.

1532. Secondly, the logic of consciously agreeing a matter which had such practical implications for the building design, without knowing what the financial and practical consequences might be of changing it at an unspecified point in the later design process, is not obvious. Purely to take an extreme example, a reversion to the guidance ACH rate could have led the contractor to say that, due to their inability to lower ceiling heights to accommodate larger ceiling voids, the net result would be that the whole building would be taller. Would overall cost have increased? At the very least there would have been significant unknowns.

1533. Without in any way inferring that witnesses were seeking to mislead the Inquiry, this explanation does have the ring of one which has occurred ex post facto. As the key decision maker, Mr Seabourne was pressed on the point. Ultimately, he conceded that, at the time, there had been no conscious thought process (and thus presumably no discussion) linking any such notion to the decision to reach agreement.[2718]

Recording and communicating the derogation

1534. Neither NHS GGC nor the Inquiry has been able to trace any written record referring to the derogation (other than the M&E Clarification log.) There are no reports, notes, or committee minutes, notwithstanding an impressive array of committees with an interest in the QEUH project. Combined with other features (such as the fact that Mr Seabourne did not tell Mr Loudon about it[2719]), this begins to explain why it came as a surprise to arriving clinicians and ICDs in 2015.

1535. It is unfortunate no notes or minutes were kept of any of the discussions

[2718] Transcript, Alan Seabourne, 29 May 2025, Page 39, Column 73.
[2719] Glasgow 4, Part 1 - Witness Statements, Volume 3, Alan Seabourne, Document 5, Page 172.

which led to the agreement. They ought to have been, as Mr Baird ultimately accepted.[2720] The obvious party to have kept these records would have been Currie & Brown, in their project management role. That would have made the decision-making process patent, including what steps were, or were not, taken before agreement was reached.

1536. We anticipate that it will be argued that the log recorded the discussions. It is true that it does provide a window into what is happening. However, it does not contain the discussions. As Mr Baird accepted - and indeed commented favourably on[2721] - the more appropriate word to apply to what is in the log is the output of discussions. So even someone reading the log would not get the whole story.

1537. We also anticipate that it will be strongly pressed on the Inquiry that those experienced in contracts and construction would know that the log would be where such matters were to be found. They would accordingly know to scrutinise that document were they looking for the information. That may be correct. Is it the complete answer? The answer is no. A wider cohort of individuals, whether Board or Committee members or other stakeholders, might want to know – and they are[2722] unlikely to find the log and the derogation (leaving aside the Rumsfeldian challenge of not knowing there is something to look for in the first place).

1538. In our submission, this agreement should have been separately recorded and reported on, at the very least to the Executive Board (and potentially approved by them). Views may differ on its significance, but if a view on significance is to be formed one needs to know what the point is. There is an argument for its appearance in the Project Risk Register. Mr Seabourne suggested[2723] that it might have appeared in an Alternate Design List to be delivered by Multiplex on handover. Neither the efforts of NHS GGC nor of the Inquiry have found it so recorded. It may also be questioned whether a pre-contract agreement of this kind would have appeared in such a

[2720] Transcript, Mark Baird, 16 September 2025, Pages 23-24, Columns 41-44.
[2721] Transcript, Mark Baird, 16 September 2025, Pages 23-24, Columns 41-44.
[2722] Transcript, Alan Seabourne, 29 May 2025, Page 48, Column 92.
[2723] Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 38.

document (whatever that was intended to be).

1539. At risk of offending construction law specialists, we also question whether recording in something described as the M&E Clarification Log was adequate. Remember that the construction contract in its final form still contains a list of compulsory guidance, including SHTM 03-01. No qualification is placed on the face of the contract to indicate that an exception is being made, which may impact on hundreds of patient bedrooms. Is the derogation even a ‘clarification’ at all? We argue not. It is certainly not akin to many of the clarifications contained elsewhere in the log. As some witnesses have argued, the log is where you go to find minor technical detail. Properly understood, both this derogation and that relating to maximum temperature could have been included in a specific section on derogations on the face of the contract (quite apart from the internal reporting mentioned previously).

1540. What was done to report it? Mr Seabourne steadfastly maintained that he had reported it orally to Helen Byrne.[2724] That was in his view sufficient. He argued that, if David Hall thought it should have been escalated, he should have done that. Mr Hall did not agree. Ms Byrne had no recollection of being told. Nothing of it is recorded in the Minutes of the Executive Board. Having been described by Mr Seabourne as ‘a detail person’, we suggest that, had Ms Byrne been told, it is likely she would have recorded the point and made sure it was reported upon. Our submission is that Mr Seaborne is simply wrong about formally reporting it to those to whom he was accountable. If he had made a formal report to the Executive Board, it would have been in the minutes. If he had reported it, people would have known about it and behaved as if they knew about it. That is the crucial distinction. The knowledge that there had been an Agreed Ventilation Derogation was lost so completely and absolutely, that the only explanation is that he did not report it at the time. Informal 'chats' are a different matter. It now appears that Mr Calderwood was told about it informally, probably during a meeting with the Project Team in 2014. He was told it was acceptable and at that stage it did

[2724] Transcript, Alan Seabourne, 29 May 2025, Page 45, Column 86.

not occur to him to query it or raise a red flag of any kind[2725]. Ms Byrne had not mentioned it to him[2726], but by 2014 she was long gone.

The Full Business Case

1541. Moving ahead from the end of 2009 to around October 2010, the Full Business Case is a critical document, designed to obtain Scottish Government approval for NHS GGC to instruct the contractor to move from the then current point in the design phase, to start the build of the hospital. Without that approval the project comes to an end. Scrutiny of FBC suggested two things to the Inquiry. Firstly, that a reader would assume that the full suite of Scottish Government guidance was being complied with. Secondly, that the reader would know nothing of the Agreed Ventilation Derogation (or for that matter the 'first derogation' or the change in the role of Currie & Brown discussed later). These propositions were put to Mr Seabourne - who was, it appeared, in charge of the FBC process – and he accepted them.[2727] These concessions are significant, given Mr Seabourne's view that the process was like, 'selling something to the government which is looking to buy something'.[2728] As we have already argued, anyone wishing to form a view as to whether the derogation is significant or unimportant or justified or not justified needs to know about it. We submit that not only should the derogation have been clear in the FBC, but also it should have been highlighted (particularly given that the audience was the same body which had promulgated the guidance which was to be departed from).

To what did the derogation apply?

1542. As a tailpiece, we return briefly to what may now be largely an academic issue - to what rooms does the derogation apply. That would, one hopes, have been resolved had a different approach been taken to recording and reporting on the derogation. Someone would have been bound to ask the question – and demand a clear answer.

[2725] Transcript, Robert Calderwood, 30 September 2025, Page 48, Column 91.
[2726] Transcript, Robert Calderwood, 30 September 2025, Page 52, Column 100.
[2727] Transcript, Alan Seabourne, 29 May 2025, Pages 70-71, Columns 136-137.
[2728] Transcript, Alan Seabourne, 29 May 2025, Page 71, Column 137.

1543. There are several candidates for the correct answer. All rooms in the tower of the adult hospital intended to have 6 ACH, all such rooms in both adult and Children's Hospitals or all single rooms which were not isolation rooms. The first of these candidates gains support both from the fact that at the relevant time it was the adult hospital which was under discussion, and from the reference in the Clarification Log[2729] (as distinct from the M&E Clarification Log) to rooms in the Tower i.e. the adult hospital. However, it lacks any logical basis. The third candidate was roundly rejected by all witnesses and is not easy to reconcile with the discussion starting with the 6 ACH figure. The nearest to a logical answer is the second candidate, i.e. that the derogation applies to all rooms which were intended to have 6 ACH (or perhaps to all general rooms) and it was not intended to apply to any ward with specialist requirements. That view seemed to find favour with witnesses at Glasgow 4, Part 1.[2730]

Who knew about the derogation by the time of handover?

1544. In our Closing Statement following Glasgow 3, we submitted[2731] that, from the evidence available in Glasgow 1, 2 and 3, it appears that, outside the Project team, no-one in NHS GGC realised that the ventilation standard for the general wards or the balance of the hospital had been derogated from the standard of 6 ACH advised in SHTM 03-01. As discussed above, Mr Calderwood was told about it informally, probably during a meeting with the Project Team in 2014. Mr Hill, as Director for Women and Families, did not know, and assumed the building was fit for purpose[2732]. Professor Williams, as lead ICD, did not know about the agreed ventilation derogation at the time he worked for NHS GGC,[2733] and his lack of knowledge is consistent with the various emails he sent around the subject of isolation rooms in 2013 and 2014. Even Mr Loudon explained in his draft statement[2734] he was not provided with information on derogations in the M&E Clarification Log but

[2729] Bundle 17, Document 21, Page 979 and Bundle 43, Volume 6, Document 64, Page 1120.
[2730] Transcript, Ross Ballingall, 21 May 2025, Pages 32-33, Columns 60-61 and Transcript, David Hall, 22 May 2025, Page 71, Column 137.
[2731] CTI Closing Statement, Glasgow 3, Page 528, Para 14.
[2732] Glasgow 4, Part 3 - Witness Statements, Volume 5, Kevin Hill, Document 1, Page 11.
[2733] Glasgow 4, Part 3 - Witness Statements, Volume 5, Kevin Hill, Document 1, Page 16.
[2734] Glasgow 4, Part 3 - Witness Statements, Volume 3, Robert O'Donovan, Document 6, Page 459.

was aware of them by the time of the email he sent to Mr Ross at the request of Mr Calderwood, copied to Mr Seabourne. That would have been his email of 21 June 2016[2735] which seems to have resulted in Mr Seabourne's email of 23 June 2016 - "We are where we planned to be…"[2736]. Mr Loudon was a recipient of Mr Powrie's email of 26 May 2016, along with Dr Inkster[2737], which resulted in her SBAR[2738]. His involvement in the reaction to the Ward 2A ventilation issues in 2015,[2739] and his email to Mr Fernie of Multiplex on 3 September 2015[2740], are consistent with Mr Loudon not knowing of the agreed ventilation derogation in 2015. It still seems reasonable to conclude that, apart from Mr Calderwood, no-one outside the Project Team knew of the agreed ventilation derogation in the summer of 2015.

8.3.5 The content of COSs

1545. COSs are clearly important. Mr Baird described putting together the COSs and the ERs as 2 halves making a whole.[2741] Ms White's evidence was that COSs varied widely, depending on the participants, their interests, and levels of specialist knowledge. That then charged the designer with the task of interpreting what was wanted and what was required.[2742] While we touch on individual wards below, even a cursory glance at the COSs for Wards 4B and 2A, dramatically demonstrates those variations. They are, as Mr Seabourne put it, 'night and day'.[2743]

1546. Each COS purports to explain the operations of a ward dealing with those who may be immuno-compromised, yet the approach is very different. Whatever witnesses said, it does not appear that there had been any attempt to produce either a common style or common list of required content - or indeed to check the content. As we will go on to explain in relation to

[2735] Bundle 12, Document 105, Page 816.
[2736] Bundle 12, Document 104, Page 813.
[2737] Bundle 20, Document 68, Page 1495.
[2738] Bundle 4, Document 11, Page 52.
[2739] Email exchange: Bundle 27, Volume 8, Document 22, Page 94, Meeting of 7 September 2025: Bundle 27, Volume 8, Document 23.1, Page 97.
[2740] Bundle 12, Document 57, Page 416.
[2741] Transcript, Mark Baird, 16 September 2025, Pages 16-17, Columns 28-29.
[2742] Transcript, Emma White, 13 May 2025, Pages 23-25, Columns 41-46.
[2743] Transcript, Alan Seabourne, 29 May 2025, Page 19, Column 34.

individual wards, this is a significant contributing factor to the out-turn of events. The intended user group best know what they require. They may not be able to produce a technical specification of a ventilation system, but it seems desirable that they produce sufficient narrative of the necessary protective environments sought, to enable an informed specialist ventilation designer to reach an appropriate conclusion. Ideally there should then be some form of 'loop back' to the users to make sure that the designer has understood it correctly.

8.3.6 Reliance on ADB sheets

1547. The ADB system was also addressed during the Edinburgh hearings. It is a database tool with detailed clinical requirements for hospital areas, based on the guidance relevant to the design of hospitals in England, including HBNs and HTMs[2744]. Accordingly, RDSs and layouts should automatically comply with the English guidance. While there is considerable overlap between Scottish and English guidance, the two are not identical and hence Scottish NHS bodies are warned to take extreme care[2745].

1548. ADB sheets were 'off the shelf' resources to assist designers by providing standard templates for types of room. There was no standard template for a room for someone whose immune system might be compromised. Ms White went out of her way to assist the Inquiry by formulating her own analysis of how problems might have arisen. Having considered a multiplicity of materials, she suggested that one answer lay in how the ADB sheets had been used. ADBs operate by way of "ADB codes", each assigned to a particular room type and setting parameters for that type. Bespoke design areas may not correspond to an ADB code – e.g. there is no code for immuno-compromised patients.

1549. Ms White emphasised the importance of liaison between client and design team to obtain room data sufficient to ensure that the requirements are properly understood[2746]. Mr Baxter emphasised the significance of ADB use

[2744] CTI Closing Statement, Edinburgh, Para 65, Page 19.
[2745] CTI Closing Statement, Edinburgh, Para 67, Page 19.
[2746] Transcript, Emma White, 13 May 2025, Page 6, Column 8.

during the design process as a means of ensuring compliance with the appropriate technical requirements[2747].

1550. Over-reliance on ADB sheets[2748] might have led to an assumption (our previous submissions on the well-known dangers of making assumptions need not be repeated here) that only two types of rooms - isolation rooms and ordinary rooms - were needed.

1551. While it is not easy to reconcile that proposition with the widespread consensus that the ventilation derogation did not apply to wards with special requirements, Mr Pardy did say that he may have assumed that anyone immuno-compromised would be in an isolation room, and hence the remainder of any ward, even dealing with haemato-oncology, could be ordinary rooms.[2749]

1552. We turn next to factors impacting on the design process, especially for ventilation. Nevertheless, we submit that undue reliance on ADB sheets was a contributing factor to unsatisfactory outcomes.

8.3.7 The Design Process

1553. What we set out in the next several paragraphs can be read as individual free-standing points. However, to obtain a full picture of what transpired they should be read together. It is not necessary for our purposes to determine contractual breach or compliance, so nothing in what follows should be read in that manner.

1554. One point may be added as a precursor to what follows. During discussion in Glasgow 3, there was much comment on the need for clarity in the event of a derogation from guidance. When considering the design process, it is also suggested that the avoidance of ‘derogation by stealth’ should be an essential. That is our phrase and is not intended to convey any devious intent. Instead, it raises the possibility that, during design meetings, or in documents or exchanges, a parameter such as ACH is on the table and the

[2747] Transcript, Mike Baxter, 16 September 2025, Page 10, Column 15.
[2748] They should have been used as a ’starter for 10’ - Transcript, Andrew Poplett, 7 November 2024, Page 38, Column 71.
[2749] Transcript, Steve Pardy, 27 May 2025, Pages 38-39, Columns 72-73.

outcome is that an ACH figure (and it could be any other parameter) is agreed which is non-compliant – without that being overtly recognised, noted and explained. It would, we submit, be highly undesirable if understanding compliance or non-compliance with guidance (and the reasons for it) involved a trail through discussions, into drawings etc, before it could be seen what had been agreed and why.

1555. Interestingly, in 2014[2750] Mr Loudon claimed IPCT were consulted during the design stages. However, from the BICC Minutes of 1st October 2014[2751], that seems to be at nurse level, and the attached list suggests that this was on a range of less critical topics, not including ventilation.

ZBP's expectations

1556. Mr Pardy explained that what ZBP would endeavour to do when designing ventilation for an area was to interpret what they had been given. He had anticipated that, somewhere in the process, what he produced would lead to someone on NHS GGC's behalf reviewing his material, analysing and assessing it, if need be consulting with users, and then returning with agreement or differences established.[2752] It appears that that did not happen. Mr Pardy, unfortunately, seemed to think that it was not for him to seek out information if the initial material was lacking. He would await a response from NHS GGC.

User Group Meetings – a missed opportunity?

1557. Mr Seabourne had grand expectations for these meetings - which he described as 'expensive gatherings'. They should have covered all critical issues, including ventilation. Otherwise, what was the purpose of having people like ZBP in attendance? Indeed, he went as far as to suggest that, at such meetings, ZBP would not have been doing their job properly if they had not pointed out to the assembled users that they were only going to get half the air change rate set out in guidance.[2753] That did not happen. Mr

[2750] Bundle 27, Volume 8, Document 2, Page 38.
[2751] Bundle 27, Volume 8, Document 3, Page 39.
[2752] Transcript, Steve Pardy, 27 May 2025, Page 34, Columns 63-64.
[2753] Transcript, Alan Seabourne, 29 May 2025, Page 57, Columns 109-110.

Seabourne's expectations were to be disappointed. (In his Supplementary Statement, Mr Seabourne expressed matters slightly differently. He said, ' I am not suggesting the users were asked to specify the building services requirements, they weren't, all they had to do was identify the room type and what they were used for (clinical functionality) and ZBP would design the required building systems'.[2754])

1558. There was broad consensus that the UGMs did not, as it turned out, discuss ventilation at all.[2755] Nor did the meetings have material in front of them - such as ACH rates, ventilation diagrams and drawings - which might have alerted an informed attendee that something was not as expected. They focused on adjacencies, room equipment and furnishings. That was described as 'clinical functionality'.

1559. Mr Hall helpfully directed the Inquiry to the definition in the contract.[2756] It can be argued that it is not as hard edged as Mr Hall (and perhaps others) would have one believe. That is because, in discussing furnishing and equipment for a room, one needs to know what kind of room it is. What function is it performing, for what cohort of patients? That might - and perhaps that lies behind Mr Seabourne's expectation - lead to discussion of a protective environment, including ventilation requirements.

1560. Whatever the logic, it is clear that ventilation was not discussed and agreed at the UGMs. This was a significant missed opportunity.

A parallel process – which did not exist?

1561. The assumption seemed to be that there would be a parallel process in which M&E issues would be discussed. There is debate about precisely how that was planned to take place, and who was intended to participate. Mr Pike accepted that separating technical matters might lead to things being missed.[2757] The analysis set out below proceeds prior to reviewing material which arrived post-hearing (which is then considered to see if the

[2754] Glasgow 4, Part 3 - Witness Statements, Volume 8, Mr Seabourne, Document 4, Page 49, Para 29.
[2755] Transcript, Frances Wrath, 14 May 2025, Page 21, Column 38.
[2756] Transcript, David Hall, 22 May 2025, Page 53, Columns 107-108.
[2757] Transcript, Darren Pike, 20 May 2025, Pages 36-37, Columns 70-72.

conclusions reached require to be revisited).

1562. Mr Hall was adamant that he repeatedly told Multiplex that all that NHS GGC was doing was signing off on clinical functionality.[2758] Design – particularly M&E design - was the responsibility of ZBP. That suggests - going back to Mr Pardy's expectations - a complete lack of consensus as to what was going on. If so, it should be no surprise that the output was unsatisfactory. Likewise, failure to have an agreed system which was adequate for the purpose is surely a joint responsibility.

1563. It may be correct, as Mr Seabourne explained, that it had been impressed upon him that he must thrust the design risk firmly into the hands of the contractors and not do anything to take it away from them.[2759] That is far from a complete answer as to how one ensures that the ultimate result is what the users want - and need.

8.3.8 Who was available to deal with M&E design for NHS GGC?

1564. If there was a system in which designs, especially including ventilation, were to be reviewed on behalf of NHS GGC, who would perform that task? Were they competent to do so? To answer that question requires us to consider the role of a range of participants (potential or actual) in the process.

Currie & Brown?

1565. So far as the role of Currie & Brown is concerned, it is something of a mystery as to why both Project Team members, and Multiplex staff and consultants, thought Currie & Brown still had or were a technical team when no such team would, with a minor exception, have been in play after January 2010. Mr Seabourne suggests[2760] they were still called Technical Advisors but why is, with respect, not clear. Ms White even seemed to think that Mr Hall was reviewing ventilation design.[2761] The contract exchanges between NHS GGC and Currie & Brown in January 2010 were clear and

[2758] Transcript, David Hall, 22 May 2025, Pages 24-25, Columns 44-45.
[2759] Transcript, Alan Seabourne, 29 May 2025, Page 8, Column 11.
[2760] Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 40, Para 8.
[2761] Glasgow 4, Part 1 - Witness Statements, Volume 1, Emma White, Document 1, Page 226 and Transcript, Emma White, 13 May 2025, Pages 8-9, Columns 12-14.

unchallenged.[2762] Their team of technical sub-consultants – including Wallace Whittle - were stood down (to use the phrase adopted by Currie & Brown2763). All that was left, in the main, was Messrs Hall and Baird doing project management and cost consulting. Neither were ventilation engineers. Mr Hall reiterated and restated the restrictions on the Currie & Brown role in his Supplementary Statement.[2764]

1566. The scope for misunderstanding, and the failure to ensure scrutiny was in place where it was needed, is only too evident if the roles which Currie & Brown filled were not properly understood. Unless the evidence the Inquiry has received is both woefully inadequate and inaccurate, there appears to have been a significant failure of communication by NHS GGC of the radical change in Currie & Brown's role from the beginning of 2010. (Indeed, was the significance of the change fully understood at Executive Board level or above? Mr Calderwood (like Mr Seabourne[2765]) recalled a paper coming from the Project Team to the Performance Review Group about changes to consultant arrangements but could not add to the Inquiry's understanding of the extent to which significance was understood). While we return to the meaning of drawings being 'signed off' below, no one remaining in place from Currie & Brown had the skills to analyse and assess the ventilation design (nor is it clear why anyone might think they had). Mr Hall graphically described an hourglass, with contractors at one end and users at the other. The Project Managers were the narrow section in the middle, ensuring there was communication, but not themselves carrying out substantive tasks.[2766] (Oddly enough when Heather Griffin was being sent off to 'collate' information on the design and sign off process for the BMT Unit in January 20162767, David Hall is recorded as confirming that the room designs were compliant 'with relevant SHTMs and SHBN04 Supp 1'.)

[2762] Bundle 17, Document 74, Page 2870 and Glasgow 4, Part 1 - Witness Statements, Volume 3, Douglas Ross, Document 10, Page 312.
[2763] Glasgow 4, Part 1 - Witness Statements, Volume 3, Douglas Ross, Document 10, Page 316. The same phrase is used by Mr Hall in his Supplementary Statement Glasgow 4, Part 3 - Witness Statements, Volume 7, David Hall, Document 3, Pages 31 and 37.
[2764] Glasgow 4, Part 1 - Witness Statements, Volume 7, David Hall, Document 3, Pages 25-26.
[2765] Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 38.
[2766] Transcript, David Hall, 22 May 2025, Pages 11-12, Columns 18-19.
[2767] Bundle 27, Volume 8, Document 73, Page 300.

Wallace Whittle?

1567. Wallace Whittle were specialist M&E consultants, who had acted as sub-consultants to Currie & Brown. They had been stood down with other sub-consultants after the end of 2009. In their case there was provision for the possibility of them being called back to do specific pieces of work. However, Mr McKechnie explained that this type of call-off proposal was not financially attractive to them, and they rejected it. [2768] He was very clear that they had not participated in the design of the ventilation systems.

1568. There were suggestions that they had been involved in the project after January 2010, but no one directly suggested they had been involved in the so-called parallel process mentioned above. Confusion may have arisen from the fact that they had made detailed comments on a ZBP environmental matrix in November 2009, which comments had been discussed and in turn commented on later in the contract process. They appear also to have participated in at least one meeting during 2010. That notwithstanding, there seems no basis for concluding that the NHS GGC reviewing role on ventilation design was being carried out by Wallace Whittle.

The Role of Capita?

1569. Capita were appointed as NEC3 supervisors. Did they have a role? In witness statements provided to the Inquiry, many participants, when asked about Capita, described their role as ‘contract compliance’. Mr Seabourne thought they had been asked to do this.[2769] Mr Loudon is recorded[2770] as saying (in an exchange with Mr Calderwood) that the rooms at the RHC were in accordance with the plans signed off by the Board and verified by the NEC3 Supervisor. That would require Capita to be on top of the details of the contract, the designs and so forth. In the High-Level Information Pack[2771] which formed part of the contractual arrangements between NHS GGC and Capita, there was provision for Capita to carry out the kind of review

[2768] Transcript, Stewart McKechnie, 27 May 2025, Page 58, Columns 111-112.
[2769] Transcript, Alan Seabourne, 29 May 2025, Pages 27-28, Columns 50-52. He reiterated that point in his Supplementary Statement at Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 38.
[2770] Bundle 27, Volume 8, Document 28, Page 116.
[2771] Bundle 17, Document 75, Page 2881.

necessary for them to be responsible for contract compliance. Mr Redmond of Capita set out in his witness statement that, when carrying out the NEC3 Supervisor role they were working from construction drawings and not going behind them.[2772] When Mr Redmond - who had not engaged with the point further in his witness statement - had the 'compliance' issue put to him in oral evidence, he was able to explain that the HLIP wording also stated that this was to be done ‘if called upon’. They had not been called upon[2773].

1570. That is a significant feature, bearing not only on the issue of the design process, but more generally on the subsequent checking of systems prior to contract handover. Mr Redmond explained that they had been asked to do two small pieces of work in relation to design review, one relating to switchgear and one reviewing ducting.[2774] Otherwise, they were not involved in ventilation design for NHS GGC.

The Project Team?

1571. If one has identified and excluded external professionals from the ventilation review role, who is left? Mr Seabourne confirmed that the original intention had indeed been for there to be a shadow team of consultants. However, with the change of contract type - not a decision made by the Project Team - and the consequent separate appointment of an NEC3 Supervisor, he did not think that anyone would have allowed him to pay for such a team. He presented a paper to the Performance Review Group, and on that Group agreeing, the Project Team implemented the change in the Currie & Brown role. The matter may be moot, but Mr Seabourne, although being of the view about finance set out above, maintained that cost was not the deciding factor.[2775] Both he and Mr Calderwood nevertheless recalled close scrutiny of costs for advisers coming from the Performance Review Group.

[2772] Transcript, John Redmond, 28 May 2025, Pages 52-51, Columns 98-99. Also agreed by Mr Ballingall - Transcript, Ross Ballingall, 21 May 2025, Page 13, Column 21.
[2773] Transcript, John Redmond, 28 May 2025, Page 56, Column 108. While that is challenged by Mr Seabourne in Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 45, Para 19, it was not challenged by NHS GGC at the time and no instruction 'calling upon' Capita was produced by any party.
[2774] Transcript, John Redmond, 28 May 2025, Pages 57-58, Columns 109-112.
[2775] Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 41, Para 10.

1572. Logically that only left the Project Team. Mr Seabourne was not fulfilling this role himself. He stressed that he had been in a different role prior to being Project Director (a role he did not in fact want) and had not done capital works for 7 or 8 years.[2776] Who else was there? One obvious candidate is Mr Moir. Unfortunately, the Inquiry does not have the assistance of Mr Moir. He had an architectural background and may have had some expertise. The extent is speculative, but he was certainly not a ventilation engineer. Ms McLeod doubted he had the technical skills. Mr Wilson of Multiplex described his technical knowledge as 'surface-level experience'.[2777]

1573. Ms Wrath had more of a technical background than some, being originally a quantity surveyor. While Mr Seabourne seemed to think that she had been provided to him because of her technical skills, she denied any ability to review ventilation design or ever having done so. For completeness, Ms McLeod and Ms Griffin, the two deputy project managers, were not project managers in the sense which might readily be understood in the construction industry. They were more akin to healthcare administrators, providing a link between the clinical teams and the Project Team.

1574. Ms Wrath mentioned in oral evidence an Alistair Smith, who she understood was brought in to approve M&E detail.[2778] Mr Wilson did think that Mr Smith would have had the skills to calculate air change rates from flow rates.[2779] According to Mr McKechnie, Mr Smith's speciality was electrical issues, and he thought it unlikely he dealt with ventilation. That accorded with Ms McCluskey's recollection.[2780] Darren Pike explained that Mr Smith was recruited into the team at a point after early 2011[2781]. Given that design of the ventilation system has started well before then we proceed on Mr McKechnie's approach.

1575. Mr Seabourne stoutly defended the notion that the Project Team had the

[2776] Glasgow 4, Part 3 - Witness Statements, Volume 8, Alan Seabourne, Document 4, Page 39, Para 7.
[2777] Transcript, David Wilson, 20 May 2025, Page 9, Column 16.
[2778] Glasgow 4, Part 1 - Witness Statements, Volume 1, Frances Wrath, Document 2, Page 265 and Transcript, Frances Wrath, 14 May 2025, Page 13, Column 22.
[2779] Transcript, David Wilson, 20 May 2025, Page 13, Column 23.
[2780] Transcript, Fiona McCluskey, 15 May 2025, Page 7, Column 10.
[2781] Transcript, Darren Pike, 20 May 2025, Page 13, Column 23.

necessary skills to deal with any issues which arose over ventilation design.[2782] On analysis, it is challenging to find much material to support his confidence, especially in a project as huge and complex as QEUH. It is also difficult to reconcile with Mr Hall's insistence that he repeatedly told Multiplex that NHS GGC were not signing off on ventilation design, but only on clinical functionality.

What does 'signing off' mean?

1576. It is not in dispute that, during the design process, members of the Project Team, including Ms Wrath, and for this purpose Mr Hall (acting on delegated authority from Mr Moir), signed off many drawings.[2783] What does that mean? It is not for us to resolve the contractual issues, but the fact that the question has even to be asked illustrates the problem. Mr Hall and Ms Wrath would say - and Mr Hall repeats this in his Supplementary Statement - that they were signing off for clinical functionality or to confirm that the matter had been through a process. They were not approving ventilation details. How does anyone looking at the drawings know that? Mr Hall says he made it clear. He says everyone knew. It will no doubt be pointed out that the drawings were to be found in a system known as Aconex used by the contractors. It has been confirmed by a variety of witnesses, that, under the Aconex system, drawings had to be signed A, B, or C. Signing off a drawing as A means go ahead and build. What such a labelling meant in terms of the approval of ventilation design is opaque.

Provisional Conclusion on process and participants

1577. Before summing up, we pick up thoughts from the Glasgow 3 Submissions where we invited readers to 'Look Forward to Glasgow 4'. A number chime with the design process. Mr Bennett, with the benefit of hindsight, pointed out that there was a reservoir of Infection Control experts in the Glasgow area (at locations such as Yorkhill and the Brownlee) who might usefully have been involved. There is no sign of IPC involvement of any note in the design process. Mr Leiper issued his cri de coeur for earlier involvement of

[2782] For example, Transcript, Alan Seabourne, 29 May 2025, Page 63, Column 122.
[2783] Capita may have signed some.

Estates. Interestingly, Mr Pardy mentioned the significant Estates involvement he had encountered on previous projects and contrasted that unfavourably with QEUH. While it is tempting to see this as a possible panacea there is nothing to support that idea in the evidence. As a more general proposition – early involvement of those who are going to have to look after everything – it remains, we suggest, sound.

1578. To describe the system as apparently dysfunctional is perhaps too kind. To describe the availability of competent scrutiny of ventilation design on the NHS GGC side as sorely lacking is not an overstatement. That process, and the participants in it, is in our submission the major contributor to the outcomes which many have felt were unsatisfactory.

1579. In a world of joined-up thinking one might have been looking at SHFN 30's reference to the need for external Project Managers, Policy Design for the NHS referring to design teams being retained, and even to NHS GGC's lawyers pointing out one downside of selection of the NEC3 contract form being the heavy onus placed on the Project Manager.[2784] Perhaps there is an element of hindsight at play, but joined-up is certainly not the world of this project. It is not clear that the members of the Project Team and the Senior Responsible Owners Ms Byrne and Mr Calderwood had paid any attention to the roles and responsibilities carefully set out for them in Chapter 2 of SHFN 30[2785].

The Pike materials

1580. During his oral evidence, Darren Pike of Multiplex gave evidence which appeared to challenge other evidence on the ongoing role – or lack of it - of Wallace Whittle[2786] and the evidence that NHS GGC were only dealing with 'clinical functionality'. Had the matter rested there, his views would have been available for assessment alongside others. However, having said nothing to that effect in his witness statement, he maintained that there existed a raft of documents, not seen by the Inquiry, which could be

[2784] Bundle 43, Volume 2, Document 8, Page 100.
[2785] Edinburgh 3, Bundle 13, Volume 3, Document 16, Page 553.
[2786] Transcript, Darren Pike, 20 May 2025, Page 8, Column 14.

produced. Why they had not been produced previously when the general position of other witnesses had been well-trailed was not clear. Pausing there, to find that the primary participants in the process may have been at odds over who was doing what does not take away from our conclusions of dysfunctionality.

1581. In any event, an RFI dated 29th May 2025 was sent to Multiplex. A response was received on 17th June. The documents produced have now all been reviewed. We focus on material bearing on ventilation specifications. It is not necessary for the Inquiry's purposes to determine whether e.g. involvement in some electrical issues means that general statements made about clinical functionality were, in the context in which they were made, too wide. Does Mr Pike's evidence, combined with the documents, cause us to alter our provisional conclusion? The answer is no.

1582. The list of design workshops in Mr Pike's statement[2787] does not suggest informed discussion of detailed ventilation design. Workshops were in any event, he said, generally high level relating to the whole hospital. That Ms Wrath and/or Mr Hall were at meetings where M&E drawings were seen[2788] is probably not in dispute but does not alter the narrative. It is, in our submission, debateable whether e.g. the Capita Report No2 on Mechanical Services Drawing Review, goes the distance of showing that NHS GGC had an informed reviewer of ward ventilation design. While reference to Wallace Whittle Comments on Workshop Review of M&E design,[2789] may cast some doubt on Mr McKechnie's evidence that they were not involved in ventilation design, again it, in our submission, leaves the general proposition that there was a dysfunctional process for detailed ventilation design review untouched.

8.3.9 The Individual Wards

Issues with Wards – 4B (original), 2A, 4B (amended) and 4C.

1583. In this section the aim is to consider why there were issues with the build of

[2787] Glasgow 4, Part 1 - Witness Statements, Volume 2, Darren Pike, Document 3, Page 98.
[2788] Transcript, Frances Wrath, 14 May 2025, Page 13, Column 12.
[2789] Bundle 43, Volume 5, Document 114, Page 944.

Ward 4B (in its original proposed form), Ward 2A, Ward 4B as amended in 2013 /2014 and Ward 4C. Many of the underlying causes have degrees of commonality. To avoid repetition, they will be addressed first, before specialities of the individual wards are addressed and linked to the Potentially Deficient Features and Terms of Reference. It is submitted that a variety of factors played a part, but we will endeavour to indicate in these submissions the degree of importance assumed by each factor.

Ward 4B (original)

1584. The COS for Ward 4B[2790] contained a significant amount of detail on the protective environment desired. The only significant omission was air change rates. It was accepted by all the witnesses that it was a specialist ward, not covered by the ventilation derogation. Helpfully, Mr Jenkins was able to confirm[2791] that the intended cohort was a haemato-oncology ward from the Southern General. It carried out similar functions to a ward he was familiar with at the Beatson (which was not moving). Shown the COS, he confirmed he would regard that as a neutropenic ward, as defined in SHTM 03-01.2792

1585. Notwithstanding that confirmation, RDSs revealed that a ventilation rate of 40 litres per second (or 2.5-3 ACH) had been applied to non-isolation rooms in the original design for Ward 4B. Mr Pardy (and indeed Mr Ballingall) seemed to accept that this was incorrect.[2793] This was explained - if explanation it was - as a failure to correctly interpret the COS (a failure which went uncorrected). Given the emphasis in the COS on patients with compromised immune systems, Mr Pardy accepted that 10 ACH would have been appropriate.[2794]

1586. On 7 May 2010, the Haemato-oncology User Group approved the 1:200 drawings[2795] for this ward. The drawing was signed by Ms Griffin, Ms Stewart, Ms Connelly and an architect from Nightingales[2796]. There was no

[2790] Bundle 16, Document 15, Page 1595.
[2791] Transcript, Gary Jenkins, 17 September 2025, Page 82, Columns 159-160.
[2792] Transcript, Gary Jenkins, 17 September 2025, Page 82, Columns 159-160.
[2793] Transcript, Steve Pardy, 27 May 2025, Pages 44, Columns 83-84 and Transcript, Ross Ballingall, 21 May 2025, Pages 34-35, Columns 63-66.
[2794] Transcript, Steve Pardy, 27 May 2025, Pages 38, Columns 71-72.
[2795] Bundle 43, Volume 4, Document 19, Page 406.
[2796] Bundle 43, Volume 1, Document 25, Page 99.

consideration of ventilation technical information and Ms Stewart had not reviewed the COS[2797]. Eight renal rooms in this ward had ventilation further downgraded in June 2010, when a PMI was issued to remove HEPA filters[2798]. No consideration was given to how this would have impacted on achieving what was required by the COS.

1587. That confirms that Deficient Features arose in the design of that ward in its original form. Such a statement is more significant than might have been anticipated, given indications that little change may have been made to that original specification when the BMT unit move into that ward was planned in 2013. The Deficient Features include an absence of 10ACH (even in isolation rooms, which had 6ACH), no HEPA filtered corridors and the absence of a pressure regime of +10 pascals. The absence of a back-up AHU was put to Mr Pardy, who appeared to accept the need for some back-up plan, but explained there were a range of options.[2799] Accepting that at face value, the absence of back-up planning is also a Deficient Feature. The failings then in turn link to the Terms of Reference, as there would have been a risk to occupants had the ward been occupied as originally envisaged.

Ward 2A

1588. The COS for this ward[2800] said quite a lot about activities, but little about technical requirements. Surprisingly, Professor Gibson said[2801] that she had not seen or contributed to the COS, nor did she know anyone who had. She said that the COS looked as if it had been written by a manager[2802]. Again, the explanation for the design was that perhaps the requirements had not been interpreted correctly. To the point that ZBP also had before them one COS with a lot of technical requirements appropriate for those with compromised immune systems (that for Ward 4B), Mr Pardy explained that the influence of that information would have depended on the order in which these presented themselves. He could not recall whether they had had the

[2797] Transcript, Jackie Barmanroy, 15 May 2025, Pages 71-75, Columns 137-145.
[2798] Bundle 16, Document 24, Page 1674.
[2799] Transcript, Steve Pardy, 27 May 2025, Page 40, Column 76.
[2800] Bundle 16, Document 16, Page 1599.
[2801] Glasgow 4, Part 2 - Witness Statements, Volume 2, Professor Brenda Gibson, Document 4, Page 58.
[2802] Transcript, Professor Brenda Gibson, 19 August 2025, Page 32, Column 60.

COS for Ward 4B before they had turned to Ward 2A.[2803] That still raises the question of whether a specialist ventilation designer should have understood enough from the COS to design a protective environment. As was put to Mr Pardy, a range of those with specialist knowledge from 2018 onwards had not found it difficult to specify what was required for the patient cohort.

1589. As to detail, not much appeared to be controversial. An RDS[2804] confirmed that the 40 litres per second figure had been applied to non-isolation rooms on this ward. That was not correct as it was a specialist ward not covered by the derogation. Because of the slight risk of infection, one would not use thermal wheels. Rooms should not have been designed as ordinary rooms with chilled beams. 10ACH and 10 pascals of positive pressure would have been appropriate.

1590. A peculiarity in relation to ward 2A, was that almost the only technical detail included in the COS was a double door, air lock type, provision to retain positive pressure within the ward. Mr Pardy was not clear why this had not been provided in the design. It did make its way into an early Nightingales' sketch design but did not appear thereafter. He speculated that it might have been removed by the users,[2805] perhaps because it was inconvenient to manoeuvre through. This seems unlikely.

1591. This is a ward where the lack of clarity about the areas to which the agreed ventilation derogation would apply clearly has impact. Mr Ballingall's surprise[2806] that the non-isolation rooms in Ward 2A had the lower ventilation rate says it all.

1592. The net result is that the list of Potentially Deficient Features applied to the Ward 2A build have been confirmed as Deficient Features. These include the absence of a ’10/10’ regime, the absence of AHU back-up planning (see 4B), rooms not sealed, the use of chilled beams, deployment of thermal wheels, the absence of the originally proposed air-lock double-door system and isolation rooms non-compliant with Guidance (on which see below). This in

[2803] Transcript, Steve Pardy, 27 May 2025, Pages 37-38, Columns 69-71.
[2804] Bundle 47, Volume 3, Document 8, Page 393.
[2805] Transcript, Steve Pardy, 27 May 2025, Page 42, Column 80.
[2806] Transcript, Ross Ballingall, 21 May 2025, Pages 32-35, Columns 59-65.

turn links to the Terms of Reference, albeit relating to actual risk.

1593. When we look at the management reaction to issues in 2A, we start with the absence of HEPA filters from isolation rooms discovered shortly after opening. Mr Wilson asserted there was only provision for housings but not filters in the design[2807]. That would be odd in an isolation room in a BMT Unit. It would thrust responsibility for this issue onto ZBP - and possibly remove any issue from Capita, if they were checking against drawings. Mr Calderwood certainly felt the error was Multiplex's and it had also been missed by Capita.[2808] In any event, following clinical complaint and senior management intervention, the filters were promptly obtained and installed.

1594. More generally, Mr Hill was entirely unclear whether the problem was the wrong specification or not building to specification[2809]. There is, of course, an email from Dr Armstrong to the Chief Executive dated 17th September 2015[2810], which discusses room specifications on Ward 2A, and which records[2811] confirmation from the Director of Facilities that rooms at RHC have been constructed and commissioned 'in accordance with the specifications and plans signed off by the Board to Brookfield Multiplex and this has been verified by- our NEC Supervisor'. The Director of Facilities, was of course, Mr Loudon, moving seamlessly from his role as Project Director. The statement may well have been literally correct, but it conceals a raft of failings which must ultimately have contributed to not producing the flagship hospital NHS GGC had hoped for. It does suggest limited contemporaneous investigation by senior management. As we now know from the evidence of Professor Brown[2812], failure to get to the bottom of why things were as they were led to piecemeal solutions and substantial delay in the major refit of the ward.

Ward 4B (as amended to accommodate the Beatson BMT Unit)

1595. The oral evidence in Glasgow 4 Part 1 had not given us any new insight into

[2807] Transcript, David Wilson, 20 May 2025, Pages 17-18, Columns 32-3.
[2808] Transcript, Robert Calderwood, 1 October 2025, Page 40, Column 75.
[2809] Transcript, Kevin Hill, 17 September 2025, Pages 49-51, Columns 93-97.
[2810] Bundle 27, Volume 8, Document 27, Page 114.
[2811] Bundle 27, Volume 8, Document 27, Page 116.
[2812] Transcript, John Brown, 3 October 2025, Page 36, Columns 67-68.

the exchanges or process which took place after a decision had been made, at the NHS GGC Quality and Performance Committee on 2nd July 2013, that Ward 4B was to be converted into the adult Bone Marrow Transplant ward.[2813] Witnesses were either unavailable or had no useful recollection. At that point, at least, the story had to be gathered purely from the limited documentation available. As will become clear from what follows, matters may have moved on - a little - after the Glasgow 4, Part 3, Hearing.

1596. At the close of Glasgow 4, Part 1, the precise origin of the £840,000 cost figure included in the instruction from the Committee to the Project Director to go ahead remained largely opaque. The minutes of the ASSB Meeting of 9th July 2013[2814] reveal that Alan Seabourne described the figure as a 'best estimate' until design works were done. We know that Multiplex were instructed to pause construction and re-assess in PMI 228 of 2nd July 2013.[2815] The Change Order of 9th July[2816] does refer to the Beatson. There is a later Compensation Event.[2817] Beyond these documents there was no clear identification of a discussion as to how to duplicate what the Beatson had.

1597. One of the signatories to the Change Order, Mr Best, gave evidence at Glasgow 4, Part 3. He accepted that, in the Change Order, layout appears to have been discussed. HEPA filters and rooms to the existing haemato-oncology specification were touched on.[2818] Other details were given. He was not the author of those details and assumed the Order was merely a start point. Precisely what was to be done with the Order was not clear to him. Had it been assumed that only the steps set out on the face of the Order were to be done that would not be correct.[2819] He assumed it would be followed up with more detailed discussion.[2820] Mr Calderwood took a different view on the paperwork. He regarded the Change Order as spelling

[2813] Bundle 34, Document 62, Page 552.
[2814] Bundle 42, Volume 7, Document 17, Page 105.
[2815] Bundle 16, Document 27, Page 1697.
[2816] Bundle 16, Document 29, Page 1699.
[2817] Bundle 16, Document 30, Page 1700.
[2818] Bundle 20, Document 2, Page 13.
[2819] Transcript, Jonathan Best, 19 September 2025, Page 76, Column 147.
[2820] Mr Calderwood agreed that the process Mr Jenkins described was what he would have expected. Transcript, Robert Calderwood, 1 October 2025, Page 4, Column 4.

out specific works, with a proposed price - a 'buying order'.[2821]. Had there been further works, that would have needed another Order and another (presumably extra) price.

1598. Questions of Mr Best had been prompted by information emerging - for the first time - in the witness statement (and subsequently in the oral evidence) of Mr Jenkins[2822]. He also regarded the Change Order as only a start. His evidence was that, to duplicate the environment in the Beatson BMT Unit, much more was needed. He said he contacted the Project Team. Thereafter there was a series of meetings (he thought perhaps five[2823]). These were attended by him together (usually) with Dr Anne Parker, one of the Beatson consultants, and Myra Campbell, one of his managers. They met Ms Griffin, Ms McLeod and Ms McCluskey of the Project Team. Meetings were chaired by Ms Griffin. He was very clear that they laid down in detail the protective environment required to duplicate the Beatson. That included air change rates (10-12), pressure gradients, sealed rooms and HEPA filters. They stressed the differences from a neutropenic haemato-oncology ward. Contact should, they suggested, be made with John Hood, who had experience of issues which arose when the Beatson BMT Unit moved into its then current home. They received no negative comments - there was no 'push-back'[2824]. (A similar point is also made in the Consultants' Note about the move back to the Beatson in 2015 - 'There was no indication at any time prior to the move, to either team or Regional Services management, that there were any problems with the specification….'[2825]). They saw drawings of various scales and inserted comments on them, which they signed. At no stage did anyone revert to them to raise issues or problems.

1599. If Mr Calderwood is correct, and any further Order is absent, it is perhaps not surprising that the objective of producing an environment as good as, or indeed a little better than, the Beatson was not achieved. That objective

[2821] Transcript, Robert Calderwood, 1 October 2025, Page 8, Column 12.
[2822] Glasgow 4, Part 3 - Witness Statements, Volume 4, Document 2, Pages 158, 172, 176 and 178.
[2823] Transcript, Gary Jenkins, 17 September 2025, Page 74, Column 143.
[2824] Transcript, Gary Jenkins, 17 September 2025, Page 80, Column 155.
[2825] Bundle 4, Document 3, Page 11.

seemed to be shared by all of Calderwood[2826], Best and Jenkins. It would still leave the mystery of what happened to the outputs from the meetings Mr Jenkins described. The apparent meeting chair, Heather Griffin, responded to written questions from the Inquiry after Mr Jenkins' evidence, but did not recognise the meetings he was describing.[2827] Ms McLeod denied any involvement and Ms McCluskey had no useful recollection.[2828] Mr Hall of Currie & Brown was unable to assist. [2829]He thought Mr Moir was leading on the project. Written material, for example emails, has proved impossible to find.

1600. Is Mr Jenkins' evidence correct, notwithstanding what Ms Griffin says? The evidence was given clearly and coherently. It was confirmed in all essentials by Ms Campbell[2830]. On the other hand, Dr Parker did not recollect attending these meetings. She did, however, recall discussing matters with Ms Campbell, who may have been attending meetings with Mr Jenkins[2831]. That there should be a follow-up is undoubtedly logical. Each of Mr Calderwood, Mr Best and Mr Jenkins thought follow-up would occur. This was a major move, which had come about only after lengthy and detailed consideration. Both Mr Best and Mr Jenkins thought more was needed than in the Change Order. A very particular protective environment was required. That there should be follow-up steps seems, as we say, logical.

1601. The lack of written material is unfortunate. Whether it can be wholly explained by the passage of time is debateable. Notwithstanding its apparent clarity, Mr Jenkins' account achieved only modest support from Dr Parker. It is not supported by any of the Project Team. On balance, climbing down from the discomfort of sitting on the fence, and recognising - a point we mention below - that investigation at the time would have been immeasurably easier

[2826] Transcript, Robert Calderwood, 1 October 2025, Page 45, Column 86 and Page 47, Column 90.
[2827] Glasgow 4, Part 3 - Witness Statements, Volume 8, Heather Griffin, Document 1, Page 3.
[2828] Glasgow 4, Part 3 - Witness Statements, Volume 6, Fiona McCluskey, Document 3, Pages 24-25 and Mairi MacLeod, Document 4, Pages 31-32.
[2829] Glasgow 4, Part 3 - Witness Statements, Volume 7, David Hall, Document 3, Page 23.
[2830] Glasgow 4, Part 3 - Witness Statements, Volume 7, Myra Campbell, Document 1, Pages 5-7. She seemed to think that Craig Willams had also been involved.
[2831] Glasgow 4, Part 3 - Witness Statements, Volume 7, Dr Anne Parker, Document 2, Pages 12-14. She also recalled being told by Dr Armstrong that the environment at the Beatson could not be duplicated.

than investigation now, we conclude that the logic of discussions to ensure the Beatson environment was replicated suggests that Mr Jenkins' account of meetings to lay down specifications should broadly be accepted.

1602. If that is the case, then the resulting Ward 4B problems are even more mysterious. Were the details Mr Jenkins and his colleagues provided lost in translation in their discussions with the Project Team? Were they never passed on to Multiplex, (in which event the Change Order with its list of minor requirements, the origin of which remains obscure - Mr Best, the signatory, did not know - would be left standing alone as an instruction)? Were they passed on but not acted upon? Is there some other explanation?

1603. Given the continued availability to NHS GGC, in 2015, of all the participants, and the significance of the issues (graphically illustrated by the fact that on the very day that Her Majesty the Queen was opening the hospital, a decision was being made to return the occupants of Ward 4B to the Beatson due to an unsatisfactory environment), one might have thought a clear answer would have been obtained. We now know from Professor Brown that Mr Calderwood had told him that the problem was that Ward 4B had not been properly specified[2832] Was there an investigation at the time? When the 2015 issues arose, Mr Jenkins was 'perplexed'[2833]. He said he consulted Dr Parker and Ms Campbell to confirm his recollection - which they did. He attempted to call up the drawings. He was told by the Project Team they had been destroyed due to lack of storage space. He says he emailed a range of people to tell them what he and his colleagues had laid down. Remarkably to an outside observer, Mr Best (who was in due course Chief Operating Officer), said they had never got to the bottom of it[2834]. There was no deeper investigation ordered by senior officials in NHS GGC.

1604. Whether the initial assumption was made by NHS GGC, or Multiplex, or both, that no discussion on changes to the ventilation arrangements was needed is not known. It is at least possible that the previous specification for the ward was deployed without change - or only with what was in the

[2832] Transcript, Professor John Brown, 3 October 2025, Page 27, Column 49.
[2833] Transcript, Gary Jenkins, 17 September 2025, Page 84, Columns 163-164.
[2834] Transcript, Jonathan Best, 19 September 2025, Pages 78-79, Columns 152-154.

Change Order (although how that assumption could have survived explanation of the requirements laid down by Mr Jenkins and his colleagues, if given, is difficult to fathom). Even after the eventual - and unexpected - departure of the intended occupants in 2015, when the matter was investigated there are still indications that the earlier specification for 4B was being deployed (albeit inadequately).[2835] Ian Powrie is recorded as saying that it was not clear what specification the designers were working to.[2836]The alternative view, that meetings to discuss the detailed requirements for the proposed move did not take place as suggested, would presumably suggest failure on three levels - those at the Beatson not making sure they were getting what they needed, the Project Team not checking what was needed, and more senior officials like Mr Best not checking communications had taken place as anticipated.

1605. Of particular interest is what happened when it arose - one would like to think it must have done - in discussion that 10 -12 ACH could not be achieved. There is no recorded debate, and we know work simply proceeded (our point about cooperation refers). Likewise, there is no record of the existing Beatson specification being discussed or debated as a template, (obvious though one might have thought that step might have been). Notwithstanding the effort put into deciding that the move was appropriate, it appears likely this is another instance of poor communication as to the precise requirements aimed for in the proposed ward. (Mr Calderwood thought that the initial flavour of the information he got on both 4B and 2A was, 'we got what we asked for, but it was not good enough').

1606. If, as we argue should have happened, ZBP had designed the original Ward 4B with 10 air changes, that issue – and much that has followed from it - would not have arisen in anything like its current form. Ward 4B continues to have the identified Deficient Features set out above for original Ward 4B, plus non-compliant isolation rooms.

[2835] Bundle 27, Volume 3, Document 7, Page 165 and Document 13, Page 295.
[2836] Transcript, Ian Powrie, 22 August 2024, Page 72, Column 140.

Ward 4C

1607. It had been hoped that oral evidence at Glasgow 4, Part 1, would have shed more light on the desired environment in Ward 4C. Unfortunately, though several witnesses were asked about it, none could assist. It arises in this way. Ward 4B was originally intended to have a protective environment in accordance with the COS, which formed part of the ERs. There was a consensus among witnesses that, when told that Ward 4B was now to be the Adult BMT Unit, they were also told that the patient cohort intended to occupy Ward 4B was being moved to Ward 4C which was (depending on the witness) either a general ward or a renal ward.[2837] With the benefit of hindsight, it seems glaringly obvious that, if not the first question, then perhaps the second, could have been, 'Are you going to reproduce the proposed protective environment you had intended for the Ward 4B cohort of patients in the location you are moving them to i.e. Ward 4C?'

1608. So far as currently ascertained, neither that question nor the next – 'If not, why not' - have available answers – at least in the oral evidence at the Inquiry. All that is known is that work was not instructed to turn a general ward into a ward meeting the original COS for Ward 4B. That leaves the assertion that Ward 4C should have had a full panoply of protection, but did not, unanswered. On the face of what we know, and on the unchallenged[2838] evidence of the requirements of the intended patient cohort, Ward 4C had deficient features in its failure to meet the standards set out in the Ward 4B COS, plus 10ACH, all as set out above in relation to Ward 4B in its original form.

Wards 5C and 5D – the Infectious Diseases Unit

1609. A brief discussion is inserted here, albeit in one sense out of place. That is because the decision to move the Brownlee ID unit into the QEUH was neither a Project Team decision nor involved that team at all. At the initial stage no alterations were made to these wards, which were planned as general wards.

[2837] Transcript, David Hall, 22 May 2025, Page 70, Columns 135-136.
[2838] Other than by Mr Calderwood.

1610. It is no part of the Inquiry's remit to review the merits of the decision to move. It appears to have been made by the ECMS (Department of Emergency Care and Medical Specialities) in August 2014.[2839] What is of interest is what arrangements were made for safe isolation rooms to suit that unit. Guidance such as HBN4 on PPVL rooms excludes an ID Unit from its coverage. Two issues arise – what isolation rooms are to be available and where they are to be located. Avoiding having to use rooms elsewhere in the hospital was raised, but rejected, due to the significant impact on ventilation requirements this would bring if the isolation rooms were to be in Wards 5C/D.[2840]

1611. While consultants originally anticipated they would have negative pressure rooms,[2841] there was also discussion on whether the existing planned lobbied rooms could be used, notwithstanding guidance. Clinicians were told they could have exclusive access to two isolation rooms in critical care[2842] but also 'were reassured' they would be negative pressure rooms.[2843] Unfortunately, negative pressure rooms were not provided, and that led in due course to the oddity of a brand-new hospital with an Infectious Diseases Unit having to send some patients to other hospitals, because they were too infectious to be accommodated in its new wards.

1612. More detail of the exchanges is set out in the narrative. For present purposes the conclusion must be that the move of the unit was carried out without adequate communication (and discussion and resolution) of what was required by way of isolation rooms and what was available. The risks were so great that patients had to be diverted until appropriate provision was made in 2019. The absence of appropriate isolation room provision is a Deficient Feature.

A possible solution?

1613. This is not the most appropriate place to look at possible recommendations. Nevertheless, a suggestion made by Mr Fernie seems worthy of note. He

[2839] Bundle 14, Volume 1, Document 6, Page 162.
[2840] Bundle 14, Volume 1, Document 4, Pages 83 and 89.
[2841] See for instance email from David Bell, Bundle 14, Volume 1, Document 6, Page 168.
[2842] Bundle 4, Document 8, Page 20.
[2843] Bundle 14, Volume 1, Document 4, Page 89.

proposed a ‘loop back’, after design, but before significant procurement or any construction – ‘before anyone starts pouring concrete’[2844]. At that point, designers, client and users could all come together to discuss, or present, on the outcomes and satisfy themselves that the output was indeed what was required. There may be several challenges to this otherwise promising idea – one would have to ensure that there was enough expertise, technical and clinical, on the client side to make it meaningful, it assumes a single point at which it could be done, whereas design might be ongoing for a significant period, and it would cause delay. The last of these was put to Mr Seabourne who did not think that was a reason not to do it.[2845] It might also be pointed out that it assumes that the design process and participants in it cannot get to the correct answer during the process itself.

8.3.10 Isolation Rooms

Why were they all PPVL Rooms?

1614. Having had the benefit of evidence from the ventilation designers, ZBP, there is a simple answer. They were all PPVL rooms because ERs[2846] specified that they should be constructed in accordance with guidance notes – HBN 04 Supplement 1 and SHPN4 - both of which refer to designs for PPVL rooms. Mr Pardy knew nothing of the conclusions of a meeting on 18 May 2009,[2847] (shortly after the ERs had been finalised in April) when a group from IPC discussed, and agreed, a position on what different types of isolation rooms would be desirable for different areas in the adult hospital. That the communication deficit is so notable is even more surprising when one sees that Ms Griffin, one of the Project Managers, was present. Another attendee, Ms Rankin, had participated in the competitive dialogue process but could recollect no discussion on isolation rooms.[2848] The apparent disconnect between a contractual process – where the contractors work to ERs compiled by the client – and the existence of separate (later)

[2844] Transcript, Alasdair Fernie, 21 May 2025, Page 90, Column 176.
[2845] Bundle 43, Volume 3, Document 23, Page 450.
[2846] Bundle 46, Volume 3, Document 1, Pages 35 and 177.
[2847] Bundle 23, Document 6, Page 46.
[2848] Transcript, Annette Rankin, 3 September 2024, Page 67, Column 129.

discussions around ‘specification’, can also be illustrated by an email of 5 June 2009 from Dr Hood to Ms Griffin (copied to Professor Williams for his role in the Children’s Hospital). In that email he refers to the HEPA filters which ‘should be in the spec’.[2849]

1615. In addition, an Isolation Room update[2850] was issued for the adult hospital. It too appears to envisage different types of isolation room (albeit it also has a note stating ‘All in accordance with SHPN4 and SHTM 03-01'). No change in design was made. It is not clear to the Inquiry whether this was because there was an informed debate around the possible use of PPVL rooms for all purposes (though who would have led that debate for NHS GGC is unclear), or whether the design and sign-off process was simply taken as indicating assent to what was being provided. The latter seems more consistent with the overall story of the design process.

What about specialist areas?

1616. Each of the Guidance Documents specified above contained (at the time – new guidance is now in train[2851]) a statement that they did not apply to rooms for severely immuno-compromised patients or for Infectious Disease units. Accordingly building all isolation rooms in that way is an undeclared departure from Guidance. In oral evidence Mr Pardy accepted that he ought to have considered these constraints, and applied his mind to the possibility of different provision.[2852] He would know that severely immuno-compromised patients were in the proposed patient mix, and might also have considered that such a large hospital might admit infectious patients (even if he was unaware – and remained unaware - that an ID Unit was to join the QEUH).

1617. If ZBP did not apply their minds to the question, any discussion as to the merits or otherwise of a PPVL room for multiple uses is rendered moot. It seems unlikely that an informed NHS GGC response would have been to

[2849] Bundle 43, Volume 2, Document 21, Page 323.
[2850] Bundle 23, Document 7, Page 49.
[2851] A new HBN Supplement 1 has been published and was under consideration for creation of Scottish Guidance. However, that has been paused pending anticipated changes to the England and Wales document. (Edinburgh 3 - Witness Statements, Volume 1, Thomas Rodger, Document 17, Pages 444-445).
[2852] Transcript, Steve Pardy, 27 May 2025, Pages 46-48, Columns 88-91.

accept PPVL rooms for all purposes, given the then current guidance. Other options such as negative pressure rooms for infectious patients, and positive pressure rooms for immuno-compromised patients, would likely have featured. However, the arrangements to ensure an informed discussion were not in place.

1618. Simply to illustrate the type of informed debate which might have arisen, we remind readers of the evidence in Glasgow 3 of enquiries being made by Professor Williams about PPVL rooms. Having been told by colleagues in England that they worked but were high maintenance (e.g. because of the risk of leaks), he reported the former but not the latter. This accords with the evidence of Mr Hoffman, who preferred positive pressure rooms as simpler and giving rise to fewer risks.

1619. A further issue arose about the placing of the main extracts in the PPVL rooms designed by ZBP. They were placed in the bedroom of such suites (rather than in the en-suite). Mr Pardy argued that there was provision in the guidance for putting an extract in the bedroom.[2853] On scrutiny of the wording there is indeed brief mention of an 'additional' extract in the bedroom.[2854] Mr Pardy accepted that his approach did not appear on any of the illustrative drawings in the guidance documents, all of which had the extract in the en-suite. He nevertheless argued that his approach - which he said was shared with other designers - had been adopted to deal with potential areas of stagnant air.

1620. When earlier evidence was given by Mr Hoffman at Glasgow 3, he explained that the layout and parameters of the rooms illustrated in the guidance had been very carefully calibrated at the Building Research Establishment to produce the desired effect. Whatever the merits of ZBP's design it does not conform to the guidance. That ought to have been discussed (which would have allowed for questions as to the unverified nature of the design) at the time and agreed – if appropriate – with reasons (which could then be recorded and circulated). From the evidence, the only logical inference is

[2853] Transcript, Steve Pardy, 27 May 2025, Pages 48-49, Columns 92-94.
[2854] Bundle 23, Document 94, Page 962 which refers to this being done 'in certain circumstances' for which 'the clinical requirement should be verified'.

that was not done. As before, it is doubtful whether anyone with appropriate technical skill was deployed by NHS GGC.

1621. There is a further issue. Mr Pardy confirmed that he had placed the extract at a high level in the patient bedroom, whereas if the guidance anticipated anything it was that the extract would be 'at low level adjacent to the bedhead'.[2855] The result is that the overall design cannot be argued to meet guidance, whatever view one takes about the earlier point. According to Mr Hall[2856], Peter Moir signed off on the isolation room design. It seems unlikely he did so on a fully informed basis.

1622. In conclusion, both the use of unapproved design for all the isolation rooms and separately the use of such rooms in Wards 2A and 4B are Deficient Features. The absence of any negative pressure rooms is also a Deficient Feature. In addition, the failure to produce a coherent plan of isolation rooms and their properties, to enable admitting clinicians to make informed decisions about room placements, qualifies for that description.

8.3.11 The Water System

1623. There was relatively little focus on water in Glasgow 4, Part 1. What there was concentrated on three questions. The first was when the water system was filled. The second was what processes were in place to look after the system. The final connected question was the issue of open pipe-ends.

Early filling

1624. The best assessment for the filling date is the middle, or perhaps second half of 2013, i.e. approximately 18 months before handover.[2857] It was filled in sections rather than as a single system. Filling in advance was felt to be a necessity given the scale of the system. The full process is considered in Chapter 5.

1625. Clearly, it was an ambitious programme to maintain a non-operational water

[2855] Bundle 23, Document 94, Page 962.
[2856] Glasgow 4, Part 1 - Witness Statements, Volume 2, David Hall, Document 6, Page 236.
[2857] E.g. Transcript, John Redmond, 28 May 2025, Pages 67-68, Columns 130-131 and Glasgow 4, Part 1 - Witness Statements, Volume 3, Capita Corporate Statement, Document 16, Page 514.

system, of the scale and complexity of that at QEUH, to the standard needed to ultimately assure water quality for a cohort of patients of varying degrees of vulnerability. The sectional process adds an additional layer of challenge.[2858] There was no external L8 assessment either immediately before or immediately after handover, (which then of course directs attention to the period after handover but before occupation, when the system is for the first time under the control of NHS GGC). Unfortunately, Mr O'Donovan had left months before the DMA Canyon Report was done, so was not able to assist as to events at that date. Was the Mercury process successful? Direct and definitive evidence to the contrary is lacking. Mr Poplett would have preferred to keep the system dry as long as possible. The overall process was 'suboptimal'[2859]. Subject to the point made below, we suggest there was a risk that the Mercury process was not successful.

1626. There was substantial manpower applied to keeping the system moving. That recognises the importance of the risk which was being tackled. Mr Poplett felt it was difficult to duplicate the operation of an active ward.[2860] Was it enough? Inevitably reliance is placed on testing (especially the H&V Test Reports in December 2014 and January 2015). Sampling for testing is, however assiduously carried out, merely what it says i.e. selecting points to check. Can it be said that testing will catch everything? Will it catch biofilm formation or reformation? We accept that testing generally did not reveal problems (and where it did, they were then tackled) but leave open the broader issue. In addition Mr Poplett took little comfort from the results, largely because he felt the time intervals selected were not sufficient to eliminate traces of disinfectant.[2861] Overall, what Mr O'Donovan told the Inquiry was a curate's egg – the good parts speaking to the implementation of a system, the more challenging parts going to emphasise the scale and duration of the challenge.

[2858] Transcript, Andrew Poplett, 19 September 2025, Page 34, Columns 63-64.
[2859] Transcript, Andrew Poplett, 19 September 2025, Page 38, Columns 71.
[2860] Transcript, Andrew Poplett, 19 September 2025, Page 35, Columns 65.
[2861] Transcript, Andrew Poplett, 19 September 2025, Page 30, Columns 55.

Open Pipe Ends

1627. This topic features in the DMA Canyon Report. It also features regularly in Supervisor's Reports from Capita. Indeed, the issue of there being open pipe ends features in reports for almost the whole of the construction period, from March 2011 right through until 2014 (albeit at varying levels of concern). The details are more fully set out in the narrative. This apparently unsatisfactory situation (not least because of the risk of 'seeding' the system spoken to by expert witnesses) was put to witnesses at Glasgow 4, Part 1. In the main the Multiplex - and Mercury - line was that, in the context of the scale of the overall operation, the results were not, in fact, significant or indeed unusual. For instance, Mr Pike said that it, 'wasn't a major problem and wasn't continually unresolved'.[2862]

1628. One misconception which was resolved, was of the mental picture produced by the 'open pipe ends' phrase. That picture was of piles of pipes lying around, uncapped. In fact, the evidence (especially from Mr O'Donovan) was that a large proportion of the pipework came to site built into pre-manufactured units. These units would then, pipework and all, be connected into the building structure. Each unit might have many pipe ends.

1629. Mr Fernie struck a slightly different tone. While he too maintained that overall performance was not bad, he recognised that open pipe ends were undesirable. He put their occurrence down to 'operator behaviour'. Whatever steps were taken to impress upon a workforce what ought to be done, periods such as the ends of shifts were an issue. An operator might clock off without sealing an open end. At peak there may have been hundreds of operatives on site. They should always have been able to do better.[2863]

1630. Mr Redmond of Capita explained that the issue was similar to other sites he had been on.[2864] Is that a good enough report? In a healthcare project it does seem desirable that – whatever might be the general experience – a stricter regime should be in place to avoid or at least reduce this problem to

[2862] Transcript, Darren Pike, 20 May 2025, Pages 27-28, Columns 52-53.
[2863] Transcript, Alasdair Fernie, 21 May 2025, Page 83, Column 162.
[2864] Transcript, John Redmond, 28 May 2025, Page 62, Column 162.

the absolute minimum.

A Postscript on Mr Calderwood

1631. To assist in tying several threads together, a brief mention of two features of the evidence of the largely unapologetic[2865] Mr Calderwood. Firstly, that he was unaware[2866] that as CEO he was the Duty Holder for Water is indicative of the state of organisation of water safety, of which much was heard in earlier evidence. Secondly, that he maintained[2867] he was also unaware of the extreme pressures on the Estates Team post-handover, assuming it is correct, is another indication of failures of communication.

8.3.12 Carbon Filter removal

1632. The topic of carbon filters relates back to an original question arising from the Inquiry's Terms of Reference i.e., read short, whether there was a link between siting near a sewage works and risk of infection. That suggestion is now negated by Mr Bennett's Report.[2868] Nevertheless, the topic is dealt with briefly here for two reasons. Firstly, because the unpleasant odours were spoken to by many witnesses earlier in the Inquiry, and secondly because it may shed further light on the management of significant decisions.

1633. A requirement to deal with odour was included early in the ERs.[2869] It was not, at that early stage, regarded as a challenging problem. Multiplex proposed to deal with it by the provision of carbon filters on the fresh air side.[2870] So far, so good. As with other issues, those who might have assumed, from the ERs and tender, that this was a problem solved, may have been surprised by the ultimate absence of carbon filter provision.

1634. Mr Seabourne dismissed the issue as of no significance. He had been told that the sewage works were being converted to a transfer station so that would solve the issue. He thus gave it no more attention. The question of

[2865] Transcript, Robert Calderwood, 1 October 2025, Pages 74-76, Columns 144-147. Given that a number of the key events occurred on his watch he was offered the opportunity to apologise. He declined to do so. (Transcript, Robert Calderwood, 1 October 2025, Pages 75, Column 145).
[2866] Transcript, Robert Calderwood, 30 September 2025, Page 13, Columns 21-22.
[2867] Transcript, Robert Calderwood, 30 September 2025, Page 38, Column 72.
[2868] Bundle 39, Document 1, Page 3.
[2869] Bundle 18, Volume 1, Document 12, Page 991.
[2870] Bundle 17, Document 9, Page 383.

what NHS GGC were told or assured, and in what form, by Scottish Water permeates this topic. At points it seems as if assurances had been given that the odour issue would be resolved. However, the Inquiry has traced nothing to support that – and it does not seem borne out in practice. Nor is there any record of precisely who was, or was not, consulted within NHS GGC.

1635. The other driver appears to have been a remarkably late realisation that carbon filters were onerous to deploy due to their resistance to air passage. Why that was not known in advance is odd. Carbon filters were expensive to run, both financially and in energy terms.[2871] In a largely opaque process (in the sense that the existence of exchanges as to options is patent, but the discussions and reasoning are not), and having toyed with the idea of making provision for the filters but not installing them, the instruction was given to remove them by PMI 157 in May 2012. Mr Seabourne's recollection[2872] was that maintenance cost burdens - what were described as 'whole life costs' - drove the decision. That decision may or may not have been correct, but the analysis to support it is not readily found, the material from Scottish Water, whatever it was, is not available, whether alternatives were considered and who was consulted is not clear.

8.3.13 Removal of the Independent Commissioning Engineer

1636. This decision was taken by NHS GGC on 8th July 2013. Why it was made remains unclear. Did it matter? Multiplex witnesses asserted that it did not. Nothing much would have changed with an Independent Engineer. Mr Pike asserted that it was largely an administrative role.[2873] Multiplex had the expertise and the nominated individual, Mr Wilson of Multiplex, was working with Mercury, the ventilation subcontractor. Other witnesses suggested an external individual might have provided an opportunity for scrutiny of what was, at least contractually, all Multiplex's work ('preventing them marking their own homework').

1637. It is difficult to disagree with the notion that independent scrutiny of any kind

[2871] Bundle 20, Document 82, Page 1669.
[2872] Transcript, Alan Seabourne, 29 May 2025, Page 74, Column 144.
[2873] Transcript, Darren Pike, 20 May 2025 Page 25, Column 48.

might have highlighted issues at the commissioning stage. Defects when set against guidance and on detailed matters were present after handover. Nevertheless, there is not enough evidence to allow the Inquiry to conclude that this NHS GGC decision did, in fact, make a difference to outcomes.

8.3.14 Horne Taps

1638. Much has been written and said about these taps during the Inquiry. A fuller account appears in our Closing Statement following Glasgow 3[2874]. The key features relevant to the Terms of Reference can be shortly summarised. There are more details in the narrative. Horne taps contain a component equivalent to a flow straightener. Flow straighteners had been implicated in an outbreak of *Pseudomonas* in Belfast, leading to infant deaths. This was a risk known at the start of 2012; however, the Project Team only appears to have sought advice from Ms McCluskey and Ms Barmanroy (and their paper of 27 July 2012[2875] failed to engage with the risks posed by the flow straighteners). In ignorance of the risks posed by these taps NHS GGC agreed to their use. In due course guidance was issued about the need to avoid flow straighteners in high-risk areas, including new guidance from HPS[2876], but by then Horne taps had been ordered, and in part installed in the QEUH.

1639. On 5th June 2014 a meeting was convened to determine what action to take[2877]. The taps could not be modified to remove the offending component. After discussion, it was agreed that, as they had already largely been installed, it was not necessary to remove them and that any risks could be dealt with by an appropriate maintenance programme.[2878] For present purposes it matters not who was at that meeting or who was therefore party to the discussion and decision.

1640. Whatever the form, the decision to press ahead was ultimately one for the

[2874] CTI Closing Statement, Glasgow 3, Chapter 4, Page 191, Para 60, Chapter 5, Page 198, Paragraphs 13-26 and Chapter 6.1, Page 528, Para 15.
[2875] Transcript, Fiona McCluskey, 15 May 2025, Page 59-62; paper at Bundle 43, Volume 1, Document 46, Page 231.
[2876] Bundle 52, Volume 10, Document 35, Page 79.
[2877] Bundle 15, Document 9, Page 692.
[2878] Bundle 32, Document 52, Page 851.

Project Team (apparently in the shape of Mr Loudon, though he denies all knowledge[2879]). While it was, no doubt, a decision which considered all the relevant factors, the stress on the taps already having been installed makes it clear it was financial and programme considerations which must have been uppermost. The fundamental flaw with what the Inquiry has seen is that this decision was treated as an unqualified one. It was not. It was conditional on appropriate maintenance. We know that the task of arranging for, and carrying out, that maintenance fell to the Estates Team (and we also know that the arrangements were not put in place due to pressure of work - from the evidence from Mr. Powrie in Glasgow 3). However, given the risks involved, ensuring taps did not remain in place and were not further installed without appropriate maintenance, was, we argue, also a matter for the Project Team. They thus also contributed to the risks which arose from the taps being in place without that protective process.

1641. In summary, NHS GGC had three opportunities to mitigate the risks posed by these taps; one in 2012, a second in 2014 and a third by implementing the management and maintenance regime that was required. NHS GGC failed to take any of these opportunities.

8.3.15 Zutec/PPM /Asset tagging

1642. We have set out additional evidence about these issues in Chapter 5, but the question of why the hospital was accepted with an apparently inadequate Zutec information system, no asset tagging and no or very little in the CAFM system for PPM remains to be resolved.

1643. Responsibility for 'accepting' handover of the hospital clearly lies with the Project Team (led by Ms Loudon). The issues are conveniently discussed in the evidence of Ms Kane[2880]. Mr Loudon told her that Zutec had been fully populated, and any issues were the fault of the estates team. That was not resolved until HPS later pointed out this was not correct. That means that Multiplex were responsible for inadequate population of Zutec, but

[2879] Glasgow 4, Part 3 - Witness Statements, Volume 4, David Loudon, Document 6, Page 465.
[2880] Transcript, Mary Anne Kane, 16 May 2025, Page 23, Column 41.

responsibility for accepting it stays with Mr Loudon.

1644. So far as CAFM was concerned, provision of a PPM system was a responsibility of Multiplex.[2881] Again, responsibility for accepting handover without it seems to rest with Mr Loudon. He told Ms Kane - who thought they were getting a PPM system - that Zutec was all they were getting.[2882] Asset-tagging seems a more complex picture, with a variety of explanations offered by different witnesses. However, the consequences of it still being incomplete years later were also clear. It may not be necessary to resolve all the issues, but as it was required for PPM, and the Project Director did not think PPM was being provided, it is not surprising that handover was accepted by the Project Team without a satisfactory solution to asset tagging.

8.3.16 Handover of the building to NHS GGC

1645. The impression gained by Multiplex[2883] from the Project Team was that they were happy to take over the hospital. According to Ms Kane, Mr Loudon specifically assured her that all systems had been checked and were 'good to go'.[2884] Given what witnesses have described, it is not clear why that assurance was couched in that language. Mr Fernie, however, confirmed walk-rounds took place in the run up to the handover date, which involved NHS GGC.[2885]

8.3.17 Commissioning and validation

1646. Again, there has been much said about the meaning of these phrases. All that is necessary here is to pick up any additional evidence. That, as might have been anticipated, simply confirmed the key points. Commissioning for Multiplex proceeded based on the construction drawings and did not look back to Guidance or ERs or the COSs.[2886] When Capita were checking the

[2881] Confirmed, ironically in the M&E Clarification log as discussed with Ms Kane in her evidence - Transcript, Mary Anne Kane, 16 May 2025, Page 41, Column 78.
[2882] Transcript, Mary Anne Kane, 16 May 2025, Page 41, Column 77.
[2883] Transcript, Mary Anne Kane, 16 May 2025, Page 33, Column 61-62.
[2884] Transcript, Mary Anne Kane, 16 May 2025, Pages 33-34, Columns 62-63.
[2885] Glasgow 4, Part 1 - Witness Statements, Volume 2, Document 1, Alasdair Fernie, Pages 42-43.
[2886] See e.g. Transcript, Alasdair Fernie, 21 May 2025, Page 61, Column 118. The evidence of Mr Wilson was to similar effect - Transcript, David Wilson, 20 May 2025, Pages 6-7, Columns 9-12.

commissioning they were proceeding in precisely the same way.

1647. As to validation – which was, of course, not done at all - the general line from Multiplex witnesses was that as this was not for them to do, they gave it little thought. No-one seems to have considered that it was intended to allow consideration of acceptability for the client – or for that matter how it related to practical completion. If they thought about it at all they assumed it would happen post-handover, but pre-occupation. While we know from Mr Seabourne that he did not raise the topic with Mr Loudon on handover of his role,[2887] had any of the team from Multiplex asked the question, 'When are you doing validation?' or even 'Who do you have lined up to do validation?', we have to assume it would then have been done. In that event much of the detective work to find out what the ventilation systems were, and why, could have been avoided.

1648. The lack of validation remains a significant Deficient Feature – albeit one which would have not readily allowed the clock to be turned back to the design phase (or indeed the contract signing).

8.3.18 Estates Underfunding

1649. That there was a serious issue over resources for the Estates team following handover seems undeniable. It was spoken to by a range of witnesses. Likewise, the consequential issues it caused (from inaction over DMA Canyon to non-implementation of a Horne taps disinfection method) are also clear and significant. Do we know why it happened and what senior management did to respond?

1650. Accounts of many snagging works, breakdowns in new machinery and multiple problems emerging with the building[2888] provide part of the answer to the first question. Another part of the answer is most clearly found in Mr Leiper's narrative following an investigation which emerged belatedly from Scottish Government[2889]; He said,

[2887] Transcript, Alan Seabourne, 29 May 2025, Page 81, Column 157.
[2888] Glasgow 3 - Witness Statements, Volume 1, Ian Powrie, Document 7, Question 19, Pages 220-223.
[2889] Bundle 52, Volume 1, Document 38, Page 735.

'… the budget for the funding the maintenance of the new hospital was based on the last year of budgeted expenditure at the demitting hospitals and…. was 'capped' at £4.5M, (around half the amount anticipated by staff… this would not have reflected the true cost of maintaining the new campus for two reasons:

The budget of the old hospitals would not have represented the full and accurate cost of maintaining them to normal levels, as there would have been a running down of the maintenance services as the hospitals were closing; and

The new campus has much more highly serviced engineering systems in comparison to the older demitting hospitals and it also contained lots of new technology. The maintenance of these complex systems, machinery and devices is expensive. It is thought that the costs of the necessary maintenance contracts for specialist equipment, together with the life cycle costs of maintaining the installed engineering systems did not form the basis of setting the maintenance budgets. It is recognised that economies of scale and efficiencies will be realised as long as plant and equipment are appropriately maintained. It is not possible to maintain systems to appropriate standards if the funding required to do so is not provided. It is thought that the cost of doing so was about double that allocated'.

1651. Combining the two produces a perfect storm. Mr Calderwood (who claimed[2890] to know nothing of the problem) laid that issue - which he found incomprehensible - firmly at the door of the management of Estates[2891].

1652. What was the response? In literal terms – 'There is no more money'. (That was accompanied in the next financial year by by insistence on manpower cuts in common with other services). With the benefit of hindsight of the consequences, this was clearly not adequate as a response. Why? According to Mr Powrie, he was told by Mr Loudon the request had gone all the way up to the top and that was the answer[2892]. Mr Calderwood maintained it was for Estates to resolve – there was an NHS GGC Estates budget and allocation was for the Director of Estates. If nothing could be done there, it would have been escalated but he was not aware of that happening.

[2890] Glasgow 4, Part 3 - Witness Statements, Volume 3, Robert Calderwood, Document 1, Page 27.
[2891] Transcript, Robert Calderwood, 1 October 2025, Pages 32-33, Columns 59-61.
[2892] Transcript, Ian Powrie, 22 August 2024, Page 6, Column 7.

1653. Whatever the true reason was for the lack of a speedy and positive reply to the request for help, it is clear beyond doubt that the management response was unsatisfactory.

8.3.19 Governance Arrangements for the new SGH Project

1654. Neither the OBC, nor the subsequent Full Business Case, referred to any derogation from ventilation standards, which ought to have been done due to the expectation that the SHTM guidance should be applied, and that the Scottish Government should have had the opportunity to consider and seek technical advice from HFS as required[2893]. The Scottish Government relied to some extent on an assumption that internal mechanisms for approval existed to take assurance that guidance was properly considered[2894].

1655. There appear to have been significant failures of governance within the new SGH project. These failures occurred at various levels and at important key decision points.

Lack of experience of NEC 3 'Design and Build' Procurement

1656. As discussed earlier, the personnel who made up the Project Team included no one with any real experience of the NEC3 design and build contract process. Ms Byrne, Mr Seabourne, Mr Moir, Ms Griffin, Ms MacLeod, and Ms Wrath had none. Within the Currie & Brown team it was notable that Mr Hall had no experience of this method of procurement. It is unclear as to the extent that Mr Calderwood was trained about this method of procurement, how it worked and how to manage risks within it.

Lack of internal assurance systems in the Project Team and the Board

1657. A Board which has approved ERs is entitled to have a reasonable expectation of being notified should there be a material departure from them[2895]. Peter Gallagher recognised that a difficulty arose if an expected notification did not happen, in that if not escalated it may be that the issue

[2893] Transcript, Mike Baxter, Pages 34-36, Columns 63-67.
[2894] Transcript, Mike Baxter, Page 39, Column 73 and Page 40, Column 75.
[2895] Transcript, James Stewart, 18 September 2025, Page 31, Column 58.

stopped with the Project Director[2896].

1658. There was no effective system for assurance in respect of technical matters within the project that could identify the risks of decisions, such as the Maximum Temperature variant and the acceptance of the Agreed Ventilation Derogation.

1659. Mr Stewart and Mr Baxter described a 'three lines of defence' governance structure, whereby scrutiny should come about through internal arrangements, through board oversight, and through independent outside assurance[2897]. A proposal to vary ERs would be dealt with by an appropriate escalation within that structure[2898]. He was concerned that the removal of the Maximum Temperature Variant did not appear to have engaged that structure to invite scrutiny from the Executive Board, that being an "absolutely material" variation from standard requirements[2899]. He did not accept that the scrutiny arrangements would prioritise decisions with a financial cost, by making those more likely to face escalation in this way[2900].

1660. Gateway Reviews did take place, and the Office of Government Commerce mandates a Gateway Review process to examine programmes and projects at critical stages in their lifecycle, to provide appropriate assurance that they can successfully progress to the next stage. Mr Stewart of PUK UK described Gateway Review as an independent review process distinct from the 'first, second and third line of defence' assurance processes. [2901] 'Assurance' should be distinguished from technical expertise, which the assurance process is not designed to provide[2902]. Gateway Reviews are no substitute for proper internal assurance processes.

1661. It is not easy to work out the extent of the role of Partnerships Ltd ('PUK') in the project. The inability of Mr Stewart to remember anything about the events he was involved in, the lack of retained documents and the passage

[2896] Transcript, Peter Gallagher, 18 September 2025, Page 38, Column 72.
[2897] Transcript, James Stewart, 18 September 2025, Page 11, Column 17.
[2898] Transcript, Mike Baxter, 16 September 2025, Pages 20-21, Columns 35-37.
[2899] Transcript, Mike Baxter, 16 September 2025, Pages 22-23, Columns 40-41.
[2900] Transcript, Mike Baxter, 16 September 2025, Page 24, Column 44.
[2901] Transcript, James Stewart, 18 September 2025, Page 11, Column 17 and Page 20, Column 36.
[2902] Transcript, James Stewart, 18 September 2025, Page 21, Column 38.

of time make it difficult to be sure, but it does look as if PUK's involvement was to some degree more superficial that it had in other projects, and in reality its involvement provided no real assurance to NHS GGC or the Scottish Government that proper governance arrangements were being carried through.

Lack of change management process

1662. Despite it being a requirement of the NSGHLPEB remit, there was no system for change management process in the project between the approval of the ERs and contract signing. As a result, the NSGHLPEB had no idea what was being done by the Project Team to make significant changes to the specification of the ventilation of this huge hospital. It is also entirely possible that this absence of a change management process is the reason that the specification for ventilation in isolation rooms at the adult hospital, approved at the 18 May 2009 IPC Meeting, was never passed on to the bidders.

1663. We require to address the conflict of evidence from Mr Seabourne on one hand, and Mr Hall of Currie & Brown on the other, about whose responsibility it was to escalate changes to NSGHLPEB or the PAG and to obtain approval. Whilst Currie & Brown were clearly an important part of the process and might have been the communication vehicle for escalation if so instructed, the ultimate responsibility for escalation of changes to the ERs must lie with the Project Team and Mr Seabourne.

Lack of proper record keeping

1664. Record keeping within the Project Team appears to have been significantly lacking. The absence of records was the reason that in both 2016 and 2018/2019 NHS GGC could not work out why the Agreed Ventilation Derogation had been agreed to. Treating an oral 'all good to go' as a record of suitability for handover is clearly inadequate.

Failure to follow the HAI-Scribe process.

1665. HAI-SCRIBE is a procedure mandated by SHFN 30 for the identification, management and mitigation of issues in the built environment giving rise to a

risk of infection[2903]. There should have been four HAI-SCRIBE stage reviews carried out for the new SGH between the inception of the project and handover. We found one and it, the 7 July 2010, Stage 2 HAI-SCRIBE produced by Ms Barmanroy,[2904] is clearly entirely inadequate. We know that Mr Calderwood asked about HAI-SCRIBE in 2013[2905] and the IPC Team deny it was their responsibility[2906]. Consultant ICN Ms Devine and Lead ICD Professor Williams were correct about this for the Stage 4 HAI-SCRIBE as the 2014 edition of SHFN 30 is clear that responsibility for the Stage 1 HAI-SCRIBE lay with Project Director (then Mr Loudon), but in respect of the earlier stages to which the 2007 edition of SHFN 30 applied the responsibility is less clear. The evidence of their work suggests the Project Team clearly did not understand HAI-SCRIBE.

1666. The IPC Register for 2014 contained an entry for the new SGH Project which is relevant this issue[2907]. It is 'Datix N8' and identifies the risk of 'failure to provide appropriate infection control advice and support in the assessment ad reduction of risks associated with new builds and renovation projects'. The risk is assessed as 'low' and allocated to Mr Walsh, Professor Williams, 'Facilities' and the Project Team. It appears that this risk was identified, but not managed by the ICM, Consultant ICN and Lead ICD.

1667. It is difficult not to reach the conclusion that had the Stage 2 HAI-SCRIBE been done properly, then the Agreed Ventilation Derogation would have been uncovered and (hopefully) understood. It is also reasonable to conclude that had the following stages been properly carried out to the standard required in the version of SHFN 30 then in force, the deficiencies of individual wards, the isolation rooms, and potentially even issues with the water system might well

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[2903] The HAI-SCRIBE procedure is set out in SHFN 30 (Bundle 13, Volume 3, Document 16, Page 553) which was originally published in 2002. 2002 version was updated by a version published in 2007. Use of the 2007 version was mandated by CEL 18 (2007) of 13 December 2007. The latest version published in October 2014 is Bundle 27, Volume 4, Document 35, Page 365.
[2904] Transcript, Jackie Barmanroy, 15 May 2025, Page 77, Column 149.
[2905] Bundle 40, Document 42, Page 153.
[2906] Glasgow 4, Part 2 - Witness Statements, Volume 1, Professor Craig Williams, Document 11, Page 91, and Glasgow 4, Part 2 - Witness Statements, Volume 1, Sandra Devine, Document 10, Page 75. Ms Devine also stated in her Glasgow 3 statement (Glasgow 3 - Witness Statements, Volume 7, Document 2, Page 437, Para 142) that in her role as Director of IPC she does "not contribute to the HAI SCRIBE process in my role…".
[2907] RFI Response of 15 October 2025, A54471690 - Bundle 52, Volume 11, Document 10, Page 89.

have been uncovered well before they were.

8.4 Revisiting the key events after handover

1668. This section supplements the conclusions reached in Chapter 6 of our Closing Statement following Glasgow 3,[2908] and develops the seven questions asked in that chapter in light of evidence that has been led, documents reviewed, recovered or understood and submissions made by CPs since the end of the Glasgow 3 hearing.

8.4.1 The reaction of NHS GGC and its staff to discovering the potentially deficient features of the water and ventilation system in 2015.

1669. Our assessment of this issue can be found in section 6.1 of our Closing Statement following Glasgow 3[2909]. What we said then needs to be understood in light of our subsequent conclusions on these issues in the earlier part of this chapter.

8.4.2 The scope and the extent of the response to potentially water related infections from early 2016, and what would have been the effect if the 2015 DMA Canyon L8 Risk Assessment had been known to IPCT that year.

1670. There is little to add to the assessment of this issue in section 6.2 of our Closing Statement following Glasgow 3,[2910] other than to observe that the work of the HAD Authors provides further support for the view that, from the second quarter of 2016, there was an increase in environmentally relevant BSI that would reach a higher level in 2017[2911].

1671. The evidence of Mr Calderwood and senior managers in the Glasgow 4, Part 3, hearing that they had no knowledge of the issues with the water system in 2016, would seem to be consistent with other evidence. However, the lack of awareness or understanding of his responsibilities as Duty Holder under the Board Water Systems Safety Policy[2912] was a remarkable oversight on his

[2908] CTI Closing Statement, Glasgow 3, Page 524.
[2909] CTI Closing Statement, Glasgow 3, Page 525, Paras 3-20.
[2910] CTI Closing Statement, Glasgow 3, Page 531, Paras 21-24.
[2911] Bundle 44, Volume 5, Document 2, Page 50, Figure 2.F.3.
[2912] Bundle 27, Volume 2, Document 1, Page 5.

part. It is difficult not to reach the conclusion that had he been more aware of the issue, and his ultimate responsibility/accountability for water system safety within NHS GGC, some of failings of the NHS GGC water safety system (including that of the Board WSG) in respect of the QEUH/RHC might well not have occurred.

8.4.3 The scope and extent of the response to further unusual potentially water related infections in 2017, and what would have been the effect had the 2015 DMA Canyon L8 Risk Assessment been known to IPCT that year.

1672. We addressed this issue extensively in section 6.3 of our Closing Statement following Glasgow 3,[2913] however there are two reasons to briefly revisit this topic. Firstly, because the work of the HAD Authors now confirms what was previously controversial; that there were a substantial number of additional environmentally relevant BSI amongst the paediatric haemato-oncology patients during 2017, and secondly, because of the additional significance that non-reporting of HAIs to HPS/AHRAI has assumed after the evidence of the former CNO, Ms McQueen and the investigations by ARHAI and the HAI Policy unit around reporting of *Cryptococcus* cases in 2024/2025.

1673. The key internal report on the IPC response to potentially water related infections in 2017 was Professor Jones' report of 31 October 2018[2914].

1674. Reviewing Professor Jones's report[2915] and Ms Devine's statement,[2916] it appears that considerable reassurance was gained that, between March 2017 and November 2017, 151 water samples were taken in Wards 2A and 2B. The number of these tests over an eight-month period is strikingly less than those ordered in 2018 following the start of the Water Incident. Given the numbers of infections now identified by Dr Drumright's work it does appear that re-assurance was not justified.

1675. The three *Stenotrophomonas maltophilia* cases in July 2017,[2917] addressed

[2913] CTI Closing Statement, Glasgow 3, Page 532, Paras 25-29.
[2914] Bundle 19, Document 56, Page 1371.
[2915] Bundle 19, Document 56, Page 1393.
[2916] Glasgow 3 - Witness Statements, Volume 7, Sandra Devine, Document 2, Page 476, Para 291.
[2917] As described in CTI Closing Statement, Glasgow 3, Page 293, Paras 311-312.

by Dr Mathers in his SBAR of 1 March 2019,[2918] and the subsequent review by Dr Chaudhury,[2919] were not reported to HPS[2920] despite a PAG assessing the HIIAT as 'Red'[2921]. Dr Mathers' SBAR does not address that issue and Professor Jones' report states that the death of one of those patients was reported to HPS on 4 September 2017, 43 days after the second patient had a positive blood culture on 23 July 2017. The report reached this conclusion on reporting:

> "The IPC Team have followed a set of national mandatory definitions requirement for IC reporting and have complied with the National Infection Prevention and Control Manual including the reporting of incidents to HPS."[2922]

1676. Ms Devine did not address the issue of reporting to ARHAI in her statement[2923]. When this failure to report is noted alongside the non-reporting to HPS of the 2017 *Cupriavidus* case in 2017[2924] and the 2015 invocation of the CNO's Framework (formerly the Algorithm),[2925] it does tend to support the view that in 2017 the NHS GGC IPC Team was not fully compliant with its reporting obligations to ARHAI under Chapter 3 of the NIPCM.

8.4.4 The understanding within NHS GGC at the time of Stage 1 Whistleblow and the 27 Point Action Plan, about the features of the hospital water and ventilation systems and whether there was any connection to the number of infections.

1677. The evidence of Ms Grant[2926] and Professor Brown[2927] requires us to re-consider the significance of the SBAR of 3 October 2017,[2928] by Dr Redding and her colleagues, in bringing the deficiencies of the ventilation systems of

[2918] Bundle 4, Document 36, Page 151.
[2919] Bundle 8, Document 19, Page 112.
[2920] Bundle 27, Volume 3, Document 25, Page 482 and Transcript, Fiona McQueen, 2 October 2025, Pages 15-18, Columns 26-32.
[2921] Bundle 2, Document 17, Pages 44-45.
[2922] Bundle 19, Document 56, Page 1371.
[2923] Glasgow 3 - Witness Statements, Volume 7, Sandra Devine, Document 2, Page 473, Paras 280-282.
[2924] As described in CTI Closing Statement, Glasgow 3, Page 295, Paras 316-317.
[2925] Transcript, Fiona McQueen, 2 October 2025 and Bundle 3, Document 3, Page 15.
[2926] Transcript, Jane Grant, 23 September 2025, Columns 49,64,65,75,79 and 84.
[2927] Transcript, Professor John Brown, 3 October 2025, Pages 18-19, Columns 32-33.
[2928] Bundle 4, Document 20, Page 104.

the QEUH/RHC to the attention of the new Chief Executive and the Chair. It was the position of Dr Armstrong that, whilst the SBAR did raise valid concerns[2929], there were not many things in it that were not already being acted on by the Board[2930]. She does describe reporting various earlier events to the previous Chief Executive[2931], but nowhere does she contradict the evidence of Ms Grant and Professor Brown (although, of course, she was not specifically asked as they had yet to give evidence).

1678. If it is the case that the then Chief Executive and Chair are correct that the SBAR was the trigger to them being told of the deficiencies of the ventilation system of the QEUH/RHC, then the importance of the Stage 1 Whistleblow to ensuring that NHS GGC was fully responding to the deficiencies of the QEUH/RHC has grown substantially.

1679. Whilst Mr Best was in North Sector at the time, his view that the SBAR was premature, raises a real question about how NHS GGC was responding to the various issues that had arisen in the QEUH/RHC in 2015 and were not promptly resolved. Mr Best was being asked about whether he was an open supporter of people using whistleblowing and responded:

> "What I personally felt about that particular issue is that I felt we had leapt, or the individuals had leapt, to a confidential whistleblowing process before we had exhausted creating an action plan to solve the issues and, … the matrix management system means that … because there's a professional line to the medical director for clinicians, there's a professional line to the director of nursing for the nurses, etc., and then there's a general management process where we work on the triumvirate system of manager, nurse and doctor running services, and my view is that we should go through the local groups, the local management processes, the directors, their respective chiefs of medicine and chief nurses and then to chief operating officer, their level and then to-- the Board."[2932]

[2929] Glasgow 3 - Witness Statements, Volume 8, Dr Jennifer Armstrong, Document 5, Page 24.
[2930] Transcript, Dr Jennifer Armstrong, 10 October 2024, Page 47, Column 89.
[2931] Concerns about ventilation in 2015 (Transcript, Dr Jennifer Armstrong, 10 October 2024, Page 12, Column 19, Page 14, Column 24 and Page 17, Column 29), Sector ICDs who wish to demit their roles in 2015 (Transcript, Dr Jennifer Armstrong, 10 October 2024, Page 21, Column 37), issues with isolation rooms in 2015 (Transcript, Dr Jennifer Armstrong, 10 October 2024, Page 18, Column 32), the realisation that the general wards had 2.5-3ACH in May 2016 (Transcript, Dr Jennifer Armstrong, 10 October 2024, Pages 30-31, Columns 55-57).
[2932] Transcript, Jonathan Best, 19 September 2025, Page 98, Column 191.

1680. The point Mr Best appears to be making is that the Board had reacted to the Stage 1 Whistleblowers, before it "had exhausted creating an action plan to solve the issues". However, we can now be sure that there was no action plan to solve the issues with the QEUH/RHC before the meeting of 4 October 2017. The hospital had been open for 52 months and yet there was no such plan. Some actions had been taken, some items had been reported to various committees, and help had been sought from HPS with the Adult BMT Unit, but under Mr Calderwood's leadership no steps had been taken to produce a comprehensive plan and that had continued after he left. That is a significant failure at a corporate level by NHS GGC.

1681. As noted,[2933] Dr Inkster, on her return as Lead ICD, had identified missing items in the Action Plan, but they had not been taken on board. In our submission the conclusion must be that the 27 Point Action Plan was a reactive document, responding to the Stage 1 Whistleblow in the SBAR of 3 October 2017. It was not a systematic considered plan to address the issues with the building. That it was not, and no such plan had been produced since the hospital opened, is an organisational failure to respond by NHS GGC.

8.4.5 The response of the IPC team, Estates staff and NHS GGC as an organisation to what appear to be unusual numbers of infections in the Schiehallion Unit in 2018

1682. We set out our assessment of this issue in section 6.5 of our Closing Statement following Glasgow 3[2934], but the Inquiry has now had the evidence of Ms Grant, Professor Brown[2935] and Mr Hill[2936]. Mr Best seemed unable to explain why Ward 2A needed to be decanted[2937]. When taken with the position set out in the SBAR which was used to brief Professor Brown, on or about 13 November 2018,[2938] it is now clear that at the time the senior management and Chair of NHS GGC understood (to the extent that they

[2933] CTI Closing Statement, Glasgow 3, Page 319, Para 392.
[2934] CTI Closing Statement Glasgow 3, Page 537, Paras 46-54.
[2935] Transcript, Professor John Brown, 3 October 2025, Columns 43-47 and Glasgow 4, Part 3 - Witness Statements, Volume 2, Professor John Brown, Document 1, Page 16.
[2936] Transcript, Kevin Hill, 17 September 2025, Pages 30-31, Columns 55-57, Page 32, Columns 59-60 and Glasgow 4, Part 3 - Witness Statements, Volume 5, Kevin Hill, Document 1, Page 18.
[2937] Transcript, Jonathan Best, 19 September 2025, Page 88, Columns 171-172.
[2938] Bundle 4, Document 32, Page 133.

understood) that contamination of the water system (as it was explained to them) was the cause of the infections in the Water Incident and that they also appreciated its seriousness[2939]. Any suggestion that the water system might not be a contributing factor to the situation came later.

1683. Should there have been one executive group consistently in charge of the NHS GGC response to the 'Water Incident' and subsequent infection crisis that had the potential to be linked to the water and ventilation systems? There was a suggestion by Dr Inkster that there should have been an 'Executive Control Group,' which was discussed in Section 5.2 of our Closing Statement following Glasgow 3,[2940] and approved of by Dr Mumford and Ms Dempster[2941]. Ms Grant described a less structured process of the NHS GGC executive team, sometimes in the form of the Water Review Group accepting recommendations from the IMT, but her explanation was made more complex by a seeming reluctance to identify where decisions to close or decant wards were actually made[2942]. There should have been a clearer and more formal structure to separate the investigation and incident management process in the IMT from the management of the wider impact and corporate response.

8.4.6 Whether the various suspected and confirmed Cryptococcus and Aspergillus cases in the period from 2016 to 2020 were properly investigated, and what can be learned that is relevant to the question of whether the ventilation gave rise to an infection link or increased risk to patients.

1684. Our assessment of this issue in section 6.6 of our Closing Statement following Glasgow 3[2943] now must take account of the results of Dr Agrawal's retrospective descriptive epidemiology work, in respect of *Aspergillus* infections amongst paediatric haemato-oncology patients from 2005 to 2022. Whilst it remains remarkable that *Aspergillus* infections after 2015 did not prompt an earlier upgrade to the ventilation of Ward 2A outside the BMT

[2939] Transcript, Kevin Hill, 17 September 2025, Page 30, Column 56.
[2940] CTI Closing Statement, Glasgow 3, Section 5.2, Page 361, Paras 519-520.
[2941] Transcript, Dr Mumford and Ms Dempster, 12 November 2024, Pages 96-97, Columns 188-189.
[2942] Transcript, Jane Grant, 23 September 2025, Pages 102-107, Columns 199-210.
[2943] CTI Closing Statement, Glasgow 3, Page 541, Paras 55-54.

rooms, that observation has to acknowledge that there was not a statistically significant increase in the rates of *Aspergillus* infections amongst paediatric haemato-oncology patients at the RHC compared to Yorkhill. Beyond that adjustment our assessment remains unchanged.

8.4.7 NHS GGC's understanding of the state of both the water system and the ventilation system in autumn 2019 and how the Board were responding at that time.

1685. NHS GGC expressed a specific concern[2944] about the interest we took in Section 6.7 of our Closing Statement following Glasgow 3[2945] about the events of August 2019 when Dr Inkster was removed as the Chair of the GNB IMT.

1686. The extent to which the ventilation and water system of the building had an adverse impact on patient safety and care in Ward 6A in the summer of 2019 is at the heart of the remit and terms of reference of the Inquiry. The IMT that began on 16 June 2019[2946] was the first attempt to reach a conclusion on that question. How that investigation was carried out therefore engages TOR 1. In 2019 NHS GGC was subject to Stage 2 of the National Framework, had been the subject of an HIS Investigation and, we know now, was being watched by Scottish Government over its handling of events. Quite apart from the difficult issue of the *Mycobacterium Chelonae* cases, at the start of August 2019 there was a difference of opinion in NHS GGC about the extent to which the hospital environment could be connected to the Gram-Negative BSI that were the subject of the IMT. There were those (such as the Chair of the IMT, Dr Inkster) who by the start of August 2019 had a primary hypothesis that the increase in Gram-Negative Bacteria was either due to "the chilled beams either leaking or dripping condensation onto patients" or that patients had access to unfiltered water outwith Ward 6A[2947]. There were others (such as Professor Steele) who expressed scepticism

[2944] Glasgow 3 - Core Participants' Closing Submissions, NHS Greater Glasgow and Clyde, Document 4, Page 45, Paragraph 32.
[2945] CTI Closing Statement, Glasgow 3, Page 543, Paras 58-69.
[2946] CTI Closing Statement, Glasgow 3, Page 451, Paras 823-827.
[2947] Bundle 1, Document 76, Page 341.

about those hypotheses. The method by which the decision was made to remove Dr Inkster appears to have followed representations from only one side of that debate. No attempt was made to hear the perspectives of others, such as Professor Gibson and her team. The meeting on 20 August 2019 took place in the absence of Dr Inkster, and the way that the decision was communicated to Dr Inkster, the other members of the IMT and, significantly, ARHAI was less than frank. It is a reasonable inference that such a partial and unfair process could discourage future NHS GGC IMT Chairs, and participants in IMTs, from raising concerns about failures in performance or inadequacies of systems - and thus TOR 4 is engaged. That is why we focused on the way that NHS GGC treated their own Lead ICD in the third year of what is clearly an exceedance of infections in QEUH/RHC in the period 2016 to 2019.

1687. Our assessment remains unchanged.

8.5 Issues developed in the Glasgow 4 hearings

1688. In the Glasgow 4 hearings we considered other areas where issues require to be resolved. These are:

a. The management of risk within NHS GGC and in particular use of the corporate risk register and other risk registers to manage acknowledged risks.

b. The steps taken by NHS GGC since 2020 to improve or change its policies and culture that might have an impact on the willingness of its staff to disclose evidence of wrongdoing or failures or inadequacies of systems.

c. The role of the Scottish Government and the Oversight Board in taking actions to remedy defects in the building, to improve HAI Reporting and to address any cultural issues that were said to discourage NHS GGC staff from disclosing evidence of wrongdoing or failures or inadequacies of systems.

d. The extent to which lessons have been learned within NHS GGC from the experience from 2015 to 2020 of the processes and practices of reporting healthcare associated infections within QEUH.

8.5.1 The management of risk within NHS GGC

1689. The Inquiry Team obtained the NHS GGC Corporate Risk Register back to January 2009[2948]. It was necessary to heavily redact it to remove risks that do not fall within the Remit and Terms of Reference of the Inquiry. However, the following conclusions can be noted:

a. There is no reference to risk arising from the water system of the QEUH until August 2018, after the emergence of the DMA Canyon L8 Risk Assessments[2949].

b. There are no references to individual wards in QEUH/RHC before November 2019, when a risk arises in respect of the "reputational risk in respect of the recent issues and concerns expressed relating to the QEUH and RHC". This appears to relate to the Health and Safety Executive review into the issues related to the management of risks associated with ventilation and water systems in the hospital[2950].

c. There is a non-specific risk that arises in December 2017, "Failure to comply with recognised policies and procedures in relation to infection control". This arises after the 27 Point Action Plan and the SBAR of 3 October 2017, but there is no reference to the QEUH[2951].

d. Apart from a redacted reference to COVID risk, there is no reference to Ward 2A or any reference to the decant of Ward 4B back to the Beatson in July 2015.

1690. To the extent that Ms Grant could answer questions about this topic, she appeared to be explaining that the absence of references to specific hospitals was in some way a feature of the fact this was the Corporate Risk Register. he did maintain that use of the risk register has improved in recent years[2952]. Whilst most risks in a corporate risk register will apply across the a board if a risk only arises in one ward, hospital or service then clarity and

[2948] Bundle 45.
[2949] Bundle 45, Pages 333 and 353.
[2950] Bundle 45, Page 446 and 462.
[2951] Bundle 45, Page 281.
[2952] Transcript, Jane Grant, 24 September 2025, Page 69, Column 134.

acknowledgment of that risk requires it to be identified, not hidden or ignored.

1691. The Inquiry Team sent a Request for Information to NHS GGC on 10 September 2025 which sought extracts of the IPC Risk Registers which mentioned the QEUH/RHC from January 2014 to December 2019. We were informed that there are no specific references to the QEUH/RHC within the IPC Risk Register, as the IPC Risk Register contain Board wide risks. Mr Walsh explained[2953] that the maintenance of this risk register was his responsibility.

1692. The VOLHI Report explains:

> "…infection prevention and control was not specifically incorporated into the risk register process until December 2008. NHSGGC now has a risk management strategy that takes into account the Scottish Government proposals contained in "The Risk Management of HAI: A Methodology for NHS Scotland" published in 2008. Each clinical directorate in the Acute Division includes infection prevention and control risks in its individual directorate risk register. Furthermore, the Infection Control Manager has the responsibility for the overarching infection control risk register, which is monitored by the AICC and reviewed annually."

1693. At the AICC of 4 February 2009[2954] Ms Rankin reported that the IPC Risk Register was now live, and it was reported to every AICC meeting as a standing item until 7 July 2011,[2955] after which it is no longer a standing item. The IPC Risk Register is then reported to the BICC from 24 May 2010[2956] to 17 September 2012[2957]. As far as we can see the IPC Risk Register is not reported to AICC from November 2014 to June 2018[2958], but at the AICC of 19 June 2018[2959] it is reported that:

[2953] Glasgow 3 - Witness Statements, Volume 4, Tom Walsh, Document 4, Page 229.
[2954] Bundle 42, Volume 1, Document 6, Page 10.
[2955] Bundle 42, Volume 1, Document 15, Page 75.
[2956] Bundle 42, Volume 1, Document 43, Page 208.
[2957] Bundle 42, Volume 1, Document 57, Page 278.
[2958] See Bundle 13.
[2959] Bundle 13, Document 16, Page 120 at Page 127.

"Tom Walsh has generated a separate risk register where primary risks relating to the IPCT are held. It allows people to see what is currently on it and see how we monitor these risks moving forward.

The register is used to update the IPC work programme every year incorporating the 4 highest risks."

1694. It does not appear from the minutes of the AICC available to the Inquiry that, despite the assurances given to the VOLHI, the IPC risk register was reported to or reviewed annually by that committee in the years immediately after the opening of the QEUH/RHC (although there are references to the IPC Risk Register in minutes of the IPC SMT once a year in 2014[2960], 2015[2961] and 2016[2962]).

1695. The Inquiry Team has come late to considering the question of the use of risk registers by NHS GGC, as part of the Board's response to realisations that all was not entirely right with the QEUH/RHC. Examination of the risk registers and minutes of relevant committees suggests that, simply put, prior to September 2018 the Board did not use its risk register system to address, understand or manage risks posed by the water or ventilation systems of the QEUH and the IPC Risk Register was not operated in a manner consistent with the way the VOLHI understood the commitments given to it by NHS GGC.

HAI-SCRIBE within the QEUH

1696. In our Closing Statement following Glasgow 3, we considered a number of pieces of evidence about the operation of the HAI-SCRIBE system within the QEUH/RHC after the hospital opened[2963].

1697. In response to that evidence the Inquiry Team was contacted by Dr Saranaz Jamdar, a consultant microbiologist in NHS GGC. In her statement[2964] she described her experience of HAI-SCRIBEs being drafted in a formulaic

[2960] Bundle 13, Document 65, Page 490.
[2961] Bundle 13, Document 67, Page 506.
[2962] Bundle 13, Document 75, Page 570.
[2963] CTI Closing statement, Glasgow 3, Section 5.2. Page 302, Paras 341-346 and Section 5.3, Page 519, Paras 1038-1040.
[2964]Glasgow 4, Part 3 - Witness Statements, Volume 2, Dr Saranaz Jamdar, Document 6, Page 161.

manner by Estates staff who had limited knowledge of clinical risks and of being asked to sign off such a HAI-SCRIBE without full access to the information. She reports being challenged for “damaging the relationship between the Estates and the IPCT". Dr Jamdar felt it important to note that these challenges were taking place at the time that the concerns about the QEUH were public knowledge. Dr Jamdar also corroborated the evidence of Dr Peters, Dr Redding, Dr Inkster and Ms Rankin about the culture in NHS GGC. We address this in respect of TOR 7.

8.5.2 Responses by Scottish Government and the Oversight Board

Initial Intervention by Scottish Government

1698. The response by the Scottish Government to the emergence of concerns about the water and ventilation systems at the QEUH/RHC was gradual. This is principally because, in contrast with the prompt disclosure of issues to Scottish Government by the Medical Director and Chief Executive of NHSL,[2965] NHS GGC simply failed to inform the Scottish Government that there were any real issues with the ventilation system of the QEUH/RHC during 2015. It is true that HPS were asked to help with Ward 4B, but that request for help came from Dr Inkster in November 2015,[2966] and was not made in July 2015 when the decision was made to return the patients to the Beatson. Even though NHS GGC were subject to CNO algorithm that year it still did not occur to Mr Calderwood to ask for help.

1699. It was not until the start of the Water Incident in March 2018, that there was any real support or systematic assistance provided by the Scottish Government or NHS NSS to NHS GGC. The evidence of Ms Freeman suggests that, even the emergence of the DMA Canyon L8 Risk Assessments in the summer of 2018, and the subsequent need to decant Ward 2A, was not viewed as worrying enough to prompt a significant intervention using the national framework.

1700. It does seem that it was the combination of the December 2018

[2965] Scottish Hospitals Inquiry Interim Report - The Royal Hospital for Children and Young People and Department of Clinical Neuroscience, Edinburgh, 3 March 2025, Paras 2.26-2.42.
[2966] Bundle 27, Volume 7, Document 33, Page 406.

Cryptococcus outbreak, and the contact made by Dr Peters and Dr Redding to Ms Freeman via Mr Sarwar in the early months of 2019, that prompted more significant action by the Cabinet Secretary and Director General. There is an argument that the government should have acted when the HIS Inspection confirmed the concerns expressed by Dr Peters and Dr Redding. It may be that it was a lack of appreciation of the long-term management failures within NHS GGC in respect to the procurement, design, construction, commissioning and operation of the QEUH/RHC, that encouraged the Cabinet Secretary and Director General to give NHS GGC more time to get its house in order.

Escalation in November 2019

1701. In our submission the decision to go to Stage 4 in November 2019 could not have reasonably been delayed. There is an argument that escalation should have come sooner, and that it should have gone to Stage 5. We accept that the reactions of the Scottish Government are not directly within the Remit and Terms of Reference, but if the Chair is to identify any lessons learnt to ensure that any past mistakes are not repeated (TOR12) then we should probably reach conclusions on this topic.

1702. Stage 5 of the framework is impractical. It would have placed the entirety of NHS GGC directly under the responsibility of the Scottish Government, at least until new board members could be appointed. However, the failings of NHS GGC are largely not failings of its non-executive board members, but rather the failure of executive board members and corporate management team members to (a) ask questions, (b) act and (c) report to the Board. The practical consequence is that, if the Scottish Government was ever again to be faced with a health board that was as dysfunctional as NHS GGC has been shown to be in respect of the procurement, design, construction, commissioning and operation of the QEUH/RHC and its reaction to that, there is a real need for a more nuanced option beyond Stage 4. We have addressed this as a proposed recommendation, but our principal point is that a useable ultimate power of intervention is needed.

    a. One option would be for Scottish Ministers have the power to remove

specific board member or members, the Chair or any executive (including the Chief Executive), if satisfied of the need to do so in the interest of proper provision of healthcare. It would be necessary to consider how contracts of employment of executives in Boards could be structured to contain appropriate provisions reflective of, and allowing for, such action.

b. Alternatively, the Scottish Ministers could have the power to appoint a group or board to take over control over a health board whilst leaving the board members in place. An analogy would be the power to appoint Commissioners as provided for English local government under section 15 of the Local Government Act 1999. Such a provision would have the advantage of keeping the responsibility at arms lengths from the Scottish Ministers whilst enabling changes to be delivered and leaving the board members in place to learn lessons and become ready to take control again once the crisis has passed.

1703. There is also the illogicality that the Chief Executive, Medical Director, Director of Public Health and other senior executive staff of a health board being formally members of that board. No such arrangement exists in respect to local authorities and removing senior managers from the board would end their dual identity and remove a clear conflict of interest.

The Work of the Oversight Board

1704. However, the decision was taken to go to Stage 4 not to Stage 5. The extent of the intervention was limited. It did not include any responsibility for oversight of the remedial action required to address any defects in the building systems. That decision created confusion. The patients, families and the public might well have reasonably thought that the Oversight Board was going to have oversight of the refit of Ward 2A or the rectification of the water system, but it did not.

1705. Any discussion of the actions of the Oversight Board and its failure to seriously engage with the question of organisational culture within NHS GGC, has to take account of the fact that the COVID 19 pandemic occurred within months of its starting work. Opportunities were missed in 2020 and 2021 to rebuild relationships between the IPC team and Dr Peters and Dr

Inkster. Of course it might simply be the case that, until their concerns about infection rates were to some extent vindicated by the work of the Board's own appointed experts in the HAD Response Document, there was never going to be 'buy in' at a senior level within the Board of the idea that the whistleblowers had been poorly treated (and had in fact been the principal means that the deficiencies of the building had come to light).

NHS GGC and the conclusions of the CNR on infection link

1706. Soon after Ms Freeman announced that the CNR was to be established, NHS GGC learned that they were not going to be given the individual reports from the CNR Expert Panel. Ms Freeman and Ms McQueen were right to proceed on the basis that the CNR were an authoritative, experienced and independent expert panel, and right to expect that NHS GGC should accept its conclusions. The main ask was, as described by the CNR Sponsor, Professor Bain, was to look in more detail about which children had been affected[2967].

1707. We now know that the Medical Director and other senior clinicians and managers within NHS GGC were profoundly sceptical of the work of the CNR when they saw its draft report In February 2021. At one level that concern was understandable. They could not see the tableau timeline and the individual assessments. They only had the draft Overview Report to consider. They made comments, these were sent to the CNR (and carefully responded to), a meeting took place over Teams, and a follow up letter was sent by the Chief Executive. There is nothing wrong in itself with this being done. The difficulty is what came next.

1708. Whilst the current understanding of Professor Gardner and the evidence of Professor Brown is that NHS GGC always accepted the conclusions of the CNR on infection link, that is not precisely what the public statement issued by the Board said. An 'unreserved' apology was given to those patients and their families for whom the CNR decided there was a link between their infections and the environment. Whilst the doubts expressed to the CNR in

[2967] Transcript, Professor Marion Bain, 25 September 2025, Page 7, Column 9.

response to its draft may have been informally reported to board members at a seminar, no approval was sought from the board of NHS GGC for any course of action.

1709. In our submission, the Chair can conclude that, at the time of publication, some members of the corporate management team, including Ms Grant, did not personally accept the conclusions of the CNR on infection link. It may be that they felt their ability to speak up was constrained by the fact NHS GGC was at Stage 4 the National Framework. It is difficult to comprehend how dramatic the public response, and ultimately the response of the Cabinet Secretary, would likely have been had they turned round in public and rejected the conclusions of the CNR on infection link in March 2021. The conclusion has to be that they chose to keep quiet.

1710. Keeping quiet had consequences for other people. Patients and parents who had received letters from Professor Stevens suggesting an infection link, had to deal with that news. Some had follow-up meetings with the CNR and their own clinicians. We do not know who they are. Any parents who had lost their child as a consequence of an environmentally linked infection, would have required to incorporate the CNR conclusion into their grieving process. Those whose children had concluded treatment would have moved on with their lives, but the largest group would have been those whose children were still requiring treatment at the Schiehallion Unit. They would have had to process that the very unit that was supposed to treat their children had, on the balance of probabilities, caused serious infections. No formal duty of candour actions were carried out by NHS GGC in direct response to the CNR Overview Report, but the public statement was close to a duty of candour acknowledgement.

1711. Keeping quiet also had consequences for the Oversight Board. Its final report was published soon after the CNR Overview Report and relied upon it. Keeping quiet had consequences for the Scottish Government. The AARG proceeded to check whether NHS GGC had implemented the local recommendations of the Oversight Board, the Independent Review and the CNR. It did so in a manner that might be criticised for presuming

administrative regularity when some (including patients, families and others) might have hoped for a more critical approach. Had the various Chairs of the AARG known that senior directors of NHS GGC had not accepted the CNR conclusion on infection link, one might have hoped for a more rigorous examination.

1712. Should the Inquiry conclude that the Board kept quiet until it was de-escalated down to Stage 2? It would be wrong to ascribe that decision, if one was made, to "the Board of NHS GGC". Those who decided to instruct the HAD Report and the first and second NHS GGC Positioning Papers never sought the authority of the Board. The Chair, Professor Brown, knew nothing about this. We can find nothing in the formal minutes of meetings. The unsanctioned decision that NHS GGC should re-open the question decided by the CNR has had consequences. Firstly, it all came as a considerable shock to patient and families. Secondly, those involved have avoided the scrutiny of the Oversight Board and the Scottish Government. Thirdly, the Inquiry has taken longer and cost more because we have had to go back to first principles and revisit the question of whether the water system of the hospital had an impact on patient safety and care. That said it should be made clear that the Inquiry Team has considered and will consider all the evidence produced to address that question, however unorthodox was its production.

8.5.3 Implementation of recommendations and the AARG

1713. There is considerable scepticism from patients and families, and the whistleblowers, that NHS GGC has learned the lessons it should have learned from how the processes and practices of reporting healthcare associated infections dealt with the impact of potentially deficient features of the water and ventilation systems of the QEUH that had potentially adversely impacted patient safety and care.

1714. Viewed through the lens of the Remit and Terms of Reference of the Inquiry, some of the recommendations of the CNR, Oversight Board and Independent Review engage TOR 4, others (mainly related to Ward 2A/2B) engage TOR 7 and those that relate to the processes and practices of

reporting HAIs engage TOR 9.

1715. We concluded that a detailed investigation and review by the Inquiry of the implementation of all the local recommendations of the Oversight Board, the CNR and Independent Review had the potential to be of very wide scope, run a risk that the Inquiry might go beyond its remit, and incur unnecessary cost in terms of section 17(3) of the Inquiries Act 2005.

1716. The evidence of Professor McMahon and Ms Ward presented the AARG as a settled matter of the audit of policy implementation rather than dispute. They described a governance process that provided reasonable assurance that the recommendations had been implemented effectively, and that lessons had been embedded within NHS GGC's ongoing infection prevention and control and patient safety procedures.

1717. The difficulty with that analysis is that in light of the supplementary statement of Ms Ward[2968] that no-one in the AARG checked the version of the NHS GGC Incident Management Process Framework (Draft 1.3),[2969] that ARHAI would later discover was in breach of Chapter 3 of the NIPCM, it appears that the AARG was not in the practice of actually checking whether the new policy documents, SOPs and Frameworks produced by NHS GGC as part of its Action Plan complied with relevant regulations, guidance and good practice. They simply received 'assurance' that they did from the various presentations of Ms Grant, Professor Steele and Professor Wallace.

1718. There also seems to be a lack of understanding of the amount of assurance, review or audit of the rebuild process for Ward 2A/2B in 2021/2022 being provided to the Scottish Government by HPS and NHS Assure. Neither organisation was really set up to provide the high level of scrutiny of the water system that the public might be thought to expect at the time the building work was underway, and very little attention was paid to ventilation. The AARG was reliant on what NHS GGC told it.

1719. The consequences of this understanding are substantial. The AARG had little technical understanding of the material it was being presented with.

[2968] Glasgow 4, Part 3 - Witness Statements, Volume 8, Christine Ward, Document 2, Page 13.
[2969] Bundle 49, Document 32, Page 298.

When its members did have expertise in the case of the IPC Framework, they did not deploy it. Approval by the AARG does not mean that NHS GGC have implemented recommendations to a standard that would likely satisfy the members of the Oversight Board, the Independent Review or CNR, agencies like ARHAI, or relevant regulations, guidance and good practice. In reality less assurance can be gained from the work of the AARG than might have been hoped for; other than the fact that NHS GGC have presented plausible responses and actions in respect of all 108 recommendations. Real 'assurance' in respect of those recommendations that engage TORs 4, 7 and 9 will need to come in other ways.

8.5.4 Developments in the practice of HAI Reporting in NHS GGC

1720. We now know that during the AARG process Scottish Government saw a version of the NHS GGC IPC Framework that was not in compliance with Chapter 3 of the NIPCM.[2970] The issue of non-compliance was not understood by ARHAI until Angela Wallace gave evidence towards the end of the Glasgow 3 hearing. By that time the NHS GGC IPC Framework had moved to Version 2,[2971] and in due course ARHAI informed NHS GGC IPC that the additional stage set out in Paragraph 2.1 was the issue. We now know that NHS GGC acted relatively quickly to change the policy and introduced a compliant Version 3 from April 2025[2972]. Why this was not explained in Ms Devine's two subsequent statements to the Inquiry is mystifying. It also appears that no one in NHS GGC IPC thought it would be a good idea to tell ARHAI of this change.

1721. There was then the question of the four additional *Cryptococcus* cases in 2024. We discussed them in our Closing Statement following Glasgow 3[2973]. Unsurprisingly, ARHAI wished to investigate these and was ordered to do so by the HAI Policy Unit in the CNO's office. It took more than six months for the necessary information to get from NHS GGC IPC to ARHAI. As Professor Gardner explained, the reasons given for not providing the

[2970] Bundle 49, Document 32, Page 298.
[2971] Bundle 27, Volume 17, Document 28, Page 315 - Effective from December 2023.
[2972] Bundle 52, Volume 7, Document 61, Page 486.
[2973] CTI Closing Statement, Glasgow 3, Section 7.4, Page 699, Paras 544-548.

information were unreasonable. The motivations can be seen within the November 2024 SBAR[2974]. Some people in NHS GGC IPC do not like external (or internal) scrutiny and think they know better than those who wrote the NIPCM. It took an intervention, from the Medical Director of NHS NSS to the Medical Director of NHS GGC, for the data to be produced and direct intervention by the Director General for the new Chief Executive to fully, or even partly, appreciate the issue.

1722. We are now in a position where the clinical lead at ARHAI does not wish to answer, 'Yes' to the question 'Do you trust NHS GGC to report HAIs in compliance with Chapter 3 of the NIPCM?' and where the former CNO shares that concern[2975]. Clearly the two organisations have plans to address these issues, but this problem is not new. There have been issues with noncompliance with Chapter 3 of the NIPCM at NHS GGC (just within the QEUH/RHC) from soon after the hospital opened dating back to the Serratia M. outbreak in NICU in November and December 2015[2976].

8.5.5 Development of organisational culture in NHS GGC

1723. NHS GGC has provided the Inquiry with a large amount of material that suggests that its organisational systems and structures has changed. Two questions remain.

a. Firstly, to what extent is NHS GGC still run by an exceptions management system? How can the NHS GGC and the public of Glasgow and Clyde area have confidence that, when in the future major refurbishment or construction programmes are carried out, deficiencies or failings will be identified and will be reported upwards within the organisation so they can be addressed?

b. Secondly, can it truly be said that NHS GGC encourages members of staff to disclose evidence of wrongdoing or failures in performance or inadequacies of systems, when it was willing to take the approach, it has

[2974] Bundle 52, Volume 5, Document 32, Page 148.
[2975] Transcript, Laura Imrie, 26 September 2025, Page 44, Column 83 and Transcript, Fiona McQueen, 2 October 2025, Page 89, Column 173.
[2976] Bundle 4, Document 9, Page 26 and Bundle 3, Document 3, Page 15.

taken to Dr Redding, Dr Peters and Dr Inkster.

1724. There is an argument that Professor Steele has significantly changed the Estates function within NHS GGC. It is not insignificant that actions to address the problem of microbial proliferation in the water system appear to have been successful. It is also important that Mr Poplett's AE Audits of the management of water and ventilation systems were very positive. The difficulty is that, in respect of the ventilation system, no risk assessment has been carried out for the general wards. The reluctance to do this raises a continued question about the willingness of senior managers to ask difficult questions of their buildings and their organisation.

1725. There is then the question of whether the IPC team is willing to listen to the views of others. That is tied up in the response of Mr Walsh, Ms Devine and others to challenge from Dr Redding, Dr Peters and Dr Inkster, but it is not just them. The number of occasions on which potentially significant environmentally relevant HAIs have not been reported to HPS/ARHAI tends to suggest that unwillingness to listen to others extends rather more widely.

1726. We recognise that the formal position of NHS GGC is that we are wrong to broadly accept the evidence of Dr Redding, Dr Peters and Dr Inkster, but we maintain the position set out in our Closing Submissions following Glasgow 3,[2977] and go on to develop it in the next chapter. Fundamentally, however, once the situation is reached (as it is now) that most witnesses accept that the concerns raised about the water and ventilation systems and the IPC response were valid and substantially accurate, then that needs to be acknowledged at formal level by the NHS GGC Board in order for future whistleblowers to have confidence that they will be heard and not suffer the same attacks as occurred in this case. The NHS GGC Way Forward Improvement Plan will not be effective, if a future 'whistleblower' can simply look back at the way others were treated and conclude, ’why put your head above the parapet’ as Professor Leonord told Dr Peters[2978].

[2977] CTI Closing Statement, Glasgow 3, Section 10.2, Page 777.
[2978] Transcript, Professor Leanord, 9 October 2024, Page 26 and Glasgow 3 - Witness Statements, Volume 4, Dr Christine Peters, Page 124, Para 56.

9. CHAPTER 9 – DISCUSSION ON THE TERMS OF REFERENCE

9.1 Introduction

1727. This Chapter is intended as a succinct statement of proposed responses to the Terms of Reference. It is not possible - nor would it be helpful - to include every detail here. That detail will be found elsewhere in these closing submissions.

9.2 The Inquiry Remit

> "The overarching aim of this Inquiry is to consider the planning, design, construction, commissioning and, where appropriate, maintenance of the Queen Elizabeth University Hospital Campus (QEUH), Glasgow. The Inquiry will determine how issues relating to adequacy of ventilation, water contamination and other matters adversely impacting on patient safety and care occurred; if these issues could have been prevented; the impacts of these issues on patients and their families; and whether the buildings provide a suitable environment for the delivery of safe, effective person-centred care. The Inquiry will make recommendations to ensure that any past mistakes are not repeated in future NHS infrastructure projects. The Inquiry will do this by fulfilling its Terms of Reference*".*

1728. References to the RHCYP/DCN Edinburgh are omitted here, and from the Terms of Reference set out below. The issues are covered in the Inquiry's Interim Report dated 3 March 2025.[2979]

1729. The Remit states it will be met by fulfilling the Terms of Reference. As discussed in Chapter 1, the essence of the task facing the Inquiry is to focus on "issues relating to adequacy of ventilation, water contamination and other matters adversely impacting on patient safety and care," and then to understand what those issues were, whether they impacted on patient safety and care and/or on patients and their families and resulted in buildings that, to any extent, did not provide a suitable environment for the delivery of safe, effective, person-centred care.

[2979] Scottish Hospitals Inquiry Interim Report - The Royal Hospital for Children and Young People and Department of Clinical Neuroscience, Edinburgh, 3 March 2025.

9.3 Term of Reference 1

> *"*To examine the issues in relation to adequacy of ventilation, water contamination and other matters adversely impacting on patient safety and care which arose in the construction and delivery of the QEUH; and to identify whether and to what extent these issues were contributed to by key building systems which were defective in the sense of:
>
> A. Not achieving the outcomes or being capable of the function or purpose for which they were intended;
>
> B. Not conforming to relevant statutory regulation and other applicable recommendations, guidance, and good practice."

1730. We deal with ventilation and water separately.

9.3.1 The impact of potentially deficient features of the water system

A. In the sense of not achieving the outcomes or being capable of the function or purpose for which it was intended.

1731. TOR 1 refers specifically to "water contamination". The issue of whether water contamination at the QEUH adversely impacted on patient safety and care, was originally considered through the lens of Key Question 1 and was discussed in Chapter 7.1 of the Closing Statement following Glasgow 3[2980]. In light of further evidence in the Glasgow 4 hearings, this needs to be revisited.

1732. Firstly, as discussed in Chapter 4, nothing turns on whether it is technically correct to call what was found "contamination" or "microbial proliferation". Those who reacted to the 'Water Incident' had no difficulty understanding what they found. Terminology should not constrain the Inquiry from addressing this Term of Reference.

1733. The domestic water system that was designed and installed ought to have been capable of performing the function for which it was intended i.e. to provide a safe and effective water system for the new hospital. There is one qualification: the scale and complexities of the designed system made

[2980] CTI Closing Statement, Glasgow 3, Page 549.

reliance on thermal disinfection challenging, and it may be that chemical dosing ought to have been considered and/or deployed from the outset.

1734. That the water system not achieving the intended outcomes was a result of a combination of potentially deficient features already identified.

a. Early filling of the system by the contractors created challenges for the delivery of a safe system.

b. Open pipe ends ought to have been reduced or eliminated as they created risks of introducing contamination.

c. Reliance on sample test results prior to handover as a determiner of water system safety gave unjustified assurance.

d. The use of a bypass pipe to fill the system with unfiltered water.

e. The installation of Horne Optitherm taps, without the necessary thermal disinfection procedures as part of essential maintenance.

1735. The key contribution to the water system not achieving the outcomes intended, was the failure to follow through the recommendations of the 2015 DMA L8 Risk Assessment - until the report 'emerged' in 2018. (That Report also recorded other issues with the system such as dead legs). The failing was eminently avoidable.

1736. The consequence was that the widespread contamination, found during the 'Water Incident' in spring 2018, may well have originated prior to handover in the early filling or contamination from open pipework. In any event the failure to effectively manage the system in a manner that would reduce, rather than increase, the risk of biofilm growth or microbial proliferation both before and after handover, and in total for a period of up to five years, likely created a water system that grew the *Pseudomonas* and gram negative bacteria found in the water system in the early months of 2018.

B. In the sense of conforming to relevant statutory regulation and other applicable recommendations, guidance, and good practice

1737. NHS GGC was responsible for managing the water system of the hospital

from handover in conformity with L8, HSG274, the Health and Safety at Work Act 1974 and the healthcare specific standards of HTM 04-01: Part B. It entirely failed to do that for nearly the first four years of the operation of the hospital.

1738. Failures to conform with these standards include:

a. Lack of a site-specific Water Safety Group and Water Safety Plan or Written Scheme for the new build QEUH/RHC from handover.

b. Lack of an Authorising Engineer (Water) and Authorised Persons (Water) for the new build QEUH/RHC from handover.

c. Lack of a comprehensive PPM schedule and system for the new build QEUH/RHC from handover.

d. A failure to adequately resource the Estates Team at the QEUH/RHC from handover.

e. The comprehensive failure to action the 2015 DMA Canyon L8 Risk Assessment.

1739. In TOR 3E, responsibility must ultimately fall on Mr Calderwood (as Chief Executive and Duty Holder), both Co-Chairs of the Board Water Safety Group (Ms Mary-Anne Kane and Mr Tom Walsh), and Mr Alan Gallacher as General Manager (Estates) with board wide responsibility for compliance and the appointment of authorised persons. In respect of the DMA Canyon L8 Risk Assessment report, the immediate responsibility to action the report once he had received it on 6 May 2015 lay with Ian Powrie, and those beneath him in the Estates' hierarchy. However, the failure to provide that team with adequate resource to carry out the functions required of them after building handover is the responsibility of the wider system. In addition, others e.g. Mary Anne Kane or David Loudon, either knew or should have known of the need for such a report to be carried out and then actioned. The NHS GGC system did not lead to any intervention to ensure that that happened. To that extent, pointing the finger solely at Mr Powrie or his subordinates would be unfair. Mr Powrie was overworked and was not provided with sufficient staff. It is not clear what training Ms Kane and Mr Walsh, and the other members of

the board Water Safety Group actually had. Whilst ultimately, the failing was institutional, all of these individuals had it in their power to call out this problem in 2015. They did not.

9.3.2 The impact of potentially deficient features of the ventilation system

1740. The issue of whether various potential deficient features of the ventilation system of the QEUH adversely impacted on patient safety and care was originally considered through the lens of Key Question 2 and was discussed in Chapter 7.2 of the Closing Statement following Glasgow 3[2981]. In light of further evidence in the Glasgow 4 hearings this needs to be revisited.

1741. In a broad sense the ventilation system could provide ventilation to the hospital. However, large parts of the system did not comply with the guidance set out in SHTM 03-01 (2009) Draft, which was the standard that NHS GGC chose (in a section listing compulsory guidance in the ERs) to apply to the hospital. To that extent, it is uncontroversial that the ventilation system of the QEUH, as built, did not conform to relevant applicable recommendations, guidance, and good practice. The full extent of the potentially deficient features of the ventilation system, and how it did not conform with guidance, has been set out in Chapter 7.

1742. The potentially deficient features of the ventilation system differ between the different wards and rooms, as unlike the water system this is not a single system. It is important to note that in different spaces those features can include:

a. Lack of HEPA filtration as recommended by SHTM 03-01.

b. Lack of pressure differentials recommended by SHTM 03-01.

c. Air change rates less than recommended by SHTM 03-01.

d. The absence of back up air handling units or other similar precautions against failure.

e. The use of wards or rooms without validation of the ventilation system to

[2981] CTI Closing Statement, Glasgow 3, Page 583.

standards such as SHTM 03-01.

f. The use of PPVL rooms (in any event not built conform to guidance) to accommodate immunosuppressed or infectious patients.

g. The presence of CBUs in locations not suited for their use.

h. Failure to seal rooms where required for pressure retention; and

i. Failure to have appropriate pressure monitoring systems.

1743. It is striking that, in its Closing Statement following Glasgow 3, NHS GGC focused its critique of our analysis of the safety of ventilation systems of the QEUH, on whether there was an evidential basis for the impact of rate of ACH on effectiveness of infection prevention and control i.e. on the question of whether air change rates themselves have any direct impact upon rates of infection[2982]. There is a lot more to the potentially deficient features of the ventilation system to consider.

1744. Since the Glasgow 3 hearing, the Chair has reached conclusions on ventilation in healthcare premises in Chapter 5 of the Interim Report. We do not propose that these be revisited. We acknowledge that infection control is multifactorial and that absence or presence of certain features of the ventilation system must be considered along with the nature and vulnerability of the patients accommodated, in order to assess the risks that a particular ventilation set-up might pose to certain patients.

1745. In Chapter 5 of the Interim Report the Chair reached some key conclusions:

> 5.32. It is difficult to correlate a particular air change rate with a particular level of risk, but a high air change rate within a particular space is a means of minimising the contact of patients with pathogens by increasing the rate at which the concentration of air-borne contaminants is diluted and therefore reducing the risk of infection. It therefore follows that a numerically significant reduction of air change rate (4 ac/h rather than 10 ac/h, for example) will bring with it an increase in the risk of infection to relevant patients.

[2982] Glasgow 3 - Core Participants' Closing Submissions, NHS Greater Glasgow and Clyde, Document 4, Page 53.

> 5.33. When considering the utility of an enhanced air-change rate as a means of infection prevention and control, regard must be had to how the quality of air within a particular space comes to be as it is. If the object is to protect vulnerable patients from opportunistic air-borne pathogens present in the external environment, a means of doing so is to accommodate such patients within spaces that are, as far as is practicable, sealed off from that external environment (protective isolation). Exclusion of pathogens from the air within these spaces can be achieved by HEPA filtration of the mechanical supply together with maintaining a positive pressure to the outside in order that air will leak out rather than in. Where, by these means, potentially harmful micro-organisms are excluded from, for example, a bedroom, an enhanced air-change rate may have nothing further to contribute to preventing the infection of the patient accommodated in that bedroom from micro-organisms carried into the bedroom by the mechanical air supply. However, even where provision for the protective isolation of a space has been made by a combination of HEPA filtration and a positive pressure differential to the outside, an enhanced air change rate within the space will have a role in increasing the rate of dilution of potentially harmful micro-organisms which have been introduced into the protected space by means other than the mechanical air supply, for example by the entry and presence of members of staff or visitors

1746. The issues in relation to adequacy of ventilation referred to in TOR 1 are significantly more complex at the QEUH/RHC than RHYCP. However, by application of the principles of risk management described in Chapter 3, it is submitted that the Chair can reach conclusions in respect of a number of key locations in the hospital, where it is clear that the ventilation systems did not conform with relevant guidance in SHTM 03-01 (2009) Draft, but where the issue is the extent to which they can be said to have adversely impacted on patient safety and care.

Lack of Validation of the Ventilation System

1747. The ventilation system of the QEUH/RHC outside operating theatres was not validated before patients moved in. In our submission, the Chair should adopt the opinion of Dr Agrawal[2983] that it would be unsafe - due to the unknown nature of any risk - to open a new ward that had a ventilation system that had

[2983] Transcript, Dr Samir Agrawal, 22 August 2025, Pages 106-107, Columns 208-209.

not been validated. This assessment is ultimately a precautionary response, and clinical need may justify the operation of a ward or facility with an unvalidated ventilation system, but to do so becomes a question of assessing and mitigating risks.

General Wards

1748. The ventilation system for general wards provided air change rates of around three per hour compared to the six per hour recommended in SHTM 03-01 and HTM 03/01 with chilled beams. That introduced unnecessary risk to patient safety and care, although, given the wide range of patients treated in general wards, the extent of that risk cannot be readily assessed. A patient who turns out to have a respiratory problem, but who is visited by a family member with undiagnosed influenza, or a patient who turns out to have a suppressed immune system due to undiagnosed cancer in similar circumstances, will be more at risk from the diminished dilution afforded by lower ACH than the orthopaedic patient who has a bad leg break. The permutations are endless.

1749. However, risks will become more serious when the patient accommodated is immunocompromised. The risks to such patients of contracting *Aspergillus* and *Cryptococcus* infections if accommodated in the general wards is discussed at the end of Chapter 4. As we explained there, whilst the likelihood of such infections may well be on the low side, given the severe consequences to such patients and a number of known or suspected deaths with a connection to *Aspergillus* and *Cryptococcus* infection, the rooms in the general wards in the hospital are unsafe for them. As a consequence, this risk requires to be acknowledged by NHS GGC, subjected to a rigorous risk assessment and mitigated by appropriate policies and potentially the conversion of more PPVL rooms to PPIR.

1750. We have investigated at some length the decision in 2014 to move the infectious diseases unit into two general wards. It seems entirely possible that that decision was made in ignorance of the limitations of the ventilation systems in general wards. Once the issue became appreciated, policies were set up in 2015 to ensure that highly infectious patients were treated

elsewhere. In one sense there is nothing wrong with that. However, it is somewhat concerning that awareness of these policies was sufficiently limited to result in the issue being raised in 2016[2984], in the 4 October 2017 SBAR[2985] and by a whistleblower in December 2019[2986]. Policies and protocols can manage risks from these low air change wards. They have to be well communicated. It is not immediately clear that that was fully the case between 2015 and 2020.

1751. A final codicil. As discussed in Chapter 7, the minimum standard for provision of air for a single room in the building regulations is eight litres per second per person. The Agreed Ventilation Derogation permitted Multiplex to build a hospital where each of the 1,300+ single rooms had air delivered at 40 litres per second. Put more than five people in one of those rooms and the air supply drops below that required by the building regulations. It must be possible that in some wards more than five people are in single rooms during visiting hours, providing treatment or during rounds. There is a clear risk of non-compliance with regulations.

The Schiehallion Unit (Wards 2A and 2B, RHC)

1752. The ventilation systems for Ward 2A were not constructed in accordance with the needs of the unit and created unnecessary risks to patient safety and care until remedied. The IDS Report[2987] is the simplest source to find a detailed list of failings, but we have narrated them in detail in Chapter 7.

1753. The BMT Isolation rooms provided were PPVL rooms not suitable for the patient group giving rise to a risk potentially impacting on patient safety and care. The balance of the ward clearly had a materially worse ventilation system than that provided in the equivalent space at Yorkhill. When the patients moved in, nobody understood that. It took years of investigation, often by Dr Peters, for the full flaws to become clear.

1754. It is not possible to know whether the ventilation system in the Schiehallion

[2984] Bundle 14, Volume 1, Page 88 and Glasgow 3 - Witness Statements, Volume 7, Dr Teresa Inkster, Document 1, Page 115, Para 337.
[2985] Bundle 4, Document 19, Page 104.
[2986] Bundle 27, Volume 5, Document 13, Page 32.
[2987] Bundle 6, Documents 33 and 34, Pages 656 and 674.

Unit directly caused infections. However, it is unreasonable to conclude that it did not impact on patient safety and care. Of course, JACIE does not require these high standard ventilation systems for such units, but NHS GGC had decided long ago that there should be a ventilation system equivalent to or better than that of a 'neutropenic ward' in Appendix 1 of SHTM 03-01. The system fitted did not achieve the outcomes of the function or purpose for which it was intended and did not conform to guidance set down by in SHTM 03-01 or the practice previously followed by NHS GGC.

Adult BMT Ward (Ward 4B QEUH)

1755. At handover the ventilation systems Ward 4B were substantially less effective than those which had been provided at the Beatson. As we explain in Chapter 7, the ventilation system in this ward was not in conformity with the standard set down for a 'neutropenic ward' in Appendix 1 of SHTM 03-01. The 2015 HPS SBAR[2988] most conveniently sets out the desired environment. As the clinicians and the hospital management acknowledged in July 2015, keeping those patients in Ward 4B prolonged unnecessary impacts on patient safety. The ward was then so unsafe that senior clinicians were prepared to return to the Beatson, without access to the necessary critical care and high dependency beds that had prompted the decision to move them to the new hospital in the first place. The Options Appraisal,[2989] in 2017, records the ongoing risk caused by not meeting the desired specification.

Haematology and Renal Ward (Ward 4C QEUH)

1756. In 2009 Dr Hood, and those preparing the COS for the South Sector haematology ward previously in Ward 24 SGH, clearly considered that questions of safety justified (in the early COS for 4B[2990]) a protective environment - including HEPA filtration and 10 ACH/10 pascals of positive pressure. That was not provided at handover in Ward 4C.

1757. NHS GGC is now keen to argue that the nature of the patient cohort in the South Sector haematology ward does not justify the full panoply of a

[2988] Bundle 20, Document 81, Page 1656.
[2989] Bundle 20, Document 51, Page 958.
[2990] Bundle 16, Document 15, Page 1595.

ventilation system for a 'neutropenic ward' in Appendix 1 of SHTM 03-01. A risk assessment was ultimately carried out by NHS GGC in February 2020 in respect of the ventilation for this ward,[2991] which evaluates the risk of infection with airborne pathogens as a medium risk that is considered acceptable.

1758. That assessment was carried out after the recalibration of the pressure differentials between rooms and corridor, the replacement of F7 secondary filters within the AHUs serving the ward with a higher grade F9 filter to improve the source air quality, and the fitting of HEPA filtered air scrubbers in the ceiling voids of the ensuites in all 28 patient rooms. That risk assessment also strongly recommends the prescribing of anti-fungal prophylaxis to all high-risk patients.

1759. In our submission, it is inevitable that the risk of infection with airborne pathogens would have scored higher before these interventions. A conclusion that handover patients in Ward 4C were exposed to a high risk of infections from airborne pathogens (high being higher than medium in the risk matrix), would be consistent with the original decision of NHS GGC to specify the COS. This has further significance in that the principal author of the COS was Dr Hood, who is routinely quoted by NHS GGC (albeit often out of context) as a preferred source of expertise in this field.

1760. Of course, it is argued by NHS GGC that in the United Kingdom many haematology units that do not carry out BMT, do not have HEPA filtration, strong pressure differentials and high air change rates. That may be true; although the argument relies on Dr Agrawal who never visited the hospital, and his own unit is not run in the way NHS GGC appears to run theirs.

1761. In our submission at handover the ventilation system of Ward 4C clearly impacted on patient safety in that patients were exposed to a risk of infection by airborne pathogens that was higher than it is currently assessed after a series of interventions.

Ward 6A QEUH

1762. At handover Ward 6A accommodated adult patients. The risk they were

[2991] Bundle 20, Documents 61 and 62, Pages 1420 and 1428.

exposed to was no different from other general wards. However, on 26 September 2018, the patients from the Schiehallion Unit were decanted into Ward 6A. In January 2019, for a short period, they were further decanted to CDU. The ventilation for these spaces suffered from the same flaws as Ward 2A outside the BMT rooms. The impact on patient safety was the same. Care was inevitably compromised. The facilities provided for the children and young people were not available. The day case unit was accommodated in the same space. These impacts were a direct consequence of the way the hospital was built.

Paediatric Intensive Care Unit ('PICU')

1763. It is a testament to the complexity of the ventilation systems at the QEUH/RHC, that relatively little attention has been paid by the Inquiry Team to PICU. Under SHTM 03-01 (2014) this was a critical care area (as discussed at length in the Interim Report). However, as described in Chapter 7, at handover PICU had air change rates well below what was required by SHTM 03-01 (Draft 2009). We assume that at times immunocompromised patients were accommodated in PICU. We know from admissions and occupied bed day data supplied to the Inquiry, and BSI data sets supplied to the Inquiry and the HAD Authors, that paediatric haemato-oncology patients were. It would be wrong to say there was no impact on their safety from the ventilation system originally installed. The true extent of the impact is probably impossible to determine.

Isolation Rooms

1764. The original - and erroneous - provision of all PPVL rooms (and rooms not constructed to recommended design) meant that the original rooms created a non-assessed risk generally, as well as being unsatisfactory for both ID and BMT use.

Responsibility

1765. Responsibility for the Agreed Ventilation Derogation must fall on the senior members of the Project Team for accepting it, on Mr McKechnie for advising them to accept it, and on those who approved the removal of the maximum

temperature variant without considering the implications. Responsibility for reducing the role of Currie & Brown must be shared by the Project Team and the ASSB, none of whom seemed to understand the possible implications.

9.4 Term of Reference 2

> "To examine the arrangements for strategic definition, preparation and brief, and concept design, including the procurement, supply chain and contractual structure adopted for the financing and construction of the buildings, to determine whether any aspect of these arrangements has contributed to such issues and defects."

1766. This Term of Reference uses a range of the broad terms. If concept design is intended to mean the broad outline of what the new hospital would look like and if procurement and supply chain are given their usual meanings, it is difficult to conclude that they contributed to the issues at the new hospital. However, if 'procurement' is taken to have a wide meaning covering the whole process of procuring the hospital then matters are very different.

NEC3 and Design and Build

1767. The selection of NEC3, a contract with which few (if any) participants were familiar, clearly did not assist. A failure to ensure that all participants had a clear understanding of the operation of a design and build contract, and the extent to which ERs could be altered, and by whom, is closer to a significant contributing factor. Provisions for the challenging task of 'ensuring' the ERs were met were inadequate. The implications for maintenance and estates of the shift from PFI to traditional contracting were not adequately understood or provided for.

1768. While the initial definition phase, in particular the creation of COSs and ERs, was clearly successful on most issues, it was not successful in every case. Providing a list of guidance documents the following of which is said to be compulsory, is of little value unless systems are in place to ensure that precisely that happens and / or if it is not then departures are prominently flagged, risk assessed and approved at appropriate levels. In addition, that the COS process was not entirely successful is best illustrated by the COS for Ward 2A which says little about the protective environment required (and

which was prepared without any input from senior clinicians, including Professor Gibson).

1769. In addition, the failure to notice that the ER's provision for isolation rooms bore no relation to a discussion only a month later by infection control of appropriate isolation rooms for various areas in the adult hospital, demonstrates a clear failure of process.

1770. Though not within the concept design label, the most significant contribution to the unsatisfactory result was undoubtedly the failure of the subsequent design process to identify, and respond to, any failures in the contractor's design (it being common ground that design responsibility rested with the contractors, represented by the specialists ZBP) to meet either intended ward requirements or even general requirements such as SHTM 03-01.ie to 'ensure' that it was the ERs which were delivered.

1771. The unsatisfactory process for, and recording of, the change in the maximum temperature variant and the ventilation derogation (and the failure to apply risk assessment to either of these) can fall under this head (as can a failure to understand the implications in the change of role of Currie & Brown).

9.5 Term of Reference 3A

> "Whether the Boards of NHS Greater Glasgow and Clyde and NHS Lothian put in place governance processes to oversee the projects and whether they were adequate and effectively implemented, particularly at significant project milestones;"

1772. That the hospital was delivered broadly on time and on budget is an achievement which must be recognised. There is no doubt that NHS GGC put in place governance processes to oversee the project. There was also no doubt that in a variety of respects these processes were ineffectual.

1773. None of the efforts to inject external expertise (whether from PUK, Scottish Government or Mr Winter), were successful in identifying the issues which have troubled the Inquiry. No change control process was in place. Issues such as the change in the maximum temperature, the ventilation derogation or the standing down of the shadow technical team were not risk assessed or

properly understood. The first two of these were not reported outwith the Project Team. There was no system of 'Assurance' with 'three lines of defence,' as James Stewart, formerly of PUK, described[2992].

1774. Communications were largely dependent on informal communication from the Project Team, and on the level of understanding of complex issues by those to whom the communications were made.

1775. It is extraordinary that the Agreed Ventilation Derogation, leading to more than thirteen hundred hospital single rooms being built not in accordance with guidance adopted throughout the UK, was not known by anyone arriving in the new hospital. That goes to illustrate the point that, neither at contract signature nor at the close of the design process, were the governance systems effective.

9.6 Term of Reference 3B

> "Whether operational management provided by the Board of NHS Greater Glasgow and Clyde was adequate and effective for the scale of such infrastructure projects."

1776. The main operational management tool was the Project Team, and those instructed to assist and advise them. With the benefit of hindsight, neither adequate nor effective are words which naturally come to mind. For a project of this enormous scale and complexity, perhaps the largest hospital building project in Europe at the time, to be managed by in-house project managers was more than ambitious. The Inquiry has not heard from everyone in the team, but based on the available material, the Project Team was inadequate for the task, lacked necessary technical skills and experience and derived such experience they had from the area of healthcare administration. Those who were said to have backgrounds in construction fields (such as Helen Byrne as Senior Responsible Owner), clearly did not have the level of skills that some had thought. All members of the Project Team who gave evidence in either oral or statement-only form appear, to some degree, to either lack insight into this issue or to have failed to raise the problem at the time.

[2992] Transcript, James Stewart, 18 September 2025, Page 10, Column 16 onwards.

1777. It is possible that this lack of experience and knowledge would not have been critical, had supporting external specialists been adequately deployed. However, the shadow design team supporting Currie & Brown was stood down following the change of contract form. Given the impact of the Agreed Ventilation Derogation, it is particularly striking that through Stage 2 and Stage 3 of the design and construction of the hospital, the NHS GGC Project Team operated entirely without specialist water or ventilation engineering advice. By that time Currie & Brown's role was limited, and they did not have specialist knowledge in areas such as M&E design. Given the number of time Mr Hall's signatures appeared on drawings, it is understandable that the less experienced members of the Project Team and those on the Multiplex side of the contract failed to understand what had happened. If, as he explained, Mr Hall told everyone of the limits of his role (and that of Currie & Brown) to compliance with clinical functionality, it is strange that no-one appears to have understood that. Capita were assumed by many to be the assurance arm of the project but were not actually 'called upon' to take up that role, nor provided with the information which would have enabled them to carry out the task of 'ensuring' that the ERs were met. Of all the failings this is the most significant.

9.7 Term of Reference 3C

> "The extent to which decision makers involved with the projects sought and facilitated the input and took account of the advice and information provided by, or available from, the clinical leadership team; infection control teams; estate teams; technical experts and other relevant parties to ensure that the built environment made proper provision for the delivery of clinical care;"

1778. The experience available within the Project Team and the use of external technical experts are dealt with under TOR 3B above.

Clinical Leadership Team

1779. Once the ERs had been set, it would appear that the Project Team did not involve the clinical leadership team of NHS GGC in the technical matters related to the water and ventilation system that are of interest to the Inquiry.

1780. In respect of the clinical leadership teams of individual services, systems may

have received involvement over issues like ward layout, but otherwise involvement was patchy. The inconsistent nature of COSs and the failure to incorporate the outcome of the 18 May 2009 IPC meeting about the specialist ventilation requirements of adult hospital isolation rooms, into ERs, suggests a lack of interest on the part of the Project Team and the committees and boards to which it reported in ensuring that available clinical advice was taken at all times.

Infection Control Teams

1781. The arrangements to provide support from IPC (regarded as an enormous improvement on previous projects because of the allocation of an ICN) do not seem to have secured effective contributions from anyone in IPC with requisite knowledge of issues like ventilation.

1782. As discussed in Chapter 6, the two parts of SHFN 30 should have provided a framework by which the infection control implications of the procurement of new health service buildings and facilities are properly understood and managed. It may be that the 2014 versions of these documents do that, but the 2007 versions were insufficiently clear. Section 3 of SHFN 30 (2007) identified the different roles in the project team by reference to the Scottish Capital Investment Manual (SCIM), when read with HAI-SCRIBE (2007) they set out a multistage process by which IPC risks could be managed at the stages of site selection, design and planning, construction and handover. The only difficulty is that no one followed that process.

1783. We know that members of the project team knew about the relevance of HAI-SCRIBE. In 2010 Ms Stewart produced a Stage 2 HAI-SCRIBE and in 2013 Mr Calderwood asked whether there was an HAI-SCRIBE. Although Ms Stewart's HAI-SCRIBE was inadequate, she and Mr Calderwood at least raised the issue. Neither of them can be taken to have truly understood what was required. The decision to appoint an ICN with no technical experience of water and ventilation systems to the Project Team, and then leave her substantially un-supported, was a major mistake, and responsibility must lie with the ICM, the IPC Nurse Consultant and the Lead ICD.

1784. Although responsibility to effectively run the HAI-SCRIBE process is not

properly allocated in SHFN 30 (2007), in our view it must lie with the Senior Responsible Owners (Ms Byrne and Mr Calderwood) and the Project Manager, Mr Seabourne. To some extent the issue may be lack of experience; Mr Seabourne had last managed a significant construction project well before SHFN 30 and HAI-SCRIBE were introduced in 2002, and Ms Byrne's professional background was south of the border where different systems operate. Surprisingly, the ICM, Lead ICD or Lead ICN made little effort during Stage 2 and Stage 3 to check that the Project Team were following HAI-SCRIBE. Had they done so the absence of the necessary documentation would have been immediately apparent.

Estates Teams

1785. The attempt to insert Mr. Powrie from Estates into the Project Team was unsuccessful. He was regarded as unhelpful, and to be sidelined where possible. As has been pointed out by more than one witness, it would undoubtedly have been helpful to have had much greater involvement on the part of the Estates teams, who were going to face the task of maintaining the hospital.

9.8 Term of Reference 3D

> "Whether the organisational culture within the Boards of NHS Greater Glasgow and Clyde … encouraged staff to raise concerns and highlight issues in relation to the projects at appropriate times throughout the life cycles of the projects;"

1786. Substance is more important than form. On paper the answer to this question should be positive, in reality it is not. Taking an overall view, NHS GGC was defensive, concerned as to its own reputation and the perception of its position, and focused on compliance with process. An illustration may assist. For a NHS GGC senior official to contentedly accept[2993] that, when he became Chair of the IMT, the emphasis shifted (as a clinician[2994] had suggested) from trying to find out what the problem was, to establishing that it was not the fault of the hospital, points to the challenge. In addition, the

[2993] Transcript, Professor Alistair Leanord, 9 October 2024, Pages 8-10, Columns 12-15.
[2994] Glasgow 2 - Witness Statements, Professor Brenda Gibson, Document 1, Page 56, Para 227.

treatment of those who did raise concerns speaks for itself.[2995] 'Encouraging' is not an appropriate description. Understanding how the organisation operated is well illustrated by what was described as a well-intentioned comment[2996] to Dr Peters about why you would not put your head above the parapet - because it would be a difficult road. (Mr Best's repetition several times in his witness statement[2997] of his preference for following due process, is a good illustration of the general corporate culture that subordinates - even those with technical expertise - should follow standard reporting lines, even when their concerns are being ignored).

1787. A further issue with the organisational culture of NHS GGC was illustrated by the approach, spoken to by Mr Calderwood, of 'exception reporting'. That relies on the next layer down in management raising a problem with the layer above - and proceeds on the basis that if they do not, all is well. Accordingly, if the individual below is too uncommitted or intimidated or worried or simply does not understand there is a problem in the first place, it never gets escalated. That is entirely unsatisfactory - and all the more surprising given what effectively amounts to the same criticism in the VOLHI[2998]. Questioning and checking should be the order of the day.

9.9 Term of Reference 3E

> "Whether failures in the operation of systems were a result of failures on the part of individuals or organisations tasked with specific functions".

1788. Most failures can be attributed to a system, rather than individuals. For instance, if Capita's inspections appeared inadequate, that was probably because they were not tasked with obtaining, understanding and checking against, the ERs. We have set out criticisms of certain "individuals or organisations tasked with specific functions" we consider justified in the section of this Chapter that deals with the particular term of reference that is engaged.

[2995] It is discussed with reference to TOR4 later.
[2996] Transcript, Dr Christine Peters, 11 September 2024, Page 78, Column 152.
[2997] Glasgow 4, Part 3 - Witness Statements, Volume 1, Jonathan Best, Document 6, Pages 157-158, Qs44 and 47; Transcript, Jonathan Best, 19 August 2025, Page 100, Column 196.
[2998] VOLHI Report, Chapter 15, Section 15.8, Bundle 51, Volume 1, Document 2, Page 523.

1789. The most significant failures were systemic. Much of the failure of the procurement of the new SGH can be placed at the door of the management culture (described in respect of TOR 3D), the failure to appoint a Project Team who had experience of procurement of a large hospital under a design and build contract (described in respect of TOR 3B), and the mystifying decision to stand down NHS GGC's own technical team. If you do not know what you are doing, and you do not realise you do not know what you are doing, you are going to make mistakes.

1790. Whether due to the emphasis on finding solutions and moving forward (rather than investigating the past) mentioned by Professor Brown[2999] or otherwise, it is striking that, in a project beset with problems, the Inquiry heard no evidence of any individual ever being disciplined, in the sense that failure was identified and consequences followed. 'Held to account' was a much-used phrase, but evidence of consequences was absent. It is effectively meaningless.

9.10 Term of Reference 4

> "To consider whether any individual or body deliberately concealed or failed to disclose evidence of wrongdoing or failures in performance or inadequacies of systems whether during the life of the projects or following handover, including evidence relating to the impact of such matters on patient care and patient outcomes; and whether disclosures of such evidence was encouraged, including through implementation of whistleblowing policies, within the organisations involved."

1791. This is a complex term of reference. It addresses two related, but separate, issues which we will initially address individually:

a. deliberate concealment or failure to disclose; and

b. whistleblowing.

9.10.1 <u>Deliberately concealment or failure to disclose.</u>

1792. There are five candidates for deliberate concealment or failure to disclose.

[2999] Transcript, Professor John Brown, 3 October 2024, Page 31, Column 58.

Concealment or failure to disclose the Agreed Ventilation Derogation

1793. We submit that the evidence of Mr Seabourne on this topic should be rejected. The Project Team did not disclose the Agreed Ventilation Derogation to the Executive Board or the Performance Review Group. That meant that those committees did not know of planned inadequacies of the ventilation system.

1794. Mr Seabourne did not disclose it to Mr Loudon when he replaced him. On a strict view it was not concealed, as it was in the M&E Clarification Log, but those trying to operate the new hospital did not know it was there. Although a slight simplification, it was not until the Lead ICD started asking questions in 2016 that its existence was reported in Mr Powrie's email to Dr Inkster, copied to Mr Loudon, Ms Harkness and Mr Walsh of 26 May 2016[3000]. Responsibility lies with Mr Seabourne.

1795. It seems clear that the Project Team gave incorrect answers to questions around ventilation and validation at and after handover. It is difficult to say that any directly impacted on patient care or outcomes, unsatisfactory though they were.

Concealment or failure to disclose the DMA Canyon L8 Risk Assessments

1796. The 2015 DMA Canyon L8 Risk Assessment set out detailed evidence of failures in performance or inadequacies of the domestic water system of the QEUH/RHC.

1797. In their Closing Statement following Glasgow 3, NHS GGC made the submission that, "at no time was the existence of the DMA Canyon report concealed by Mr Powrie or by NHS GGC"[3001]. That was not the submission we advanced[3002]. Whilst those who knew about the DMA Canyon L8 Risk Assessment did not 'conceal' its existence, no member of the Estates Team who knew of the report (including Mr Powrie) raised it at the meeting of the

[3000] Bundle 20, Document 68, Page 1495.
[3001] Glasgow 3 - Core Participants' Closing Submissions, NHS Greater Glasgow and Clyde, Document 4, Page 50, Para 49.
[3002] CTI Closing Statement, Glasgow 3, Chapter 3.1, Page 32, Para 22 and Chapter 6.1, Page 529, Para 16.

WTG in April 2018, when the widespread nature of contamination of the water system was apparent[3003]. It also seems probable that questions by Dr Inkster in 2016 about whether there had been water risk assessments for the hospital were not answered in the affirmative[3004]. There was a failure to report to the Lead ICD and the WSG that these risk assessments existed. The consequences are discussed elsewhere.

Concealment or failure to disclose the flaws in the ventilation systems of the hospital from 2015 to 2018.

1798. That the ventilation systems of Ward 4B, Ward 2A, the Infectious Diseases Unit and certain PPLV isolation rooms were not as clinicians expected, was known in 2015. Dr Armstrong described how NHHS GGC did not get the hospital it expected. This was clear evidence of failures in performance or inadequacies of those ventilation systems.

1799. Apart from Ward 4B (where Dr Inkster called in HPS late in 2015), no attempt was made to seek the assistance of NHS NSS before late in 2017. Problems with the hospital ventilation system were not disclosed to the Scottish Government at the time. In Glasgow 4, Part 3, we learned that the Chief Executive was not told about these issues in the first six months of her appointment (until the 3 October 2017 'Action Plan').

1800. In our submission, whilst highly regrettable, this repeated sequence of missed opportunities to inform the Scottish Government cannot be described as deliberate concealment or failure to disclose. There was no formal obligation on NHS GGC to disclose deficiencies in its new hospital to the Scottish Government, and there may be a plausible administrative reason why it was not technically necessary to tell Ms Grant for six months after she arrived. Accordingly, this failure does not directly engage TOR 4.

Concealment of knowledge of problems in NHS GGC public statements and communications with patients and families

1801. This is discussed in the Submissions from Glasgow 3, under the head of

[3003] Bundle 10, Documents 2 and 3, Pages 9-17.
[3004] CTI Closing Statement, Glasgow 3, Chapter 5.2. Page 277, Para 258.

Communications (and in in respect of TOR 8 below). The defensive approach to communications, and the need to check they met the corporate approach, clearly contributed to less than transparent material in public statements and communication to patients and families.

1802. TOR 4 asks us to consider evidence of wrongdoing or failures in performance or inadequacies of systems, and this heading relates to the state of knowledge of NHS GGC of failures in performance or inadequacies of systems.

1803. The attempt to say the Board did not know of water problems in 2015, the now notorious attempt to explain the Ward 2A ventilation changes as an 'opportunistic upgrade', and the failure to reveal in the Q&A paper[3005] that it was by then known that Ward 2A had not been constructed in the way NHS GGC had hoped, are all striking examples of concealment or failure to disclosure failures in the performance or inadequacies of building systems to the public.

Concealment or failure to disclose rejection of the conclusions of the CNR on infection link.

1804. The CNR Overview Report contained evidence of failures in performance or inadequacies of systems and their impact. In paragraph 89 of its Closing Statement following Glasgow 3, NHS GGC stated that:

> " It is important to emphasise, however, that at no stage did NHSGGC deliberately conceal, or attempt to conceal, information from patients and families."

1805. That submission was made before attention was directed toward this issue. There now is evidence that some senior officials in NHS GGC rejected the conclusions of the CNR on infection link. When that was is unclear.

a. The first possibility is that, in March 2021, senior officials of NHS GGC decided not to accept the conclusions of the CNR Overview Report, but to keep quiet about that decision for fear of provoking a response from the Oversight Board or Scottish Government, as they were still at Level 4 of

[3005] Bundle 5, Document 92, Page 157.

the National Framework. In light of the press statement[3006] issued by NHS GGC (circulated to staff in the Core Brief), that would be misleading the Chair, the NHS GGC Board, Scottish Government, the Oversight Board, NHS GGC staff and, most importantly, parents and patients (especially given the 'unreserved' apology given in that press statement).

b. The alternative is that initially, despite misgivings, those officials accepted the conclusions of the CNR Overview Report in March 2021 but then decided in late 2022 to instruct Professor Hawkey and Dr Agrawal to challenge them, not telling the Board or informing patients and families.

1806. It stretches language too far to describe either action as related to systems. That leaves the possibility of deliberate concealment or failure to disclose wrongdoing. In our submission either of these approaches by senior officials of NHS GGC amounts to wrongdoing, in the sense that they offend against the broad principles that underlie the corporate duty of candour, and probably breach the fourth, fifth and seventh of the Nolan Principles of Public Life[3007]. TOR 4 is engaged either by such concealment in March 2021, or in the winter of 2022/2023 when it was engaging with this Inquiry.

1807. Patients and families, the Oversight Board and the Scottish Government were entitled to expect that NHS GGC would be open, candid and transparent about its attitude to the conclusions of the CNR on infection link. It was not.

9.10.2 Whistleblowing

1808. In our Closing Statement following Glasgow 3, we criticised the way NHS GGC and its senior staff responded to attempts to raise concerns about patient safety[3008]. We have addressed the criticisms of our approach by NHS GGC in Chapter 8 but concluded after Glasgow 3 that we should obtain more evidence in Glasgow 4.

[3006] Bundle 25, Document 61, Page 1260.
[3007] The Seven Principles of Public Life (also known as the Nolan Principles) are listed in Sir Robert Francis's report for the Inquiry: Bundle 51, Volume 1, Document 1, Page 21.
[3008] See for example: CTI Closing Statement, Glasgow 3, Pages 533-536 and 777.

Report of Sir Robert Francis

1809. As discussed in Chapter 1, Sir Robert Francis KC produced a report for the Inquiry on Whistleblowing.[3009] He also responded to additional questions.[3010] His instructions did not ask him to reach factual conclusions on events at NHS GGC, that being a matter for the Chair.

1810. Interestingly, however, in response to our summary of events he said, the Second NHS GGC Positioning Paper, "does not display a tone which is conducive to encouraging professionals with honestly held safety concerns to raise them, or, if they have already done so to persist even where they genuinely believe these have not been addressed."[3011] Having considered the NHS GGC policies, in response to the 2021 NHS GGC review of whistleblowing, he said that it was, " …indicative of a culture in which the value of serious concerns being raised was not widely understood.'"[3012]

1811. Sir Robert sets out material from many investigations which suggest whistleblowing is - notwithstanding all efforts at public inquiries and elsewhere - still not adequately encouraged. That material is not repeated.

1812. He then proposes that the List of Principles from his Freedom to Speak Up Report, be used as a guide to be followed by an NHS board that wishes to create an effective system in which concerns can be raised[3013]. They are set out In Appendix 7 of his Report[3014]. We, in turn, suggest the following necessary actions are especially relevant.

- Change behaviours which deter reporting and raising concerns (3a);
- Visible leadership showing that raising concerns is welcomed and encouraged (4);
- Swift, proportionate, fair and blame-free investigations (8); and
- A range of persons to whom concerns can be reported easily. (Sir Robert

[3009] Bundle 51, Volume 1, Document 1, Page 3.
[3010] Bundle 51, Volume 3, Document 1, Page 3.
[3011] Bundle 51, Volume 1, Document 1, Page 15, Para 2.3.6.
[3012] Bundle 51, Volume 1, Document 1, Page 20, Para 3.4.2.
[3013] Bundle 51, Volume 1, Document 1 at page 33, Chapter 4 (particularly Para 4.6.1).
[3014] Bundle 51, Volume 1, Document 1, Page 202.

went on to add that 'a concern should be dealt with positively even if raised in the 'wrong' way and even if the person raising it is accused by some of having an ulterior motive'.)[3015]

1813. Asked how one can tell if an NHS Board has a problem with encouragement of reporting of concerns, Sir Robert deals with a series of topics[3016]. He identifies a range of behaviours that that in our submission clearly arose after the QEUH/RHC opened, (particularly, but not exclusively, in respect of Dr Redding and the other whistleblowers and then with Dr Inkster). He deals with Policies and Procedures, Leadership (welcoming staff concerns; prioritising safety over the organisation's reputation), Bullying (avoiding the phrase 'keep your head down'), How Raising Concerns is Treated (avoid focus on process rather than substance), Supportive Teamwork, Recognition of Successes, and Staff Morale and Wellbeing[3017]. We would draw the Chair's attention to the following:

> " In the end a culture can only be judged by the behaviours over a period of the people working within it and not by formal compliance with policies, let alone the bureaucratic processes associated with them."[3018]
>
> "At all times [leaders need to] prioritise the interests of patient safety over the organisation's reputation." [3019]
>
> "… tensions arising from the conflict between [the duty to speak up] and the pressures of their workplace atmosphere will lead to a reduction in staff willingness to raise concerns or even stay in the employment, unless there is constant encouragement to speak up, and for that to be part of business as usual."[3020]
>
> "Those receiving concerns can be tempted to focus on the process for handling concerns rather than their substance and their relevance to safety. The emphasis

[3015] Bundle 51, Volume 1, Document 1, Page 48, Para 4.15.
[3016] Bundle 51, Volume 1, Document 1, Page 49, Chapter 5.
[3017] Bundle 51, Volume 1, Document 1, Page 50, Chapter 5.
[3018] Bundle 51, Volume 1, Document 1, Page 49, Para 5.1.
[3019] Bundle 51, Volume 1, Document 1, Page 49, Para 5.2.
[3020] Bundle 51, Volume 1, Document 1, Page 50, Para 5.3.

should be on the need to share concerns rather than a preoccupation with the whistleblowing category into which they might fall." [3021]

"Where a concern has resulted in a safety improvement, the individual raising it should be recognised and thanked. Where possible examples of this should be shared more widely to encourage others to behave in the same way" [3022]

1814. In his Report Sir Robert considered what changes might be needed to create an effective system.[3023] He again stressed leadership. As he put it, "Leaders need to be seen by their staff to role model the principles and that means, for example, readily accepting, if necessary in public, organisational and, where appropriate, personal responsibility when something has gone wrong. If staff see defensiveness let alone denials they know to be untrue, they will be very reluctant to raise concerns."

1815. He also stressed a corporate expectation of candour, openness and transparency.[3024] No place for the quiet suggestion to colleagues that they should 'keep their head down'. He argued for a FTSU Guardian - not in the normal management hierarchy, and accessible to all. Bullying was not to be tolerated, but 'it is important that persistence in raising a genuinely held concern should not be misnamed bullying'.[3025]

1816. There was, he said, no point in staff raising concerns if they are not investigated and acted upon. Staff are most often discouraged by 'lack of confidence that anything will be done'. Importantly, the purpose of the investigation is not to 'exculpate the organisation'. In the Direction 5 process Sir Robert was asked whether there was a risk that concerns, may be wrongly interpreted as matters of personal grievance, and if so, how should that be guarded against. His response is significant:

"The risk here is not so much that a concern is interpreted – rightly or wrongly – as a matter of personal grievance, but that this results in a failure to investigate the reported concern. Many concerns arise in circumstances in which personal

[3021] Bundle 51, Volume 1, Document 1, Page 50, Para 5.4.
[3022] Bundle 51, Volume 1, Document 1, Page 50, Para 5.6.
[3023] Chapter 6, Bundle 51, Volume 1, Document 1, Page 51, Para 6.1.
[3024] Bundle 51, Volume 1, Document 1, Pages 52-53, Para 6.3.
[3025] Bundle 51, Volume 1, Document 1, Page 55, Para 6.6.

relationships between the professionals involved have broken down. Animosity or worse may motivate some reports of concerns. That does not mean that the concern is not objectively justifiable and relevant to patient safety. It is all too easy for purported disclosures to be written off as being matters of personal grievance. That is most likely to happen if the recipient of the report assumes that because of a possible ulterior motive, the concern is not real. That is one reason why it is so important to ensure concerns that appear to be relevant to patient safety – or other matters of comparable importance in the public interest – are investigated impartially, objectively and proportionately, by reference to the content of the concern rather than the personalities involved. While motivation may be relevant in assessing the credibility of conflicting accounts this should never detract from the need to establish the facts and to search for verifiable evidence. Dismissing a concern relevant to safety on the ground of a suspected or even proven ulterior motive is never justifiable. Any leader finding that has occurred should require a review by a different – and impartial - investigator. I should add that the importance of establishing the objective facts relevant to safety does not necessarily mean that no action needs to be taken to improve negative relationships and personality issues. These themselves can, if sufficiently toxic, give rise to safety issues. There is research evidence suggesting that bullying, shouting and other symptoms of negative relationships can at least temporarily affect professionals' cognitive abilities and performance at work."[3026]

1817. The contrast between the Stage 2 Whistle-Blower Report[3027] and the way that Sir Robert considers such concerns should be investigated is striking.[3028]

1818. Sir Robert expresses important views on the use of data:

> "In relation to potential safety issues it is not sufficient to defer action on concerning results on the excuse that the data does not prove a serious problem exists. A gross example of such a failing may be seen in the response of some to information about infected blood that it did not prove conclusively that such blood could transmit infection to patients".[3029]

1819. He reminds us how the Infected Blood Inquiry concluded that the line that there is 'no conclusive proof', whilst technically correct, was indefensible. It did

[3026] Bundle 51, Volume 3, Document 1, Page 8.
[3027] Bundle 27, Volume 4, Document 6, Page 81.
[3028] Bundle 51, Volume 1, Document 1, Page 56, at 6.7.
[3029] Bundle 51, Volume 1, Document 1, Page 57, Para 6.10.

not spell out the real risk. It gave false reassurance. It lacked candour 'and represented a deliberate choice… to emphasise the absence of conclusive proof rather than the presence of a likely risk'. In the Mid Staffs Inquiry, '...faced with mortality figures showing the hospital was a statistical outlier, the Board prioritised a challenge to the technical validity of the statistics over commissioning a case note review in the outlier wards.'[3030]

1820. Sir Robert's final conclusion[3031] was that "the persistence of cultures which discourage or obstruct staff from raising safety concerns or acting to remedy them could be halted by a coordinated and committed approach, perhaps absent in the past". This requires an effective and independent system of accountability and monitoring.

Application to events at the QEUH/RHC

1821. In Chapter 2 we analysed the NHS GGC response to the actions of Dr Inkster, Dr Peters and Dr Redding and to our response to their evidence in our Closing Statement following Glasgow 3. In light of the evidence now heard we would make five observations:

a. The NHS GGC submissions fail to acknowledge the persistent failure by its staff to investigate the known deficiencies in the ventilation system of the QEUH/RHC, identified by a wide range of staff (not limited to Dr Inkster and Dr Peters) in 2015, 2016, 2017 and 2018. It ignores the many times that safety issues with the building had to be raised, the acceptance that the issues with the building raised in the 2017 SBAR were both valid and in substance correct, and, as we learned in the Glasgow 4, Part 3 hearing, the Chief Executive only learned about these problems because of that SBAR.

b. In its submissions and Positioning Papers NHS GGC appears to see Dr Inkster, Dr Peters and Dr Redding as a group. It should be remembered that Dr Inkster was not a member of the group who raised the Stage 1 Whistleblow in the 2017 SBAR. She appears to have been the respected and trusted Lead ICD, until some point in early 2019 when, for some

[3030] In footnote 133, Bundle 51, Volume 1, Document 1, Page 57.
[3031] At 7, Bundle 51, Volume 1, Document 1, Page 59.

reason, she lost the confidence of the Medical Director.

c. The IMTs were difficult, and during 2018 and 2019 that difficulty must have been made worse by (a) the realisation that Estates staff attending IMTs had not acted on the DMA Canyon L8 Risk Assessment, and that those responsible for water safety had failed to notice an issue with water-borne microorganisms before patients had become infected, (b) the fact that inadequacies of ventilation systems (such as the lack of HEPA filtration) became terribly significant in December 2018 and (c) that Dr Inkster and Dr Peters knew that they had raised relevant patient safety concerns about building systems since at least July 2015.

d. At paragraph 20 of its Closing Submission following Glasgow 3, NHS GGC propose a presumption against the conclusion that professionals tasked with the care of highly vulnerable children, whether medical or estates, would place their reputation, or the reputation of the organisation they work for, above their patients' interests. There is no basis in law for such an approach and if it was to apply to, for example, Dr Armstrong, Mr Gallacher or Ms Devine then it should equally apply to Dr Inkster, Dr Peters and Dr Redding. No such presumption exists.

e. As described in Chapter 5 we have received evidence from Dr Jamdar and evidence about the whistleblowing experience of Dr Jenkins. That taken along with the HIS Review[3032] and the response by the Chief Executive and Chair of NHS GCC supports the conclusion that Dr Redding, Dr Peters and Dr Inkster are not the only NHS GGC staff to have suffered detriment (some profoundly seriously) as a consequence of their decision to seek to protect patient safety by whistleblowing.

1822. We do acknowledge that there must have been times when contact from any of those three individuals to members of the IPC SMT, the Medical Director or senior staff within the Estates function must have been exasperating, but people who draw attention to failings of an organisation are often perceived as annoying by those closely associated with the actions they are criticising.

[3032] Bundle 52, Volume 1, Document 7, Page 904.

There is also an element that persistently ignoring the raising of patient safety concerns will cause the person who is being ignored or minimised to escalate the number and complexity of written communications. It would, in our submission, be wrong to entirely ignore how Dr Peters communicated in 2017 and possibly early 2018, but had her clear, concise and fundamentally accurate concerns identified in July 2015 been acted on, then one has to conclude that such communication would not have been necessary. If you do not want to get long emails explaining why there is a patient safety issue, then address the patient safety issue when it is first raised. This approach is also consistent with the correct approach to whistleblowers discussed by Sir Robert Francis.

1823. The eighteen months that preceded August 2019 were clearly a terrible time for the patients, families, and clinical staff in the Schiehallion Unit. It is hardly surprising that tensions ran high. In such an environment any organisation can have problems where colleagues disagree, but surely it is relevant if that organisation has previously been warned, more than once, over a period of years that its new hospital was flawed. As some senior NHS GGC managers have told the Inquiry, there was not a problem with 'difficult' microbiologists anywhere else in NHS GGC's area. Of course, that might be down to the character and behaviour of those microbiologists, but it is equally possible that they were raising valid concerns about this particular hospital, and it is the lack of a substantive response over many years that is the true cause of any 'difficulties'.

Conclusion on Whistleblowing

1824. Anyone who has followed the Inquiry evidence will readily recognise issues - treatment of those who speak out, 'keep your head down', emphasis on process, substantive concerns not acted upon - which emerged as well as focus on the manner in which concerns were raised, quite apart from the NHS GGC treatment of whistleblowers during the Inquiry

1825. NHS GGC did have a whistleblowing policy. In part it worked effectively, e.g.

the production of the 27-point Action Plan[3033] arising from complaints by Dr Redding and others. Overall, however, the desiderata of a good whistleblowing system set out by Sir Robert Francis[3034] were not recognisable at NHS GGC (and that another failure to respond appropriately to concerns more recently emerged over A & E clinicians in the HIS Review[3035] confirms that matters had not by that stage truly improved).

1826. We conclude overall that 'speaking out' was not encouraged, and that those who did so were not well received in NHS GGC. It is particularly striking that, after all the extensive oral evidence, there is almost none to support the proposition that any of the whistleblowers' complaints were other than well-intentioned and, most critically, well-founded.

9.11 Term of Reference 5

> "To examine whether, based on the governance arrangements in place, national oversight and support of such large-scale infrastructure projects was adequate and effective and whether there was effective communication between the organisations involved."

1827. NHS Assure was created in 2021 as a direct result of the challenges encountered at the QEUH. That amounts to an acceptance that national oversight and support as it previously existed was not adequate. There was no Scottish Government involvement in scrutiny of the Construction Contract between issue of the tender and contract signature, notwithstanding that it was Scottish Government money that was at stake. The FBC process did not reveal any of the contentious issues (though that can be attributed to the fair inference from the FBC contents that all was in accordance with the ERs). The involvement of PUK did not reveal the lack of a change control process, and the involvement of a Scottish Government official on the relevant 'board' focussed entirely on finance.

1828. It appears to be the Scottish Government's position, as advanced by Mr

[3033] Bundle 52, Volume 7, Document 7, Page 76.
[3034] Bundle 51, Volume 1, Document 1, Page 19 onwards.
[3035] Bundle 52, Volume 1, Document 7, Page 904.

Baxter,[3036] that CEL 19 (2009)[3037] and the Policy on Design Quality for NHS Scotland[3038], via a requirement to use ADB, imports a reference to SHTMs and therefore SHTM 03-01 so, as a consequence, whilst SHTMs are guidance, the policy requires mandatory application. In our submission the documentation is simply not clear. If the Scottish Government wished to make compliance with SHTMs an essential it should say so. The location of this statement at Annex A of the Policy is too obscure.

9.12 Term of Reference 6

> "To examine, during the life cycle of the QEUH, how the Board of NHS Greater Glasgow and Clyde secured assurance and supporting evidence that:
>
> A. All necessary inspection and testing had taken place;
>
> B. All key building systems had been completed and functioned in accordance with contractual specifications and other applicable regulations, recommendations, guidance, and good practice and;
>
> C. Adequate information and training were provided to allow end-users effectively to operate and maintain key building systems."

1829. A and B taken together: the key elements are 'assurance' and 'supporting evidence'. While NHS GGC obtained assurances from the contractor (and, of course sampling results for water etc), they were reliant on the Project Team to assure them of compliance. That does not seem to have been done. As Capita had not been given the information or instructions to provide 'assurance' on compliance with the ER's, their reports did not go back beyond contractor's drawings. No validation was carried out, notwithstanding verbal assurances that everything necessary had been done for handover. A notable feature was the absence of supporting evidence despite many opportunities to ask for it. The reluctance to insist on that borders on the inexplicable.

1830. C: Asset tagging – necessary for PPM – was not in place by handover and only completed years later. A PPM system was not provided as appears to be

[3036] Transcript, Mike Baxter, 16 September 2025, Pages 9-11, Columns 14-17.
[3037] Bundle 48, Document 1, Page 4.
[3038] Edinburgh 1 - Bundle 3, Volume 1, Document 2, Page 125.

required under the Building Contract and efforts to challenge its absence delayed by incorrect insistence from the Project Team that it was not being provided. ZUTEC, the document system, which was provided, was difficult to access and did not have all the necessary material. There was limited evidence of training. What there was suggested it may have been superficial.

1831. It seems entirely possible that these failings have their roots in a lack of knowledge within NHS GGC of how to procure a large hospital under a CPAM.

9.13 Term of Reference 7

> "To examine what actions have been taken to remedy defects and the extent to which they have been adequate and effective."

HAI-Scribe at the QEUH/RHC

1832. In our submission the evidence in Glasgow 3 on this issue, the additional evidence of Dr Jamdar and the evidence of lack of rigour in the operation of HAI-Scribe within the new SGH project, entitle the Chair to reach two conclusions as they address HAI-Scribe at the QEUH/RHC and possibly more widely across NHS GGC. Firstly, NHS GGC did not have a sufficiently rigorous approach to the operation of HAI-SCRIBE system from 2015 to 2019, and quite possibly before, there was insufficient time and information given to ICDs required to consider and approve HAI-SCRIBE for maintenance and refurbishment work and an unwillingness on the part of Estates managers and some more senior members of the IPC Team to see the raising of questions by ICDs about the substance of the HAI-SCRIBEs they were asked to approve as a valid and useful form of scrutiny. Secondly, in light of the terms of the 2014 version of SHFN 30 Part B, Version 3.0, October 2014[3039], that "1.17 Implementation of HAI-SCRIBE is aimed at all personnel who may be involved in providing not only new build, but also refurbished or extended healthcare establishments" and accordingly the Chair should reject the evidence of Mr Clarkson[3040] that a Stage 4 HAI-SCRIBE was not required for

[3039] Bundle 27, Volume 4, Document 35, Page 365.
[3040] Transcript, Kerr Clarkson, 20 August 2024, Page 23, Column 41.

the refurbished Wards 2A/2B. One should have been done.

The Water System

1833. Real steps have been taken under the leadership of Professor Steele to remedy issues with the water system, including the introduction in 2018/9 of chlorine dioxide dosing, the installation of POUFs, greatly extended testing regimes and the retrofit of the water system in Wards 2A and 2B RHC. That this has been substantially successful is confirmed by the real reduction in the number of environmentally BSI amongst the paediatric haemato-oncology patients since 2020.

1834. As Dr Walker explained, appointment of a Site Water Safety Group, with responsibility for writing a Site Water Safety Plan, was an essential part of management.[3041] The AE Audits from 2020 to 2023 demonstrate clear progress from 2018 onwards, describing the delivery of the required risk reduction processes as "virtually complete"[3042] On the basis of Mr Poplett's 2025 AE Audit[3043] these steps have been adequate and effective.

1835. The process to remove the POUFs the QEUH/RHC will pose real issues for NHS GGC in terms of maintaining the confidence of patients, staff and the public. This task has been made immeasurably harder by how NHS GGC has responded to families, staff, external agencies and this Inquiry, when the management of the water system has been questioned or challenged.

1836. We add a codicil about the work of the Advice, Assurance & Review Group (AARG). It failed in 2021/2022 to adequately check whether the refit work to Ward 2A/2B was being properly carried out. The AARG had access to little external advice and was overly reliant on assurances provided by NHS GGC. This concern is reinforced by the discovery that the NHS GGC team had issues with microbial proliferation at the end of the retrofit as described in the 2025 paper in Water Research by Dr Chaput et al.[3044] Not only was this not disclosed to the Inquiry, but it does also not appear to have been disclosed to

[3041] Transcript, Dr James Walker, 6 November 2024, Pages 46-47, Columns 88-89.
[3042] Transcript, Andrew Poplett, 8 November 2024, Pages 64-67, Columns 124-129.
[3043] Bundle 53, Document 3, Page 14.
[3044] Bundle 44, Volume 8, Document 6, Page 141.

Scottish Government at the time. This suggests a lack of openness. Had we been asked for a view on the remediation of the water system of Ward 2A/2B in early 2022, we would have been sceptical. Fortunately, the evidence of water testing results and numbers of infections in the past three and a half years, suggests that the problem was lack of process in scrutiny by the AARG, rather than failure to deliver a successful refit on the part of NHS GGC.

The Ventilation Systems

1837. The complexities of the ventilation system, and the different standards applying in different parts of the hospital, make the answer to TOR 7 for ventilation more complex.

Remediation Ward by Ward

1838. Two groups of deficient features have been remedied. Most of the PPVL isolation rooms have been converted to the correct type for the patient groups who require to use them. The same is true for Ward 2A/2B, where the belated rebuild has produced a first-class environment and no repetition of problems. In our submission the ventilation system in the isolation rooms and the Schiehallion Unit can now be said to be safe.

1839. The challenges in Ward 4B which led to the 2017 options appraisal recommending return to the QEUH as not a long-term solution, have not been fully remedied (particularly the absence of the recommended air change rate), nor has a new location been selected or a new unit constructed. They remain risks to patient safety from airborne pathogens but have been reduced to a level which can properly be described as acceptable, at least as a temporary solution.

1840. Similarly, substantial improvements have been made to the ventilation system in PICU, although it still does not meet the standard that should have applied had its designers sought to deliver a SHTM 03-01 (2009) compliant ventilation system.

1841. Ward 4C, notwithstanding improvements, does not have an environment

designed for the patient cohort envisaged (in the original 4B COS[3045]). NHS GGC now considers that the ventilation system in this ward poses a medium risk of infection by airborne pathogens, but that risk reduction may well be partly reliant on use of anti-microbial prophylaxis which cannot be tolerated by all patients.

1842. The failure to build general ward rooms in accordance with SHTM 03-01 has not been rectified and may be impossible to rectify in the existing building structure. For most patients, especially those who are not immunocompromised, risks of infections from airborne pathogens will be low. However, without a comprehensive risk assessment and subsequent management plan, it always remains possible that an immunocompromised patient will be treated in these wards and exposed to a higher risk.

9.14 Term of Reference 8

> "To examine the physical, emotional and other effects of the issues identified on patients and their families (in particular in respect of environmental organisms linked to infections at the QEUH) and to determine whether communication with patients and their families supported and respected their rights to be informed and to participate in respect of matters bearing on treatment."

1843. Term of Reference 8 was the subject of a significant amount of evidence in Glasgow 1, 2 and 3, and in respect of Communications has been the subject of submissions already made in Chapter 8 of the CTI Closing Statement following Glasgow 3[3046].

9.14.1 <u>Impact of communication issues</u>

1844. Concerns regarding communication, both to the media and to the patients, were a recurrent theme. Witnesses describe anger and frustration at the lack of information, [3047].especially when they only found out about certain events, such as a ward closure, from the media [3048] Patients felt they were being fobbed off with excuses, with some even feeling there was a deliberate

[3045] Bundle 16, Document 15, Page 1595.
[3046] CTI Closing Statement, Glasgow 3, Pages 724-751.
[3047] Glasgow 1 - Witness Statements, Bundle 7, Mark Bisset, Document 2, Page 25, Para 50.
[3048] Glasgow 1 - Witness Statements, Bundle 5, Denise Gallagher, Document 1, Page 30, Para 98.

attempt to cover up failings [3049] and to downplay their concerns. [3050]The effect of this was to leave many patients and families with a profound sense of suspicion and mistrust[3051], although this was overwhelmingly directed towards NHS GGC management[3052] rather than the clinical teams, who were almost uniformly praised.

1845. In Glasgow 4, Part 3, we heard in person from Professor Brown on the extent to which communications could have been better[3053], and we have received evidence in the form of written statements from Professor Cuddihy[3054], Molly Cuddihy[3055] and Lisa Mackay[3056].

1846. In its Closing Statement following Glasgow 3, NHS GGC made the concession that:

> 85. Addressing the first of these considerations, the Inquiry's impact hearings in 2021 heard evidence from patients and families on their experiences at the QEUH/ RHC from the opening of the new hospitals. It was clear that the experience of many patients and families at the QEUH/ RHC was adversely affected by the issues which were ongoing at the hospital at the time of their treatment. It has always been, and remains, a matter of profound regret to NHSGGC that the experience of patients and families at the QEUH/ RHC, at an already stressful and challenging time in their lives, was made worse by events unfolding within the hospital, particularly for those patients and families affected by the decant from ward 2A.
>
> 86. Secondly, it is accepted that there were failures by NHSGGC in its communications to patients and families. Certain families and patients first learnt of the proposed closure of Wards 2A and 2B, and the decant to Ward 6A, from media sources rather than from NHSGGC. That this occurred was a matter of

[3049] Glasgow 3 - Witness Statements, Volume 11, Sandie and Beth Armstrong, Document 1, Page 32, Para 109.
[3050] Glasgow 3 - Witness Statements, Volume 11, Sandie and Beth Armstrong, Document 1, Page 24, Para 77.
[3051] Glasgow 3 - Witness Statements, Volume 10, Louise Slorance, Document 1, Page 48, Para 168.
[3052] Glasgow 1 - Witness Statements, Bundle 3, Suzanne Brown, Document 5, Page 239, Para 144.
[3053] Transcript, Professor John Brown, 3 October 2025, Page 45, Column 86.
[3054] Glasgow 4, Part 3 - Witness Statements, Volume 3, Professor John Cuddihy, Document 6, Page 242 and Glasgow 4, Part 3 - Witness Statements, Volume 6, Professor John Cuddihy, Document 5, Page 34.
[3055] Glasgow 4, Part 3 - Witness Statements, Volume 3, Molly Cuddihy, Document 7, Page 248.
[3056] Glasgow 4, Part 3 - Witness Statements, Volume 2, Lisa Mackay, Document 7, Page 171.

deep regret and an immense source of frustration at the time to those within the Board who were responsible for communications.

1847. In respect of communications our views as set out in Chapter 8 of our Closing Statement following Glasgow 3 are, if anything, reinforced. At the relevant time communications to parents and patients were not satisfactory. The Board did not respect their rights to be informed. To that extent this was not patient centred care.

9.14.2 Impacts on patients and their families.

1848. The impacts – ranging from distress to anger and the need for extra treatment – have been graphically illustrated in the evidence from patients and parents (supported in many cases by nurses and clinicians). What follows is an attempt - necessarily incomplete - to provide a high-level summary of the evidence of patients and families, largely in the Glasgow 1 hearing. (Material on this topic can also be found in Themes 4-10 of Counsel to the Inquiry's Submissions after the Glasgow 1 Hearing and Chapter 5 of Counsel to the Inquiry's Submissions after the Glasgow 2 hearing.)

Physical impact on patients

1849. The physical effects of an infection are unpleasant at the best of times, but especially so in a child already weakened by cancer. Symptoms include fever,[3057] diarrhoea[3058] vomiting, rigor [3059] and breathlessness. [3060] Serious infections can result in septic shock, which can lead to organ dysfunction. [3061]The most serious infections can be fatal. Even a mild infection can interrupt treatment while it is dealt with.[3062] Chemotherapy may need to be halted,[3063] and surgery such as a transplant postponed[3064], which may even risk the loss of a donor. Infections may necessitate additional procedures

[3057] Glasgow 1 - Witness Statements, Bundle 5, Witness 1, Document 3, Page 77, Para 42.
[3058] Glasgow 1 - Witness Statements, Bundle 5, Witness 3, Document 9, Page 262, Para 27.
[3059] Glasgow 1 - Witness Statements, Bundle 3, Cameron Gough, Document 2, Page 36, Para 138.
[3060] Glasgow 1 - Witness Statements, Bundle 5, Witness 2, Document 4, Page 93, Para 27.
[3061] Glasgow 1 - Witness Statements, Bundle 3, Colette Gough, Document 3, Page 115, Para 87.
[3062] Glasgow 1 - Witness Statements, Bundle 4, Alfie Rawson, Document 6, Page 190, Para 39.
[3063] Glasgow 1 - Witness Statement, Bundle 5, Witness 1, Document 3, Page 73, Para 19.
[3064] Glasgow 1 - Witness Statements, Bundle 5, Denise Gallagher, Document 1, Page 13, Para 35.

such as line insertion or removal [3065] Treatment such as antibiotics, antiviral medication and steroids, can have unpleasant side-effects, which can be long-term.[3066]

Psychological impact on patients

1850. An infection usually requires inpatient treatment, taking patients away from their families. There is often a requirement for "source" isolation[3067], confining a patient to his or her room and limiting visitors, which parents described having a profound effect on mental wellbeing, particularly for very young children.[3068] Although it is difficult to differentiate the psychological effects of infection and related matters from those stemming from the cancer diagnosis itself, the symptoms can often be severe enough to constitute a recognised psychiatric disorder such as anxiety or PTSD[3069], requiring treatment and counselling.

Impact on family members

1851. Watching a child suffer an infection causes distress on top of the already significant trauma of seeing a child with cancer. An infection can manifest itself in sudden and drastic deterioration, a traumatic experience for anyone witnessing it.[3070] For parents, there are often feelings of guilt, anguish and helplessness, with the perception that they have somehow "failed" a child it was their job to protect.[3071] The knowledge that suffering was avoidable can add to distress.[3072] Additional hospital visits interfere with family life [3073] as well as adding to stress and anxiety. Once infections emerge, parents were fearful of their child falling ill, and the fear of infection meant that some families chose to keep younger siblings away from the ill sibling[3074] Serious

[3065] Glasgow 1 - Witness Statements, Bundle 3, Cameron Gough, Document 2, Page 38, Para 145.
[3066] Glasgow 1 - Witness Statements, Bundle 7, Mark Bisset, Document 2, Page 29, Para 61.
[3067] Glasgow 1 - Witness Statements, Bundle 4, Stevie-Jo Kirkpatrick, Document 2, Page 59, Para 19.
[3068] Glasgow 1 - Witness Statements, Bundle 4, Charmaine Lacock, Document 8, Page 254, Para 53.
[3069] Glasgow 1 - Witness Statements, Bundle 4, Annemarie Kirkpatrick, Document 3, Page 40, Para 154.
[3070] Glasgow 1 - Witness Statements, Bundle 3, Cameron Gough, Document 2, Page 45, Para 173.
[3071] Glasgow 1 - Witness Statements, Bundle 3, Colette Gough, Document 3, Page 116, Para 88.
[3072] Glasgow 4, Part 3 - Witness Statements, Volume 3, Louise Slorance, Page 54, Para 19.
[3073] Glasgow 1 - Witness Statements, Bundle 4, Annemarie Kirkpatrick, Document 3, Page 41, Para 156.
[3074] Glasgow 1 - Witness Statements, Bundle 3, Lynn Kearns, Document 4, Page 194, Para 83.

illness has a financial burden as well, which is increased by additional inpatients stays and travel [3075] As with patients, the level of psychological harm sustained by some family members could amount to a recognised psychiatric disorders such as PTSD. [3076]

Impact of infection control measures

1852. As well as the direct effects of the infections themselves, the rise in infections led to various infection control measures, such as limits on water use. Showers were out of use, and patients had to use wet wipes, or had to be washed by parents in a basin of water, which was humiliating and undignified.[3077] Sometimes toilets were out of use, and patients were required to use bedpans. [3078]The work of the estates team - installing filters, cleaning chilled beams and changing taps - was highly disruptive. [3079]

1853. The decant to Ward 6A had a profound effect on the mental wellbeing of many patients. The alternative ward was not designed for children and did not have the same range of facilities, such as a playroom. Patients and families felt isolated[3080], and that they had lost the sense of community that the old Schiehallion ward had brought. There was also a perception that the infrastructure of Ward 6A affected the standard of care, which was not as high as in the Schiehallion unit[3081].

9.14.3 Organisational Duty of Candour

1854. The position of NHS GGC is that there:

> "was no requirement for NHSGGC to invoke organisational duty of candour for the infection episodes under review as, after extensive investigation, no evidence was found that any infection was linked to deficiencies in the hospital environment or to failures in care or procedures by NHSGGC staff. There was therefore no

[3075] Glasgow 1 - Witness Statements, Bundle 4, Annemarie Kirkpatrick, Document 3, Page 43, Para 163.
[3076] Glasgow 1 - Witness Statements, Bundle 4, Annemarie Kirkpatrick, Document 3, Page 40, Para 154.
[3077] Glasgow 1 - Witness Statements, Bundle 3, Lynn Kearns, Document 4, Page 185, Para 50 and 51.
[3078] Glasgow 1 - Witness Statements, Bundle 6, Molly Cuddihy, Document 1, Page 45, Para 162.
[3079] Glasgow 1 - Witness Statements, Bundle 3, Lynn Kearns, Document 4, Page 189, Para 66.
[3080] Glasgow 1 - Witness Statements, Bundle 4, Stevie-Jo Kirkpatrick, Document 2, Page 69, Para 53.
[3081] Glasgow 1 - Witness Statements, Bundle 3, Cameron Gough, Document 2, Page 23, Para 80.

clear evidence of an unexpected or unintended incident which led to the episodes of infection under investigation."[3082].

1855. The organisational duty of candour scheme requires action from a health board when a reasonable opinion is reached by a registered medical practitioner that an infection relates to an unintended incident in the provision of health care.[3083] To attempt to argue that an event such as "The Water Incident" is not 'an incident' in terms of the 2016 Act is, in our respectful opinion, obtuse. It clearly was. Furthermore this submission ignores the fact that it was not until December 2020 that the work of Professor Leonord and Dr Brown on WGS, that was reported to the CNR Expert Panel[3084], or presented to Ms Grant and Ms McQueen, enabled a view to be taken (however flawed) that the absence of close genetic connection between the available samples meant the hypothesis of links to the environment was unsubstantiated.[3085]

1856. Well before that point a number of registered medical practitioners held reasonable views that there could well be a link between potentially environmentally relevant BSI at the environment. These existed whenever the IMT saw the appropriate connection in time, place and person to support a hypothesis of a link. Such a conclusion was clearly stated in respect of the Water Incident at the time of Full Incident Management Team Report of 5 June 2018 and in respect of the 2017 *Stenotrophomonas* cases in the fruits of the investigation that followed Dr Mather's SBAR.

1857. That later clinicians took a different view from that held by the Lead ICD, Microbiologists involved in cases and in formal reports, does not remove the requirement to invoke the organisational duty of candour when the connection was first identified. In addition, as Professor White had to point out to NHS GGC, the statutory requirement is deliberately couched as including 'could' lead to harm, to avoid the necessity for establishing causation (as is inferred

[3082] Glasgow 3, Core Participants' Closing Submissions, NHS Greater Glasgow and Clyde, Document 4, Page 58, Para 92.
[3083] Section 21, Health (Tobacco, Nicotine etc. and Care) (Scotland) Act 2016), Bundle 52, Volume 7, Document 2, Page 38.
[3084] Bundle 6, Document 38, Page 1070.
[3085] To adopt the language of the April 2023 NHS GGC Positioning Paper Para 63, Bundle 25, Document 10, Page 362.

in the NHS GGC approach). NHS GGC repeatedly did not invoke its duty and act on it. It should have.

9.14.4 Impact of the Board's attempt to challenge the CNR conclusions

1858. Parents and some patients gave evidence in Glasgow 1, eighteen months before the second NHS GGC Positioning Paper, and just under two years before NHS GGC made reference to it in a footnote to their Closing Statement following Glasgow 2. We therefore do not have the reaction of most of the Glasgow 1 witnesses to the NHS GGC challenge to the conclusions of the CNR on infection link.

1859. However, Professor Cuddihy has set out his view in his Second Supplementary Statement (produced in October 2025 following the tragic death of his daughter). His response should be considered in full:

> 10. Additionally, I was astonished to learn through recent disclosures that certain witnesses from NHS Greater Glasgow and Clyde challenged the recommendations of the Case Note Review—information that was previously unknown not only to us but also to the Chair of the Oversight Board and other senior officials at the time. Had these challenges been known then, they likely would have been vigorously contested by the Chair, the Director General for Health, and Scottish Ministers. Such scrutiny may have influenced the critical decision to de-escalate NHSGGC from Level 4 to Level 2 within the NHS escalation framework and might even have warranted escalation to Level 5. This revelation casts further doubt on the transparency and accountability of the response to the serious failings identified, underscoring the urgent need for open governance and steadfast oversight.[3086]

1860. We have already discussed whether the NHS GGC approach amounted to deliberate concealing or failure to disclose wrongdoing, and so in this context it seems appropriate simply to note the high levels of distress that the approach of NHS GGC must have caused to patients and families. If the evidence of Professor Gardner is to be accepted, then that distress was entirely unnecessary.

[3086] Glasgow 4, Part 3 - Witness Statements, Volume 6, Professor John Cuddihy, Document 5, Page 36, Para 10.

9.15 Term of Reference 9

> "To examine the processes and practices of reporting healthcare associated infections within QEUH and determine what lessons have been or should be learned."

1861. The extent to which NHS GGC consistently and reliably report HAIs to HPS/ARHAI in compliance with Chapter 3 of NICPM has been a regular feature of this Inquiry.

1862. From the invocation of the CNO Framework (formerly the algorithm) in respect of Serratia infections in NICU in 2015, to the response by the IPC Team to the *Cryptococcus* cases brought to our attention during Glasgow 3, there have been repeated occasions which have seen departure from national guidelines, with a consistent feature of second-guessing national policies and challenge to those who write those guidelines.

1863. The troubling November 2024 SBAR[3087] which was couched in terms which were, to put it mildly, unwise, and which demonstrated a significant degree of obduracy, demonstrates the reluctance of the NHS GGC IPC Team to learn, unless compelled to do so. Moreover, there does appear to be a lack of understanding, at times, that IPC is about more than the nationally reportable infections (as illustrated by Appendix 1 to the NHS GGC April 2023 Positioning Paper on infection link[3088]).

1864. There is a reasonable inference that, when subject to the CNO Framework or Stage 4 of the National Framework, the NHS GGC IPC team will report HAIs to HPS/ARHAI in compliance with Chapter 3 of NICPM, but at other times there is a habit of ploughing their own furrow and failing to do so.

1865. As a consequence of the interest shown in this area by the Inquiry there have been positive developments in the form of the Joint letter of 9th September 2025[3089] and the SBAR of 19th September 2025[3090],

[3087] Bundle 52, Volume 5, Document 32, Page 148.
[3088] Bundle 25, Document 10, Page 364.
[3089] Bundle 52, Volume 7, Document 48, Page 453.
[3090] Bundle 52, Volume 7, Document 60, Page 483.

However, the creation of the necessary level of trust in the willingness of senior IPC clinicians at NHS GGC to take advice from, and follow directions by, their colleagues at ARHAI is going to require a major change in culture. It will be for the Scottish Government, NHS NSS and the non-executive members of the NHS GGC Board to make sure this happens.

9.16 Term of Reference 10

> "To examine whether the choice of sites was appropriate or gave rise to an increased risk to patients of environmental organisms causing infections."

1866. The Inquiry received a limited amount of evidence as to the broad reasons for site selection. There is no reason not to accept this. The controversial issue was closeness to the Shieldhall Scottish Water Waste Water Treatment Works. We accept the evidence of Mr Bennet[3091] that there is no increased risk of infection due to proximity to the works. That conclusion is consistent with the experience of IPC clinicians who worked at the SGH. When asked whether QEUH's proximity to the nearby Shieldhall Wastewater Treatment Works created a risk of infection to patients, Mr Bennett stated that:

> "any risk of infection by this means must be regarded as being very unlikely"[3092]

1867. Odour nevertheless caused nausea and similar symptoms for some patients. The original cure was intended to be a sealed ventilation system with carbon filtration of entry air. The decision to have a sealed ventilation system ultimately resulted in it being impossible to deliver a maximum temperature of 26 degrees with an SHTM 03-01 compliant ventilation system in the 1,300+ single rooms. The carbon filters themselves were abandoned without much thought of the impact on IPC, probably due to cost.

1868. There is limited evidence of some discussion - undocumented - with Scottish Water about potential improvements planned to the Shieldhall site to reduce odour, but there was no real analysis and no follow-up.

1869. In our submission the principal consequence of the site selection was to place

[3091] A51308483 - Bundle 39, Document 1, Page 3 and associated documents in Bundle 28.
[3092] A51308483 - Bundle 39, Document 1, Page 28, Para 11.2.1.

a greater burden on the ventilation system of the hospital to protect immunocompromised patients from the urban environment. Unfortunately, that also placed a burden on the NHS GGC Project Team and NHS GGC to deliver an effective ventilation system to protect those patients. It did not do that for the reasons already discussed.

9.17 Term of Reference 11

> "To examine whether there are systematic knowledge transfer arrangements in place to learn lessons from healthcare construction projects and whether they are adequate and effective."

1870. This term of reference has been addressed in the Interim Report in respect of (a) systematic knowledge transfer arrangements before NHS ARHAI was set up and (b) systematic knowledge transfer for lessons identified from the construction of the RHCYP and DCN. That left the question of what had been learned from the experience in Glasgow.

1871. The principal witness in Glasgow 4, Part 3, was Ms Critchley who spelled out an extensive series of learning processes run or led by NHS Assure.[3093] These are due credit. They included seminars, an Annual Conference, speaking at other events and indeed events focussed specifically on learning lessons from practical experience. NHS Assure were looking to extend these. Whether they will turn out to be adequate and effective will be seen in time. At present it is too early to say.

1872. We have two concerns:

a. Firstly, it remains unclear how such efforts would deal with an organisation inclined to think it knows best, particularly one which will pay lip service when forced to do so, but does not really think it needs help (Professor Bain reported that impression during her stint as head of IPC at NHS GGC and Malcom Wright described it as a 'red flag'.) That said, Ms Critchley felt the KSAR and NDAP processes at least could cope with both mindsets.[3094]

[3093] Transcript, Julie Critchley, 8 October 2025, Pages 16-17, 29-30, Columns 28-29, 53-57.
[3094] Transcript, Julie Critchley, 8 October 2025, Page 29, Columns 53-54.

b. Secondly, it is unclear how NHS Assure and its KSAR and NDAP processes can impact in the important period between the selection of a preferred bidder and contract signature. Important decisions are made at the last minute. The only real protection is to ensure that the Scottish Government as principal funder has a voice in the actual negotiations. We address that in our Recommendations.

9.18 Term of Reference 13

> "To report to the Scottish Ministers on the above matters, and to make recommendations identifying any lessons learnt to ensure that any past mistakes are not repeated in any future NHS infrastructure projects, as soon as reasonably practicable."

1873. We address potential recommendations in the next chapter.

10. CHAPTER 10 - RECOMMENDATIONS

10.1 Introduction

1874. This chapter discusses potential recommendations which the Chair may wish to make. We develop these, in light of submissions made in our Closing Statement following Glasgow 3, by CPs in Closing Statements following Glasgow 3, and evidence led, or documents reviewed, recovered, or understood since the end of the Glasgow 3 hearing.

1875. A number of recommendations were made in the Interim Report,[3095] following the conclusion of evidence in respect of the RHCYP/DCN. It will be seen from what we set out later that some issues were common to the two sections of the Inquiry. The Edinburgh recommendations are summarised here:

a) A communication strategy for patients and their families; patients and families were not provided with a direct explanation for the reasons the RHCYP and DCN did not open as planned, by either NHSL or the Scottish Government and this was unsatisfactory. The impact of poor communication should not be underestimated. Health boards must ensure that in the event of any adverse situation that could affect the wellbeing of patients and their families, there is a communication strategy in place to liaise with this crucially important group. The Scottish Government should ensure that this liaison is supported in any overarching communication strategy it may wish to introduce.

b) Risk assessment if there is a change in the arrangements for funding a project; in situations where the funding model or procurement route changes mid project, a risk assessment should be conducted to assess whether work done on the project up to that point is suitable for the revised project. The rationale for decisions taken in this regard should be formally recorded. The party carrying out the risk assessment should be the party on whom the potential risk falls, unless there are sound reasons and mitigations to the potential risk, unless there are sound reasons why this should not be the

[3095] Scottish Hospitals Inquiry Interim Report - The Royal Hospital for Children and Young People and Department of Clinical Neuroscience, Edinburgh, 3 March 2025.

case.

c) Clarity in the brief for the construction or refurbishment of a healthcare facility; health boards should prepare and present full and clear briefs. The briefs need to ensure that the facility meets clinical standards, and includes, but is not limited to, COSs, and detailed room date sheets which include detailed specifications.

d) Requirement for a standard form for derogations from guidance; SHTM 03-01 now requires the Ventilation Safety Group to scrutinise and agree in writing any decision to depart from guidance, but there is no method designated for how this should be done. The evidence indicated that a standard form of derogation for use throughout the NHS in Scotland would be beneficial.

e) Duplication of procedures; the procedures in place to help ensure health board projects meet appropriate standards (such as KSAR) ought to be streamlined, and potentially merged, to ensure they are thorough and robust whilst avoiding duplication and unnecessary delay. Consideration should also be given to how complimentary procedures - such as aspects of the HAI-SCRIBE process set out in SHFN 30 - can potentially be streamlined to avoid duplication with other processes.

f) Information about common errors; to ensure that common errors are not repeated, health boards undertaking projects should have information about common errors, and that this information is clearly communicated to them. It was recommended that Assure should consider, in consultation with relevant stakeholders, whether and how to provide health boards with more detailed information about common errors and issues experienced with projects than is currently provided.

g) Validation for revenue funded projects; whatever the method adopted for funding, contracts for the construction of new hospitals should permit independent validation by an Authorising Engineer, appropriately witnessed and with safeguards for all parties. The independent validation should be undertaken on behalf of the health board in accordance with the guidance contained in SHTM 03-01 (2022) with a view to a report or reports being

sent to the health board's lead project manager.

h) Role specifications; (1) role specifications within the NHS; and (2) the role of advisers to NHS bodies responsible for construction contracts. Priority to be given to protecting scarce IPC resources. With that objective in view, what is expected of consideration and advice from individual disciplines at various stages of a project should be made clear. Job and role specifications for various disciplines, particularly IPC should be similarly identified. Consideration should also be given to whether there are sufficient IPC professionals to resource the current system. There requires to be clarity in the role definition in relation to advisers. With clear record keeping of advice tendered.

i) Training; IPC professionals should receive some basic training on the recommendations made by the NHS's own guidance for engineering systems, insofar as they are made in the interests of patient safety and care, before they are recruited to work on large scale hospital projects. Similarly, engineers would benefit from basic training on infection control principles and clinical requirements before embarking on new build hospital projects. Clinicians involved in projects would also benefit from basic training in the recommended output parameters of building engineering systems which have a direct bearing on the safety and care of patients in their departments.

10.2 Proposed Recommendations addressed to the Scottish Government

10.2.1 Procurement processes

1876. Prior to the approval of OBC for new large healthcare building projects, health boards and Scottish Government should obtain external specialist legal advice on contract selection (and the practical implications for project management of the form of contract selected) and ensure this advice is followed and understood by project teams and key advisers.

a. If NEC3 is selected, they should obtain specialist legal advice on the then current position on the 'obligation of cooperation', ensure it is understood, and in due course meet the selected contractor to agree a protocol for its

operation.

b. In such cases, health boards must have in place mechanical and engineering support to mirror that available to the contractor, including architects, structural engineers, M&E engineers and other such experts. This should be incorporated into the NHS Assure KSAR review check list.

c. Health boards should ensure the appointment of a suitably qualified and experienced construction professional during such contracts who has the remit to ensure the works meet the ERs (or equivalent), including any regulatory or guidance requirements. This person should report regularly to the project board and certify compliance to the health board before it accepts the building from the contractor is practically complete.

1877. In order to ensure, as funders, and in the public interest, that such contracts are in all respects satisfactory to them and meet their requirements, the Scottish Government should instruct specialist legal advice and representation in all major healthcare projects during the period between the approval of the OBC and contract signature. This recommendation is made in the belief that the most significant issue with the building systems of the QEUH/RHC, arose from a decision, made in the final weeks before contract signature, by a Project Team that did not understand the implications of its decision. It seems unlikely that the systems now introduced by NHS Assure would have been able to influence the decision, had they been in place.

1878. The SCIM should be amended so that in all major healthcare construction projects there should be a requirement that suitably qualified and experienced external professionals should be instructed as Project Managers (or equivalent), and that as funder the Scottish Government should be informed who they are to be and the scope of their instructions.

1879. NHS NSS should produce a template for COSs or other means by which clinical requirements and required protective environment for an area are to be set out in a construction contract, which should provide for clinical involvement, and approval by both senior clinical leadership from the relevant specialism and the Board IPC senior management team.

1880. NSS Assure should review the present practice of simply listing guidance such as SHTM as compulsory within specifications and employers' requirements, with a view to also adding headlines or key points from that guidance for insertion in any contract. The requirement for compliance with guidance such as SHTM should be highlighted within the employers' requirements and other schedules of the contract.

1881. NSS Assure should conclude as soon as possible their work on a ‘Once for Scotland’ process for agreeing, authorising and recording any derogation from guidance such as SHTM (which should otherwise be regarded as compulsory).

1882. Contracts for major projects should contain provisions to ensure validation of the ventilation systems under SHTM 03-01 is (a) included in the contract programme, and (b) a step required before the Board is required to accept handover of all or any part of the project.

1883. A ‘Loop Back’ pause should be built-in to major healthcare construction contracts prior to FBC and authorisation to proceed, to provide, before construction commences, for a meeting (or meetings) where finalised designs can be checked and confirmed with the client team, including clinicians and IPC, before matters proceed. It is of critical importance that the design process be finalised before the construction stage commences.

1884. Having regard to the special vulnerabilities of occupiers of healthcare buildings, contracts for major projects should include provision for aiming to eliminate open pipe-ends for pipework and open ventilation ducts awaiting assembly, with contractors required to produce a method statement for approval by the Board showing how that is to be achieved. That should then be monitored by Board representatives and contractors during construction.

10.2.2 HAI-SCRIBE

1885. While the current HAI-Scribe process is - or should be - practical to use for smaller scale works, such as a ward refurbishment, carrying out the HAI Scribe process for a large new-build hospital or large-scale project may not be. NHS NSS should review the HAI-Scribe process and produce a specific

volume and process for use in larger scale projects. This should include:

a. A requirement to invest in the organisational development and training of the IPC team in relation to the functions and tasks that they will be required to carry out in the course of progress after OBC approval and well in advance of the building opening.

b. a specifically allocated and seconded ICD in addition to any seconded ICNs to support the Project Team for the duration of the project.

c. Over and above the secondment of IPC clinicians to any project team, the completed HAI-Scribe at each stage of the project should be subject to approval by the Board's IPC SMT, comprising the Director of IPC or ICM, the Lead ICD and the Lead ICN.

1886. Stage 4 of HAI-SCRIBE should include a requirement to confirm that all appointments under SHTM 04-01 (Responsible, Designated and Authorised Persons and Authorising Engineer) for any new or refurbished hospital or healthcare facility are in place in advance of building handover.

10.2.3 Safe operation of water and ventilation systems of new hospitals

1887. The SCIM should contain a requirement that, from at least the OBC stage and continuing until handover, the team developing a new hospital procurement project receive substantive and regular input from Estates personnel who will be involved in post-handover estates management.

1888. The SCIM should contain a requirement that the FBC contain a justification of a sufficient budget for the continued maintenance and operation of the building and its systems, that will ensure compliance with regulations and guidance and safe operation of systems, prioritising patient safety and safeguarding staff well-being, along with confirmation of a contingency budget provision in case the maintenance and operation of the systems of the new hospital requires more resource than anticipated.

1889. During the construction phase, where there is a time gap between pressure testing and commissioning, a healthcare facility domestic water system must either (a) not be pre-filled, with all pressure testing of the water distribution

system being carried out with air/inert gases (pneumatic testing), or (b) if the water system is pre-filled, then it must be managed from that point in compliance with SHTM 04-01 as an operational water system.

1890. All major healthcare construction contracts must contain provisions mandating that all the requirements for an effective Planned Preventative Maintenance regime are in place, to the entire satisfaction of the Board and its Water Safety Group and Ventilation Safety Group, before the Board is required to accept handover.

10.2.4 Training

1891. All Board officials likely to have any interface, formal or informal, with any large health procurement project should undergo training on (a) adopting an approach of constant check and challenge, (b) refusing to accept unvouched oral assurances on any matter of importance, and (c) that there is no requirement of deference to Project Teams. Project Teams (and contractor representatives) should be advised in advance to expect, and welcome, such scrutiny and the requirement to establish compliance.

10.2.5 HAI Reporting and Investigation

1892. The Scottish Government should obtain for the Chief Executive of NHS NSS a statutory power to send a formal report on the compliance of a Board with the HAI reporting requirements of Chapter 3 of the NIPCM to the Chair of that board, and to require that they place the report before the full board, that the board consider its implications and responds to NSS promptly thereafter.

1893. So that health boards comply with the most up to date version of the NIPCM when considering whether or not to report infections, the practice of health boards writing their own SOPs on HAI reporting should cease and be superseded by national compliance with the current version of the National Infection and Prevention Control Manual. NHS ARHAI should be involved in training to ensure full alignment on national guidance.

1894. The NIPCM should include advice on how, in larger outbreaks and infection incidents, an IMT and the work of the IPC Team should report to and integrate

with the executive management of the hospital and board so that lines of responsibility are clear between the Chair of the IMT and the wider management of the board.

10.2.6 Communications

1895. Open, clear and transparent communications are necessary. Scottish Government should ensure that there is a clear and consistent communication strategy adopted across all Health Boards, promoting honest, timeous, patient-centred and transparent communications with patients and families.

10.2.7 Healthcare Governance

1896. Scottish Government should review its statutory powers and consider widening of the options available in the event of issues arising with a health board. They should give consideration to:

a. Ending the practice by which the Chief Executive, Medical Director, Director of Public Health and other senior executive staff of a health board are members of that board.

b. Obtaining the power, short of current Level 5 of intervention under the NHS Scotland Board Performance Framework, which would enable the Scottish Ministers to remove a specific board member or members, the Chair or any executive, and specifically to remove the Chief Executive, if satisfied of the need to do so in the interest of proper provision of healthcare. Contracts of employment of executives in Boards should contain appropriate provisions reflective of, and allowing for, such action, and

c. Obtaining the power to introduce Commissioners to run the business of a health board and resolve issues, leaving the board members in place to learn lessons and hold the corporate management team to account.

1897. Scottish Government should review whether there is a need for a Regulator for the NHS in Scotland to oversee and enforce performance of IPC practice and HAI reporting. It may be possible to extend the powers of HIS, but the regulator should not be NHS Assure (due to their cultural emphasis on

cooperation).

10.3 Proposed Recommendations addressed to NHS GGC

1898. NHS GGC should acknowledge the risk of airborne infections posed to immunocompromised patients accommodated in general wards at the QEUH/RHC, by recording it on the corporate risk register, carrying out a rigorous risk assessment, and implementing appropriate policies for the management and accommodation of immunocompromised patients when specialist wards are not available to them. This risk should be reviewed on the corporate risk register until such time as appropriate actions and policies are implemented by NHS GGC to the satisfaction of NHS Assure.

1899. Pending the carrying out of a risk assessment of the ventilation of the single patient rooms in the hospital that receive air supply at or about 40 litres per second, NHS GGC should implement, with immediate effect, a limit on no more than four persons (in addition to the patient) being in any patient bedroom, other than when urgently required for clinical reasons.

1900. NHS GGC Board members, members of the Corporate Management Team and management staff should undergo compulsory training with the aim of:

a. Inculcating an approach of constant questioning and challenge of areas under their remit. That training should include (a) the dangers of making assumptions on compliance and (b) how to wholly eliminate the approach of ‘exception reporting’, where issues and problems do not come to the attention of the next stage in the hierarchy unless reported up.

b. Demonstrating the importance of understanding the reasons for failure and underperformance in areas under their remit. That training should include discussion of how an approach of 'looking forward' or focusing on 'moving forward' runs the real risk that without investigation similar mistakes will be made in the future and remedial steps will not resolve the underlying cause.

c. Demonstrating the value to the safety of patients and the delivery of patient-centred care of encouraging and commending staff for disclosing evidence of wrongdoing, failures in performance or inadequacies of

system by specific reference to the report of the 'Freedom to Speak Up Review'.

1901. That in order to ensure that patients, the public and staff have confidence that the NHS GGC Way Forward Programme encourages staff disclosing evidence of wrongdoing, failures in performance or inadequacies of system, the NHS GGC Board should issue a clear and public statement at a public meeting of the Board that:

    a. It has in the past not always encouraged staff for disclosing evidence of wrongdoing, failures in performance or inadequacies of system.

    b. That in respect of Dr Redding and Dr Peters it was wholly unacceptable that they were required to raise issues with the Cabinet Secretary for Health in January 2019 and that it owes them an apology for failing to act promptly on issues of patient safety raised by Dr Peters and Dr Inkster in July 2015.

    c. That in respect of Dr Inkster it owes her an apology for the way she was removed as Chair of the Ward 6A IMT in August 2019 and an acknowledgement that, if not addressed, such treatment of the Chair of an IMT is likely to discourage other staff in the future from speaking up.

    d. That the issues raised by Dr Inkster, Dr Redding, Dr Peters and other whistleblowers about the water and ventilation systems of the QEUH/RHC from 2015 to 2020 were validly raised and substantially well-founded.

1902. NHS GGC must institute a programme of comprehensive training to address lack of technical knowledge and experience within estates and facilities, in particular when large scale water and ventilation systems are involved. In respect of Authorised Person and other relevant post holder appointments, at the point of making appointments the Board must ensure that all post holders appointed (a) carry out mandatory training which includes shadowing a current post holder and (b) have opportunity to spend six months familiarising themselves with the current system.

1903. To ensure adequate reporting to the Board of operational compliance and any necessary improvement works for the water and ventilation system, an annual

review of all annual verifications of equipment and systems and timely corrective action to identified issues and a statement of current provision of maintenance and management staff and budget should be reported to the Board every year.

1904. The NHS GGC Board should consider the Report of this Inquiry and carry out a thorough review of decision-making that is the subject of criticism in the Inquiry Report, to identify lessons that should be learned by that organisation. The product of that review should be published, forwarded to the Cabinet Secretary for Health and considered at a public meeting of the full Board within six months of the publication of the final Report.

1905. In light of Professor Gardner's evidence (and some of the challenges that approach potentially faces), NHS GGC should report to Scottish Government in 6, 12 ,18 and 24 months' time (continuing thereafter if necessary) on progress to deliver the recommendations of this Inquiry, and each report should be published.

10.4 Proposed Recommendation addressed to the Health, Social Care and Sport Committee of the Scottish Parliament

1906. In light of the recommendation of the House of Lords Report - Public inquiries: Enhancing Public Trust, 2024, HL Paper 9 - that parliament take a role in the monitoring of the implementation of the recommendations of public inquiries eighteen months after the publication of the final report, the Scottish Parliament Health, Social Care and Sport Committee should carry out a retrospective review of the implementation of the recommendations of the Inquiry so as to ensure that all are being addressed by the organisations to whom they are addressed.

Fred Mackintosh KC
Craig Connal KC
Graham Maciver, Advocate
Neil Morrison, Advocate

21 November 2025