SCOTTISH HOSPITALS INQUIRY

Provisional Position Paper 13

Queen Elizabeth University Hospital and Royal Hospital for Children

Procurement History and Building Contract

Contents

1. PART 1: INTRODUCTION, PRFs and QUESTIONS

1.1 PPP Outline

This Provisional Position Paper ("PPP") consists of:

Part 1: Introduction, Potentially Relevant Features, and Questions for CPs
Part 2: The Building Contract
Part 3: Chronological Narrative

Appendix A: Terms of Reference (extract)
Appendix B: Key Organisations
Appendix C: Timeline - Key Dates

Note that there is likely to be some overlap between some of the issues identified in this PPP and matters to be addressed in a later Governance PPP to be produced by the Inquiry Team.

1.2 PPP Purpose

This PPP has been produced to assist the Chair in addressing the Remit and Terms of Reference by providing the factual matrix and identifying potentially relevant features relating to:

- the procurement by NHS Greater Glasgow and Clyde ("GGC") of the Queen Elizabeth University Hospital/Royal Hospital for Children ("QEUH/RHC"), Glasgow; and

- the contract between Brookfield Construction (UK) Limited ("Brookfield") and Greater Glasgow Health Board ("GGC") for the design and build of the QEUH/RHC dated 18 December 2009 (the "Building Contract").

The issues considered in this PPP are of particular relevance to Terms of Reference 2, 3C, 4 and 6. Understanding how the QEUH/RHC project was defined and then procured, how it was that the contract between GGC and its building contractor came to be in the form that it was agreed, what the terms of that contract were and how it came to be applied during the construction process, all provide the vital context and factual underpinning for many of the questions that arise from those Terms of Reference. The Terms of Reference referred to above have been reproduced in Appendix A for ease of reference.

Earlier this year, the Inquiry issued Provisional Position Paper 11 titled: "Potentially Deficient Features of the water system of the QEUH/RHC" ("PPP 11") and Provisional Position Paper 12 titled: "Potentially Deficient Features of the ventilation system of the Queen Elizabeth University Hospital And the Royal Hospital for Children" ("PPP 12"). Those PPPs set out features of the ventilation and water systems that did or do not conform to statutory regulations or other

recommendations, guidance, or good practice[1] ("Potentially Deficient Features"). Core Participants have commented on PPP 11 and PPP 12 and the Inquiry Team is now considering those responses.

PPP 11 and PPP 12 raised concerns that certain Potentially Deficient Features of the ventilation and water systems might have a root in the Building Contract that governed the construction of the QEUH/RHC. This PPP sets out the results of further investigations by the Inquiry Team into that contract, and into the question of whether those Potentially Deficient Features can be linked to the Building Contract (either directly or indirectly) or have been contributed to by the manner in which the Building Contract was implemented by one or either party.

The reader of this PPP should note that when events are described, the companies involved will be referred to by their names at the time. There have been many changes to the identities of the various participants in these events since the Building Contract was negotiated and signed. A list of these organisations and how they relate to each other can be found in Appendix B to this PPP.

1.3 Potentially Relevant Features - Glasgow III[2]/IV[3]

The Inquiry has identified a series of decisions, events and contractual terms as being Potentially Relevant Features ("PRFs") of the procurement history in general and the Building Contract in particular.

The Inquiry intends to consider these PRFs primarily in the Glasgow IV hearing in the spring of 2025. However, since the factual matrix behind some aspects of the PRFs is not, at this stage of the Inquiry, fully understood, witnesses in the Glasgow III hearing may be asked about the events that surrounded some of these PRFs, why certain steps were taken by participants and parties and, importantly, who knew about key decisions, events, and contractual terms.

In particular, Infection Prevention and Control ('IPC') team members working at the QEUH/RHC before the handover of the hospital in January 2015 may be asked in Glasgow III what they knew about the Agreed Ventilation Derogation (see PRF 1 below); whether their views were sought at the time it was agreed; what knowledge they may have of the reasons behind it; and whether in their opinion it contributed to the need for upgrading works subsequently carried out or works that may still be required.

IPC team members working at the QEUH/RHC before the handover of the hospital in January 2015 may also be asked about the extent to which they were consulted about those parts of water and ventilation systems that now appear to amount to Potentially Deficient Features identified in PPP 11 and PPP 12 and when they were so consulted.

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[1] As explained in PPP 11 and PPP 12, the defined term of a "defect" under the Building Contract is not the same as the concept of a Potentially Deficient Feature used in the PPPs or the Key Questions identified by the Inquiry Team.
[2] Glasgow III is the Hearing commencing 19 August 2024.
[3] Glasgow IV is the Hearing due to take place in the spring of 2025.

It is intended that a number of members of the NHS GGC Estates Team may give evidence in Glasgow III about events in the months and years that followed handover in January 2015. Many of those witnesses were also in post whilst construction was underway, and some were in post before the Building Contract was agreed. Those witnesses may be asked about when they learned of the Agreed Ventilation Derogation (see PRF 1 below), whether their views were asked for, any knowledge they may have of the reasons behind it and what effect it had on the safe operation of the hospital.

1.4 Potentially Relevant Features

PRF 1: The decision by GGC and Brookfield to enter into a Building Contract under which it was apparently agreed (in a document called the "M&E Clarification Log") that Brookfield would design and deliver a ventilation system for the hospital which, at this stage of the Inquiry's investigations, appears to have been known to, and accepted by, both parties as being (a) not compliant with SHTM 03-01; and/or (b) a derogation from the Employer's Requirements (the "Agreed Ventilation Derogation").

PRF 2: The reasons for the Agreed Ventilation Derogation, in particular why it was agreed in the context of a new build hospital which was described by the then Chair of GGC at its opening on 3 July 2015 as "state-of-the-art", "magnificent new facilities" and "centres of excellence", with the prevention and control of infection a primary consideration in its design and construction.

PRF 3: The extent to which the Agreed Ventilation Derogation was driven by any of the following factors: (a) the decision to choose NEC3 Option C for the contract which meant shared financial consequences for both Brookfield and GGC if target costs (defined in the Building Contract clause 11.2(30)) were exceeded; (b) the late stage (i.e. on or around 15 December 2009, being three days before the Building Contract was signed) at which it appears to have been realised and accepted that the ventilation system designed by Brookfield and described in the Contractor's Tender Return Submission would not comply with SHTM 03-01; (c) the stage at which a decision was made that the building would be sealed or non-sealed; and (d) a contractual agreement that £250,000 would paid to Brookfield if energy targets/BREEAM ratings were achieved by the design.

PRF 4: The ambiguous scope of the Agreed Ventilation Derogation, in particular whether it covered all wards in the QEUH/RHC, including specialist wards and specialist ventilation and isolation rooms then intended to be included in the hospital, and any specialist facilities to be later added to the hospital before it opened.

PRF5: The agreement between Brookfield and GGC to include the Agreed Ventilation Derogation in a contractual document called a "M&E Clarification Log" (while at the same time not expressly amending references in the Employer's Requirements to mandatory compliance with SHTM 03-01) which may have contributed to subsequent lack of awareness of it.

PRF6: The agreement between Brookfield and GGC that the M&E Clarification Log would on a plain reading of the Building Contract take precedence over the Employer's Requirements.

PRF7: The apparent lack of awareness by a wide range of organisations and key individuals of the Agreed Ventilation Derogation, from its agreement in December 2009 to date, apart from Brookfield and a small but currently unknown number of people in GGC.

PRF8: The lack of clarity about how widely the Agreed Ventilation Derogation was consulted on (a) prior to the Building Contract being signed; and (b) during the design development stage between the Building Contract being signed on 18 December 2009 and the Authorisation to Proceed being signed on 16 December 2010.

PRF9: Whether GGC carried out, instructed to be carried out, or was aware of, any formal or informal risk assessment about the risks of the Agreed Ventilation Derogation or other alternative options for the design of a ventilation system that would achieve compliance with SHTM 03-01. The Inquiry holds no evidence to show that a formal risk assessment was carried out.

PRF 10: The omission of any reference to the Agreed Ventilation Derogation in the Full Business Case (FBC) submitted by GGC to Scottish Government.

PRF 11: Whether any lack of knowledge about the Agreed Ventilation Derogation caused opportunities to interrogate or question it to be missed from late 2009 onwards; and whether any of those missed opportunities could have led to upgrading work necessary to ensure compliance with SHTM 03-01 being carried out prior to patients occupying the hospital.

PRF 12: The extent to which GGC's agreement to the Agreed Ventilation Derogation was the principal or a significant cause of the QEUH/RHC being built with the potentially deficient features of the ventilation system identified in PPP 12.

PRF 13: The decision by GGC to reduce the scope of the services provided by their professional team during the construction phase.

PRF 14: The decision by GGC to allow Brookfield to take on the role of Independent Commissioning Engineer.

PRF 15: The lack of independent validation as recommended in NHS Guidance. The QEUH/RHC was therefore not independently validated against national standards before patients began to use the hospital.

PRF 16: Whether GGC adequately assessed the risks and the resource implications of changing the procurement model from PFI to traditional design and build. For example, assessing the importance of commissioning and validation, and ensuring sufficient resources to manage and maintain the hospital post-handover.

1.5 Procedure to be adopted

This PPP is based upon publicly available and other prominent reporting and the Inquiry's investigations across its various workstreams. The principal documents relied upon by the Inquiry Team in preparing this PPP are contained in a new bundle (Bundle 17 – Contract and Procurement) that will be available for the Glasgow III hearing.

In due course, the Chair is likely to be invited by the Inquiry Team to make findings in fact based on the content of this paper. In paragraph 1.6 below, the Inquiry Team has asked specific questions that are relevant to the issues considered in this PPP. In addition to answering these questions it is open to any Core Participant (CP) or indeed any other person holding relevant information, to seek to correct and/or contradict it by way of response. In considering those responses, and in taking forward its investigations, it is therefore possible that the Inquiry's understanding of matters may change. If it is the case that the Inquiry's understanding does change significantly, a revised edition of this paper may be issued in due course.

While it is possible that the matters covered in this paper will be touched upon to a greater or lesser extent at a subsequent hearing held by the Inquiry – something that may also change the Inquiry's understanding of matters – this is not guaranteed. If Core Participants wish to address the issues dealt within in this PPP, then they are invited to do so now. In the absence of a response on a matter, the Chair is likely to be invited by the Inquiry team to make findings in fact based on the content of this PPP.

It should be emphasised that Section 2 of the Inquiries Act 2005 provides that an inquiry is not to rule on, and has no power to determine, any person's civil or criminal liability. Accordingly, in the context of the Scottish Hospitals Inquiry's investigations into the matters falling within its remit in relation to QEUH/RHC, the issue of any liability arising under the Building Contract, or other contractual arrangements including those appointing professional consultants, is not a question for the Inquiry to rule on or determine. The Inquiry understands that the issue of whether there was non-compliance with the Building Contract or other contracts, and the consequences of any non-compliance, are controversial. While nothing in this paper should be taken as seeking to determine what the respective civil liabilities of the parties were or may be, it is clearly impossible for the Inquiry to fulfil its Terms of Reference without having regard to the development of the Building Contract and the related appointments. This PPP's examination of the contractual standards should therefore not be read as offering a view or otherwise commenting on the respective legal rights and obligations of the parties involved; its purpose is to enable the Inquiry to fulfil its Terms of Reference.

1.6 Questions for CPs

The issues covered by this PPP address, to a significant measure, the actions of parties to the Building Contract, the consultants employed by parties and those organisations involved in the strategic definition, preparation and brief, concept design and procurement of the QEUH/RHC. These events took place many years

ago and most of the contractual parties are not natural persons but limited companies or statutory bodies. It is the position of the company or statutory body (as opposed to individual employees or officers) that is sought by these questions. The Inquiry reserves the right to make the questions for specific CPs set out in this PPP (or questions ultimately derived from them) the subject of a notice under section 21(2)(a) of the Inquiries Act 2005.

1.6.1 Questions for all CPs

The narrative

(a) Is the narrative described in Parts 2 (The Building Contract) and 3 (Chronology) accepted as an accurate history of what occurred?

(b) With regard to the Agreed Ventilation Derogation in particular, and subject to the answers given to the specific questions noted below,

(i) are the events around the Agreed Ventilation Derogation correctly described; and

(ii) does this PPP report all relevant contemporaneous communication around the time of the Agreed Ventilation Derogation?

If there are any points in respect of which a CP challenges the description of events, CPs should identify what the points of disagreement are and what evidence exists to support the position taken by the CP.

(c) Are CPs aware of other matters that ought to be part of the narrative? If so, please explain them and refer to what evidence exists (including in existing Inquiry bundles) to support them.

(d) Is the description of the Building Contract terms in this PPP accurate? It is noted that CPs may not accept that the contract terms described in this PPP have been breached.

(e) Are CPs aware of any other features of the Building Contract which should be considered by the Inquiry as being relevant to the water or ventilation systems?

(f) Are CPs of the view that the ventilation and water systems did not, at the time of handover of the QEUH/RHC to NHS GGC in January 2015, comply with all relevant statutory regulations or other applicable recommendations, guidance, or good practice? Is so, when did CPs become aware of this?

Potentially Relevant Features

(g) In respect of the PRFs identified in paragraph 1.4, do Core Participants:

(i) agree that each of the PRFs are relevant to the remit and Terms of Reference of the Inquiry;

(ii) have any comments or explanations which they wish to make in respect of any of the PRFs?

1.6.2 Specific questions for Currie & Brown, Brookfield/Multiplex, IBI Group UK and TUV SUD/Wallace Whittle

(a) Was the ventilation design strategy, at the date of the Contractor's Tender Return Submission (11 September 2009), a mixed mode ventilation system (dependent on a non-sealed building) or a mechanical ventilation system (dependent on a sealed building)?

(b) Do you accept that the design and/or specification of the ventilation system as recorded in the Building Contract, in particular in the M&E Clarification Log, was not compliant with NHS Guidance?

If you accept that it was not compliant, please explain (a) why this design was proposed; and/or (b) why this design was accepted.

If you are of the view that it was compliant, please explain why, with particular reference to SHTM 03-01 2009 (Ventilation Design).

(c) What was the scope of the Agreed Ventilation Derogation recorded in the M&E Clarification Log?

In particular, was it restricted to general wards only? If so, (a) how is this interpretation evidenced within the documentation; and (b) where is the specification located for areas that required specialist ventilation and isolation rooms?

(d) Was GGC aware of the ZBP Ventilation Strategy Paper dated on or around 15 December 2009 (other than potentially being sent a copy for the sole purpose of printing it)?

1.6.3 Specific questions for GGC

(a) Did you understand the ventilation design strategy contained in the Contractor's Tender Return Submission (11 September 2009) to be a mixed mode ventilation system (dependant on a non-sealed building) or a mechanical ventilation system (dependent on a sealed building)?

(b) Do you accept that the design and/or specification of the ventilation system as recorded in the Building Contract, in particular in the M&E Clarification Log, was not compliant with NHS Guidance?

If you accept that it was not compliant, please explain (a) why this design was proposed; and (b) why this design was accepted.

If you of the view that it was compliant, please explain why, with particular reference to SHTM 03-01 2009 (Ventilation Design).

(c) What was the scope of the Agreed Ventilation Derogation recorded in the M&E Clarification Log?

> In particular, was it restricted to general wards only? If so, (a) how is this interpretation evidenced within the documentation; and (b) where is the specification located for areas that required specialist ventilation and isolation rooms?

(d) Was GGC aware of the ZBP Ventilation Strategy Paper dated on or around 15 December 2009 (other than potentially being sent a copy for the sole purpose of printing it)?

(e) What risk assessments (if any), whether in compliance with the standards in HAI Scribe or otherwise, did GGC carry out or have carried out in respect of the change in the ventilation strategy that appears to follow the ZBP Ventilation Strategy Paper dated 15 December 2009?

1.6.4 Specific questions for NHS NSS and the Scottish Government

(a) When did you first become aware of the Agreed Ventilation Derogation?

(b) Were you aware of any risk assessment being carried out in connection with the Agreed Ventilation Derogation? If you have any relevant documents, please provide them.

Please be aware that all responses to this PPP received by the Inquiry will be published on its website as soon as possible after the deadline for responses has passed.

2. PART 2: THE BUILDING CONTRACT

2.1 Introduction

This section of the PPP describes the documents forming the Building Contract entered into for the design and construction of the QEUH/RHC, and the contractual terms within those documents that the Inquiry currently understands may be potentially relevant to the Potentially Deficient Features in Provisional Position Paper 11 titled: "Potentially Deficient Features of the water system of the QEUH/RHC" ("PPP 11") and Provisional Position Paper 12 titled: "Potentially Deficient Features of the ventilation system of the Queen Elizabeth University Hospital And the Royal Hospital for Children" ("PPP 12").

The identification of relevant contract terms in this PPP is not to the exclusion of other terms which may be relevant.

It is possible that documents relevant to this PPP or to the Terms of Reference have not yet been identified by (or are not yet in the possession of) the Inquiry or were not otherwise available when drafting this PPP. Further documents may come to light in CP responses and as the Inquiry continues to fulfil its Terms of Reference.

2.1.1 Contractual agreement to derogate from SHTM 03-01 re ventilation

The Inquiry Team reached the preliminary conclusion in PPP 12 (ventilation) that, within the contract documentation, a document entitled "The M&E Clarification Log (2010 ItP) – Final" was important.

The Inquiry team has now considered that document in the context of the Building Contract. It appears that GGC and Brookfield agreed in the Building Contract signed by them on 18 December 2009 (more specifically in one of the contractual documents called the "M&E Clarification Log") that Brookfield would design and deliver a ventilation system for the hospital which, at this stage of the Inquiry's investigations, appears to have been known to, and accepted by, both parties as being (a) not compliant with SHTM 03-01; and/or (b) a derogation from the Employer's Requirements.

For ease of reference, it is called the "Agreed Ventilation Derogation" in this PPP (see PRF1).

The M&E Clarification Log contains an entry in the section "Bid Submission - Vol 2 drawings": "Board Comment":

> "Ward Air change to be 6AC/HR, currently shown as 2.5 AC/HR which is not in compliance with SHTM 03-01".

Brookfield's response is recorded as:

> "Brookfield proposal as outlined within the bid submission is to incorporate chilled beams as a low energy solution to control the environment which do not rely on large volumes of treated air or variable natural ventilation. All accommodation is single bedrooms and therefore the need for dilution of airborne microbiological contamination should be reduced (rooms could also be at slightly negative pressure to corridor). Providing 6 air changes is energy intensive and not necessary."

The agreed position is then noted as:

> "The proposal is accepted on the basis of 40 litres per second per single room (8 litres per second per second) for one patient and four others…Negative pressure to be created in the design solution."

On a plain reading, this appears to apply to the whole hospital. However, the Inquiry is aware that the scope may be restricted only to general wards in the QEUH/RHC as built.

A key purpose of this Part 2 of the PPP (The Building Contract) is to understand (to the extent necessary to answer the Inquiry's remit and Terms of Reference) why this entry in the M&E Clarification Log was agreed and how it is relevant to the Potentially Deficient Features identified in PPPs 11 and 12. To do that, this PPP explores the documents comprising the Building Contract.

2.1.2 Building Contract – production of documents

Building contracts are renowned for the complexity of their legal and technical content as well as the multiple documents which are included in technical appendices and/or incorporated by reference. This PPP draws out those parts of the Building Contract that the Inquiry Team considers of significance to the Inquiry.

The Inquiry will only produce in the bundle relating to this PPP (Bundle 17) those parts of the Building Contract which have been identified as relevant to this PPP. Other parts of the Building Contract (such as Employer's Requirements Volume 2/1 Appendix B Clinical Output Specifications) are produced in the bundles relating to the PPPs in which they are expressly referred to.

2.1.3 Building Contract – key dates and documents

This paragraph briefly highlights the following dates and documents to (a) provide context for more detailed narratives of the Building Contract terms later in this part of the PPP; and (b) ensure that the documents which make up the Building Contract are produced in the bundle relating to this PPP in a logical order.

1 May 2009 - IPCD

Following the advertising of the tender for the construction works, GGC issued to three selected bidders the "Invitation to Participate in Competitive Dialogue" (IPCD).

The IPCD comprised three volumes and multiple appendices containing technical information and drawings. The following are produced:

- **Volume 1 Project Scope and Commercial**[4]. This provided an overview and outlined the scope and commercial parameters of the project. It set out the background to the project, outlined the detailed procurement process and timetable, identified the competitive dialogue process and incorporated the draft construction contract.

- **Volume 2/1 Employer's Requirements**[5]. This set out the technical and clinical requirements of the Board. Three of the appendices are also produced:

  Volume 2/1 Appendix K Design Development (FBC and Overall Design Requirements)[6]
  Volume 2/1 Appendix M M&E (parts 1-7)[7]
  Volume 2/1 Appendix U BREEAM Design Guide[8].

- **Volume 3 Bids Deliverables and Evaluation**[9]. This detailed the range of deliverables required from bidders and the evaluation strategy and scoring approach to be applied by the Board. The scoring approach is outwith the scope of this PPP but will be considered in the Governance PPP.

May to August 2009 - competitive dialogue period

During these four months, GGC and its team of professional advisors met with each of the three selected bidders in a series of 16 scheduled meetings to discuss and clarify the Board's requirements in four main areas of the project: design, site logistics, laboratories, commercial.

[4] A35184454 - IPCD Volume 1 Project Scope and Commercial Document - (iss1 rev1) - May 2009.
[5] A35761303 - IPCD Volume 2/1 Employer's Requirements - May 2009, Bundle for Oral hearing commencing 19 August 2024 - Bundle 16 - Page 1357.
[6] A33010737 - IPCD Volume 2/1 Employer's Requirements Appendix K Design Development - (Updated Revision 1) - May 2009.
[7] A35762133 - IPCD Volume 2/1 Employer's Requirements Appendix M M&E.1 Building Services and Utility Connections - May 2009.
A35762137 - IPCD Volume 2/1 Employer's Requirements Appendix M M&E.2 Base Building Loads - May 2009.
A35185420 - IPCD Volume 2/1 Employer's Requirements Appendix M M&E.3 Plant Strategy and Design Criteria – May 2009, Bundle for Oral hearing commencing 19 August 2024 - Bundle 16 - Page 1592.
A35185421 - IPCD Volume 2/1 Employer's Requirements Appendix M M&E.4 Sustainable Design Considerations - May 2009.
A35185440 - IPCD Volume 2/1 Employer's Requirements Appendix M M&E.5 Integrated Building Management System - May 2009.
A35185464 - IPCD Volume 2/1 Employer's Requirements Appendix M M&E.6 Renal Water - May 2009.
[8] A35761788 - IPCD Volume Employer's Requirements 2/1 Appendix U BREEAM Design Guide - May 2009.
[9] A35186047 - IPCD Volume 3 Bid Deliverables and Evaluation - May 2009.

11 September 2009 - Contractor's Tender Return Submission

Brookfield submitted their Contractor's Tender Return Submission. This is sometimes referred to as the Contractor's Proposals or the Contractor's Tender Return. It comprised 10 volumes. The following three volumes are produced[10]:

- Volume 3 Design Narratives[11]
- Volume 4 Specifications[12]
- Volume 7 SHTM[13]

18 December 2009 - the Building Contract is signed

The Building Contract between Greater Glasgow Health Board and Brookfield was signed on 18 December 2009. As explained in the following paragraphs, this incorporated Volume 2 of the Employer's Requirements and the Contractor's Tender Return Submission as amended by certain documents including documents called logs. The following parts are produced:

- The Agreement[14]
- The Conditions[15]
- The Logs (known as the 2009 Logs to differentiate them from the 2010 versions of the Logs by which they were superseded when the Authorisation to Proceed was signed on 16 December 2010). The Logs were the:

  M&E Clarification Log[16]
  BIW Log[17]
  RFI Log[18]
  Clarification Log [19]
  Laboratory Log [20]
  Sustainability Log[21]

[10] The Contractor's Tender Return Submission is incorporated into the Building Contract, as amended. See the following section of this PPP for more information.
[11] A32758374 - Contractor Submission Volume 3 1-3.33 Design Strategies - 11 September 2009, Bundle for Oral hearing commencing 19 August 2024 - Bundle 18 Volume 1 - Page 205. Note Water Services and Drainage Design Strategy (page 101 of document/page 305 of Bundle 18 Volume 1); Heating Design Strategy (page 103 of document/page 307 of Bundle 18 Volume 1); Ventilation and Air Treatment Design Strategy (page 107 of document/page 311 of Bundle 18 Volume 1).
[12] A33015497 - Contractor Submission Volume 4 Specification 4.5-4.57 - 11 September 2009.
[13] A33015508 - Contractor Submission Volume 7 SHTM Compliance - 11 September 2009.
[14] A32372025 - Agreement between Greater Glasgow Health Board and Brookfield Construction Limited - 18 December 2009.
[15] A35761216 - NEC3 Engineering and Construction Contract June 2005 Option C: Target contract with activity schedule - June 2005.
[16] A48743675 - M&E Clarification Log - 2009.
[17] A35762552 - BIW Log - 2009.
[18] A33010812 - RFI Log - 2009.
[19] A33010815 - Clarification Log - 2009.
[20] Not relevant to this PPP.
[21] A33010809 - Sustainability Log - 2009.

16 December 2010 – Authorisation to Proceed

A year after the Building Contract was signed, Greater Glasgow Health Board issued the Authorisation to Proceed[22] with the construction stage. This document is sometimes referred to as the Instruction to Proceed or ITP. It captured the agreed changes in the design development stage during the previous year and modified the Building Contract in respect of them. It was signed in a form conforming to Appendices 2 and 3 of the Building Contract signed on 18 December 2009. It included 2010 versions of the logs previously agreed in the Building Contract in their 2009 versions.

The following parts are produced:

- The Authorisation to Proceed[23]
- The following Logs known as the 2010 Logs (to differentiate them from the 2009 Logs incorporated into the Building Contract dated 18 December 2009). They were the:

  BIW Log (2010ItP) (FINAL)[24],
  RFI Log (2010ItP) (FINAL)[25],
  Clarification Log (2010ItP) (FINAL) [26],
  M&E Clarification Log (2010ItP) (FINAL)[27],
  Laboratory Log (2010ItP) (FINAL) [28],
  Sustainability Log (2010ItP) (FINAL).[29]
  A new log was also agreed, namely the Stage 3 Instruction to Proceed Log December 2010[30].

The Inquiry is particularly interested in the M&E Clarification Log (2010ItP) - (FINAL)[31].

The Agreement to Proceed states at Clause 3.v. that "Contract Data Part One and Contract Data Part Two forming part of the executed Contract dated 18 December 2009, is amended and supplemented" by the 2010 Logs.

[22] A32421449 - Authorisation to Proceed - 16 December 2010.
[23] A32421449 - Authorisation to Proceed - 16 December 2010.
[24] A35761406 - BIW Log (2010 ItP) FINAL - 2010.
[25] A35761414 - RFI Log (2010 ItP) FINAL- 2010.
[26] A33015736 - Clarification Log (2010 ItP) FINAL - 2010.
[27] A35761409 - M&E Clarification Log (2010 ItP) FINAL - 2010, Bundle for Oral hearing commencing 19 August 2024 - Bundle 16 - Page 1662.
[28] Not relevant to this PPP.
[29] A35761402 - Sustainability Log (2010 ItP) FINAL - 2010.
[30] A35806194 - Instruction to Proceed Log - 2010.
[31] A35761409 - M&E Clarification Log (2010 ItP) FINAL - 2010, Bundle for Oral hearing commencing 19 August 2024 - Bundle 16 - Page 1662.

A 2010 Instruction to Proceed Bible Index[32] was prepared capturing the differences between the Building Contract (18 December 2009) and the Authorisation to Proceed (16 December 2010). It is not known if it was a contract document.

2.2 Documents comprising the Building Contract

Brookfield Construction (UK) Limited ("Brookfield") and Greater Glasgow Health Board ("GGC") entered into a contract for the design and build of the QEUH/RHC dated 18 December 2009 (the "Building Contract"). The Building Contract was for the management and delivery of design and construction services for the New South Glasgow Hospital subsequently known as the QUEH/RHC.

Clause 6 of the Building Contract lists the documents forming part of that contract. These are:

> "6.1 this Agreement
> 6.2 the conditions of contract[33],
> 6.3 Contract Data part one including Works Information – data provided by the Employer
> 6.4 the Contractor's Tender Return Submission dated 10 September 2009 including:
> (i) Contract Data part two – Data provided by the Contractor"

A brief overview of these four elements of the Building Contract is provided below[34].

2.2.1 The Agreement

The four-page main agreement consists of a short preamble and seven clauses.

The preamble sets out that the Employer, Greater Glasgow Health Board, wishes the Contractor, Brookfield Construction (UK) Limited, to provide the Works for the New South Glasgow Hospital comprising "the management and delivery of design and construction services" for four stages of work (i.e. Stages 1, 2, 3 and 3A where only stages 2 and 3 are relevant to this PPP) as defined, i.e.:

Stage	Heading	Outline Activities
1	Design and Construct Laboratories	Detailed design and construction of the Laboratories and FM Hub. Concurrent with Stage 2.

[32] A33018486 - NSGH Instruction to Proceed Bible Index - 2010.
[33] It is a feature of the NEC form of contract that some terms are narrated in italics e.g. "*conditions of contract*", "*works*", "*Employer*", *"Project Manager*", "*Supervisor*". The Contract Data part one states what these terms mean e.g. "*conditions of contract*" is stated to be the core clauses of the NEC form of contract and the clauses for main Option C together with stated additional secondary options (see paragraph 2.2.2 of this PPP); the *Employer* is stated to be Greater Glasgow Health Board; *the Project Manager* is stated to be Peter Moir, the *Supervisor* is stated to be Peter Moir. The contractual clauses which are reproduced in this PPP do not retain the italics. The original clause in the Building Contract should be referred to if the specific contractual meanings of these terms is likely to be of relevance.
[34] It is noted that 'Contract Documents' is a defined term in the Building Contract (per clause 11.2(35) of the Conditions of Contract as amended).

2	Design Development – New Hospitals Building	Detailed design of the New Adult Acute and New Children's Hospitals to Full Business Case Submission. Concurrent with Stage 1.
3	Design and Construct New Hospitals Building	Design and Construction of New Adult Acute and New Children's Hospitals and Energy Centre. Consecutive to Stage 2.
3A	Demolition of Surgery Block	Demolition of surgical block and associated buildings and completion of soft landscaping.

Clause 1 provides that the Contractor "will provide the Works in accordance with the NEC Engineering and Construction Contract, Option C: Target contract with activity schedules, June 2005 (as the same are amended by the Contract Data) ('the conditions of contract') and the principles stated in Appendix 1 of this Agreement."

Clauses 2 to 4 concern the pricing and payment terms for the Stages.

Clause 5 provides that at the Contract Date the contractor is authorised to proceed with Stages 1 and 2 only, and that the contractor would only be authorised to proceed with Stage 3 upon written authority being provided by the Employer (GGC) in the form attached as Appendix 2 to the Building Contract. The effect is that the Building Contract is a "two-stage" contract as a separate authorisation ("Authorisation to Proceed") is required before starting the construction stage. Stage 3 can only commence once the Full Business Case is submitted and approved by the Scottish Government. The Full Business Case is an essential gateway which must be achieved to allow the construction of the hospital to start. It is a significant document in the history of the project. Further details are provided in Part 3 of this PPP (Chronology).

As set out above, clause 6 sets out the documents that form part of the Contract.

The final clause, clause 7, sets out the hierarchy to be given to the different contract documents in the event of conflict. The hierarchy is set out in more detail in the following section of this PPP (paragraph 2.3).

As to the three appendices to the main agreement, Appendix 1 is the "Principles governing the Agreement" and Appendices 2 and 3 are the short (one-page) forms of agreement to be entered into to authorise the contractor to proceed with Stage 3 and Stage 3A, respectively.

After these appendices, at page 13 of the Agreement, the "Contract Data Part One - Data provided by the Employer" (GGC) is provided. This includes six appendices.

The drafters of the NEC3 Option C envisaged that Contract Data part one would form part of the tender documents issued by the Client (i.e. GGC) and then Contract Data part two would be completed as part of the Contractor's (i.e. Brookfield's) tender return.

Contract Data parts one and two appear to be within the definition of the "Agreement". They are considered under separate heads below.

2.2.2 The Conditions of Contract

It is usual for construction contracts to consist of a short form agreement which incorporates standard conditions of contract (such as the conditions from the NEC suite of standard conditions) with bespoke amendments to those standard conditions negotiated between the parties. This is what happened in this Building Contract.

Clause 1 of the main Agreement defines the Conditions of Contract as "the NEC Engineering and Construction Contact, Option C: Target contract with activity schedules, June 2005[35] (as the same are amended in by the Contract Data)."[36] This definition is repeated in clause 11.2(48) of the amended Conditions of Contract.

In the Contract Data part one, the Conditions of Contract are defined as the core clauses and the clauses for main Option X, dispute resolution Option W2 and Secondary Options – X2, X4, X5, X7, X13, X18.5, Y(UK)2 and Z of the NEC3 Standard Form.

The Contract Data part one also sets out various bespoke amendments and additions to those Conditions of Contract clauses.

As to the selection of NEC3 Option C, this pricing model means that there is no contract sum. Rather, a target cost is agreed at the outset, with an incentive to the contractor to achieve or better the target in the form of a share in any savings. The contractor would therefore be paid the defined cost, plus the fee. In addition, it is paid a share of any saving against the target price (or alternatively minus a share of any excess over the target price). The Activity Schedule sets out target costs for the activities making up the works, which may be updated under clause 60 (compensation events) or clause 54.2 of the Conditions of Contract. The defined cost is defined in clause 11.2(23) of the Conditions of Contract as the amount of payments due to subcontractors and the cost of components in the Schedule of Cost Components for other work less Disallowed Cost (as defined in clause 11.2(25).

The selection of Option C has an important impact on risk profile and incentivisation. It requires detailed risk analysis and risk management and a careful setting of both the target cost and the pain/gain share percentages. It may also be important to consider this alongside the defined compensation events and how risk is allocated more broadly (such as in relation to changes to standards or legislation).

The share percentages are stated in clause 5 of Contract Data part one. In essence, under the Building Contract, Brookfield would take the majority of the gain if there was a saving, and (unless overspend was relatively limited) would be liable for the majority of the overspend if the target price was exceeded.

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[35] A35761216 - NEC3 Engineering and Construction Contract June 2005 Option C: Target contract with activity schedule - June 2005.
[36] That definition is repeated in clause 11.2(48) of the amendments to the NEC Standard Form.

2.2.3 The Contract Data part one including Works Information – data provided by the Employer

As to "the Contract Data part one including Works Information – data provided by the Employer," the Contract Data part one is set out in the Agreement.

As to what the "Works Information" includes, per the Contract Data part one, it comprises:

> "The Contract Documents: Part Five (Works Information);
> The Employer's Requirements; and
> The Contractor's Proposals including the M&E Clarification Log."

The 'Contract Documents: Part 5 (Works Information)' is understood to be a reference to "Appendix 5 to Contract Data part one: Works Information agreed relationship and hierarchy". There are six appendices to Contract Data part one. The other five appendices are: Appendix 1 – a Form of Consultant's Collateral Warranty; Appendix 2 – a Form of Sub-Contractor's Collateral Warranty; Appendix 3 – a Form of Novation Agreement (including appendixes); Appendix 4 – a Building Contractor's Parent Company Guarantee; and Appendix 6 – a Guarantee Bond.

As previously explained, the Employer's Requirements is a very detailed document. Part of the reason for this is appears to be consideration of the cost implications for bidders, as explained in clause 8.1.5 of the IPCD: "the Board has developed certain levels of Works Information (contained in Volume 2) [of the IPCD, which contain the Employer's Requirements] aimed at minimising transaction time and costs for Bidders."

Note the specific reference in the definition of the "Works Information" to the M&E Clarification Log. It appears to the Inquiry Team that this is a significant contractual document and its impact on the Building Contract and the ventilation system for the hospital that was eventually built is a key theme in this PPP.

2.2.4 Contractor's Tender Return Submission (10 September 2009) including Contract Data part two – Data provided by the Contractor

Brookfield's tender bid also forms part of the Building Contract, including Contract Data part two. The Contractor's Proposals were contained in ten volumes as follows[37]:

- Volume 1: Schedule of Accommodation
- Volume 2: Drawings
- Volume 3: Design Narratives
- Volume 4: Specifications
- Volume 5: Components

[37] As explained earlier, Volumes 3, 4 and 7 are relevant for this PPP and therefore produced in the related Bundle.

- Volume 6: Equipment
- Volume 7: SHTM
- Volume 8: ADB
- Volume 9: Programme
- Volume 10: Logistics
- Volume 11: Not used
- Volume 12: Commercial

2.3 Terms of the Building Contract relating to interpretation and hierarchy of documents

Questions of contractual hierarchy only apply in cases of inconsistency. It is therefore important to read the contractual documents together to see whether, on a proper construction, there is any inconsistency.

2.3.1 The Agreement

Clause 7 of the main Agreement sets out the overarching contractual hierarchy:

> "In the event of conflict between the documents forming part of this contract the following order of priority will apply:
>
> 7.1 This Agreement (excluding Appendix 1)
> 7.2 The conditions of contract,
> 7.3 Contract Data part one including the Works Information
> 7.4 Contract Data part two
> 7.5 Appendix 1 of this Agreement"

Thus, the Agreement (excluding its Appendix 1) is to be given the highest priority in the event of conflict between the Contract Documents.

2.3.2 The Conditions of Contract

Second in the order of priority are the Conditions of Contract (which, as a defined term, includes the amendments). In terms of construction and hierarchy, the Conditions of Contract as amended provide:

> "**12 Interpretation and the law** […]
> 12.4 This contract is the entire agreement between the Parties."
>
> "**Z1 Additions to Clause 11.2 – Identified and Defined Terms** […]
> 11.2(39) 'Employer's Requirement' is the description of the Employer's technical requirements for the works supplemented and amended by the Logs and signed by the parties for identification and deemed to be incorporated in and forming part of this Agreement."
>
> "**Z8 Addition to clause 17 – Ambiguities and inconsistencies**

17.2 The Project Manager and the Contractor agree that inconsistencies and ambiguities between (a) the NHS Mandatory Documentation and NHS Guidance Documentation and building control or (b) between the NHS Mandatory Documentation and NHS Guidance Documentation and the Schedules of Accommodation or (c) between the NHS Mandatory Documentation and NHS Guidance Documentation and any information issued to the Contractor by the Employer, will be dealt with in accordance with the procedures set out in the Works Information."

"**Z51 New Clause – Inconsistencies**
In the case of any inconsistency between these additional conditions of contract and the other terms of the contract, the additional conditions of contract prevail. In the event of any inconsistency between the Core Clauses and any other term of this contact (except these additional conditions of contact) the Core Clauses prevail."

"**Z52 New Clause – Approval**
No inspection, testing, approval or review nor any omission to inspect, test, approve or review on the part of the Employer diminishes any duty or liability under this contract of the Contractor."

2.3.3 The Contract Data part one including Works Information

Below the Conditions of Contract is the Contract Data part one.

Clause 1 of the Contract Data part one provides

"**1. General** […]
The Works Information agreed relationship and hierarchy is set out in Appendix 5 to this Contract Data Part one."

Appendix 5 to Contract data part one therefore determines the priority of documents as between the documents comprising the Works Information.

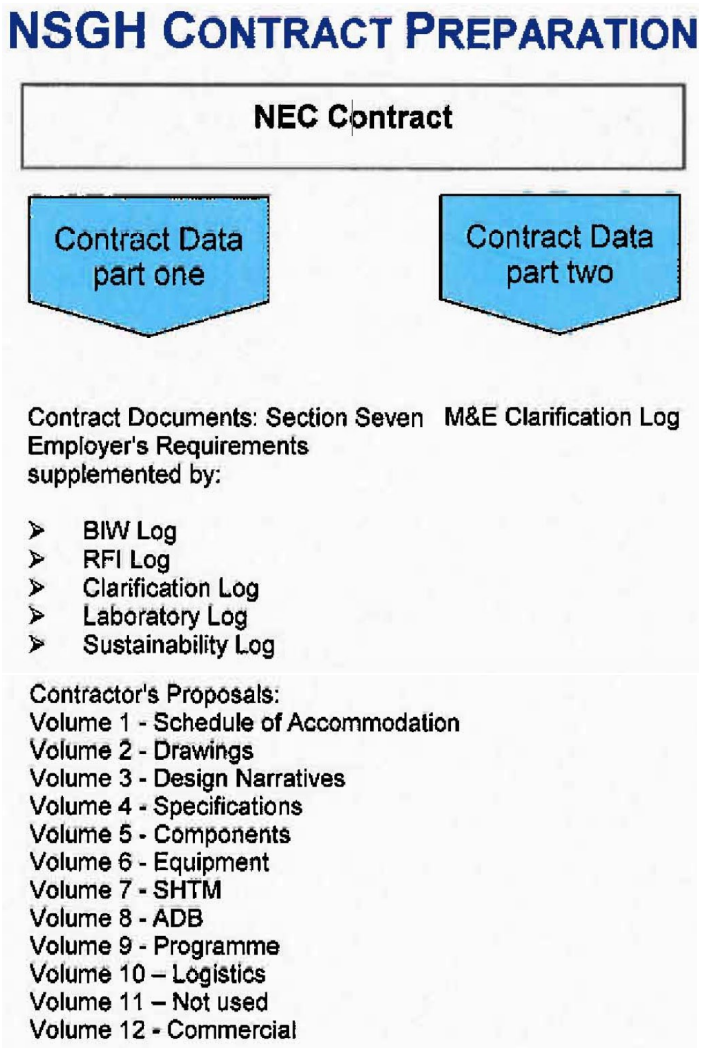
The Inquiry's current understanding is that Appendix 5 is likely to be important to its understanding of the hierarchy of documents. Appendix 5 to Contract data part one provides *inter alia* that:

"**NSGH Contract Data Part One and Part Two: Works Information Agreed relationship and hierarchy**

The contract is arranged such that the contract includes Contract Data part one and Contract Data part two. The Works Information will be wholly contained in Contract Data part one with the exception of the M&E items contained in the M&E Clarifications Log. The Works Information

therefore will be in two parts and contained in Contract Data part one and Contract Data part two.

The output requirements of the Employer in relation to the M&E Clarifications Log will be contained in the Employer's Requirements with the proposals of the Contractor in relation to the M&E Clarifications Log contained in the Contractor's Proposals Volume 1 to Volume 10 set out in Contract Data part one. The contents of Works Information is illustrated below.



It is agreed that the Employer's Requirements takes precedence over the Contractor's Proposals, with the requirements of the Employer's Requirements to be met by the Contractor as a minimum requirement. The exception to this stated hierarchy is in relation to the items contained in the M&E Clarifications Log (found in Volume 3 of the Employer's Requirements), which identifies the agreement between the parties in relation to the requirement for certain M&E items. All other aspect of M&E design require to

achieve the standards and other requirements stated in Contract Data Part One.

In order to maintain an audit trail of the status of the documents to be included in the Employer's Requirements throughout the procurement process, the Employer's Requirements in Contract Data part one is supported by a Building Information Warehouse ("BIW") Log, Request for Information ("RFI"), Additional Log and Clarifications Log (collectively known as "the Logs" which track and identify the agreed position between the parties in relation to certain technical matters and documents and identifies the documents included in the Works Information. In the event of a discrepancy between any item in the Employer's Requirements in the Employer's Requirements [sic.] and that item in the Logs, the information contained in the Log takes precedence and the standard set out in the Logs is to be achieved by the Contractor. Further, the BIW Log identifies aspects of the original technical information which set out the Employer's Requirements (issued with the Invitation to Participate in Competitive Dialogue) which are included or omitted from the Employer's Requirements as well as providing similar clarity in respect of the other documents and information that was uploaded to Building Information Warehouse during the period up to the issue of the Invitation to Submit Final Bids.

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. The Works Information contained in both Contract Data Part One and Contract Data Part Two have been signed by the parties to identify their acknowledgement that such documentation is included in the Contract. The drawings referred to in the drawing register included in the Works Information which is signed by the parties, are deemed to be incorporated in and form part of the Contract by reference without having to be signed individually." (bold added)

It is unclear whether "Request for Information ('RFI'), Additional Log" refers to one log or two logs. The Inquiry has the Request for Information Log but not a document titled 'Additional Log.'

The interpretation of Appendix 5 is considered in more detail in the following sections.

2.4 Terms of the Building Contract relating to design and construction

To put in context the contract terms being referred to below, reference is made below to the potentially deficient features identified of the ventilation and water systems detailed in PPP 12 (ventilation) and PPP 11 (water), respectively.

As to the potentially deficient features regarding ventilation, as set out in PPP 12, these differences appear to have had their roots in, or at least been contributed to by, a decision to build by reference to the M&E Clarification Log rather than the Employer's Requirements which required compliance with SHTM 03-01. The focus in this PPP in relation to ventilation is on the meaning of the design requirements under the Building Contract, including the relevant contractual consequences of the M&E Clarification Log. Reference will also be made to the commissioning and validation requirements, which might have provided opportunities to question departure from SHTM 03-01 in this area.

Whereas the potentially deficient features relating to ventilation primarily concern design standards in SHTM 03-01 (including air change rate and room air pressure), the potentially deficient features relating to water are much broader and relate to various design, installation and maintenance failings and standards in SHTM 04-01, including *inter alia*: selection of materials (sub-standard stainless steel, copper, carbon steel); selection of fittings (taps with flow straighteners and thermostatic mixing devices, flexible hoses, ARJO baths); lack of backflow protection; potential for deadlegs; pipework installation techniques; issues with the energy centre and maintaining water temperatures; lack of flushing; unscreened water tank vents; exposed waste pipes; insufficient control measures and record keeping to monitor system performance; introduction of unfiltered water; and cleanliness issues (with chilled beams, plant rooms, water coolers, shower heads etc). Consideration is given to how the various matters identified in PPP 11 were governed by the Building Contract.

For the avoidance of doubt, statements in this PPP as to the potentially deficient features identified in PPP 11 and PPP 12 are for convenience only and is not intended to amend or depart from those PPPs.

The terms in this section appear potentially relevant to those potentially deficient features, though not to the exclusion of others. This section is intended to provide an overview. The construction and meanings arising from these terms is considered in a later section of this PPP.

In the extracts of the documents referred to below, and in the remainder of this PPP, the Inquiry has highlighted in bold the sections considered to be of particular interest.

2.4.1 The Agreement

The preamble and clause 1 of the main Agreement provide that:

> "WHEREAS
> The Employer wishes to have the Contractor Provide the Works for the New South Glasgow Hospital comprising management and delivery of design and construction services as follows: -
> […]
> Stage 3 Design and Construct New Hospital Building […]
> NOW IT IS AGREED THAT

1. The contractor will provide the Works in accordance with the NEC Engineering and Construction Contract, Option C: Target contract with activity schedule, June 2005 (as the same are amended by the Contract Data) ('the conditions of contract') and the principles stated in Appendix 1 of this Agreement."

Appendix 1 to the Agreement sets out the Principles Governing the Agreement.

The 'Overriding Principle' of the Agreement includes achieving the 'Overriding Objective' which is defined in clause 4 of Appendix 1 as follows:

"4. In entering into the Agreement the parties' Overriding Objective is by working together in accordance with the terms of the Agreement 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**; (bold added)

4.2 at a cost to the Employer that offers best value for money taking into account whole life (as well as capital) costs over the proposed design life of the works through the application of the principles of value engineering;

4.3 to the timescale acceptable to the Employer and agreed between the parties without compromising health and safety or the Employer's required standards and the quality of the completed works and in any event before the Completion Dates set out in the Agreement; and

4.4 with an appropriate allocation of the risks associated with the works to the party best able to manage such risks."

Further, clause 5 of Appendix 1 provides as follows:

"The Consultant shall carry out the management and be responsible for the delivery, design and construction of the works in accordance with the Agreement and shall work and liaise with the Employer and any of its Professional Advisers as necessary or appropriate or as requested by the Employer in order to achieve the Overriding Objective."

2.4.2 The Conditions of Contract

As to the contractual standard contained in the Conditions of Contract, the following provisions are noted:

"**10 Actions**

10.1 The Employer, the Contractor, the Project Manager and the Supervisor shall act as stated in this contract and in a spirit of mutual trust and co-operation.

11 Identified and defined terms […]

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 and
- corrected any Defects which would have prevented the Employer from using the works and Others from doing their work.

If the work which the Contractor is to do by the Completion Date is not stated in the Works Information, Completion is when the Contractor has done all the work necessary for the Employer to use the works and for Others to do their work.

[…]

11.2(5) A Defect is

- a part of the works which is not in accordance with the Works Information
  or
- a part of the works designed by the Contractor which is not in accordance with the applicable law or the Contractor's design which the Project Manager has accepted.

[…]

11.2(13) To Provide the Works means to do the work necessary to complete the works in accordance with this contract and all incidental work, services and actions which this contract requires".

11.2(39) "Employer's Requirements" is the description of the Employer's technical requirements for the works supplemented and amended by the Logs and signed by the parties for verifications and deemed to be incorporated in and forming part of this Agreement".[38]

"**14 The Project Manager and the Supervisor**

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."

"**20 Providing the Works**

20.1 The Contractor Provides the Works in accordance with the Works Information.

[38] Bespoke amendment to the Conditions agreed in the Agreement.

20.3 The Contractor advises the Project Manager on the practical implications of the design of the works and on subcontracting arrangements."

"**21 The Contractor's design**

21.1 The Contractor designs the parts of the works which the Works Information states he is to design using the degree of skill and care that would reasonably be expected of a competent professional design and build contractor experienced in carrying out projects of a similar nature, scope and complexity to those comprised in the works.[39]

21.2 The Contractor submits the particulars of his design as the Works Information requires to the Project Manager for acceptance. The Project Manager either accepts the design or rejects it and notifies the contractor of his reasons for doing so within the period of reply to the Contractor's submission of particulars of his design for acceptance.[40]A reason for not accepting the Contractor's design is that is does not comply with either the Works Information or the applicable law.

The Contractor does not proceed with the relevant work until the Project Manager has accepted his design.[41]"

"**26 Subcontracting**

26.1 If the Contractor subcontracts work, he is responsible for Providing the Works as if he had not subcontracted. This contract applies as if a Subcontractor's employees and equipment were the Contractor's."

"**30 Starting, completion and Key Dates**

30.1 The Contractor does not start work on the Site until the first access date and does the work so that Completion is on or before the Contract date."

Option X15 of the Conditions of Contract does **not** apply (per clause 1 of Contract Data part one). Option X15 provides that: "The contractor is not liable for Defects in the works due to his design so far as he proves that he used reasonable skill and care to ensure that his design complied with the Works Information."

As to the two-limbed definition of "*Defect*" under clause 11.2(5), it is noted that:

- the definition excludes defects which are due to design for which the employer is responsible (as that would form part of the Works Information); and

[39] Bespoke amendment to the Conditions agreed in the Agreement.
[40] The second sentence of 21.2 is a bespoke amendment to the Conditions agreed in the Agreement.
[41] Further amendments to this clause of the Conditions relate to the failure of the Project Manager to accept the design or reject it can be viewed in the Agreement.

- the definition also excludes defects in the works which are due to the contractor's own design if the Project Manager has accepted the design, and if the design and the relevant part of the works complied with the Works Information.

2.4.3 Contract Data part one including the Works Information

As set out above, the Works Information is defined as comprising the Contract Documents: Part Five (Works Information), the Employer's Requirements, and the Contractor's Proposals including the M&E Clarification Log.

Contract Documents: Part Five (Works Information)

The Inquiry's current understanding is that the reference to "Contract Documents: Part Five (Works Information)" as being part of the Works Information refers to Appendix 5 of Contract Data part one.

Part of Appendix 5 was set out in an earlier section of this PPP, as it relates to the relationship and hierarchy of the other items comprising the Works Information.

The final paragraph of Appendix 5 starts with "The process for review of design to be submitted by the Contractor in relation to the Contractor's Proposals to ensure that it meets the Employer's Requirements is appended to this document as Appendix A."

A document titled "Reviewable Design Data" is attached (though it is titled "Appendix 1"). It sets out the Design Development Process, whereby at each review the Board would "consider the design information provided by the contractor, against the Works Information."

The Reviewable Design Data document provides that during the Design Development Process all information would be subject to review in three categories: for approval, for acceptance, for comment. This procedure would 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".

Responses would 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."

The process set out includes that 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." It appears to provide that the review focus is on "clinical functionality" the meaning of which is set out in the document and includes matters (a) to (g), including "infection control" and other matters but "only insofar as each of the matters […] relate to clinical use."

The document attaches a table which is said to indicate "the proposed extent for Approval and Acceptance with all other data being for comment." Table 1 is titled "New South Glasgow Hospitals List of Data for Review" which includes a list of "Drawing Information" and a list of "Design Information." The list of Design Information including inter alia "Plumbing fittings/tapware," "Schedules of components for M&E" and "Mechanical & Electrical drawings." The final line of the table states that the "above is in addition to key design requirements as set out in SHTMs and advisory documentation as included in Volume 7."

The document states that the list in Table 1 sets out the "proposed extent" of data to be for comment in the design review process, but that that list is a "minimum requirement" and that "a final agreed list will be prepared jointly within 2 calendar months of contract execution".

Employer's Requirements

Volume 2 of the Employer's Requirements comprises Volume 2/1 relating to the hospitals and Volume 2/2 relating to the laboratories. It sets out the technical and clinical requirements, including by Clinical Output Specifications. The Employer's Requirements were together Volume 2 of the Invitation to Participate in Competitive Dialogue. (Volume 1 and 3 of the IPCD are not part of the Building Contract and are therefore not set out here. Volume 1 contained the Project Scope and Commercial Document and Volume 3 contained details of the bid return and evaluation).

As to Volume 2/1, GGC's requirements included the following paragraphs which have been identified as relevant to this PPP.

As elsewhere in this PPP, certain text has been put in bold to emphasise relevant parts.

> "**2.1 Introduction**
> The Board wish to procure Works which **shall enable it to carry out its clinical functions, to combat health acquired infection** and to maintain physical assets and clinical and non-clinical functionality with ease; and it shall be the responsibility of the Contractor to deliver a design and construction solution that optimises these requirements. […] Innovative design and construction proposals, **which as a minimum meet the requirements of the Works Information,** Site Information and Employer's Requirements are sought from the Contractor.
>
> **2.2 Responsibilities of the Contractor**
> The Contractor shall be responsible for the following:
> 2.2.1 Providing Works that are **fit for purpose**;
> 2.2.2 Meeting all the requirements of the Board stated in the **Works Information**, Site Information and Employer's Requirements as **a minimum requirement**; […]

2.2.5 Working with the Board and its advisors in fulfilling all of the requirements and good practice inherent in the NEC3 contract; […]

2.2.10 Procuring that the Works are at all times performed: […]

e. Except to the extent **expressly stated to the contrary** in the Works Information, Site Information or Employer's Requirements **in compliance with all NHS Mandatory Documentation, NHS Guidance Documentation and Additional Guidance contained in Section 5.1**; […]

f. In accordance with all British and European Standards; and

h. In accordance with **Good Industry Practice**."

"4. General Design Requirements

The following section provides an overview of the Board's key objectives for the Works. The Contractor's proposals should clearly demonstrate cognisance of these objectives in relation to the design and the construction process. In particular, **the operational, functional and equipment issues contained in the Employer's Requirements must, as a minimum standard, be met by the design and construction solutions** of the Contractor. Further to this, the Contractor shall ensure the design delivers a solution which indicates acknowledgement and understanding of the types of patients that are planned for the facility.

The Contractor must take cognisance of the following documentation in his design solutions and shall require to demonstrate in his bid return strategies to embrace the ethos of the documentation in the development of the design:

a. Scottish Government's Policy and Design Quality for NHSScotland; […]

"4.1 Uses

4.1.1 Functional Requirements

The **design** of the Works shall:

a. Function efficiently, effectively and economically;
b. Optimise the Board's operating costs;
c. Demonstrate that the design fully reflects the special needs for each patient group in terms of access, functional relationships and planning. Patient groups are described and their particular requirements are defined in the Clinical Output Specifications in Appendix B and the mandatory and relevant guidance listed in Section 5.1. The facility as a whole should be fully accessible to the widest variety of patient groups, ambulatory, assisted and non-ambulatory patients of all ages providing access to specialist services led by medical staff, allied health professionals and nursing staff;
d. Interface easily with other service providers in particular the wider services provided by the Board; and

e. The design shall be able to do this in terms of environment, scale, comfort, privacy, reassurance, style and security. […]"

"**4.2.9 Recognisable Quality**

The Board expects high quality design to match the **best national standards of healthcare provision** it intends to implement.

Materials shall be substantial and **of high quality**. They shall be carefully **detailed and constructed such that the quality is appreciated throughout the life of the Works**. […]

The lifecycle plan and design detailing shall allow for replacement of elements in a way that does not impair design quality or service provision. A schedule of required life expectancies of building elements can be found in Section 5.3."

"**5.1 Minimum Design & Construction Standards**

5.1.1 **NHS Publications**

General

5.1.1.1 The Board has considered the documentary advice and guidance provided by Health Facilities Scotland and the Facilities Directorate of the Department of Health in relation to Health Building Notes ("HBN"), Health Technical Memoranda ("HTM"), Fire Practice Notes ("FPN") and other National Health Service published material.

5.1.1.2 The Contractor in carrying out of the Works **shall comply with the requirements of the documents listed in Table 2 – NHS Mandatory Documentation** in Section 5.1.2. **Specific statements of compliance form an aspect and element of the bid return** and evaluation process and requirements, with the requirement for bidders to clarify their approach during the bid period as an aspect of the dialogue process.

5.1.1.3 The Contractor in carrying out the Works shall have regard to and take into consideration the requirements of the documents listed Table 3 - NHS Guidance Documentation in Section 5.1.3. Specific statements of compliance form an aspect and element of the bid return and evaluation process and requirements, with the requirement for bidders to clarify their approach during the bid period as an aspect of the dialogue process.

5.1.1.4 Documents listed in Tables 2 and 3 (together part of "NHS Publications") are deemed to include all volumes, supplements and any other associated requirements, unless specific volumes, parts or the like are specifically noted or noted as excluded.

5.1.1.5 Any reference to HTM/HBN is deemed to include SHTM/SHPN. The requirements of SHTM/SHPN shall take precedence over HTM/HBN unless expressly required otherwise by the Board and noted in Table 2 or 3. Presently Tables 2 and 3 include reference to HTMs in relation to services systems. It is the intention of the Board that the new SHTMs in these areas, due

for release by HFS late April/early May 2009, will be adopted and require to be complied with, as shall other SHTMs issued during the procurement process (subject to 5.1.9 below) – this to be clarified by the Board during the bid period. Current draft documentation is marked in Tables 2 and 3 in blue shading. […]

5.1.1.9 All references in these Employer's Requirements to NHS Facilities Scotland Requirements, building and engineering standards, Building Regulations, legislation, Statutory Requirements, Codes of Practice, Department of Health publications, NHS Publications and other published guidance shall be deemed to mean those in place at the date of signing the construction contract. Any date reference in Table 2 or Table 3, therefore, may be replaced/read as that in place at the date of signing the construction contract.

5.1.1.10 Except as noted in 5.1.7 or 5.1.8 above, the Contractor shall provide Works which comply at all times with the requirements of Table 2, Table 3 and the Additional Guidance identified at Section 5.1.4."

The documents relating to water, ventilation and infection prevention and control in Table 2, which the Board considers to be mandatory, include: CEL 18 Healthcare Associated Infection: SHFN 30 and HAI SCRIBE Implementation Strategy; HAI SCRIBE; SHFN 30 Infection Control in the built environment design and planning; HTM 03-01 Specialised Ventilation for Healthcare Premises; HTM 03-01 Part B Specialised Ventilation for Healthcare Premises; Part B HTM 03-01 Part A Specialised Ventilation for Healthcare Premises; Part A Draft for Consultation SHTM 03-01 Part A Specialised Ventilation for Healthcare Premises; Part A Draft for Consultation SHTM 03-01 Part B Specialised Ventilation for Healthcare Premises; Part B SHTM 2025 forms; SHTM 2027 Hot and cold water supply, storage and mains services; HTM 04-01 Part A Control of Legionella...drinking systems Part A; HTM 04-01 Part B Control of Legionella...drinking systems Part B; Draft for Consultation SHTM 04-01 Part A Control of Legionella...drinking systems Part A; Draft for Consultation SHTM 04-01 Part B Control of Legionella...drinking systems Part B; SHTM 2030 Washer disinfectors.

The documents relating to water, ventilation and infection prevention and control in Table 3, which the Board considers to be guidance, include: SHGN Safe hot water and surface temperatures; SHTN 2 Domestic Hot and Cold Water Systems for Scottish Health Care Premises; HBN 04 Supp Isolation facilities in acute settings.

Clause 5.1.4.1. also requires the contractor to comply with all law and consents, as well as additional standards including Current British Standards, European Standards, and Codes of Practice.

"**5.2 Hierarchy of Standards**

5.2.1 Where there is any conflict between two or more documents, the more onerous standard shall be complied with by the Contractor, at no additional cost to the Board.

5.2.4 While the Board has placed a clear obligation on the Contractor in relation to NHS Publications, it also wishes to acknowledge that in certain cases the subject matter, guidance and advice included therein has been further developed and improved since the date of publication. While applying the foregoing as a base position, **the Board does not wish to limit the use of current best practice or innovation in relation to the adoption of design standards**. Consequently, the Board therefore wishes the Contractor to actively engage the Board in an on-going dialogue during the design process in order for the Board to review and agree to any proposed alternatives.

5.2.5 The Board considers **NHS Publications reflect minimum standards** and any **alternatives proposed by the Contractor shall provide an equivalent or enhanced level of service and quality**."

"**5.5 Sustainability**

5.5.1 […] The Board has targeted an 'Excellent' BREEAM rating for the Project. […]"

"**5.6 Control of Infection**

5.6.1 **Prevention and control of infection shall remain a primary consideration of the Contractor in the design and construction of the Works**. The whole hospital design shall place a high priority on infection prevention and control in relation to the movement of goods and in particular the segregation as far as is reasonably practicable of clean linen, food trolleys and the removal of waste, soiled linen and empty food trolleys. The Contractor will be required to demonstrate to the satisfaction of the Board's Infection Control Team that the design and construction of the Works fully reflects and incorporates the following key infection control challenges; […]

b) Ventilation system – including the use of natural ventilation in relation to the affect by neighbourhood sources of environmental pollution; […]

i) Water systems; […]"

"**5.8 Equipment Requirements**

5.8.1 The Equipment List is contained in Appendix F. This identifies equipment by Group (for pricing in bid returns), with location of equipment ascertained via the ADB Room Data Sheets (for all rooms) and exemplar 1:50s for those drawn at this stage. Group 1 Equipment shall be supplied and fitted by the Contractor, with Group 2 Equipment provided "free issue" to the Contractor by the Board and fitted by the Contractor. The Board are responsible for the supply and installation of Group 3 and Group 4 Equipment.

[…]

5.8.6 Irrespective of the party responsible for the supply, installation, maintenance and replacement of each item of equipment, the Contractor shall provide Works that satisfy the following criteria:

a) allow Equipment and associated systems to be installed, commissioned, operated, maintained and replaced in accordance with:
   i) Good Industry Practice;
   ii) Manufacturer's instructions; and
   iii) The Board's, statutory health and safety requirements.
b) Allow Equipment and associated systems to operate efficiently, effectively and in accordance with its intended function for the whole of its design life when operated in accordance with the manufacturer's requirements;
c) Take due account of the impact on the environmental conditions within the Works;
d) Take due account of the potential impact of future equipment changes through either refresh or replacement. In particular, allowance for equipment of different sizes, weights, service requirements or environmental impacts […]"

"**5.9 Materials**

5.9.3 Where materials and components are not specifically identified as complying with the Construction Products Regulations 1991, The Contractor shall ensure that they comply with the relevant British Standards and Codes of Practice.

5.9.4 The Contractor shall ensure that the whole **quantity of each product and material** required to complete the Works is of a consistent type, quality and overall appearance and **is fit for its intended purpose**. The Contractor shall ensure all products and materials are handled, stored, prepared and used or fixed strictly in accordance with the manufacturers' written instructions or recommendations and not be damaged when incorporated into the Works.

5.9.6 The Contractor shall not specify or include products or materials that do not comply with relevant British or European Standards, Codes of Practice […]

"**5.10 Energy Strategy**

5.10.1 In accordance with best practice, **the Contractor shall consider key design features** including, but not limited to:

a) Use of passive ventilation where appropriate whilst minimizing mechanical cooling […].

5.10.4 **The Contractor shall submit a Mandatory Variant bid providing for a Maximum Temperature provision (26degC)."**

"5.14 Design Development

[…]

5.14.2 The procedure for the review of design development will be agreed with the Contractor prior to the return of bids and the commencement of the design development."

"5.15 Extended Defects Period

5.15.1 Due to a number of factors, including double-running/transition from other hospital sites, the Board are desirous of a defects period that provides management and physical benefits to the Project. In this regard a period in excess of the 'traditional' one year defects will be sought, with particular associated requirements in relation to:

a) Training and handover to Board personnel;
b) Correction times/periods for defects;
c) Seasonal commissioning;
d) Management activities; and
e) Performance requirements."

"**6.0 Construction Phase Requirements**

6.3 Workmanship, Construction Accuracy and Tolerances

6.3.1 The Contractor shall ensure that general workmanship conforms to current revisions of BS 8000: – "Workmanship on Building Sites", which covers typical building construction activities. Where specialist design proposals require construction activities outside the scope of this document, The Contractor shall propose specific quality procedures relating to these activities based on Good Industry Practice current at the time, as a minimum."

"**6.7 Witnessing and Testing**

6.7.1 **Witnessing and testing duties will be carried out by the Supervisor**, all as detailed in relevant Clauses of the current NEC3 Engineering and Construction Contract, namely […]."

[…]

6.7.2 It is envisaged that the Supervisor role will be carried out by a number of delegated parties – parties will be delegated by named Supervisor all as Clause 14.2, and are likely to comprise the following;

a) Civil & Structural Engineering;
b) Mechanical & Electrical Services;
c) Board Personnel (FM Services); and
d) Civil/M&E/Fabric Clerks of Works

6.7.3 In relation to the above duties as detailed under Section 4 – Testing and Defects, the Supervisor will carry out the following functions;

a) Design Compliance Check
   i) Review the Design Data and detailed design information for general compliance with the terms of the Contract;

[…]

e) Familiarisation with Other Project Documents

i) The Supervisor shall familiarise itself with the Design Data and the Project Documents to the extent necessary to carry out the Supervisor role as provided for in accordance with the terms of the Contract;

[…]

h) Certification

i) The Contractor shall give the Supervisor (and Project Manager) sufficient notice in accordance with the Contract, of the date (the Completion Date") when it anticipates that Completion in respect of any Project Phase will be achieved;

ii) The Supervisor shall issue the relevant Defects Completion Certificate(s) in accordance with Clause 43.3 of the Contract; and

iii) As soon as practicable following the issue by the Project Manager of the Completion Certificate in respect of the final Project Phase to be completed in accordance with the Construction Programme, the Supervisor shall (provided that the Contractor has complied with its obligations to remedy any works listed in the Defects List) issue a final Defects Certificate.;

[…]

k) Miscellaneous

The Supervisor shall:

i) monitor the progress of the Contractor's design production;

ii) observe and monitor mock-ups, fabrication, construction and installation works on the Sites so as to satisfy itself that the Works comply with the Contract;

iii) audit the Contractor's Quality Assurance and the Contract control systems and procedures;

iv) issue Defect/Non-compliance notices and oversee the resolution of non-compliant matters; […]"

"**6.8 Commissioning and Handover**

6.8.1 **It is envisaged that the Contractor will appoint an Independent Commissioning Engineer** to manage/programme/collate all M&E Testing and Commissioning processes, all as detailed in Appendix M, M&E3 Section 5 of the Employers Requirements

6.8.2 The Contractor will be required to provide the following in relation to the Commissioning and Handover process.

[…]

b) Pre-Completion Commissioning

iv) The Board's Commissioning shall comprise the activities identified as such in Table A Commissioning – Outline Commissioning Programme;

[…]

e) Post Completion Commissioning

i) The Contractor's Post Completion Commissioning shall comprise the activities identified as such in Table A Commissioning – Outline Commissioning Programme;

ii) The Contractor shall undertake and complete the Contractor's Post Completion Commissioning for the relevant Phase as follows: […]

- in relation to staff training, when Board Employees are made available to The Contractor for training in accordance with the Training Release Schedule, Induction Programme, Staff Familiarisation Programme and/or Staff Training Programme (as appropriate);

OUTLINE COMMISSIONING PROGRAMME

Completion process

A. Final Commissioning Programme

A.1 The Final Commissioning Programme shall be in accordance with the Outline Commissioning Programme and shall impose no greater or more onerous obligation on the Board or the Contractor than those set out in the Outline Commissioning Programme, unless otherwise agreed. The Final Commissioning Programme shall be developed by the Contractor in conjunction with and having consulted:

1.1.1 the Contractor;
1.1.2 the Board;
1.1.3 the Supervisor; and
1.1.4 the Board's FM Team.

A.2 The draft Final Commissioning Programme shall contain, amongst other things, full details of the following (including timing and sequence of events) for each Phase:

1.1.5 Contractor's Pre Completion Commissioning;
1.1.6 Board's Commissioning;
1.1.7 Contractor's Post Completion Commissioning;
1.1.8 the Board's Post Completion Commissioning; and
1.1.9 the Supervisor's Completion Criteria applicable to the relevant Phase.

A.3 The Contractor shall provide the Board with a draft of the Final Commissioning Programme relating to each Phase not less than 12 months prior to the anticipated Phase Completion Date.

[…]

6.8.3 Handover Procedures

6.8.3.1 **The Contractor's Commissioning Programmes to include for sign off of relevant Testing and Commissioning elements by other parties**, e.g.:

a) Board Approved Parties
   i) Fire Officer;
   ii) **Control of Infection Officer**;
   iii) Radiation Protection Officer; and
   iv) Medical Gases Officer;
b) **Supervisor**; and
c) **Independent Commissioning Engineer**

6.8.4.2 The Contractor shall ensure that major items of plant shall be tested at the works for both performance and safety prior to dispatch. Major items of plant shall include, but not be limited to, the following: boiler plant, generators, chillers/refrigeration machinery, large pumps, HV/MV switchgear, large pressure vessels etc. The Contractor shall arrange to witness all factory testing and shall furnish the Board, its Project Manager and the Supervisor with the opportunity to witness all factory testing, and sign off marked items of Plant and Materials. The Board, its Technical Advisors and the Supervisor shall be given at least fourteen days notice of such testing.

[…]

6.8.5 Works inspection, testing and acceptance activities

6.8.5.1 Completion Criteria

6.8.5.2 The Contractor shall demonstrate that the following criteria have been achieved:

6.8.5.5 The Mechanical and Electrical plant and systems operate satisfactorily in accordance with the specified design criteria, and the ADB Room Data Sheet;

[….]

6.8.5.11 All internal and external drainage systems are installed and are operational;

[…]

6.8.7.1 All documentation associated with the Tests on Completion shall be collected and collated by the Contractor/Independent Commissioning Engineer and shall be presented as a bound, indexed document to the Board. The following list is indicative of the test documentation expected to be provided: […]

"**7.6 Windows** […]

7.6.5 The following criteria require to be incorporated in the Contractor's Proposals: -

a) windows must combine security with good natural light and ventilation; […]
d) all windows (in a naturally ventilated building solution) to have robustly controlled, limited openings -…]
e) all windows (in a naturally ventilated building solution) should be capable of opening in order to meet the desire to naturally ventilate the building so far as practicable. This required to address seasonal changes, where

external temperatures may dictate that it is not desirable to open windows to achieve ventilation. […]

f) there may also be reduced air flow within the building as, for security reasons, some windows may not open extensively. With this in mind, it is essential that the ventilation and temperature control systems are of a high standard. The use of passive methods is encouraged.

g) as part of any passive, natural ventilation scheme dependant on the opening of windows, the Contractor shall demonstrate through thermal simulation (IES, TAS or equivalent) the optimum window opening armament has been selected to optimise thermal comfort with due consideration to any restrictions on openings. […]

i) in the critical care department windows in the single bedroom should be sealed. This is essential to maintain mechanical cooling and positive/negative airflow;"

"**7.7 Building Envelope**

Facade

7.7.1 The Board would confirm that **a variety of building envelope solutions will be considered** in response to the following diverse challenges;

a) Energy usage;
b) **Environmental considerations i.e. Odour from the nearby sewage works**;
c) **Ventilation and overheating**;
d) **Infection Control**;
e) Acoustics;
f) Natural Light;
g) Cleaning and maintenance; and
h) Solar Control strategy

7.7.2 **The envelope solutions which will be considered as acceptable to the Board include:**

a) a partially sealed air conditioned building working in tandem with natural ventilation;
b) mechanically ventilated building working in tandem with natural ventilation;
c) double skin facade solution.; and
d) a sealed building where a maximum temperature solution is provided.

7.7.3 The envelope solution(s) proposed by the Contractor will require to be fully developed and modelled clearly indicating compliance with the Board's stated Sustainability and Energy Targets. **It is not envisaged that a fully air conditioned solution alone will be capable of meeting the stated targets, however if this option is proposed, as above, a the Contractor will require to provide to the satisfaction of the Board a fully developed and modelled solution clearly**

indicating compliance with the Board's stated Sustainability and Energy Targets."

"**8.0 Building Services Requirements**

8.1.1. Introduction

8.1.1.1 The Contractor shall in carrying out the Works comply with the following non-exhaustive list of Mechanical & Electrical requirements. […]

8.1.1.3 The heating and cooling mediums shall be selected to ensure the most efficient systems are utilised taking into account integration of low carbon technologies and the site wide interconnectivity requirements. […]

8.1.1.10. Access to all services shall facilitate ease of maintenance which should be safe and able to be effectively undertaken. There shall be provision for space to give flexibility for future re-planning and / or re-modelling and replacement of the services.

8.1.1.11. The Board **requires the buildings to be designed to achieve a very efficient level of energy and utility utilisation** in accordance with the energy targets noted in Appendix M&E4. […]

8.1.1.19. Where contradictory advice is apparent, the most recent guidance shall generally take precedence; unless indicated otherwise in the main compliance section of the Employer's Requirements – Volume 2.1 Section 5.1. […]

8.1.3.10. Plant rooms shall be configured and constructed to minimize the risk of water penetrating into Critical operational areas. This is a pre-requisite of the design and the Contractor shall provide a detailed strategy document indicating the risk assessments and mitigation measures proposed e.g. water tanks not located above Critical operational areas, plant room floors constructed to prevent water seepage, tanking to be integrated in construction detailing rather than ad hoc post installation details, appropriate location of floor gulleys and sensitive routing of water and drainage pipework.

[…]

8.1.5.9. No exposed pipework shall be visible in clinical areas."

"**8.1.6. Energy Targets**

8.1.6.2. The Contractor shall comply with the requirements relating to energy targets as specified in Appendix M&E 4. […]

8.1.6.7. In order to assist in achieving the water consumption target noted in Appendix M&E 4. The Contractor shall use water saving measures including but not limited to: […]

e) Flow restrictors (if risk assessment accepted)."

"**8.1.7. Thermal Comfort**

8.1.7.1 It is a requirement of the Contractor's Bid Submission **that a maximum temperature (28 degree C) solution** be considered for the whole of the Works. This will be discussed with bidders during the bid process

8.1.7.2. Where maximum internal summer time temperature calculations of ventilated rooms indicate that the internal temperature will exceed those limits set out in the Appendix M&E 3 for frequent periods, the Contractor shall provide means of reducing the temperature rise."

"**8.1.8. Air Quality**

8.1.8.1. Internal

8.1.8.2. Air quality in all areas shall take account of occupancy levels, internal pollutants, heat gains, external pollutants, atmospheric conditions and shall be controlled to provide adequate comfort and fresh air levels appropriate to the functions of each department area.

8.1.8.3. **Particular attention should be given to the risk of cross infection within the hospital / healthcare environment and shall be such as to minimise the spread of infection, all systems to comply with Hai-Scribe and infection control requirements**. […]

8.1.8.6**. Consideration shall be given to the odours from the adjacent sewage works** and appropriate filtration shall be included to reduce odours entering the facility.

[…]

8.1.13. Compliance with Health Service Notes and Memorandums

8.1.13.1. **The Mechanical, Public Health, Electrical, Life Safety and Lift Services shall be designed and installed in accordance with the relevant SHTM's, HTM's, SHBN's, HBN's, SHGN's and HGN's to meet the Employers Requirements**.

8.1.13.2. Refer to Volume 2.1 Section 5.0 General Design & Construction Requirements for document hierarchy and Compliance Requirements

8.1.14. Compliance with Planning/Building Regulations

8.1.14.1. The Building Services Installations shall generally comply with the Building Regulations and Planning Requirements."

"**8.1.18. Site Mains Water, Fire Water, Quality & Distribution** […]

8.1.18.3. The Contractor shall filter the Site potable water to the criteria set out in SHTN02 with 0.2 micron filtration**. Pipework shall be stainless steel**.

8.1.18.4. The water filtration system shall be established within the Energy Centre to provide resilient filtered water to meet the requirements for The Works. […]

8.1.20.4. Irrespective of the option proposed by the Contractor the availability criteria described elsewhere in this document must be strictly adhered to."

"**8.1.25. Service Capacity Reserve**

8.1.25.1.In accordance with Good Industry Practice, all plant, plant spaces and building services systems shall be specifically designed and provided with defined reserve capacity allowances

and future expansion capabilities for The Works (e.g. distribution boards with 25% spare capacity, 25% additional containment, 25% spare capacity in distribution Pipework, 25% additional plant capacity, 25% additional cooling capacity, 25% additional air handling capacity etc. for the buildings as designed). As detailed in 8.1.3.2, the Contractor to provide compliance matrix detailing how this to be delivered. […]"

"8.**1.26 Commissioning, Testing and Demonstrations**

8.1.26.1. **The Mechanical, Electrical, Public Health and Specialist systems shall be fully tested and commissioned** in accordance with:

c) Requirements **of SHTN's** and SHBNs; […]"

"**8.1.27. Environmental Proving**

8.1.27.1. During the design stage the Contractor shall provide the Computational Fluid Dynamic requirements of SHPN57 e.g. CFD shall be used to **model and prove the ventilation strategy for the works**."

"SECTION 8.2 – MECHANICAL SYSTEMS

8.2.1. General

8.2.1.1. The Contractor shall design, supply, install, test, commission and maintain all Mechanical Building Services necessary to support the clinical activities of The Works. The following systems are indicative of those anticipated by the Board but are not exhaustive and it shall be the Contractor's sole responsibility to determine that all necessary systems (excluding Medical Equipment) are included.

8.2.1.2. **Systems shall be designed, supplied, installed, tested, commissioned, and put into service all in accordance with all relevant Regulations and Standards.**

[…] Water Systems and Filtration.

[…] Ventilation and Air Conditioning.

[…] High Specification Air Conditioning Systems."

"**8.2.8. Water Systems and Filtration**

8.2.8.1. Cold Water Supply […]

8.2.8.3. The Contractor shall design and install the domestic cold and hot water supply installations to fully comply with the requirements of;

a) **SHTM 04-01**;
b) SHTM 2027;
c) SHTM 02;
d) SHTM 2040 "The control of legionella in healthcare premises - a code of practice"; and
e) Health Guidance Note "Safe Hot Water and Surface Temperatures."

8.2.8.4. **Pipework shall be stainless steel** with compatible accessories.

8.2.8.5. The Contractor shall include for all specialist membrane filtration treatment plant (Replaceable cartridge systems are not acceptable). The Contractor shall provide water sampling points throughout the installation in accordance with the SHTM02. Renal water treatment shall be provided by the Contractor in accordance with Appendix M&E6 with due regard for clinical requirements.

[…]

8.2.8.13. Attention is drawn in particular to SHTN 02 concerning pipework materials and standards of filtration to be used in Scottish Healthcare Facilities.

8.2.8.14. **Cold water system to comply with Hai-Scribe and the Board's infection control requirements**. […]

8.2.8.16. The Contractor shall carry out a full risk assessment of the complete water systems of the legionella risks and ensure that the system design and equipment selection and installation is carried out to minimise risks.

"**8.2.9. Hot Water Supply**

8.2.9.1. Appropriate operational engineering systems for hot water shall be included in the design of The Works.

8.2.9.2. **Pipework shall be stainless steel** with compatible accessories.

8.2.9.3. Domestic hot water systems shall be designed with plate heat exchangers and buffer vessels to provide adequate flow to satisfy maximum demand whilst minimising stored hot water and energy consumption. The provision of some storage via buffer vessels may be required to minimise the impact of hot water generation on boiler power. (If buffer vessels are required these shall be minimal rating)

8.2.9.4. The adoption of recommended design practices to control of legionella and other bacteria within the systems is critical and is considered mandatory.

8.2.9.5. **Type 3 thermostatic mixing valves (TMV's) shall be installed (in accordance with NHS Model Engineering Specification D08) at all HWS [hot water system] outlets to SHTMs and SHGNs except where 60°C water is a particular requirement**. Double check valves to be duplicated at TMV's.

8.2.9.6. The Contractor shall carry out a full risk assessment of the complete water systems of the legionella risks and ensure that the system design and equipment selection and installation is carried out to minimise risks.

8.2.9.7. Hot water system to comply with Hai-Scribe and the Board's infection control Requirements."

"**8.2.11. Ventilation & Air Conditioning** […]

8.2.11.3. The need to maintain the **specified comfort conditions** in all areas **but particularly in clinical areas is of paramount importance** and the Contractor shall develop **strategies for**

achieving the specified environmental conditions with minimum energy consumption.

[…]

8.2.11.8. **Air changes shall be in accordance with CIBSE guides, SHTM's**, HTM's and Building Regulations.

8.2.11.12. Ensure that ventilation systems installed in areas classified as hazardous are designed to relevant standards."

[…]

8.2.14. Ventilation of Isolation Rooms

8.2.14.4. **The Contractor shall provide air conditioning systems to Isolation Rooms to support;**

a) Employers Requirements;

b) Clinical Output Specification; and

c) NHS infection Control standards

With strict positive / negative pressure differentials."

"**8.2.18. CHP Equipment**

8.2.18.1.A CHP installation is proposed as part of the low C02 / energy strategy for the new Facilities. The CHP units shall be located within the Energy Centre. The Contractor shall develop the strategy to incorporate the full benefits of tri-generation and select appropriate plant to meet the works requirements."

"**8.2.28. Testing and Commissioning of Mechanical Services** […]

8.2.28.2. **The Contractor shall appoint an independent Commissioning Engineer to manage the Testing and Commissioning as detailed in Appendix M&E3**."

"**Section 12.0 Bid Return Requirements**

12.0 Bid Return Requirements

12.1 The particular bid return requirements of the Board are identified and listed, along with the evaluation process, in Volume 3 of this ITPD.

12.3 The Contractor will then work with the Board through the Stage 3 Design Development period **to produce the FBC design requirements as identified in Appendix K**."

Appendix M & E to Vol 2 of the ERs

Before turning to the appendixes to the Employer's Requirements below, the Contents page of Volume 2/1 of the Employer's Requirements set out that there are appendixes A to L. Appendix K refers to "Design Development (FBC Requirements)." The Appendices referred to below are all "M&E" appendixes.

Volume 2/1 Appendix M&E 1 to the Employer's Requirements provides that

"**5.3 Filtered Water**

The full water requirement for the Hospitals and Laboratories shall be filtered in accordance with Section 8 of the Employers requirements."

Volume 2/1 Appendix M&E 3 to the Employer's Requirements provides that

"**2.2.12 Water Filtration Equipment**

Water filtration equipment shall be provided in accordance with the current SHBN, and will be located in the Energy Centre. Filtration shall be introduced to; ensure the domestic water supply and hence all associated pipework is maintained at a high standard of cleanliness, from the supply point to all the potable water outlets, it will also prevent build-up in water systems of sediments and deleterious biofilms, which may act as nutrient sources for bacteria. The plant shall be provided with a gas backwash facility. A suitable compressor and air receiver shall be provided to operate the air blowback system all located in close proximity to the water filtration equipment. Filtration should not be a requirement for incoming water destined for non-domestic use, such as fire fighting, boiler feed or other chemically treated or dosed systems."

"**2.4.3 Chilled Beams**

The use of active **chilled beams should be considered within all ward areas**. Active chilled beams will provide tempered, filtered air together with heating and comfort cooling of the space; thus providing effective local control of the environmental conditions. Care must be taken in positioning of the chilled beams to ensure that cold draughts are avoided when they are in a cooling mode."

"**2.19 Storage Tanks**

A water treatment regime shall be put in place and carried out to ensure that the water storage does not harbour Legionella all in accordance with the SHTM's."

"**2.26 Schedule of Pipeline Materials** […]

(l) Stainless Steel Pipework for H&C water services."

"**5.2 Commissioning Engineer**

An independent Commissioning Engineer shall be appointed by the Contractor. The Commissioning Engineer shall be responsible for fully managing the commissioning process for the Electrical and Mechanical, Public Health, Medical Gases, Life Safety and communications Installations and shall carry out all necessary liaison with other Contractors and specialist installers and compile the operation and maintenance manuals. The role of the Commissioning Engineer is to assist the Project Manager in providing the Employer with engineering services that perform effectively. […]"

Volume 2/1 Appendix M&E 4 to the Employer's Requirements provides that:

> "**2. General Obligations and Objectives**
> **The sustainability and low carbon designs are fundamental to the design quality evaluation of the project and bids will be scored significantly on these aspects.** This section sets out the requirements.
>
> A BREEAM "Excellent" is a fundamental requirement and achievement of the final rating, as defined in later sections, will be part of the building acceptance procedure. Furthermore, there is a requirement for a Low Carbon design process which will be monitored and evaluated by a Carbon Trust accredited consultant. There are both design and operational energy targets which are to be met as part of the building acceptance procedures…
>
> It is the contractor's responsibility to provide commentary and clear proposals in the submission on any actual or perceived conflicts in requirements"
>
> […]"

> "**3.3.7 Summertime overheat - design considerations**
> 1. **The use of mechanical cooling shall be avoided wherever possible. HTM 03-01 requires that "patient areas only should not exceed 28Cdb for more than 50 hours per annum**" but also that "it can generally be assumed that for a naturally ventilated building, the internal temperature will be approximately 3 K above the external shade temperature. For a building with simple mechanical ventilation, the internal temperature can never be less than the external shade temperature and will invariably be higher. Where calculations indicate that internal temperatures will exceed the selected design for a period that exceeds the building design risk, methods of reducing temperature rise should be implemented. […]"

Removal of Maximum Temperature Variant

The Inquiry notes at this point of the PPP that, on 8 June 2009, (after the issue of the IPCD in May and before Brookfield's Tender Return Submission in September) NHS GGC issued a revision called NSGACL Removal of Maximum Temperature Variant_iss1_rev." [42] It is a contract document.

> "Removal of Mandatory Maximum Temperature Variant.

[42] A33010775 - Removal of Mandatory Maximum Temperature Variant - June 2009.

> The maximum temperature variant has been removed from the bid requirements, the bidders shall put forward schemes to ensure thermal comfort and avoid overheating.
>
> Sustainability has a major input into the project and all solutions must seek to minimize C02 and energy usage, however this must not be at the expense of thermal comfort and avoidance of over heating.
>
> For design purposes the level of thermal comfort shall be:
>
> Room temperatures should not go below 18oC in winter for longer than 2 hours at a time, or higher than 26oC in summer for more than 50 hours in total, but not on successive days.
>
> Feasibility studies are to be carried out into the potential use of low and zero carbon technologies to reduce carbon emissions associated with the operation of the building.
>
> The bidders' attention is drawn to the Employer's Requirements and in particular the following sections…"

The bidders' attention is then drawn to various extracts from Appendix M&E3 of the Employer's Requirements.

The Inquiry understands that the issue of this revision to the Employer's Requirements may have been a relevant factor behind the Agreed Ventilation Derogation. Further information is provided in paragraphs 3.20.2 and 3.23.3 of this PPP.

Appendix U to Vol 2 of the ERs

Appendix U to the Employer's Requirements was called "BREEAM Design Guide". Appendix U is extensive at 107 pages. The whole document is referred to, however the following paragraphs are noted:

> "…The sustainability and low carbon design are fundamental to the design quality evaluation of the project and bids will be scored significantly on these aspects…" (page 2)
>
> "…The sustainability and low carbon design are fundamental to the design quality evaluation of the project and bids will be scored significantly on these aspects. This section sets out the guidance in relation to the detailed BREAAM requirements and processes and is intended to provide assistance to the bidders in the requirements necessary to achieve a BREEAM "Excellent" rating..." (page 2)
>
> "... A BREEAM "Excellent" rating is a fundamental Board requirement and achievement of the final rating as detailed above, will be part of the building acceptance procedure…" (page 2)

"Note that this Appendix overlaps/interacts with the following sections of the Employers Requirements:

- Section 7 – Architectural Requirements
- Section 8, Building Services Requirements, with particular reference to Appendix M, M&E4 – Sustainability & Energy Targets
- Section 9 – Civil & Structural Engineering requirements

and it is the Contractors responsibility to provide commentary and clear proposals in the submission on any actual or perceived conflicts in requirements." (page 2)

"Hea 8 **– Indoor air quality**
[…]

- The building should be designed to provide fresh air rates to dilute pollutants in accordance with the following good practice:
  a. ….
  b. **All clinical areas with controlled environmental conditions comply with HTM 03-01 "Specialised ventilation for healthcare premises**".

"Hea 12 – Microbial contamination

- All water systems in the building should be designed in compliance with the measures outlined in the following standards:

  a. **HTM 04-01** "The control of Legionella, hygiene, "safe" hot water, cold water and drinking water systems"

  b. Health and Safety Executive's "Legionnaires' disease - The control of legionella bacteria in water systems". Approved Code of Practice and guidance, 2008…"

It may also be of note that in Volume 1 of the IPCD (which is not a contract document), the document provides that "The Employer's design aims, functionality requirements and design brief for the contract are described in ITPD Volume 2 Employer's Requirements" and that "The Employer accepts no design responsibility for design issues with the ITPC."

The Logs

Clause 11.2 (39) of the Agreement says that "Employer's Requirement" is the description of the Employer's technical requirements for the works supplemented and amended by the Logs and signed by the parties for identification and deemed to be incorporated in and forming part of this Agreement"".

Appendix 5 to Contract Data part one also makes clear that the Employer's Requirements are supplemented by the Logs – namely the Building Information

Warehouse ("BIW") Log, Request for Information (RFI") Log, [Additional Log] and Clarification Log, Laboratory Log and Sustainability Log.

Also note Part 2 Section C relating to the hierarchy of the Logs, in particular the priority of the M&E Clarification Log over the Employer's Requirements.

The Clarification Log is of note as under Technical Clarification 2 the Board asked Brookfield to "Please indicate any deviations from the M&E elements on the Employer's Requirements." In response, Brookfield stated "The following deviations are proposed" and listed six items. In relation to each item, the Board responded, either to "refer to" the M&E Clarification Log, the RFI Log, the Instruction to Proceed Log or the Instruction to Proceed Project Bible. The six derogations listed by Brookfield on the Clarification Log do not mention the derogations raised in PPPs 11 and 12.

2.4.4 Contract Data part two

M&E Clarification Log

It is unclear where the M&E Clarification Log is in fact located in terms of the compilation of the Building Contract given that Appendix 5 refers to it being located both in Volume 3 of the Employer's Requirements and also in Contract Data part two. For ease of reference, the Inquiry for present purposes has set out the M&E Clarification Log as being part of Contract Data part two, though it may be that it is in fact not in Contract Data part two but in the Employer's Requirements.

As set out in PPP12, the M&E Clarification Log appears to be the basis for the derogation from SHTM 03-01 in the ventilation system design.

The key line of the M&E Clarification Log is set out below (bold added):

Board Comment	Status	Brookfield Comment	Board Comment 2	Agreed Position 2009 Contract	2010 ItP Comments	Agreed position 2010ItP
Ward Air change to be 6AC/HR, **currently shown as 2.5AC/HR** which is **not in compliance with SHTM 03-01.**	Agreed	Brookfield proposal as outlined within the bid submission is **to incorporate chilled beams as a low energy solution** to control the environment which do not rely on large volumes of treated air or variable natural ventilation. **All accommodation**		**Agreed** The proposal is accepted on the basis of 40 litres per second **per single room** (8 litres per second per second) for one patient and four others. Joint review to be carried out between the Board and Brookfield of the energy model to	Energy model based on the agreed 2009 position.	**Agreed**

		is single bedrooms and therefore the need for dilution of airborne microbiological contamination should be reduced (rooms could also be at slightly negative pressure to corridor). **Providing 6 air changes is energy intensive and not necessary.**		determine any impact on the energy target/BREEAM rating. Brookfield, however, remain responsible for achievement of the energy target/BREEAM, with £250,000 added to the contract sum in this regard. Negative pressure to be created in the design solution.		

It is unclear which specific part of the Contractor's Tender Return Submission is being referred in the M&E Clarification Log as "currently shown as" an air change rate of 2.5AC/HR. It is possible that is related to the Bid Submission Clarification document dated 17 December 2009 (see paragraph 3.23.2 of this PPP for more information).

Contractors Tender Return Submission Vol 3 (Design Narratives)

Ventilation

Volume 3 of the Contractor's Tender Return Submission ("Design Narratives) sets out the "Ventilation and Air Treatment Design Strategy."[43] After noting its view that "the main benefit of employing a natural ventilation strategy in the hospital building is the reduction in energy consumption," Brookfield set out its analysis of the ventilation strategy which is said to be "based on an amendment to the ITFD documents which stated that the overheating threshold was to be set at '50 hours per year above 26ºC'." Brookfield states that it carried out simulations using different design criteria and options to be able to reach a final solution on ventilation. The simulations appeared to show that there would be overheating on 60% of elevations on the mid floor wards and on 100% of top floor wards where mechanical ventilation was at 15 litres per second. The specification noted that "There is no natural ventilation provided on the top floor wards to avoid nuisance from helicopter noise and downdraft."

As to the issue with the problem of odours from the adjacent sewage works, the analysis set out that in association with the design of the mechanical ventilation the

[43] A32758374 - Contractor Submission Volume 3 1-3.33 Design Strategies, - 11 September 2009 at p.107-108, Bundle for Oral hearing commencing 19 August 2024 - Bundle 18 Volume 1 - Page 205.

issue "has been addressed with the provision of carbon filters on the fresh air side of the air handling units."

The design analysis concluded that:

> "in the wards a mixed mode, natural and mechanical ventilation combination, together with optimising the glazing area and type does not provide the solution to meeting the overheating criteria in the majority of the rooms. It is proposed that all ward rooms be provided with a means of mechanical cooling in the form of an active chilled beam as pictured below. The active chilled beams operate most effectively with the windows sealed as this reduces the likely hood of condensation.
>
> With the overheating design target set at '50 hours per year above 26ºC' and the summer external design temperature also 26°C the target is an onerous one to achieve with natural ventilation. In progressing the ventilation design strategy a number of calculations have been carried using '50 hours per year above 28ºC' (in accordance with the guidance in SHTM 03-01) as the target and it has been found that the mixed mode method is a feasible solution in the majority of the ward rooms."

Volume 3 of the Contractor's Proposals also set out the need for the Health Board to undertake maintenance of the ventilation.[44]

Water

The Cold Water Services design envisaged for incoming mains water to be filtered into bulk storage tanks, where it would be stored in a 'wholesome' condition. From there it would be distributed throughout the domestic cold water system, thus avoiding the need for a separate drinking water distribution system. Cold water would pass through electronic water conditioning devices to reduce the build-up of scale within equipment and distribution systems. Measures would be in place to regulate scale and pressure, together with capacity for cleaning and treatment. The domestic hot water system was envisaged to be fed from the domestic cold water system, thereby existing at pressure, with further mechanisms or configurations to regulate pressure, to control temperature and flow and risk from contamination, and to minimise risk from scalding.[45]

Contractors Tender Return Submission Vol 4 (Specifications)[46]

Ventilation

[44] A32758374 - Contractor Submission Volume 3 1-3.33 Design Strategies, - 11 September 2009 at p.288, Bundle for Oral hearing commencing 19 August 2024 - Bundle 18 Volume 1 - Page 205.
[45] A32758374 - Contractor Submission Volume 3 1-3.33 Design Strategies, - 11 September 2009 at p.101-102, Bundle for Oral hearing commencing 19 August 2024 - Bundle 18 Volume 1 - Page 205.
[46] A33015497 - Contractor Submission Volume 4 Specification 4.5-4.57 - 11 September 2009, Page 47 to 50 of PDF.

Volume 4 (Specifications) of the Contractor's Tender Return Submission included a section called "Specification for Ventilating Systems". The whole section is referred to, however it is noted that:

- mechanical ventilation and air conditioning systems will comply with the relevant clauses of various guidance documents in including SHTM 03-01;

- both natural ventilation via openable windows in perimeter rooms, and mechanical ventilation in internal rooms and certain perimeter rooms will be used;

- "Absolute HEPA (high efficiency particulate air) terminal filters will be provided only for 'ultra clean' areas such as UCV Theatres and Pharmacy Aseptic Suite. Consideration will be given to installing HEPA filters on plants serving vulnerable patients to afford additional protection against air-borne contamination, e.g. Aspergillus."

- "Air pressure regimes for theatre suites will be designed in accordance with the guidance provided in SHTM 03-1 employing wall mounted pressure control valves. Air volumes will be established by consideration of heat gains or losses and also the air change rate necessary for comfort and safety as appropriate for the activity carried out in each area. Relative air pressures between rooms will be maintained to suit the activity concerned, by design of the supply and extract air volumes, and use of pressure relief equipment where necessary to prevent cross infection or transfer of unpleasant odours between areas, as required by the ADB sheets."

- Descriptions are given of typical ventilation systems including Wards, Isolation Rooms, and "Critical Care departments such as ITU/HDU will be provided with dedicated ventilation systems"

Water

The corresponding section for the Cold Water and Hot Water Services is to be found at pages 37-39. It envisages particularly that both Water Services will conform to NHS Model Engineering Specification Parts C01, C02 C07, C82, D08, addendums to Part C, SHTN 02, SHTM 2027, BS 6700, with Cold Water Services additionally specifying SHTM 2040 and HTM 04-01 6700. Among the specific provisions for cold water were a modification/reduction of storage capacity, and the incorporation of filtering for all incoming water to 0.2 microns. Devices and other measures were to be in place to regulate issues such as pressure, isolation, backflow, monitoring, and special filtration where appropriate. For hot water the configuration of the system was envisaged to be such as to regulate pressure, temperature and contamination, and to be designed to minimise the presence of 'dead leg' areas which would not see regular flow.[47]

[47] A33015497 - Contractor Submission Volume 4 Specification 4.5-4.57 - 11 September 2009, at p. 37-39.

Volume 7 ("SHTM") of the Contractor's Tender Return Submission included a document titled "NHS Mandatory Documentation" which sets out a table summarising whether the bid complied with the NHS guidance which was listed as mandatory in clause 5.1.2 of the Employer's Requirements.

Brookfield states that its bid complied with all the mandatory guidance referred to in PPPs 11 and 12 (including inter alia: HTM 03-01; HTM 03-01 Part B; HTM 03-01 Part A; SHTM 03-01 Part A; SHTM 03-01 Part B; HTM 04-01 Part A; HTM 04-01 Part B; SHTM 04-01 Part A; SHTM 04-01 Part B).

Ventilation

Further in Volume 7, the Contractor's Proposals sets out the "Specification for Ventillating Systems"[48] as follows:

> "The mechanical ventilation and air conditioning systems will comply with the relevant clauses of the NHS Model Engineering Specification Parts C04, C82, addendums to Part C, HVAC DW144, 154, TR19, SHTM 03-1, HTM 05-1, BS 5726 (updated), and descriptions and requirements set out below."

"Wherever possible, natural ventilation via openable windows will be provided in perimeter rooms."

"The Hospital will be mechanically ventilated throughout all internal rooms with no access to natural ventilation, perimeter areas where mechanical ventilation is required for clinical and operational and environmental control reasons and deep plan perimeter areas where necessary to assist the natural ventilation. […]."

"Active chilled beams and fan coil units will also be provided for comfort cooling in areas where there is a need for separation or where high heat gains make these a more appropriate choice of systems. […]."

"[…] Consideration will be given to installing HEPA filters on plants serving vulnerable patients to afford additional protection against air-borne contamination, e.g. Aspergillus."

"Air pressure regimes for theatre suites will be designed in accordance with the guidance provided in SHTM 03-1 employing wall mounted pressure control valves.

Air volumes will be established by consideration of heat gains or losses and also the air change rate necessary for comfort and safety as appropriate for the activity carried out in each area. Relative air pressures

[48] A33015497 - Contractor Submission Volume 4 Specification 4.5-4.57 - 11 September 2009, at p. 47.

between rooms will be maintained to suit the activity concerned, by design of the supply and extract air volumes, and use of pressure relief equipment where necessary to prevent cross infection or transfer of unpleasant odours between areas, as required by the ADB sheets."

Water

Volume 7 also describes the specification of the water system in the following terms:

> "Hot and cold water services are described in Design Strategy for Hot and Cold Water Services Volume 3 Section 3.7 and specification sections Volume 4 Sections 4.27, 4.28 & 4.51. However, the following adjustments are proposed: - Fig 2 shows A small CWS break cistern serving each cold water system, prior to the main filtration plant will be provided. However, a secondary break cistern before each bulk storage cistern will not be provided. At least two equally sized bulk storage cisterns with a total of 100% of the design capacity in each location have been provided. The recommended quantities of water storage given in Table A1 are considered excessive for modern hospitals. Therefore, reduced levels have been used. Refer to Design Strategy for Hot and Cold Water Services Volume 3 Section 3.7 for further details. Clauses 9.13/9.23 recommend providing peak continuous hot water output for 20 minutes. Following the recommendations of the SHTM, results in excessive storage capacity, which can increase energy consumption and increase the risk of Legionella, the HTM approach is also outdated and relates back to when there was high usage of baths at set periods of the day. Modern hospitals predominantly use showers, which use less water and have a much higher diversity factor. This approach will not be followed, but diversity will be considered using the principles of BS 6700." [49]

[49] A33015497 - Contractor Submission Volume 4 Specification 4.5-4.57 - 11 September 2009, at p.9.

3. PART 3: CHRONOLOGICAL NARRATIVE

An outline of the history behind the delivery of the QEUH/RHC is described by NHS GGC on their website: "Building the Hospital: Why was the site chosen"[50].

A more detailed history is contained in NHS GGC's Outline Business Case[51] (and appendices[52]) dated February 2008 and their Full Business Case[53] (and appendices[54]) dated October 2010, both of which are referred in greater detail in the narrative below.

The following events have been highlighted for the purposes of this PPP.

Pre 2006

3.1 Acute Services Review and Strategy

Between 1998 and 2001, NHS Greater Glasgow undertook an Acute Services Review[55]. The review was intended to develop a strategy to address challenges facing the delivery of acute services in Glasgow. The Acute Services Review culminated in the Acute Services Strategy being approved by the Scottish Government in June 2002.

The second phase of the Acute Services Strategy involved the development of the new South Glasgow Hospital Campus (later known as the Queen Elizabeth University Hospital) "which not only sees the single biggest phase of modernisation and rationalisation of [NHS GGC's] adult clinical services but incorporates the creation of a new Children's Hospital for the Greater Glasgow and West of Scotland populations and the completion of the modernisation of Glasgow's Maternity Services".[56]

A 1109 bedded adult new build acute hospital was planned to provide A&E services, acute specialist in patient care, a small volume of medical day cases and out -patient clinics serving the local population. The proposed new 240 bedded children's hospital would provide A&E services and a comprehensive range of inpatient and day case specialist medical and surgical paediatric services on a local, regional and national basis. The proposed New Laboratory build would provide biochemistry,

[50] A49125059 - NHS GGC Webpage "Building The Hospital - Queen Elizabeth University Hospital and Royal Hospital for Children - Why the site was chosen" - downloaded 27 June 2024.
[51] A35289377 - NHS GGC Outline Business Case (public version) - February 2008.
[52] A35289470 - NHS GCC Outline Business Case Appendices (public version) - February 2008.
[53] A35100876 - NHS GGC Full Business Case (public version) – October 2010 (profiled January 2011), Bundle for Oral hearing commencing 19 August 2024 - Bundle 18 Volume 1 - Page 629.
[54] A32691394 - NHS GGC Full Business Case Appendices - October 2011.
[55] The Inquiry does not currently hold a copy of this Review. It is described in the Outline and Final Business Cases.
[56] A35289377 - NHS GGC Outline Business Case (public version) - February 2008, at p.11.

haematology blood transfusion and mortuary services[57]. The expected benefits of the project were many, ranging from the provision of high quality services to "Modern, fit for purpose facilities which meet the needs of patients, visitors and staff".[58]

3.2 Selection of the Southern General Hospital site

The Inquiry is aware that suggestions have been made that the selection of the site at the Southern General Hospital Site had a bearing on issues relating to infection control and the decision to design the hospital with sealed windows and a mechanical ventilation system.

In 2019, the Scottish Government instructed a Review which included a review of the site selection process. Chapter 3 of the Queen Elizabeth University Hospital Independent Report[59] is referred to, in particular paragraph 3.7 "Conclusions"

> "3.7. Conclusions
> 3.7.1. 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".

3.3 Consideration of a public-private partnership procurement model

When seeking to procure an infrastructure asset (such as a hospital), the Scottish Government would generally invite private sector contractors to tender to deliver the asset. There were, broadly speaking, two procurement models the Government could adopt.

One model was a standard procurement structure, in which the Government specified its requirements and paid a contractor to design and/or build it. On completion, the Government then took ownership of the asset, including the obligation to maintain it. NEC3 and NEC4 contracts have become public sector contracts of choice in the UK for this structure.

[57] A35289377 - NHS GGC Outline Business Case (public version) - February 2008, at p.12 and 13.
[58] A35289377 - NHS GGC Outline Business Case (public version) - February 2008, at p.13.
[59] Queen Elizabeth University Hospital Independent Review Report - June 2020.

As sub-categories to the standard procurement structure, the Government could follow the “traditional procurement” route, where the employer put its own design out to tender and retains the design risk through the construction process. Alternatively, the Government could select a so-called “Design and Build” procurement route. In a Design and Build contract, generally the employer sets out its requirements and the contractor submits a design for all or part of the works. After accepting a tender bid, the design may then also go through a design review process by the employer’s design team. In a Design and Build contract, the design risk is generally on the contractor, although the allocation of risk depends on the form of contract and any bespoke amendments.

The other model was a public private partnership structure. A public-private partnership is a cooperative arrangement between government and private sector to work together to deliver a project and/or to provide services to the population. Typically, the Government would contract out the design, build and maintenance/operation of a public facility to a private project delivery company, usually for a period of 25 to 30 years. The private company will be funded by some equity finance which will be substantially augmented by debt finance. During the 25 to 30 year period (commonly referred to as the “concession period”), the Government would pay back all project costs (possibly by allowing the service provider to retain the resulting revenue). Public-private partnership contracts are typically structured on the basis that the contractor assumes liability for the design.

A key benefit in the above mentioned structure is that most of the up-front finance is provided by the private sector, enabling the Government to increase national infrastructure investment without increasing public debt. However, the maintenance costs under this structure are generally higher than under the standard procurement routes.

Initially, in 2005, NHS Greater Glasgow explored the option of a Public-Private Partnership contract model to deliver the QEUH/RHC.

On that approach, the intention was for NHS Greater Glasgow to appoint a Technical Advisor to prepare a Public Sector Comparator design setting out the key design requirements and to prepare the outline business case (“OBC”). Once the OBC was approved, NHS Greater Glasgow would invite three potential delivery partners to develop a proposal to design, finance, build, and maintain the hospital for 25-years during which NHS Greater Glasgow would pay back all project costs.

3.4 Appointment of a Technical Advisor

Following a procurement process via the Official Journal of the European Union (“OJEU”) in 2005, NHS Greater Glasgow appointed Davis Langdon LLP as the project Technical Advisor in contemplation of adopting a public-private partnership procurement structure for delivery of the QEUH/RHC.

Davis Langdon LLP subconsulted several aspects of the works to others to form a larger Technical Advisor design team. The roles within that design team were: Davis Langdon LLP as the lead consultant (including project managers, costs consultants, health and safety and planning supervisor); Avanti Architects as architectural consultants; Directors Consultancy as health planners; SKM Anthony Hunts as civil and structural engineers; and Max Fordham LLP as mechanical and electrical engineers.[60]

3.5 Formation of NHS GGC

In April 2006, NHS Greater Glasgow amalgamated with part of NHS Argyll and Clyde to form NHS Greater Glasgow & Clyde ("NHS GGC"). The Inquiry understands that this did not affect the procurement strategy of the QEUH/RHC.

3.6 Scottish Executive Policy on Design Quality for NHS Scotland

In October 2006, the Scottish Executive issued "A Policy on Design Quality for NHS Scotland"[61]. It required Boards to produce a Design Action Plan in recognition that good design in healthcare buildings makes a measurable difference to the experience of staff, visitors and patients. It stated in the covering letter[62] that

> "4. The fundamental principle upon which this new policy is founded is that all NHS Scotland Bodies, as an integral part of the commitment to deliver the highest quality of environment for patient care, ensure that design quality is fully integrated into the healthcare building procurement process and is apportioned appropriate emphasis throughout all stages of this process.
>
> It also stated in the Policy (Annex A)[63] "Of particular importance in the context of healthcare buildings is the need for the Project Brief to incorporate policy, guidance and best practice in relation to reducing Healthcare Associated Infections (HAI). Guidance to ensure that prevention and control of infection issues are identified, analysed and planned for at the earliest stage of the provision of new or refurbished healthcare facilities Is contained within Scottish Health Facilities Note 30 (SHFN 30): 'Infection Control in the Built Environment: Design and Planning', published by Health Facilities Scotland. Additionally, Health facilities Scotland has developed a system which aims to assess and manage the risk of infection in the built healthcare environment called HAI-SCRIBE, an acronym for Healthcare Associated Infection System for Controlling Risk in the Built Environment. HAI-SCRIBE has been designed as an effective tool for the identification and assessment of potential

[60] The Inquiry does not hold copies of these appointments.
[61] A33010662 - Scottish Executive Policy on Design Quality for NHS Scotland - 23 October 2006.
[62] A33010662 - Scottish Executive Policy on Design Quality for NHS Scotland - 23 October 2006, at p.2.
[63] A33010662 - Scottish Executive Policy on Design Quality for NHS Scotland - 23 October 2006, at p.19.

hazards in the built environment and the management of these risks. The tool should be applied from the design and planning stages of a project through to the occupation and operation of the facility".

2007

3.7 Planning Application

In April 2007, a planning application was submitted to the local authority under the Town and Country Planning (Scotland) Act 1997[64]. The Inquiry understands that the local authority granted conditional approval of the plan in January 2008, subject to 43 conditions. 23 conditions were pre-start conditions.

3.8 Change of Government in Scotland

In May 2007, there was a change of Scottish Government. Before May 2007, there was a Labour/Liberal Democrat coalition. From 2007 to 2011 there was an SNP minority administration. The Inquiry is not aware that this affected the procurement strategy of the QEUH/RHC.

3.9 Design Solutions Report/PSC

A Public Sector Comparator (PSC) was developed to allow the clinical criteria and footprint allowance to be tested and a budget cost established. The PSC was captured within a Design Solutions Report by Davis Langdon LLP dated July 2007 [65]. This included design analysis and proposals as well as architectural drawings and Mechanical and Electrical drawings. Air quality is addressed at paragraph 5.6.6 "Air Quality":

Shieldhall Waste Water Treatment Works

"The works are situated approximately 400 meters from the proposed development (see Figure 28). The works are the largest Waste Water Treatment Works in Scotland, serving 800,000 people (this is very large). Conversation with Scottish Water have revealed that there are issues with five storm tanks each of which hold 1,000,000 gallons of storm water. In adverse weather, all water and raw sewage is diverted here. It then needs to be processed but the tanks are too large for odour to be contained and a lot of odour is created and released. This generates a large volume of complaints, especially in the summer. They have attempted to empty the tanks at night but are often compelled to empty them more frequently to allow for more storm water.

All normal sewage inlet channels are covered but money for more comprehensive odour control such as containment of the storm water tanks

[64] The Inquiry does not hold a copy of this document.
[65] A48943284 - Design Solutions Report - 2007.

requires significant capital investment. There are plans to upscale a project injecting an enzyme into the sludge which is claimed to dramatically reduce odour. Scottish Water is looking at options for containment on the site or even relocation but there is no certainty with respect to either scope or program for this at present.

HAI-SCRIBE (Healthcare Associated Infection System for Controlling Risk In the Built Environment):

Odour does not present a direct infection risk, but may force windows and ventilation intakes closed, and this in turn may increase the risk of HAI in the healthcare facility. Clinical areas require good rates of ventilation to provide dilution of pathogens generated within the hospital and to control odours within the hospital.

Odour is unpleasant to patients and visitors. Staff are more likely to become tolerant to the smell as they are continuously exposed to it.

The improvement of air quality in healthcare settings is a constituent of modern airborne hygiene procedures. The vast majority of microbes are associated with particles and air filtration is a solution to preventing spread of infection. The air quality requirements in healthcare settings vary from department to department and, often, even from room to room. Some areas require high-efficiency filtration of airborne micro-organisms to protect patients, staff and visitors (e.g. in operation suites, ICUs, TB isolation rooms), whereas other areas require the filtration of gaseous contaminants, chemicals and odours to provide a safer and more pleasant working environment (e.g. in laboratories, autopsy rooms, dental surgeries and pharmacies). It is thus essential that only very-high-quality filters are installed in these environments.

Increasingly stringent national and European environmental legislation on air quality has resulted in the development of new filters to remove and reduce odours and chemical fumes from the workplace. These filters combine a blend of high-grade carbon and alumina/ potassium permanganate that destroys odours, corrosive gases and fumes such as ammonia, arsine, ethylene, formaldehyde, hydrogen sulphide, nitrogen dioxide and oxide and sulphur dioxide as well as contaminants normally treated with standard carbon products. These Air Processors run with near-silent fans, are odour-free in operation and create a healthy and productive environment for everyone's benefit.

An odour problem will be present at times on the proposed site of the New South Glasgow caused by the waste water treatment works at Shieldhall. Odour is best treated at source and measures to control odour at this site could well be implemented by the Scottish Government and Water Authority. **If odour control at the hospital is deemed necessary, activated carbon filtration is the most suitable technology both in terms of effectiveness and cost. However, it would rely on a sealed**

building with a mechanical ventilation system throughout any odour treated areas."

Paragraph 6.3.9 "Ventilation" is also noted, in particular the conclusion that "The Clinical Areas, Wards and the remainder of the main hospital buildings are to be mechanically ventilated throughout" and the repeated references in this part of the Report to the importance of ventilation in controlling airborne infection.

The PSC design was revised and updated in 2008/9 by Currie & Brown so that it could be used as the design exemplar and form part of the Employer's Requirements documentation.

3.10 NHS GGC Design Action Plan

In October 2007, NHS GGC produced their Design Action Plan[66]. This is the plan required by the Policy on Design Quality referred to above. It set out the Board's vision for achieving design quality.

2008

3.11 Gateway Review 1

The New South Glasgow Hospitals project was subject to an Office of Government and Commerce (OGC) Gateway Review. The review was an independent assessment confirming that the business case was robust to meet the business need, was affordable, achievable with appropriate options explored and likely to achieve value for money.

In January 2008, 'Gateway Review Stage 1: Business Justification was completed. The project could then proceed to the Board and Scottish Capital Investment Group with the Outline Business Case subject to recommendations that had to be addressed before the Gateway 2 Review.

The outcome of the Gateway Review Stage 1 is summarised in paragraph 20.2 of the Outline Business Case (OBC) [67] referred to below. It records that five amber recommendations were made in the Gateway Review including "…The project team should take appropriate time to consider the full implications of a decision to adopt a traditional (design and build) procurement route…" and "…the project team, should review their draft plans for the project governance and management of the next phase.". The OBC records that immediate plans included:

- "A workshop organised for mid February 2008 attended by the Boards legal and financial advisers supported by a number of technical advisers to determine the optimum conventional procurement model.

[66] A35185698 - Design Action Plan - October 2007.
[67] A35289377 - NHS GGC Outline Business Case (public version) - February 2008, at p.142 to 144.
[67] A35289470 - NHS GCC Outline Business Case Appendices (public version) - February 2008.

- More detailed information and communication with staff side representations including continuing with internal meetings between the project managers and staff side, input into the Project Groups and involvement in how information should be more widely communicated to staff.

- Development of a fully consolidated risk register. This will amalgamate the current risk register held by the Project Team, the project risk management strategy (as detailed in Appendix 13) and the technical risk register developed by the technical advisers which focuses specifically on building risks.

- The governance structures for the next phase of the project are being developed with draft proposals reflected in this document which will be subject to revision in line with the preferred Design and Build procurement model which will be identified through an option appraisal at the mid February workshop."

3.12 Alternative procurement routes considered

Around February 2008, NHS GGC began investigating procurement routes that could be funded using public capital. On 19 February 2008, a Procurement Workshop[68] was held where a range of procurement options were considered. The initial review of the procurement model involved assessing alternative delivery models against critical success factors, and an Options Appraisal.

From March 2008, Ernst & Young undertook a 'market sounding' exercise and produced a report in September 2008. The conclusion is later recorded as "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" [69].

It is unclear when the decision to select the NEC3 Engineering & Construction with Option C Target with Activity Schedule as the form of contract (as opposed to a different standard form Design and Build contract) was formalised.

It is unclear whether NHS GGC sought or received advice from their legal advisors regarding the appropriateness of a Design and Build model or the choice of Target Cost.

[68] A35068196 - Email chain - P Moir and G Roy - Procurement Workshop 19 February 2008 - Attached briefing documents (agenda, evaluation form, list of procurement options, NSGH current position procurement) - 15 to 19 February 2008.
[69] A35422662 - NHS GGC Performance Review Group - Report on Procurement Strategy - 16 September 2008 (The Inquiry does not hold a copy of the Ernst & Young report. However, a summary of its conclusions is recorded in this document dated 16 September 2008).

3.13 Outline Business Case Approval

In April 2008, after having progressed through the Scottish Capital Investment Manual ("SCIM") process, the Outline Business Case ("OBC") was approved by the Scottish Government. The OBC was submitted on the basis that the project would be delivered using public capital funding.

The OBC[70] (and appendices[71]) is a key document in the chronology of events.

The OBC included the history of the "jewel in the crown of NHS Scotland"[72] from the 2002 Acute Services Review to date (section 1); the case for change and project objectives (Sections 4 and 5); the site and design configuration options (section 6); risk management strategy (section8), financial appraisal (section 9); the procurement model for scheme (section 10); and the project management arrangements including the role of advisors (sections 15-20).

3.14 Appointment of a Lead Consultant

In 2008, a re-scoped Lead Consultant role was developed for the design and build model. This would replace the Technical Advisor role used under the public private partnership model.

On 26 June 2008, an invitation to tender[73] was issued by an OJEU tender selection process.

On 6 August 2008, Currie & Brown responded to the tender invitation by tender submission[74], followed by a letter dated 13 August 2008[75] clarifying that tender submission.

By letter of 2 September 2008[76], NHS GGC wrote to Currie & Brown UK Ltd, accepting their tender bid. Currie & Brown then began performing the Lead Consultant role.

By an exchange of letters dated 18 January 2010 and 26 February 2010[77] the scope of Currie & Brown's appointment was restricted. See paragraph 3.26 of this PPP for further details.

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[70] A35289377 - NHS GGC Outline Business Case (public version) - February 2008.
[71] A35289470 - NHS GCC Outline Business Case Appendices (public version) - February 2008.
[72] A35289470 - NHS GCC Outline Business Case Appendices (public version) - February 2008, at p.9.
[73] A32371754 - Invitation to Tender: "Appointment for a lead consultant and technical team for a public finance procurement route" - 26 June 2008.
[74] A32371144 - Letter from Currie & Brown to NHS GGC - 06 August 2008.
[75] The Inquiry does not hold a copy of this letter.
[76] A32372008 - Letter from NHS GGC to Currie & Brown - 02 September 2008.
[77] A32421344 - Letter from Currie & Brown to NHS GGC - 26 February 2010.

Whilst a formal memorandum of agreement between Greater Glasgow Health Board was not entered into between Greater Glasgow Health Board and Currie & Brown until 6 April 2011[78] (the "Currie & Brown Appointment"), clause 1.1 of Appendix A under that appointment said that the appointment commenced from the date that Currie & Brown started carrying out its duties.

The Currie & Brown appointment consisted of a short four-clause main agreement and an appendix in seven parts. Clause 1.2 of the main agreement set out that the agreement consisted of the memorandum of agreement and appendixes A to G.

Currie & Brown's appointment as set out in the appendix included the following terms:

> "**APPENDIX PART A – CONDITIONS OF APPOINTMENT**
>
> […]
>
> **Generally**
>
> Note, where reference is made to the 'Consultant' throughout this section, this refers to the Lead Consultant and the Technical Advisory Team as a whole.
>
> **1.1 Duration of commission**
>
> The appointment of the Consultant will commence from the date that the Consultant commenced carrying out the Duties and the commission, unless suspended or terminated, shall be deemed to be completed on the conclusion of the duties by Work Stage, as set out in Part C of the Appendix.
>
> Note this will be a staged appointment, the Board reserves the right to terminate the commission at the end of each and every Work Stage from 1A - 5. Progression from one Work Stage to another will be subject to written confirmation by the Board (which may be via the Project Director).
>
> **Objectives and obligations of the Consultant**
>
> **1.2 Scope of Duties**
>
> The duties to be performed by the Consultant are those listed at Part C of the Appendix, as amplified by the Consultants' Bid Submission, (provided always that where there is a conflict between the duties listed at Part C of the Appendix and deliverables and methodologies contained within the Consultants' Bid Submission that the duties listed at Part C of the Appendix shall prevail) and any Additional Duties.
>
> […]
>
> **1.6 Duty of care**

[78] A32421614 - Memorandum of Agreement between Greater Glasgow Health Board and Currie & Brown UK Limited - 06 April 2011.

The Consultant is to **exercise reasonable skill, care and diligence in the discharge of the Duties**. Submission of drawings, calculations, specification and other documentation produced by the Consultant for comment by the Board shall not relieve the Consultant of this responsibility.

[…]

1.29 Sub-contracting

The Lead Consultant shall not sub-contract any of the Duties without the written consent of the Board. **The Lead Consultant shall be fully responsible and liable for the performance of the Duties by any SubConsultant notwithstanding that the consent of the Board has been obtained**.

[…]

Notwithstanding the foregoing the Lead Consultant shall not require to obtain consent from the Board in respect of the appointment of the following Sub-Consultants and organisations forming part of the Technical Advisory Team or delivering services to the Technical Advisory Team:

- HLM Architects - architect for the adult and children's hospital (sub-contracting to BMJ Architects - architect for the laboratory block and all projects; Hirst Landscape Architects - landscape architect; and Buro Happold - fire engineers);
- Buchan Associates - healthcare planning for all projects;
- URS - civil and structural engineer for all projects; and
- Wallace Whittle - building services for the adult and children's hospital and laboratory (subcontracting to Harley Haddow - building services for the adult and children's hospital).

[…]

APPENDIX B – SCHEME PARTICULARS

[…]

1.2 General description

The Duties are required to assist the Board to develop a full brief, tender and all Employer's Requirements documentation to enable engagement in a public finance procurement for the New South Glasgow Hospital Project, to provide the hospital facilities as listed below. The Duties include the management of the Building Contract with a D&B consortia, through to the successful completion of the works, commissioning and equipping, transfer and occupation.

Key elements of the project are (for information):

- Development of an integrated adult acute and children's hospital proving the full range of acute health services.
- Development of a new Laboratory facility including Mortuary and Post-Mortem Services, Biochemistry, Haematology and Blood Transfusion.

- Provision of a rooftop helipad.
- Possible provision of non-clinical services such as Hard FM services to the new facilities by the D&B contractor for an initial 3-5 year period.
- The supply and installation of Group 1 equipment and location and/or fitting of Group 2 equipment supplied by the Board.
- Information Management and Technology (IM&T)- Out with this project, the Board is procuring software and end-use hardware as part of a separate IM&T project.

The Board requires the provision of integrated facilities that are readily adaptable to changing clinical practice and makes the best use of new technologies.

[…]

1.12 Lead Consultant Team

It is the **Board's intention to appoint the following disciplines as part of the Lead Consultant team**. The team will be lead by the Lead Consultant/Project Manager; **a single appointment will be made with this company for the whole team**. […].

- Lead Consultant/ Project Management
- Employer's Agent role (construction stage)/Contract Administration
- Architectural Design and Site Masterplanning
- Healthcare Planning
- Civil and Structural Engineering
- Building Services Engineering & IT Infrastructure
- Cost Consultant/Quantity Surveying/Lifecycle costing
- CDM Co-ordinator
- Risk and Value Management advice
- Facilities Management advice (soft and hard FM)
- Procurement and Construction Management Advice
- Landscape Architect

[…]

The Board has existing Consultancy agreements for the supply the following services, these appointments have been made and do not form part of this commission. The Lead Consultant team will be expected to work with these advisers, and acceptance of the commission will be conditional on this.

- Legal - Shepherd & Wedderburn LLP.
- Financial - Ernst & Young LLP.
- Town Planning Consultant- Keppie Planning.
- Environmental Consultant- Ironside Farrar.
- Transportation Consultant - JMP Consultants Ltd.
- The Carbon Trust and sub-consultant.

[…]

1.14 Site Inspection Staff

It is the Board's intention to make direct appointments for the under-noted roles, some will be made for the duration of the works

contract others for particular stages, the appointments will be full-time. The Lead Consultant team will be required to structure and manage the selection and appointment process for all site inspection staff on behalf of the Board, although the contractual and payment arrangements will be between the Board and the respective companies.

- **Building Clerk of Works (4)**
- **M&E Clerk of Works (3)**
- **Site Engineer (2)** - sub-structure, drainage, groundworks and frame.

The Lead Consultant will manage and direct the work of the site inspectorate staff. Site Inspectorate staff will be based on site for the duration of the works contract.

[…]

1.16 Board's procedures/ requirements

• NHS GG&C PSC / OBC documentation and OBC Stage Design Report as prepared by others, including all associated drawings, specifications and Project costs.
• Scottish Capital Investment Manual (SCIM).
• SEHD - Procode V 2.0
• The Board's Design Action Plan
• Health Facilities Scotland - SHPN and/or NHS HBN and HTM's.
• NHS Estates and others guidance documents such as AEDET, NHS NEAT, or BREEAM.
• Government Gateway reviews will be undertaken at various stages (see separate section).
• OGC Guidance on Competitive Dialogue and general project delivery. (use of CD unlikely).
• FBC

1.17 OGC Gateway Reviews

The Scheme will be subject to external review by a Gateway Review Panel at various stages of the Scheme and the Lead Consultant team will be expected to assist the Board's Project Team at the following stages;

Gateway Review 0 - Strategy assessment (2 reviews).
Gateway Review 2 - Procurement strategy.
Gateway Review 3 - Investment Decision.
Gateway Review 4 - Readiness for Service.
Gateway Review 5 - Benefits Realisation.

Input from the Lead Consultant will be focused to technical elements associated with each review, and cover matters such as programme, cost management, procurement strategy and structure, project specification and buildability. Each Gateway Review will last approximately 2- 3 days and it is likely that the Lead Consultant will need to prepare a status report on technical elements and be available for interview for 2-3 hours.

[…]

1.21 Further Development of the Board's OBC/PSC Design Exemplar

The Board have developed a PSC design exemplar through the first stage of a PPP procurement strategy. While this strategy has now changed course towards a public finance route, a good deal of the design and information prepared for OBC is still valid. […]

The PSC design therefore requires to be revised and updated before it can be used as the design exemplar and form part of the Employers Requirements documentation

[…]

APPENDIC PART C – CONSULTANTS' DUTIES

Lead Consultant Technical Advisory Team - Scope Of Services

The Lead Consultant/ Technical Advisory Team will provide guidance, advice and active input to the Board in the following key areas throughout the duration of the commission, the Lead Consultant team will be expected to manage and direct the process on behalf of the Board. The Team will be responsible for the procurement of;

- The New Adult and Children's Hospital Project - two stage D&B process.
- The New Laboratory Project- single stage D&B process.

The Board require the following consultancy services as a minimum;

- Lead Consultant/ Project Manager
- Employer's Agent role (construction stage)/Contract Administration
- Architectural Design and Site Masterplanning
- Healthcare Planning
- Civil and Structural Engineering
- Building Services Engineering & IT Infrastructure
- Cost Consultant Quantity Surveying/Lifecycle costing
- CDM Co-ordinator
- Procurement and Construction Management advice.
- Landscape Architect.
- Risk and Value Management advice
- Facilities Management advice (soft and hard FM)

[…]

General Duties of the Team

[…]

- Remain up to date and responsive to changes in legislation or guidance on all matters relative to the project. […]
- **Advise the Board on general issues of on-going advice on government policy; compliance with SCIM, SEHD, DoH, OGC and Treasury procedures; compliance with Local Council planning procedures. Compliance with legislation and NHS Design Guidance.**

Key Team Activities and Tasks for Stage 1A - Preparation of Employers Requirements Documentation

[…]

1) Manage the compilation and publication of a comprehensive set of Employers Requirements documents for the approval of the Project Director. The contents should include as a minimum the items list below, and the bulk of the work will be undertaken by your team.
    - Board's ASR Strategy and clinical strategy.

[…]

2) Develop and manage a process through OJEU to advertise the project (in association with the Board's legal adviser), and then to evaluate and shortlist interested D&B consortia, to include preparation of a PQQ and information Memorandum. Provide advice and guidance to the Board on all aspects of this process including timetable. The Board hope to engage a maximum of 3 D&B teams in this process. Assist the Board's Project Team with responses to request for further information during pre-qualification process.

[…]

Key Team Activities and Tasks for Stage 1 B - Stage One Design and Bid Development and Evaluation, selection of a preferred bidder D&B team.

1) Produce, print, package and issue Employer's Requirements tender documentation to selected D&B consortia - max 3. During this stage further develop any tender documentation and information for this or next stage that maybe outstanding. Note much of this information will be developed in conjunction with the Board's Project Team and user groups and ongoing development and detail of the project requirements.

[…]

6) Manage the receipt of Stage 1 bids from three D&B Consortia, and commence and manage the full process to evaluate the bids with full involvement of the Board's Project Team and the eventual involvement of user groups perhaps by way of open day presentations by each D&B bid team.
7) On completion of the evaluation of bids, prepare a full report giving the Project Director a recommendation based on (exact criteria will be confirmed later) value for money, design solution / functionality, healthcare design and technical specifications and systems and all financial and commercial aspects. The report should also include any significant areas of deviation from the Employer's Requirements and compliance statement and detailed 'technical' and 'user' evaluations.

Key Team Activities and Tasks for Stage 2 - Stage 2 Design and Bid Development, package tender through to agreement of a Guaranteed Maximum Price, Full Business Case preparation and approval and contract sign off.

1) Complete and issue any further information in respect of the Employers Requirements.
2) Engage with preferred bidder and develop and agree a structured programme to allow the design and work packages to be fully developed

for tender issue.

[…]

5) Support the Board in the 'user' evaluation of the design proposals as they develop, by developing approaches to enable users to fully understand the design, technical and clinical operational issues implicit in the preferred bidders design proposals.

[…]

7) Participate in review and evaluation of all aspects of Stage 2 bid response, provide clarification as required on all design and technical matters. Prepare technical report on Stage 2 bid submission, including evaluation process and giving recommendation to the Project Director and Executive Board. The report should also include any significant areas of deviation from the output specification and compliance statement and detailed 'technical' and 'user' evaluations.

8) Based on the format/content for Stage 2 tender response, developed by your team and included for information in the Stage 1 tender documents, secure a full Stage 2 tender submission from the D&B consortia. While the detail of this package will be complex we reproduce below a minimum requirement to assist you to prepare your bid. The bulk of this evaluation will be undertaken by your team, and the output included in a formal report to the Project Director.

Content

- By end of stage - full clinical sign off;
- Agreed functional content.

9) **Undertake and manage a full technical, financial and commercial review of the preferred bidders final tender submission, provide clarification as required on all technical matters, prepare a full report giving the Project Director a recommendation for approval or otherwise. The report should also include any significant areas of deviation from the Employer's Requirements and detailed 'technical' and 'user' evaluations.** Await approval from Project Director to proceed to next stage.

Key Team Activities and Tasks for Stage 3 - Implementation and Construction, Design Development.

[…]

2) Undertake the role of Employers Agent for the duration of the works contract and manage the interface between the Board and the D&B contractor.

Key Activities and Tasks for Stage 4 - Equipping and Operational Commissioning

2) **Assist the Project Director to develop a fully structured Commissioning Plan** for the operational commissioning and equipping of the following projects in chronological order;
   - New Laboratory Project
   - New Children's Hospital
   - New Adult Acute Hospital

LEAD CONSULTANT / PROJECT MANAGER – KEY ROLE AND

RESPONSIBILITIES

Key aspects of Project Manager's role:-

[…]

- Manage the technical review of D&B bidder proposals during the procurement process for Stage 1 and Stage 2 final bid at Contract Close.

[…]

- Carry out and deliver the duties of Employers Agent throughout the construction phase, manage interface with D&B contractor, manage and administer contract and associated processes.

[…]

- Provide full shadow design team service throughout the duration of the works contract.

ARCHITECT / SITE MASTERPLANNER – KEY ROLE AND RESPONSIBILITIES

- Take lead on all matters relative to architectural, building and site master planning, interior design, room layouts, fire engineering, fire escape and fire safety, fabric, components and their life-cycle, phasing and construction.

[…]

- Assist with preparation of Employer's Requirements documentation, the bid process and evaluation at all stages.

[…]

- Review bidders proposals at all stages for compliance with Employer's Requirements document, participate in the production of technical reports at the end of each stage, to include aspects on architectural, building construction, healthcare design, interior design, landscape and master planning.
- Provide full shadow design team architectural and building service throughout the duration of the works contract.
- In conjunction with Board, manage activities of Board appointed Clerks of Works during construction phase.
- Provide monthly reports on compliance of project with Employer's Requirements.

[…]

HEALTHCARE PLANNER – KEY ROLE AND RESPONSIBILITIES

Key aspects of Healthcare Planners are:-

- Take lead on all matters relative to clinical design, clinical output specifications, operational policies, functional content, schedules of accommodation, within Technical Advisory Team
- Lead on behalf of the TA team and assist the Project Managers for the Adult and Children's Hospitals with the development of Clinical Output Spees / Operational Policies for all departments within the new facilities, working closely with NHS staff to agree and sign off a standard reference document for the Employer's Requirements briefing process and documents. In other words ensure full briefing packs are prepared for all departments to a suitable level for the project.
- Actively participate in design development process between user groups

and bidder design teams through the various stages of tender through to contract close.
- Lead in clinical and healthcare planning design reviews from bidders and evaluation meetings at each stage of the process.
- **Review bidders proposals at all stages for compliance with Employer's Requirements**, participate in the production of technical reports at the end of each stage, to include aspects on healthcare planning and design, good practice, compliance with National healthcare quality, **infection control and design standards.**
- Provide full shadow design team 'due diligence' service on healthcare planning and design matters throughout the duration of the works contract.

BUILDING SERVICES ENGINEER – KEY ROLE AND RESPONSIBILIIES
Key aspects of Services Engineer's role:-
- **Take lead on all matters relative to mechanical and electrical engineering services,** energy and environmental matters, renewables, carbon neutral design, integration with existing hospital and other main utility services.

[…]
- **Assist with the Design Development process** and input to the ADB room data and room layout processes by the supply of building engineering information for the sheets to focus on environmental conditions, **air changes**, room temperatures, humidity any **specialist filtration, negative or positive pressure systems**. Also review and advise on M&E equipment, including the location of M&E apparatus such as light and power switches, light fitments, air handling grillage, appropriate types of heating systems, powered medical equipment, telecoms and IT.
- **Review bidders proposals at all stages for compliance with tender requirements**, participate in the production of technical reports at the end of each stage, to include aspects on building services.
- Provide full shadow design team service throughout the duration of the works contract.
- **Fully participate in the technical commissioning** of the new facilities in conjunction with Board estates staff and the contractor.

COST CONSULTANT/ QUANTITY SURVEYOR- KEY ROLE AND RESPONSIBILITIES
[…]

CIVIL AND STRUCTURAL ENGINEER- KEY ROLE AND RESPONSIBILITIES
[…]

FACILITIES MANAGEMENT DESIGN ADVICE- KEY ROLE AND RESPONSIBILITIES
[…]

CDM CO-ORDINATOR- KEY ROLE AND RESPONSIBILITIES
[…]

LANDSCAPE ARCHITECT
[…]"

3.15 Appointment of Sub Consultants including Wallace Whittle

After Currie & Brown were appointed as lead consultant, they appointed various sub consultants. These included:

- HLM Architects - architect advisor;
- Wallace Whittle - building Services engineer (including M&E services);
- Buchanan Associates - healthcare planning; and
- URS Corporation - civil and structural engineering and CDM coordinator.

In the context of PPP 11(water) and PPP 12 (ventilation), the role of Wallace Whittle as the provider of mechanical and electrical (commonly known as "M&E") services is of particular relevance. The terms of their engagement are therefore produced and referred to below.

The Inquiry has been advised that Wallace Whittle was acquired by TUV SUD in July 2011 and then, in April 2021 subject to a management buyout whereby it was reestablished under the Wallace Whittle name.

The Agreement between Currie & Brown and Wallace Whittle is dated 31 May 2012[79] but, like Currie & Brown, their services had been delivered from a much earlier date which is believed by the Inquiry to be 2008.

In relation to Wallace Whittle's involvement with the project, there is an additional feature which should be noted. Wallace Whittle was involved in the project in two separate ways at two separate times. They were initially appointed by Currie & Brown as subconsultants advising NHS GGC. They were subsequently appointed by Brookfield/Multiplex as subconsultants advising them. The Inquiry has been advised by the legal advisors of Wallace Whittle/TUV SUD that:

- Wallace Whittle's appointment by Currie & Brown ceased at conclusion of the tender exercise by December 2009;

- neither Wallace Whittle nor TUV SUD was part of Multiplex's design team. Neither was it involved with assessing Multiplex's developed design on behalf of the health board (a role carried out by Capita). It was not envisaged that Wallace Whittle would have any ongoing role and their involvement with the Project ceased at this point;

- Wallace Whittle may have provided some ad-hoc advice to Currie & Brown on specific technical issues (on a 'time charge' basis) after the completion of the

[79] A32659704 - Memorandum of Agreement between Currie & Brown UK Limited and Wallace Whittle Limited - 31 May 2012.

tender process; however, this was with respect to the electrical infrastructure/district of the larger campus, rather than being connected with the construction of the hospital itself;

- the mechanical and electrical engineer appointed by Multiplex was Zisman Bowyer & Partners LLP ("ZBP"). On 28 January 2013 ZBP entered administration. On 7 March 2013 Multiplex appointed TUV SUD to take over and complete ZBP's role;

- TUV SUD acquired a number of assets from ZPB (including staff) but was appointed under a distinct agreement with Multiplex i.e. TUV SUD did not take over ZBP's existing appointment as a 'going concern' but was separately appointed in its own right;

  [Note: the terms of the agreement, in the context of Wallace Whittle /TUV SUD "replacing" ZBP in 2013, are referred to later in this chronology]

- by the time TUV SUD were appointed the mechanical and electrical design was complete and the construction phase of the project was already underway;

- TUV SUD's role in the project was principally focused on closing out the project through the commissioning and inspection phases. These tasks were primarily undertaken by a specific team by Multiplex with Capita representing the health board. TUV SUD's role was to attend specific elements of this process as directed, by Multiplex, and respond to any ancillary queries raised; and

- separately, in early 2016 after the hospital was opened, TUV was involved with the redesign of wards 2A and 4B. This was carried out on the instruction of Multiplex and understood to be the result of a change in the client brief. This involved alterations to the ventilation of those wards.

2009

3.16 The Technical Advisory Team

From around the end of 2008 through to April 2009, the Technical Advisory Team led by Currie & Brown prepared the exemplar design, to inform the Employer's Requirements for use in the Building Contract.

The Technical Advisory Team also compiled the Employer's Requirements that were issued in May 2009.The Inquiry understands that, in particular, it was Wallace Whittle that was responsible for Appendix M (M&E) of the Employer's Requirements. See Part 2 of this PPP (The Building Contract) for further details about the content of Appendix M.

The Inquiry holds copies of minutes of meetings of the Technical Review Group in 2009[80] which show recurring items of discussion were (a) the importance of the

[80] A48705272 - Technical / ER's Meeting Minute - 30 January 2009.
A48705274 - Technical / ER's Meeting Minute - 13 February 2009.

Employer's Requirements; (b) the importance of compliance with SHTMs/HTMs; and (c) the impact of a "sealed/non sealed building". Attendees included Peter Moir (NHS GGC), David Hall and Mark Baird of Currie & Brown, representatives of HLM and Stewart McKechnie of Wallace Whittle.

There appears to have been an ongoing discussion about whether the building should be sealed or non sealed which was recorded in the minutes, usually as item 15. Wallace Whittle was actively involved in those discussions as one would expect of the M& E engineer. It appears that they were, at this stage, developing a mixed mode narrative for inclusion in Appendix M (Mechanical &Electrical) of the Employer's Requirements.

3.17 Gateway Review 2 (delivery strategy)

In January 2009, the Scottish Government carried out Gateway Review 2 (delivery strategy)[81].

3.18 Tender process

In February 2009, the project was advertised via the OJEU process[82]. The main contractor was to be selected using a tender process involving a competitive dialogue period managed by Currie & Brown.

Clause 7 of IPCD Volume 1 contained an outline timetable for the procurement as follows:

A48705273 - Technical / ER's Meeting Minute - 27 February 2009.
A48705275 - Technical / ER's Meeting Minute - 13 March 2009.
A48705276 - Technical / ER's Meeting - Summary of Board Actions - 19 March 2009.
[81] The Inquiry does not hold a copy of Gateway Review 2. However, it is referred to in the Full Business Case.
[82] The Inquiry does not hold a copy of OJEU advertisement. However, it is referred to in the Full Business Case.

Event	Milestone
Publication of OJEU (incl MoI and PQQ)	10 February 2009
Closing date for responses to PQQ	20 March 2009
Evaluation of PQQ responses and shortlisting of bidders	08 April 2009
Issue of Invitation to Participate in Competitive Dialogue (ITPD) to bidders	01 May 2009
Tender Return	11 September 2009
Evaluation of Bids and Contract Award	November 2009
Stage 1 (Design + Construction of New Laboratories) commences	November 2009
Stage 2 (Detailed Design of Adult, Children's and Infrastructure to FBC Submission) commences	November 2009
Stage 2 completion, FBC and approval to proceed with Stage 3	November 2010
Stage 3 (Engagement to carry out the construction of the Adult, Children's and Infrastructure) commences	November 2010
Stage 1 Completion (Construction) - Laboratory Facilities	December 2011
Operational Date – Laboratory Facilities	February 2012
Stage 3 Completion (Construction) – Hospitals	January 2015
Operational Date – Hospitals	Summer 2015
Stage 3A (Demolition of Surgical Block and associated buildings, and completion of soft landscaping) commences	Summer 2015
Stage 3A completion	Summer 2016

Five potential bidders completed a pre-qualifying questionnaire, namely Balfour Beaty Group Limited, Brookfield Europe LP, FCC Elliot Healthcare Ltd, Laing O'Rourke Construction Limited, and Miller Construction UK Ltd.

In April 2009, Atkins Limited undertook a peer review of the Employer's Requirements and competitive dialogue process[83].

In May 2009, three bidders – namely Balfour Beatty Group Limited, Brookfield, and Laing O'Rourke Construction Limited – were selected from the pre-qualifying questionnaires. On 11 May 2009 they were issued with an Invitation to Participate in Competitive Dialogue ("IPCD") which included (in volume 2) the Employer's Requirements. See Part 2 (The Building Contract) of this PPP for more details of the IPCD.

3.19 Competitive dialogue period

Between June and August 2009, competitive dialogue meetings took place with the three bidders. They were identified as bidder A, B and C. 16 scheduled meetings were planned with each bidder to discuss and clarify NHS GGC's requirements for the main aspects of the project.

The competitive dialogue period was strictly controlled to ensure parity between bidders. Agendas were produced for meetings and outcomes noted. The meetings were categorised according to four workstreams; design/site; logistics; laboratories/FM; commercial.

The competitive dialogue period was an intensive period of time for NHS GGC, the three bidders, and their professional consultants.

[83] The Inquiry does not hold a copy of this document.

During this period, Requests for Information (RFIs) were made by bidders to NHS GCC in a prescribed form. An example RFI is produced to show the type of RFI that could be made by a bidder and how it was responded to. In this example RFI (number 38[84]), bidder A (not Brookfield) asks for clarification on AHU plant and distribution strategy. The bidder proposes common AHU plant rather than departmental dedicated plant as required by Appendix M&E 3 -2.4.2. NHS GGC's response is "Not acceptable. Please comply with M&E 3".

Brookfield submitted 147 RFIs which were later recorded in the RFI log incorporated into the Building Contract.

During this period, meetings with bidders were carefully structured with agendas, minutes of meetings and action lists for each bidder. The following selection of documents is produced to show the nature and detail of the issues being discussed in the meetings.

- A dialogue meeting agenda dated 27 May 2009[85]. In this document, ZBP (Multiplex's subconsultants) appear to be actively engaged in the agenda items related to M&E (as one would expect for an M&E specialist consultant).

- Action lists for Bidder B (Brookfield) in relation to the commercial dialogue sessions dated 5 June 2009[86] and 14 July 2009[87] It is noted that in the last entry of the document dated 5 June 2009 that, as at that date, the intention still appears to be that architects would be novated over to the successful contractors as would be expected in a standard design and build contract.

- In relation to the design dialogue sessions, the following documents are produced:

  - an action list for bidder B (Brookfield) dated 15 June 2009[88];

  - a design dialogue presentation for bidder B (Brookfield) dated 23 June 2009[89];

  - a design dialogue agenda for bidder B (Brookfield) dated 7 July 2009[90]; and

  - a design dialogue minute for bidder B (Brookfield) dated 7 July 2009[91].

[84] A48705350 - NSGH Bidder A RFI 038 - Response - 05 May 2009.
[85] A48705333 - NSGH Dialogue Meeting Agenda - Bidder B - 27 May 2009.
[86] A48705355 - NSGH Commercial Competitive Dialogue - Bidder B - Action List - 05 June 2009.
[87] A48705254 - NSHG Commercial Competitive Dialogue - Bidder B - Action List - 14 July 2009.
[88] A48705373 - NSGH Dialogue Meeting Agenda Minute - Bidder B - 15 June 2009.
[89] A48705396 - NSGH Design Dialogue Meeting 4 - Bidder B - Presentation - 23 June 2009.
[90] A48705401 - NSGH Dialogue Meeting Agenda - Bidder B - 07 July 2009.
[91] A48705407 - NSGH Dialogue Meeting Agenda Minute - Bidder B - 07 July 2009.

The competitive dialogue process concluded in August 2009. The three bidders submitted their tenders on or around 11 September 2009.

3.20 Clarifications to bidders

During the competitive dialogue period, clarifications were issued to the bidders in respect of the documents issued with the ITCD. The following clarifications are highlighted.

3.20.1 Isolation room clarification

A clarification was issued to bidders called "Update on Isolation Rooms"[92] indicating the isolation rooms required for the New Adult Hospital. The clarification refers to the haemato-oncology ward, respiratory wards, renal inpatient wards, A&E and "Critical Care (includes ICU/Surgical and Medical HDU". It concludes: "All in accordance with SHPN4 and SHTM 03-01".

3.20.2 Removal of maximum temperature variant

On or around 28 May 2009, a document called "NSGH Project Issue 01 Maximum temperature variant"[93] was produced by or for NHS GGC. The first page is reproduced since this clarification appears to be relied up on as a reason for the ZBP Ventilation Strategy Document produced in December 2009 (see paragraph 3.23.3 for further details).

> "**Maximum Temperature Variant**.
>
> The mandatory variant bid was partially removed from the ER's and the references have been highlighted under separate cover.
>
> The Variant bid allowed the Board to take a decision on maximum temperature prior to contractor appointment based on fully costed schemes.
>
> This has been discussed at length with Currie and Brown, we believe that uncontrolled removal has increased the risk that the bidders will not provide an environmental scheme with sufficient flexibility to allow for future requirements and will increase pressure on bidders to provide lowest construction cost solutions.
>
> We have been advised that thermal comfort is still a high priority of the Board, late removal of the maximum temperature variant bid appears to

[92] A36372525 - Update on the isolation rooms for the New South Glasgow (adult) Hospital - undated but understood to be issued during the competitive dialogue period.
[93] A48705331 Removal of Mandatory Maximum Temperature Variant - Issue 01 - 28 May 2009.

have signaled some of the bidders to reduce the importance of avoidance of overheating.

We suggest that this issue is clarified and guidance given to avoid difficulties comparing unlike schemes and possible reduction in cost control created by amendments to the bidders proposals after Contractor appointment.

At this stage we suggest that the bidders are reminded of the importance of thermal comfort and the avoidance of over heating, this could be achieved by issuing a response in the Technical Query process in line with the attached or similar wording.

We recommend that this is circulated and considered by all parties with agreement reached prior to issue to the bidders."

The remainder of the document is the same as the document called "NSGACL Removal of Maximum Temperature Variant_iss1_rev." [94] which was issued to bidders on or around 8 June 2009. That document formed part of the Building Contract. It is therefore referred to in greater detail in paragraph 2.4.3 of this PPP.

3.20.3 Technical clarifications

After the submission of bids and before the selection of the preferred bidder, bid clarifications were issued to Brookfield.

- 23 September 2009 - "Bid submission clarifications, bidder:1 (Brookfield), Technical Clarification:1"[95]. On page 2 it noted: "Energy model - confirm that the energy model is fully compatible with the servicing strategies set out in volume 3 in particular the use of a sealed building with chilled beams." The response is not known.

- 30 September 2009 - "Bid Submission clarifications, bidder:1 (Brookfield), Technical Clarification:2"[96]. This included the clarifications recorded in a document called "Brookfield Information Requests[97]." prepared by Wallace Whittle which included: "1) Please indicate any deviations from M&E elements of the ER's …21) Please confirm that all services comply with HAI -SCRIBE…".

- 2 October 2009 - "Bid Submission clarifications, bidder:1 (Brookfield), Technical Clarification:3"[98]. This is produced for completeness although it is not directly relevant.

3.21 Brookfield/Multiplex design team

Brookfield had a design team assisting throughout the project. It included:

[94] A33010775 - Removal of Mandatory Maximum Temperature Variant - June 2009.
[95] A48705255 - Brookfield Technical Clarification 1 - 23 September 2009.
[96] A48705258 - Brookfield Technical Clarification 2 - 30 September 2009.
[97] A48705256 - Brookfield Information Requests for Clarification 2 - 25 September 2009.
[98] A48705260 - Brookfield Technical Clarification 3 - 02 October 2009.

3.21.1 Nightingale/IBI

Nightingale Associates Ltd were appointed by Brookfield as their Lead Consultant and Architect. Their formal Agreement is dated 18 June 2010[99]. Nightingale provided services before this date.

The Inquiry has been advised that Nightingale Associates was acquired by IBI in June 2010. Nightingale Associates designed the adult and children's hospitals of the QEUH/RHC. In particular, Nightingale Associates had responsibility for the coordination of the Room Data Sheets and were a key party in the RDD process.

The Inquiry has been advised by their legal advisors that:

- IBI's architectural design remit did not extend to the design of the mechanical, electrical and plumbing systems and they understand that (1) the ventilation and water systems were designed by TUV SUD (taking over the role from ZBP, the original MEP consultant); and (2) Mercury Engineering, the MEP subcontractor who also bore design responsibilities;
- IBI's role, as it related to ventilation, involved coordination of: (i) the location of ventilation-related components within each room (i.e. avoiding clashes between MEP components and other equipment in the room); and (ii) the receipt and input of environmental information onto a Room Data Sheet ("RDS") for each type of room at the QEUH; and
- IBI's role, as it related to water and drainage systems, was limited to the specification of materials in areas of sanitaryware e.g. the pipework in the boxes behind sink and WC units).

3.21.2 ZBP

Zisman Bowyer & Partners LLP ("ZBP") were appointed by Brookfield as mechanical, electrical and plumbing (MEP) services engineers. Their formal agreement is dated 28 September 2010[100]. ZBP provided services before this date. An administrator was appointed to ZBP in February 2013.

In March 2013, TUV SUD Ltd (trading as Wallace Whittle) entered into a formal agreement dated 7 March 2013[101] for services in connection with Stage 3 (Final Design of the New Hospitals Building) and Stage 3A (Demolition and Final Landscaping). The Services "include all services performed or to have been performed by Zisman Bowyer & Partners LLP ("ZBP") pursuant to the Professional

[99] A32893603 - Professional Services Contract between Brookfield Construction (UK) Limited and Nightingale Architects Limited - 18 June 2010.
[100] A32607385 - Professional Services Contract between Brookfield Construction (UK) Limited and Zisman Bowyer & Partners LLP - 28 September 2010.
[101] A32607363 - Professional Services Contract between Brookfield Multiplex Construction Europe Limited and TUV SUD Limited (trading as "Wallace Whittle") - 07 March 2013.

Services Contract entered into between the Employer and Zisman Bowyer & Partners LLP dated 28 September 2010 in respect of the Project ("ZBP Appointment')" (Clause 1).

Clause 4 states:

> **"The Consultant agrees to be responsible for and liable to the Employer pursuant to this contract for all of the duties, obligations and services provided or to have been provided by ZBP pursuant to the ZBP Appointment. The Consultant warrants to the Employer that all services performed by ZBP pursuant to the ZBP Appointment have been carried out in accordance with the requirements and standards required by the ZBP Appointment**. However, and notwithstanding any other provision of this contract, the Consultant shall bear no responsibility or liability for or in respect of delays arising to the Project as a consequence of ZBP's insolvency or the resulting termination of the ZBP Appointment" (bold added).

Schedule 1 Scope of Services is referred to. The Services are to be provided in the following work stages: Concept Design and design development; construction documentation and construction phase; commissioning, completion and post completion.

It is unknown whether NHS Greater Glasgow Health Board or Currie & Brown approved this appointment of Wallace Whittle by Brookfield.

3.21.3 WSP

WSP UK Ltd were appointed as Structural and Civil Engineer and other specialist Design Services by agreement dated 17 August 2010.

3.21.4 Doig & Smith

Doig & Smith Limited were appointed as quantity surveyors by agreement dated 15 November 2010.

Whilst the dates of the appointments referred to above post-date the bidding process, the Inquiry understands that at least some of those consultants were already providing services from an earlier date including during the competitive dialogue stage.

3.22 Preferred bidder selected

In October 2009, a five-week evaluation process was undertaken, in which NHS GGC and its advisers evaluated and scored the proposals. The bid evaluation used a Most Economically Advantageous Tender ("MEAT") scoring methodology to evaluate the tenders, based on design, logistics and commercial aspects.

On 3 November 2009, the Performance Review Group were asked to approve the appointment of preferred bidder 1 (i.e. Brookfield). The minutes of the meeting are produced.[102] A paper was submitted by the Director of Acute Services Strategy Implementation and Planning (Paper No 09/43)[103]. A PowerPoint presentation[104] was made by Mr Seabourne to the Performance Review Group. Its agenda included technical overview and evaluation, cost analysis, legal considerations, MEAT score, affordability and recommendations. In respect of Brookfield's masterplan, it is noted that it "Fully met the Board's Exemplar requirements" (page 10) and, in respect of "1/500's Departmental Adjacencies), (page 11) is "Compliant with Employer's Requirements". In respect of legal considerations, it is noted: "Clarification from bidders to ensure there is no misunderstanding". The recommendation is to appoint Brookfield. The next steps include "From 16 November 2009 engage with Brookfield regarding pre- contract requirements".

It was decided that Brookfield Europe LP would be appointed preferred contractor.

The period between Brookfield being appointed preferred bidder (early November 2009) and the Building Contract being signed (18 December 2009) was between four and six weeks. The Inquiry currently has an incomplete picture of the events during this period which led up to the Agreed Ventilation Derogation being included in the M&E Clarification Log which was part of the Building Contract. The Inquiry's current understanding of the position is noted in the following paragraphs.

3.23 Agreed Ventilation Derogation

After being appointed as the preferred bidder, Brookfield continued the dialogue with NHS GGC. The Inquiry's understanding of what happened will be developed through the evidence of witnesses in future hearings. In the meantime, it is noted that the Inquiry holds the following documents.

3.23.1 NSGH Contract Preparation - Design Summary

On 4 December 2009, D. Hall of Currie & Brown sent to R. Ballingall of Brookfield, (copied to others) an email[105] attaching an updated RFI Log with Board comments and a M&E Design Summary "which is not adding anything to the ER's, but rather identifying areas where clarity is required on the bid in relation to its compliance with the ER's".

The Design Summary records that the ward air change rate is currently shown in the drawings submitted by Brookfield as 2.5 A/HR which is not in compliance with SHTM 03-01.

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[102] A34871046 - Performance Review Group Minutes - 03 November 2009.
[103] A35382437 - Performance Review Group Final Paper - 03 November 2009.
[104] A35561501 - Performance Review Group PowerPoint Presentation - 03 November 2009.
[105] A48746242 - Email from D Hall to R Ballingall and others - RFI Log and M&E Design Summary attachments - 04 December 2009.

3.23.2 Bid Submission Clarifications

On or around 15 December 2009, a second version of a table of Bid Submission Clarifications was produced. It is not known when the first version was produced but the Inquiry holds a copy of the second version which appears to be dated 15 December 2009 (the date is not stated but it is profiled as 151209 rev 2)[106]. In this document, mechanical air change rates are addressed (page 11 section 10). SHTM compliance is also addressed. The Board asks Brookfield to confirm air change rates for the ward tower. The response is:

> "A typical ward in the tower has the following air change rates to either meet the ADB requirements or achieve the environment conditions:
>
> • Bedrooms 2.5 ACH (related to ensuite extract rate and air volume for chilled beam unit loadings)
> • Ensuites 10 ACH
> • Clean Utility 6ACH
> • Disposal Hold 10 ACH
> • Pantry 6 ACH
> • Dirty Utility 10 ACH
> • Equipment store
> • Cleaner 5 ACH
> • Nurse base Up to 12 ACH to balance extract from utility spaces, etc
> • Office/meeting 4 ACH"

This response is repeated in the third version of the document[107] which appears to be dated the 17 December (the day before the Building Contract is signed). A new comment is added to the final column: "Refer to M&E Clarification Log". This Bid Submission Clarification document appears to be the source of what was then inserted into the M&E Clarification Log which is, as explained in Part 2 of this PPP, a significant contractual document in the Building Contract.

3.23.3 ZBP Ventilation Strategy Paper

On or before 15 December, ZBP (Brookfield's subconsultant) produced a document titled the "**NSGH Ward Ventilation Design Strategy**" (the "ZBP Ventilation Strategy Paper").[108] It is two pages.

This document acknowledged that the ward ventilation strategy designed by Brookfield and their subconsultants would **not** be compliant with NHS guidance.

[106] A48744521 - Bid Clarification Log (Brookfield to Board) - rev 2 - 15 December 2009.
[107] A48744495 - Bid Clarification Log (Board to Brookfield) - rev 3 - 17 December 2009 (see page 12).
[108] A32993814 - Email chain - R Ballingall and M Baird - Attaching "NSGH Ward Ventilation Design Strategy" - 15 December 2009.

It states:

“NSGH
WARD VENTILATION DESIGN STRATEGY

Board Requirement

The design requirements for the NSGH states that the summertime temperature limit is ‘not to exceed 26°C’.

This exceeds the guidance provided within the draft SHTM 03-01 on the design of ventilation in healthcare premises, limiting the summertime temperature to ‘not exceed 28°C for more than 50 hours per year’.

Natural Ventilation

The SHTM allows for the natural ventilation of areas including general wards. In clause 2.3 it states that ‘as the motivating influences of natural ventilation are variable, it is almost impossible to maintain consistent flow rates and ensure that minimum ventilation rates will be achieved at all times. This variability is normally acceptable for general wards’.

Through the use of thermal modeling during the bid stage the use of natural ventilation using openable windows was investigated and results showed that the Board’s requirement for temperature control could not be achieved. Furthermore, adding additional background cooled mechanical ventilation, at a quantity to balance the ensuite extract rate, still did not achieve the requirement. Other concerns with natural ventilation included patient comfort due to uncontrolled wind driven ventilation and air quality, particularly in winter when windows would be closed.

Therefore, the sole use of mechanical ventilation was explored, again using thermal modeling.

Mechanical Ventilation

The recommended air change rate for single rooms in SHTM 03-01 Appendix 1 Table A1 for single rooms is 6 air changes per hour (ac/h).

Modelling was carried out based on this recommendation, but it was found that the requirement of 26ºC could not be met. To try to achieve this, the ventilation rate was further increased, but became excessive and likely to cause draughts to the occupants, poor temperature control and increased energy consumption.

Consideration was then given to a terminal cooling solution, using active chilled beams which provide cooling, heating and fresh air via the primary air supply system. The performance of chilled beams is related to their physical size and thus the amount of primary air supplied from the central air handling plant. The primary air volume will also provide make up for

the extract from the ensuite toilets to achieve a negative inflow of air into the bedroom from the corridor as required by SHTM 03-01 Appendix 1 Table A1.

Using active chilled beams delivers the temperature control requirement, provides individual room control and fresh air, albeit less that the recommendation of
SHTM 03-01.

Chilled beams are also an energy efficient solution and save some 9kg/m^2 of CO_2 over that of an all air system delivering 6ac/h, equivalent to about 10% of the hospitals' total emissions.

Conclusion

If natural ventilation could be employed then the air change rates within the bedrooms would be variable dependant on window opening and external conditions, and is rarely likely to achieve 6ac/h.

The recommended air change rate of 6ac/h in the SHTM is considered to relate to the ability to achieve an acceptable internal environment, i.e 50 hours exceedence above 28^{o}C. This could be achieved with 6ac/h of cooled air.

However, the Board's requirement for a reduced temperature makes this solution impractical and the use of chilled beams is the only viable solution, using a reduced quantity of primary air.

Whilst the air change rate is less than the SHTM, at a supply air volume of 30 litres per second it is in compliance with Scottish Building Regulations and also CIBSE codes, giving sufficient fresh air for a continuous occupation of three people at 10-12 litres per second each."

3.23.4 Email exchanges 15/16 December 2009

- By email of 15 December 2009, Ross Ballingall of Brookfield sent the ZBP Ventilation Strategy Paper to David Hall and Mark Baird of Currie & Brown:

  "Attached latest update of M&E Log. There are a couple of bits that I still need to get an answer on but thought I would issue anyway. I have also attached a paper by ZBP on the Wards Ventilation Strategy. They have discussed this with Stuart at WW who seems to support it".

- The above email and the attached ZBP Ventilation Strategy Paper was then forwarded by Mr Baird of Currie & Brown to Karen Connelly of GGC[109]. The Inquiry has been advised that Currie & Brown representatives involved in the preparation of the ERs, competitive dialogue and contract discussions frequently

[109] A32993814 - Email chain - R Ballingall and M Baird - Attaching "NSGH Ward Ventilation Design Strategy" - 15 December 2009.

used the Project Team office as a base and documents were frequently forwarded via email to a member of the NHS GGC Project Team for the sole purpose of obtaining a printed copy. It is therefore unclear whether, notwithstanding this email, GGC were formally provided with the ZBP Ventilation Strategy Paper. However, it is noted that the Inquiry also holds another copy of the ZBP Ventilation Strategy Paper which is a "clean", non-scanned, document, and which was sent to the Inquiry by GGC[110].

- Also, on 15 December 2009, a separate email chain[111] headed "M&E log" started between Mr Baird of Currie & Brown and Stewart McKechnie of Wallace Whittle. Forwarding on the email between Mr Ballingall and Mr Baird (attaching the ZBP Ventilation Strategy Paper), Mr Baird said:

> "Stewart, If you can review and advise re ventilation + option choice on flow pipes (pros +cons of options and recommendation)".

Mr McKechnie responded:

> "Mark, On ventilation we see this as a sensible, practical solution and Energy efficient although it doesn't strictly comply with the SHTM, only further provision is that room should be kept at a neutral or slightly negative pressure as per the SHTM which needs to be incorporated in extract system sizing.
> On the water pipe resilience, which applies to all services from the energy Centre, either solution technically satisfies the ER's the100% solution probably easier to physically separate, proposals for which need to be signed off although maybe this falls into Design Development"

- The following day, 16 December 2009, Mr Baird responded. He noted "Things for today" and asked four questions including one about air changes:

> "Air changes – WW to take Board through this + specific query = **do we think SHTM 03-01 is driven by temperature or HAI for stated nr of air changes**" (bold added).

No written answer to that question appears to have been given. Mr McKechnie's response is "OK see you at 10.30 hillington".

The Inquiry does not know what Mr McKechnie said at the meeting between him and Mr Baird on 16 December, in particular whether and, if so how, he responded to the specific query about whether SHTM 03-01 is driven by temperature or hospital acquired infection risk.

The Inquiry does not hold the minutes of the Board meeting referred to by Mr Baird.

[110] A48746401 - NSGH Ward Ventilation Design Strategy paper - as submitted by GGC to Inquiry - December 2009.
[111] A48705259 - Email chain - R Ballingall, M Baird and S McKechnie - Ward Ventilation Design Strategy - Air changes - 15 to 16 December 2009.

- Later that day, Mr Baird of Currie & Brown emailed Mr McKechnie of Wallace Whittle[112] saying:

> "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 halfhour/hour in the morning please …"

The Inquiry does not hold the minutes of this meeting between Mr Baird and Mr McKechnie.

In 2016, Mr McKechnie produced a report explaining the ventilation strategy and attaching a "Current Ward Airflow diagram"[113].

The Inquiry is presently unclear whether the foregoing ZBP Ventilation Strategy Document, exchange of emails and unknown advice and calculations of Mr McKechnie of Wallace Whittle, individually or cumulatively, contributed to the decision by NHS GGC to agree (in a document called the M&E Clarification Log which became part of the Building Contract) that Brookfield would design and deliver a ventilation system which, at this stage of the Inquiry's investigations, appears to have been known to, and accepted by, both parties as being (a) not compliant with SHTM 03-01; and/or (b) a derogation from the Employer's Requirements (the "Agreed Ventilation Derogation").

As explained earlier is this PPP, this will be the subject of witness evidence and CPs have been asked to address this in the questions contained in Part 1 (Introduction) of this PPP.

3.24 2009/10 Awareness of Agreed Ventilation Derogation

The Inquiry is presently unclear about whether, or to what extent, the project team consulted or informed IP&C staff about the decision to reduce the air changes and agree to the design of a ventilation system that did not comply with SHTM 03-01.

The Inquiry is presently unclear about whether and to what extent the Estates and Facilities team were aware of the Agreed Ventilation Derogation as recorded in the M&E Clarification Log.

An email dated 23rd June 2016[114] (after handover of the hospital to GGC) reviews events around this period of time and is accordingly referred to:

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[112] A48745734 - Email from M Baird to S McKechnie - NSHG air changes - 16 December 2009.
[113] A33642652 - Note from Wallace Whittle on Ward Ventilation Strategy with email exchanges from 2009, 2010 and 2016 - 18 May 2016, Bundle for Oral hearing commencing 19 August 2024 - Bundle 12 - Page 796.
[114] A33642592 - Email from A Seabourne to D Ross and others - Ventilation specification - 23 June 2016, Bundle for Oral hearing commencing 19 August 2024 - Bundle 12 - Page 813. See also A33642583 - Email from D Loudon to D Ross - SBAR Rooms air changes - 28 June 2016, Bundle for Oral hearing commencing 19 August 2024 - Bundle 12 - Page 815.

"[…] no matter what the infection control people say, they were involved in every aspect of the design and the member of my team responsible for infection control, Annette Rankin was the person responsible at design, dialogue and evaluation for ensuring that appropriate liaison and communication with the Infection Control Department and Microbiology was carried out effectively. To this end **infection control and Microbiology along with Annette were party to the sign off of all design matters that had an impact on patients** including the environment. There was no instance during the whole project time line that I can remember when I was informed this did not occur. Also, I would confirm that **Facilities Management were involved in every aspect of the design including the final sign off** of the contract documents after Dialogue and Evaluation had been completed.
Douglas's timeline is correct in that the decision on ventilation regarding the general single rooms was made at design/dialogue stage and confirmed at evaluation stage.
[…]
One of the key issues we faced from the outset of the project was that **Facilities specified that the building could not rise in temperature above 26 degrees** in the summer months (not unusual) as this had been problematic with previous new buildings such as the ACHs. As you have all seen from previous correspondence (design strategy) **this issue drove the change in ventilation design in order to achieve appropriate comfort levels and infection control as well as achieving this maximum temperature**. **This was agreed by all parties.**

Your email states that the general single rooms are not at negative pressure, although Douglas states this is not required. From my recollection, Brookfield are contracted to provide negative pressure rooms along with the agreed change in air changes. I would like to know how Brookfield tested this at commissioning and who signed it off and also, what tests the Board have done to enable them to now state the rooms are not at negative. This must have had its difficulties as the rooms were never required to be sealed with doors that do not have automatic closing devices (as agreed by all parties at the mock-up single rooms we had built) and hence can be left open, clearly removing any form of environmental control.
[…]
We are where we planned to be and if its not acceptable now then there needs to be a revised risk assessment that instructs what protocols are required to be put in place.
[…]" (bold added)

3.25 Building Contract signed

On 18 December 2009, Brookfield and Greater Glasgow Health Board entered into the Building Contract. The structure and relevant terms of the Brookfield Contract have been set out in detail in Part 2 (The Building Contract) of this PPP.

2010

3.26 Restriction of Currie & Brown's role

On 18 January 2010 (after the Building Contract was signed), NHS GGC wrote to Currie & Brown[115] setting out the fees for the next stage of project. Whereas under its original appointment, Currie & Brown had been named as the "Project Manager", under this letter Currie & Brown would now only provide "Project Management Support" as "the Board" were undertaking the role of Project Manager. The Building Contract states that Peter Moir (an employee of NHS GGC) will act as Project Manager).

On 26 February 2010, Currie & Brown responded to NHS GGC[116] and confirmed that it understood there were two key changes to Currie & Brown's appointment and fee structure for "Brookfield Construction Contract Stage 1 and Stage 2":

> "1. Responsibility for managing and administering the Building Contract sits with the Board as the designated Project Manager under the Contract and we will accept Delegated Duties as directed.
>
> 2. The requirement to direct the work of the Site Inspectorate team is no longer required. The required role of Supervisor under the NEC3 Contract will be procured separately."

3.27 Design Development Stage

Following the signing of the Brookfield Contract between Greater Glasgow Health Board and Brookfield on18 December 2009 (for Stages 1 and 2 only), there followed a period of approximately one year of design development. As set out earlier in this PPP, the contractor could not advance to Stage 3 (construction) unless the Full Business Case was approved under Stage 2.

The design development phase was described as follows at paragraph 5.14 of the Employer's Requirements:

> "5.14.1 The bid period has specific bid return requirements (detailed in Volume 3 of the ITPD) with regard to written and drawn design information. Once the Contractor is appointed, the period to Full Business Case (FBC) approval comprises design development of the Contractor's Proposals in relation to the Hospitals, concurrent with the design and construction of the Laboratories. The design development to FBC will be fully programmed and demonstrable in a priced Activity Schedule forming an aspect of the bid returns from bidders.

[115] A32660883 - Letter from NHS GGC to Currie & Brown - 18 January 2010.
[116] A32421344 - Letter from Currie & Brown to NHS GGC - 26 February 2010.

5.14.2 The procedure for the review of design development will be agreed with the Contractor prior to the return of bids and the commencement of the design development.

5.14.3 The Contractor shall, as a minimum requirement, provide the information detailed in Appendix K (Design Development) as an output of Stage 2 (Hospitals Detailed Design to FBC). The satisfactory production of completed Appendix K information to the Board is one of the preconditions to the approval to proceed to Stage 3. More information relating to Stages 2, 3 and 3A are contained in Volume 1 of the ITPD."

As set out Part 2 (The Building Contract) of this PPP, Appendix 5 to Contract Data part one also sets out the process for review of the design in similar terms to clause 5.14 of the Employer's Requirements above. Appendix 5 states that the process for review of design to be submitted by the Contractor is relation to Contractor's Proposals to ensure that it meets the Employer's Requirements" is attached. The document attached is called "Reviewable Design Data" and explains that with the Design Development process all information will be subject to review in three categories: "for approval", "for acceptance", "for comment". This procedure 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".

3.28 Appointment of Capita Symonds as Supervisor

The Building Contract signed on 18 December 2009 stated that the NEC3 Supervisor would be Peter Moir (an employee of NHS GGC).

In February 2010, a tender process was carried out to procure a Supervisor to undertake the design and support services of an NEC3 Supervisor for the remainder of the project[117]. The stages of the project mirror the Building Contract: Stage 1 (Construct Laboratories), Stage 2 (Detailed design of hospital to FBC submission), Stage 3 (Construction), Stage 3A (Demolition surgical block and landscaping).

Following a mini procurement competition via the Frameworks Scotland Agreement, NHS GGC appointed Capita Symonds as the Project Supervisor by letter of 21 May 2010[118]. The scope of the Supervisor role was detailed within the invitation to tender. The letter confirmed that the appointment was in accordance with the NEC Professional Services Contract Option A Priced Contract with activity schedule. The commencement date was 31 May 2010. The fee for Stages 1 and 2 was fixed. The letter notes that:

> "Stages 3 and SA are subject to full business case (FBC) approval by Scottish Government in November 2010, and your commission will only

[117] A32420043 - NHS GGC High Level Information Pack - Supervisor Role - February 2010.
[118] A32421399 - NHS GGC Capita Appointment Letter (Stages 1 and 2) - 21 May 2010.

be extended to included Stages 3 and 3A once the FBC has been confirmed…"

By letter from NHS GGC to Capita Symonds dated 28 March 2011, Capita Symonds were appointed as Project Supervisor for Stage 3[119]. The commencement date was 28 March 2011. The fee for Stage 3 was fixed.

Like other professional appointments, the formal agreement was not signed until a later date. The formal agreement was signed on 28 May 2013[120]. The starting date is retrospectively agreed as 24 May 2010.

The Supervisor's duties are defined in Appendix A of the appointment: "Schedule of Duties for Supervisor." By way of broad overview, the Supervisor would provide post-contract pre-construction services. This included liaising with Brookfield and "designers" to establish the tests and inspections to be carried out; monitoring site investigation operations; informing the Project Manager of all Defects and unacceptable practices by the PSCP and other members of the supply chain; notifying the Project Manage of defects; keeping records of tests, inspections and acceptance for inclusion in the Health and Safety File as may be required by the CDM coordinator, inspect and accept Contractor enabling works, review and become acquainted with all contract documentation, and review the contractor's design proposals and provide comments to the Project Manager. At the post contract stage the Supervisor would: undertake tests and inspections (with the option to watch testing done by the Contractor) and then notify the team of results, instruct Brookfield to search for a Defect by opening up covered works and undertaking tests to demonstrate compliance, notify Brookfield of any defect identified, inform the Project Manager should Brookfield fail to correct a notified defect within the contractual defect correction period, issue the Defects Certificate recording any defects not resolved by the defects date 24 months following Completion being certified.

Appendix C of the Capital Symonds appointment is headed "Consultant and Contractor Endorsement for the Prevention of HAI for NHSScotland (HAI-SCRIBE and SHFN 30)". It contains detailed guidance as to the implementation of HAI-SCRIBE.

3.29 Gateway review 3 (investment decision)

In October 2010, the Scottish Government carried out Gateway Review 3 (Investment Decision)[121].

[119] A32421441 - NHS GGC Capita Appointment Letter (Stage 3) - 28 March 2011.
[120] A32402298 - Agreement between NHS GGC and Capita Symonds - 28 May 2013.
[121] The Inquiry does not hold a copy of this document.

3.30 Full Business Case approved

In October 2010, the Full Business Case (FBC) [122] (including appendices[123]) for the Project was submitted to the Scottish Government. It was approved in November 2010.

The FBC is a key document. Without its approval, the project could not proceed.

The FBC is a very detailed document (190 pages excluding appendices). The document details the Strategic Case, Economic Case, Commercial Case, Financial Case and Management Case for the building of the new hospitals.

Infection control, compliance with NHS guidance is addressed. Examples include:

- "…the new hospital has been designed in accordance with best practice for infection control to minimise hospital acquired infections and the associated risks" (page 37);

- …It is essential for patients with a high risk of being a source of infection to others to be managed "separately" to avoid the risk of infecting other patients. This will include; Influenza, Norovirus, Gastroenteritis, SARS, MRSA etc. This will require isolation facilities. The Infection Control Team have been fully involved in the planning of hospital to address and reduce the risk of spread of infection through the design of the facilities." (p57);

- in relation to the "Physical Environment (Compliance, Adjacencies and links)... "good levels of natural light and ventilation… compliance with NHS guidance and statutory regulation…"(page 68);

- "2I. STRATEGIC RISKS
  …
  …Headline examples of this essential activity to mitigate and manage strategic risks includes:
  …
  Control of change - There is a robust change management control mechanism in place. Requests for change need to be supported by the respective Director, and a case presented to the Acute Services Strategy Board Executive Sub Group for consideration and approval. Due to the extensive user consultation undertaken prior to tender there have been very few requests for change from users during the development of the 1:200 and 1:50 design." (page 77);

- "4A.2 Agreed Output Specifications". "The ERs include specific outputs to be met for all aspects of the construction and design, including reference to and application of NHS (e.g. Scottish Health Technical Memorandum) and other

[122] A35100876 - NHS GGC Full Business Case (public version) – October 2010 (profiled January 2011), Bundle for Oral hearing commencing 19 August 2024 - Bundle 18 Volume 1 - Page 629.
[123] A32691394 NHS GGC Full Business Case Appendices.

standards, commissioning and handover requirements, sustainability targets, treatment of arts, community engagement and benefits, plus other technical requirements, together forming a comprehensive set of requirements to be met by the contractor…." (page 108);

- "4D. AGREED KEY CONTRACT ARRANGEMENTS

  The Contract Conditions are generally in accordance with NEC3 Conditions of Contract Option C Target Price.

  Amendments were made to accommodate bidders' requirements (only insofar as did not amend NHS protection under contract) and the discussions agreed during Competitive Dialogue."

- In Table 32 "Governance Workgroups and Remits", the remit of the Technical Design Group includes managing design compliance with and derogations from ERs.

It is noted that the FBC does not appear to contain any reference to the derogation from NHS guidance in respect of the ventilation system as contained within the M&E Clarification log incorporated into the Building Contract.

It is also noted that in an email dated 21 October 2010 from Senior Nurse advisor (F. McCluskey) to various employees of NHS GGC, information is requested about ventilation in the Renal Dialysis Outpatient area as "this information is needed now as a matter of urgency for the Full Business Case".[124]

3.31 Authorisation to Proceed to Stage 3 (construction)

Greater Glasgow Health Board and Brookfield signed the Authorisation to Proceed[125] to Stage 3 (construction) on 16 December 2010. Part 2 (The Building Contract) of this PPP contains more information about this document.

2011- 2013

3.32 Brookfield appoint subcontractors

Brookfield appointed various subcontractors to carry out parts of the construction works.

A relevant subcontractor referred to in PPP 11 (water) was Mercury Engineering.

Om 19 January 2011, Brookfield Construction (UK) Limited entered into an agreement with Mercury Engineering to provide the subcontract works to stages 1 (design and construct laboratories), stage 2 (design development – new hospitals building) and stage 3 (design and construct – new hospitals building). The

[124] A48745034 - Email chain between J Hood and others - Ventilation - 15 to 25 October 2010.
[125] A32421449 - Authorisation to Proceed - 16 December 2010.

subcontract works comprised the supply, delivery, installation, commissioning and setting to work of the Mechanical, Electrical and public health systems including the partial design of such systems, all as defined in the agreement between them.

3.33 Brookfield becomes Brookfield Multiplex

On 21 February 2011, Brookfield changed its name to Brookfield Multiplex Construction Europe Limited ("Brookfield Multiplex").

3.34 ZBP replaced by Wallace Whittle

As explained earlier in this PPP, on 7 March 2013, Brookfield replaced ZBP with TUV SUD Limited (trading as "Wallace Whittle") as the MEP (mechanical, electrical and plumbing) Services Engineer.

3.35 Brookfield start on site

On 28 March 2011 Brookfield start on site.

3.36 Commissioning - Building Contract Amendment

On 8 July 2013 Project Manager's Instruction 231 (2073)[126] was issued by the Project Manager. It stated:

> **Title**
> PMI 231 ADULT AND CHILDRENS HOSPITAL - COMMISSIONING & HANDOVER
> **Description**
> The Board confirm amendments to the requirement for an Independent Commissioning Engineer.
> **Instruction**
> The Board acknowledge the request for a change to the ER requirement in relation the independence of the engineer on the basis that the current BMCE staff have a detailed knowledge of the complex installations and are best placed to undertake the role. Refer attached document

Part 2 (The Building Contract) of this PPP contains the relevant terms of the Building Contract being amended. PPP12 (ventilation) is also referred to for further information.

[126] A33795364 - PMI 231 - 8 July 2013 Bundle for Oral hearing commencing 19 August 2024 - Bundle 16 - Page 1698.

3.37 Capita Symonds Limited becomes Capita Property and Infrastructure Limited

On 1 October 2013, Capita Symonds Limited became Capita Property and Infrastructure Limited.

3.38 Nightingale Associates' activities transferred to IBI

In 2014, Nightingale Associates' trade and assets were transferred to IBI and its former trading activities continued with IBI.

2015 - 2017

3.39 Sectional Completion Certificate issued

NHS GGC took possession of the building on 26 January 2015. On 29 January 2015, the Stage 3 Sectional Completion Certificate[127] was issued. It certified that sectional completion was achieved on 26 January 2015. This was four weeks earlier than the Scheduled Completion Date of 28 February 2015. Attached to the Certificate are the Supervisor's (Capita Symonds) Notification of Defects (26 January 2015) and the Project Manager's (P Moir) Schedule of Incomplete Works (26 January 2015). The defects correction period is noted as ending on 26 January 2017. The Certificate is signed by P Moir as Project Manager and J Redmond for Capita Symonds.

3.40 Brookfield Multiplex becomes Multiplex

On 31 August 2016, Brookfield Multiplex Construction Europe Limited changed its name to Multiplex Construction Europe Limited ("Multiplex").

3.41 Final Defects Certificate issued

On 26 January 2017, following the end of the two-year defects liability period, the Final Defects Certificate[128] was issued by Capita Symonds for "Stage 3 Adult and Children's Hospital and Energy Centre". It certifies that defects identified in three lists have not been corrected.

[127] A32402295 - NHS GGC Sectional Completion Certificate - 26 January 2015, Bundle for Oral hearing commencing 19 August 2024 - Bundle 12 - Page 23.
[128] A32402296 - NSGH Final Defects Certificate - 26 January 2017, Bundle for Oral hearing commencing 19 August 2024 - Bundle 15 - Page 1028.

2020

3.42 Court proceedings issued

In January 2020, following GGC's concerns with the as-built QEUH/RHC environment, Greater Glasgow Health Board commenced court proceedings in the Court of Session, Edinburgh against Multiplex Construction Europe Limited, BYP Holdings LP, Currie & Brown and Capita Property and Infrastructure Limited (the "defenders").

GGC issued a copy of the document initiating those proceedings (called a Summons[129]) to the public.

Greater Glasgow Health Board seeks to recover a sum in excess of £71 million in respect of losses alleged to have been sustained as a consequence of defects in the construction of the QEUH. Multiple breaches of the Building Contract are alleged including those relating to the water system, and ventilation in standard isolation rooms, Adult Hospital Ward 4B and RHC Ward 2A. No claim is made in relation to the ventilation of the general wards.

The Inquiry understands that the court proceedings are being actively defended.

[129] A32385266 - Summons issued by Greater Glasgow Health Board - January 2020.

Appendix A: Terms of Reference (extracts)

The issues considered in this PPP are of particular relevance to Terms of Reference 2, 3, 4 and 6

"…

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.

3. To examine during the delivery of QEUH and RHCYP/DCN projects:

A. 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;

B. Whether operational management provided by the Boards of NHS Greater Glasgow and Clyde and NHS Lothian was adequate and effective for the scale of such infrastructure projects;

C. 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;

D. Whether, the organisational culture within the Boards of NHS Greater Glasgow and Clyde and NHS Lothian encouraged staff to raise concerns and highlight issues in relation to the projects at appropriate times throughout the life cycles of the projects;

E. Whether failures in the operation of systems were a result of failures on the part of individuals or organisations tasked with specific functions.

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.

…

6. To examine, during the life cycle of the QEUH and RHCYP/DCN projects, how the Boards of NHS Greater Glasgow and Clyde and NHS Lothian 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.

Appendix B: Key Organisations

	GGC and their team of professional advisors
	Brookfield/Multiplex and their team of subconsultants and subcontractors

Brookfield/ 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.
Buchan	Buchan Associates: subconsultant (healthcare planner) appointed by Currie & Brown UK Limited
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.
Currie & Brown	Currie & Brown UK Limited: lead consultant appointed by Greater Glasgow Health Board.
GGC	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.
HLM	HLM Architects: subconsultant (architect advisor) appointed by Currie & Brown.
Mercury	Mercury Engineering: subcontractor appointed by Brookfield in respect of mechanical and electrical works.
Nightingale /	Nightingale Associates: architect appointed by Brookfield.

IBI	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.
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 Brookfield.
URS	URS Corporation Limited: subconsultant (civil and structural designer and CDM co-co-ordinator) appointed by Currie & Brown.
WSP	WSP UK Ltd: civil and structural designer appointed by Brookfield.
ZBP	Zisman Bowyer & Partners LLP: mechanical and electrical (M&E) designer appointed by Brookfield. Replaced by Wallace Whittle on 7 March 2013.

Appendix C: Timeline - key dates

2002	Acute Services Review and Strategy
2007	PSC/Design Solutions Report
	NHS GGC Design Action Plan
2008	NHS GGC investigate alternative delivery models due to lack of funding for PPP route. Two stage design and build procurement route selected
	Outline Business Case approved
	Lead Consultant (Currie & Brown) appointed to prepare the Employer's Requirements
2009	February - Project advertised for tender. Three bidders enter Competitive Dialogue stage (including Brookfield)
	May - Invitation to Participate in Competitive Dialogue (which includes the Employer's Requirements) is issued to three bidders
	August - competitive dialogue process with bidders runs from May to August 2009
	September - three bidders (including Brookfield) submit their tenders for the building contract in a document called the Contractor's Tender Return Submission
	15 December - on or around this date, GGC and Brookfield agree (in a document called the "M&E Clarification Log") that Brookfield will design and deliver a ventilation system which, at this stage of the Inquiry's investigations, appears to have been known to, and accepted by, both parties as being (a) not compliant with SHTM 03-01; and/or (b) a derogation from the Employer's Requirements (the "Agreed Ventilation Derogation") which was then incorporated into the Building Contract dated 18 December 2009
	18 December - Building Contract between GGC and Brookfield signed
2010	Design development process

	May - Capita Symonds appointed as Supervisor
	November - Full Business Case approved
	December - Authorisation to Proceed issued. Brookfield instructed to commence construction works
2011	March - Brookfield start work on site
2013	July - PMI 231 advises Brookfield can act as Independent Commissioning Engineer
2014	Pre-completion commissioning
2015	26 January **-** Sectional Completion of Stage 3 – QEUH/RHC handed over to GGC
	27 April - Adult patients were moved into the hospital
	10 June **-** Child patients were moved into the hospital
2017	26 January - End of two-year defects liability period