SCOTTISH HOSPITALS INQUIRY

Hearings Commencing
26 February 2024

Day 11
Wednesday, 13 March 2024
Stephen Maddocks
Alan Morrison

CONTENTS

10:02

THE CHAIR: Good morning. Now, Mr MacGregor, are we ready to begin?

MR MACGREGOR: Yes, my Lord. The next witness is Mr Stephen Maddocks.

THE WITNESS: Good morning.

THE CHAIR: Good morning. Good morning, Mr Maddocks. Now, as you are aware you are about to be asked questions by Mr MacGregor, who is sitting opposite you, but first I believe you are prepared to take the oath?

THE WITNESS: Yes.

THE CHAIR: Sitting where you are, could I ask you to raise your right hand and repeat these words after me?

Mr Stephen Maddocks
Sworn

THE CHAIR: Thank you very much, Mr Maddocks. Now, we sit generally between ten and take a lunch break at one, but between these times we will take a coffee break at about half past eleven. Now, what I say to every witness is that while we are having a sort of fixed break, if they, for any reason, want to take a break during the day, you just have to indicate to me. Please feel that you are in control of the situation.

THE WITNESS: Thank you.

THE CHAIR: Right, Mr MacGregor.

MR MACGREGOR: Thank you, my Lord.

Questioned by Mr MacGregor

Q You are Stephen Maddocks, is that correct?

A I am.

Q You have provided two reports to the Inquiry. You provided a previous report to the Inquiry and gave evidence, but you have provided a further report to the inquiry dated 13 December 2023. Is that correct?

A That's correct.

Q Just for the benefit of core participants, that is available at pages 3-56 of bundle 1 of the reports and statements. The content of that further report, which deals with critical care ventilation systems at the Royal Hospital for Children and the Department for Clinical Neurosciences, that will form part of your evidence to the Inquiry. You are also going to be asked some questions by me today. If you want to refer to your report at any point, please just do let me know. Any documents I want to

take you to should come up on the large screen in front of you. If, for any reason, you cannot see them or you are seeing something different to the document I am referring to, please just do let me know.

A Thank you.

Q In relation to your qualifications and experience, those are set out in a biography included as an appendix to your report, but in summary, you are a chartered building services engineer. Is that correct?

A That's correct.

Q You have got 40 years' industry experience?

A A bit more now, but yes.

Q Thank you.

A Over 40.

Q You are a member of the Chartered Institute of Building Service Engineers and have been since 1995, a chartered engineer since 1996, and you have been a fellow of the Institute of Healthcare Engineering and Estate Management since 2005. Is that correct?

A That's correct.

Q Thank you, and in addition to those issues, you have also worked on a number of hospital projects throughout your career?

A That's correct.

Q If I could perhaps just look to your report to begin with, please, and if we could look to page 5 within the bundle. So that will be in bundle 1 of the witness statements. Look to page 5.

A Thank you.

Q So, bundle 1 of the witness statements, please, and to page 5. See in the executive summary, you say:

> "This report is a review of the design, commissioning and validation documents associated with the ventilation systems for critical care rooms at the Royal Hospital for Children and Young People and the Department for Clinical Neurosciences in Edinburgh."

Am I correct in saying that, in the executive summary, your professional opinion is that the ventilation system for critical care is now designed and functioning in compliance with published guidance and best practice?

A That's correct.

Q Also your professional opinion is that, from an engineering perspective, the ventilation system in critical care provides a suitable environment for the delivery of safe, effective, person-centred care?

A That's correct.

Q Thank you. I want to

begin by looking at some general issues and then we will look at some specific issues relating to the Royal Hospital for Children and Young People and the Department for Clinical Neurosciences. I will just refer to that as the project. If I use that term, that is what I am referring to.

If I could begin, though, by asking you to look at a document within bundle 13, volume 3, at page 554. So this is a document called the Scottish Health Facilities Note 30: Infection Control in the Built Environment Design and Planning. This is an iteration from 2007; the current version is from 2014.

A Thank you.

Q If I can ask you to look on within that document to page 574, please. You see at the top there is a bold heading that is called "Common errors." Do you see that?

A Yes.

Q It says, 5.5:

> "Common errors in design and construction adapted from Carter and Barr, 1997 due to inept or non-existent risk management, includes …"

And then if we look to the second bullet point it says, "Incorrect air turnover" and "airflow patterns." Do you see that?

A Yes, I do.

Q So, again, just drawing on your experience working in this space, if we were thinking back to 2007, was it well recognised that common errors, common mistakes could include getting pressure cascades and air change rates wrong?

A I think pressure cascades is probably the challenge rather than air change rates, because trying to get that pressure cascade from clean to dirty is quite tricky and is not necessarily engineering solely related, and the same with air change rate because rooms often leak. If you're trying to pressurise a space and get a cascade through a space, you need the room to be airtight and impermeable surfaces. Otherwise it won't work.

Q Okay.

A So it's not just a ventilation system. It's about the whole infrastructure, the building and the engineering.

Q Thank you, and then if I could ask you to look on to page 576, please. Paragraph 5.19, you will see that there is a conclusion that is set out here, which states:

> "The integration of prevention and control of infection risk management and

construction is in its infancy. It represents a significant change in the management of healthcare facilities' design and planning, which will take time to develop to a level at which the greatest benefits can be achieved. Just as important then is the need to carry out research in the area of risk management prevention and control of infection in the built environment to produce sound, irrefutable evidence on which to base further risk management strategies."

Do you see that?

A I do.

Q Now, the last time you gave evidence you talked in a general sense about studies that had been done, particularly in the 1970s, by Dr Lidwell. Do you remember that?

A Yes, I do.

Q So, we see here 2007 Scottish Health Facilities' note saying that certainly by 2007 infection prevention and control, how that links into the built environment, that was something that further research really needed to be carried out to really understand the links. Was that your understanding as at 2007?

A I think so, yes. I mean, the first sentence, you know:

"Infection risk management construction is in its infancy."

It really was. It was a new concept that infection prevention teams existed and were able to inform designers. I still think there are not enough of them to do that role. They very much focus on the day-to-day operational issues, and they don't have enough capacity to look at new developments because of other aspects of infection prevention control in healthcare, and the research that it mentions is ongoing. There are still, certainly post-COVID, many universities – two that I can think of – that are involved in healthcare-acquired research.

Q So if we think about the period pre COVID to begin with, 2007 need for research, was there a lot of research that went on to try to bottom out these issues in that period?

A I can't recall the publishing of papers. It's not something I would've really focused on in that particular period. The research tends to happen in the background and you pick it up when you get a new version of a health building note or a health technical memoranda.

Q Okay.

A You tend to pick up that. I'm a little bit closer to it now because

of the work I'm doing with the CIBSE Healthcare Group.

Q Okay. So if that is the period up to COVID, are you aware of any further research that takes place either in the period the COVID pandemic is taking place or in the subsequent period?

A Yes, there's been lots of research by the University of Leeds, University of Liverpool on ventilation in particular, the use of ultraviolet systems and HEPA filtration systems and air scrubbers in rooms to-- A lot of it is driven by the net zero carbon agenda to try and reduce energy and reduce big ventilation systems, so that has been evolving. There was new documentation published in November last year about the use of ultraviolet cleaning air scrubbers and HEPA scrubbers within buildings. That was published by NHS England, November '23.

Q So, if we think through the research that you said was being done at the University of Liverpool and the University of Leeds, in broad terms, what is that research looking at?

A Looking at the efficacy of those systems and whether you can use a thing-- there's a new term that's come in to the industry called equivalent air changes. So, in the past, you would look to change the air in the room from a centralised ventilation system, but now these in-room air scrubbers will recirculate and clean the air in the space and give you an equivalent air change rate and that will kill any viruses, bacterias or capture any particles in those spaces. So it means you don't have a massive piece of infrastructure from a plant room all the way down to a room.

Q Okay, and just in general terms, from an engineer's perspective, you use the term an air scrubber. What is that and what does it do?

A Imagine it's just like the filter on your car. The air scrubbers could be just a filter to remove any particulates that we emit as people, and dust and so on. And the ultraviolet aspect: ultraviolet's been around for quite a number of years as a known technique to kill viruses and bacteria, particularly in water systems, so it's relatively new in the commercial or the healthcare environment.

You might see that in shops, where you used to have those bug zappers that were those sort of things. It's that sort of device where you pass air across a series of ultraviolet lamps and it kills viruses and bacteria, and if you continually recirculate air over one

of those, then you will clean the air in that space.

Q Okay, and again, just so I am understanding things, the science and technology, if we look to HTMs, SHTMs, they talk about an air change rate per hour. Are you telling the Inquiry that that science and technology is moving on, so in addition to a straight air change per hour, you can also have an equivalent air change rate?

A Yes.

Q Again, if you could just explain in simple terms for those of us that do not work in the space, what is an equivalent air change rate, and how does it differ from a simple air change?

A Simple air change rate is the grills that we see in this room push air in and take air out, and the air would change so many times an hour. Equivalent air change rate is-- imagine if you have a small filing cabinet, possibly smaller than that unit there, with a fan in it that just circulates the air around the space. I can't recall the number of air changes, but you have a fan in there that you can turn on and, just like a fan heater at home, you just turn it from one speed, two speed, three speed, and it will just circulate the air. So, the number of times that the air moves around that space is the equivalent air change rate.

Q Okay, and again, I picked you up as saying, I think, there had perhaps been guidance published in late 2023. Is that correct?

A Yes.

Q Again, in broad terms, what does that guidance say?

A It just advocates that they are acceptable for use. They've gone through a lot of research. They've gone through various committees and approval processes within the NHS in England to say that these are-- They issued two NHS technical bulletins to cover the use of these devices because lots of people were trying to sell them and people were buying them and they weren't sure whether they were the right thing, and there are certain characteristics within each one.

It's very new technology in terms of the approved use of it, so it really-- I use the word approved, sanctioned the use of these devices, and manufacturers are now offering products to say that our product complies with that technical bulletin.

Q These are technical bulletins issued in England and Wales, is that correct?

A Yes.

THE CHAIR: Mr MacGregor, if I

can just intervene, just to make sure I am keeping up, Mr Maddocks. You made the point that the technology is advancing.

A Yes.

Q You told us about air scrubbing----

A Yes.

Q -- by, for example-- and there may be other techniques but one technique is ultraviolet light.

A The ultraviolet kills any viruses or bacteria in the air stream.

Q Right. Now, just so that I am keeping up, you gave the example of a fairly small unit with a fan in it.

A Yes.

Q Now, does that unit incorporate an air scrubbing technology?

A It has a bank of ultraviolet lights inside it because obviously you can't look at an ultraviolet light; it will damage your eyes.

Q Yes.

A So they're in sealed containers and the airflow goes across the bank of lights to kill the bacteria, and if it was a HEPA filter, which is basically a very fine filter, the air gets passed through. It gets drawn in and blown around and cleaned.

Q Right. Thank you very much. I am sorry, Mr MacGregor.

MR MACGREGOR: Thank you, and I think just a final issue to ask you about, by way of introduction. You mentioned work that you had done on the CIBSE Healthcare Committee. Could you just explain what work you have been doing?

A We are a group of authorising engineers, design engineers. We meet quarterly and discuss new technologies. We get past copies of draft documents that were going to be published by the NHS for comment to see whether we think it's up to date, and members of our committee sit on the various-- they contribute to new guidance.

So we take industry knowledge, feed into things, so that way the NHS get a balanced view from design professionals, people who visit hospitals every day as authorising engineers and pick up faults. So they feedback operational issues, manufacturers with new products come in, so we do meetings, discuss new technologies, new projects, new ideas.

We have webinars from manufacturers and people who look at new technologies, like the ultraviolet systems, and people from research. Professor Tony Fisher from University

of Liverpool has presented on the UVC side, I think, in the last 12 months. So, my role is just really secretary, just to issue the minutes and what have you.

Q Okay, so you would sit on that committee, effectively consider new technologies that are emerging and provide some form of input in relation to that?

A Yes. We've got two documents that have come to us in the last few weeks, so there's a few of us, we'll read those documents, we will put commentary against each paragraph, like the one in front of us, and we'd say, "We don't necessarily agree with 5.15. Have you considered this?" and we would put a response together. That, again, goes back to the Central Committee of Publication Team within NHS Estates or NHS, and they will review those comments and decide what to do with them.

Q Thank you, and in terms of the research, should the Inquiry understand that that is research that is ongoing at the moment into relatively new technologies, which are generating content such as options including equivalent air change rates rather than simply the standard air changes per hour that we have looked at in the past?

A Yes.

Q Thank you. I now want to move on and ask you some specific questions about the project itself and to begin by asking you about the contractual specification at financial close. Now, it is appropriate to say at the outset the contractual specification is a matter of dispute between a number of core participants involved in the Public Inquiry, and it is no function of the Public Inquiry to work out what the definitive correct contractual interpretation is, but if we just think about some of the issues that are in play.

One of the disputes in this particular project was the exact status of the environmental matrix. Was this simply provided in the tender documents as a document that was a guide, could not be relied upon, or was it a fixed contractual brief? Regardless of how the briefing was done by NHS Lothian, by the point the contract was signed, the project agreement was signed, should the Board's technical requirements for the ventilation system have been in absolute final form, in your opinion?

A I believe so, yes.

Q Okay, and can you just explain, if that does not take place, if you do not have an absolutely crystal-clear, locked-down brief, what are the

problems and risks for a project?

A It's a risk item for design development and potential cost increase programme delays, and it just allows an element to be debated further. The design will only have been taken up to a certain point at financial close, but not having a clear brief, you need to sort of ringfence some money, time to allow that to be--

It might be for very good reasons that it's not been done. It does happen on some projects where people can't define the brief for a variety of reasons because they're anticipating a change in technology. It just needs to be clear that something isn't defined or finalised and an allowance be made within a risk register.

Q Okay, and if you were including aspects of the technical brief within reviewable design data-- You talked about reviewable design data in the past and you have said there is nothing wrong with the concept of reviewable design data for launch projects, but if you are taking part of the brief, it is not finalised, it is not locked down when the contract is signed and that is pushed into reviewable design data, what problems could potentially emerge later in a project?

A Just impact on the design, impact on the buildability issues, impact on plant delivery, design time to finalise that, the fact that you then need to figure a mechanism to resolve those issues once you're in contract. So you then need to be calling the technical team, the client team to finalise that brief. So it's an anomaly that you need to try and avoid if you can because it will just take potentially a long-- The clock is ticking, you know? If you want to get that resolved, you need to be-- in my opinion, a surety of what the design principle will be, what the design requirements will be.

Q The Inquiry has heard a lot of evidence about 10 air changes per hour as opposed to 4 air changes per hour. It has also heard evidence that it is not as simple as just cranking the system up; there would be a whole host of knock-on issues that you need to think about in terms of the design of the air handling units, the capacity of the pipework.

Could you just try to explain, in your own words, if you do not lock down the number of air changes you are going to have for a space, if you do not resolve whether it is going to be 10 or it is going to be 4, how difficult is that from a design perspective the further into the project you get?

A Very, very difficult. It's such a big difference between the two numbers. It has such a knock-on effect from the size of the grill. If we use this room as an example, the size and the number of the grills in this room would increase, the ductwork that serves them increases, the air handling unit that serves the ductwork increases, the heating systems, the electrical systems that power the fans, all those increase in magnitude.

Depending on how big the systems are, it might result--because a small area might be fed by one air handling unit or a number of air handling units. It just has a complete knock-on effect all the way through the process.

Q Thank you. Again, just so I am understanding, what impact, if any, would that have on price? You obviously have a contract, you agree that, it is a package of rights----

A It would increase.

Q -- and you have paid a certain sum of money. What impact, if any, would that have on price?

A It would increase.

Q Increase?

A When you design a system, unless the brief tells you otherwise, you only put a small margin on the calculated air volume of an air handling unit. So you add up all the grill volumes, you say that's (inaudible) at 10 cubic metres per second. That air handling unit's designed at 10 cubic metres per second, it's a physical dimension of x by y by z, and it costs so much. That would increase, so all those aspects of that piece of kit will take longer to deliver. The plant room might not be big enough, so it just has a complete knock-on effect all the way down the line.

The allowance that you might have on the 10 cubic meters per second may be 5 or 10 per cent, and that's due to allowances for leakage in the ductwork over the 20 years that you anticipate the system might be, and for filters getting dirty. So you do build in a small allowance, and SHTM 03-01 has those limits specified now in the current version, but certainly not to go from 4 to 10 for major areas.

Q Thank you. If I could ask you to look within your report, please, onto section 2 and to page 12, please.

A Page 12?

Q Page 12. So we are in bundle 1 of the witness statements and reports, and page 12. You see that you address the design brief documents, and you say:

"I understand that the status of various documents issued

during the tender process is controversial. In particular, the status of the EM issued during the tender process. As an engineer, I do not offer any comment on that matter. In this section of the report, I have proceeded on the basis of the documents that the designers, TÜV SÜD, consider were the relevant briefing documents."

Do you see that?

A I do.

Q So, at this stage, you are not saying, "This is the contractual brief." You are saying, "I am prepared to look at this section of my report on what the designers, TÜV SÜD, say they think that the design documents are." Is that correct?

A That's correct.

Q Proceeding on that assumption, that all of the documents listed as A to J constituted the briefing documents, on that basis, having seen those documents, do you consider that the final design complied with published guidance, including SHTM 03-01?

A The TÜV SÜD design? I don't believe the air change rate-- I think the air change rate is clear in the SHTM 03-01.

Q Okay, so you do not think that, even on the basis of that documentation-- We will come on and look at Board construction requirements in a moment, but if that was the brief, the design that comes back is not meeting that because there is not full compliance with SHTM 03-01?

A Correct.

Q Thank you. If I can ask you to look over the page onto page 13, please, and to paragraph 2.1.3. You say:

"I have been asked by the Inquiry Team to proceed on the assumption that, during the competitive tender process, the competing companies were provided with items (a) and (b) together with the Board's Construction Requirements…"

Do you see that?

A I do.

Q So, again, for the purposes of your report, you have fully considered the Board construction requirements that were issued to tenderers?

A I have.

Q Thank you.

A I have reviewed them.

Q If I could ask you to look at some aspects of the Board construction requirements themselves,

please. If we could look to bundle 1 and to page 779. (After a pause) Bundle 1, page 779, is the start of the Board's construction requirements. If I could ask you to look on, please, to page 789. Page 789, you see the general requirements are set out which states:

> "This document sets out the key design criteria and the core requirement to create a modern facility to re-provide services from the Existing RHSC, Existing CAMHS and the Existing DCN in a single building adjoining the RIE Facilities at the Campus Site. The design shall be enduring and take account of the history, culture and physical requirements of these internationally renowned centres of excellence."

Do you see that?

A I do.

Q So, it says right at the start, "This is going to be an internationally renowned centre of excellence." If I could ask you to look on, please, to page 797. You see section 2, the bold heading "Project Wide Requirements." Do you see that?

A Yes.

Q So it says, "The Board's vision is to provide high-quality, patient-centred services from modern Facilities." You see that? If we just think about Critical Care – we will come on and look at in a minute – and again, controversial as to what the exact contractual requirements were, but, in your opinion, at the point we are in 2015 when the contract is being signed, would rooms in Critical Care that had 4 air changes per hour as opposed to 10 air changes per hour-- from an engineering perspective, would that be "providing high-quality, patient-centred services from modern facilities"?

A No.

Q Can you just explain why not?

A In my opinion, the SHTM requirement was clear that it's 10 air changes, and 4 was not meeting that that modern facility because that standard was in place at the time.

Q Okay, and if you were faced with a brief – you are the designer, you have a brief that says, "Forget about published guidance. What I want in Critical Care is 4 air changes per hour" – and, as an engineer, you know that the published guidance says 10 air changes per hour, what, if anything, from either a professional and/or an ethical perspective, would you do?

A You'd write to the client or your client and flag it up as an issue, as a risk that the brief, in your opinion, doesn't meet the recognised standards.

Q Again, just so I understand, if you got a set of Board construction requirements that said, "I'm building a world-renowned facility. I need it to be providing high-quality, patient-centred modern facilities," and you were provided with a brief that says, "Actually, what I want is less than 50 per cent of what the published guidance says," that, for you, is something that you would want to raise with the client and have specific confirmation that they were wanting to derogate from the published guidance?

A Absolutely.

Q Thank you. If we could look on, still within the Board construction requirements, to page 800 and paragraph 2.3, the NHS requirements. It says:

> "In addition to the standards listed in paragraph 2.4 of this Sub-Section C, unless the Board has expressed elsewhere in the Board's Construction Requirements, a specific and different requirement, the Facilities shall comply with but not be limited to the provisions of the NHS Requirements as the same may be amended from time to time…"

You will see a number of documents listed, including HFN and SHFN, and HTM, and SHTM. So, again, I am not asking you as an engineer to resolve this difficulty, but just for your information, the two schools of thought in relation to the project are: one school of thought says there simply has to be full compliance with published guidance, SHTM 03-01; the other school of thought is to say there has to be general compliance with that, but the environmental matrix with lower parameters was a specific fixed brief that trumped those general requirements. Those are the two issues that are in play, but I am not asking you to resolve that issue today.

If I could ask you to look on, still within the Board construction requirements, to page 821, please. You will see that there is a section 3.6.3, "Room Data Sheets," and if we could look to the final paragraph in that section, beginning, "For the avoidance of doubt…" Do you see that?

A I do.

Q So they say:

> "For the avoidance of doubt, Project Co shall provide

mechanical ventilation, comfort cooling and air conditioning to suit the functional requirements of each of the rooms in the Facilities. Irrespective of the ventilation requirements in Room Data Sheets, where rooms are clearly intended to be occupied and/or become internal spaces during design development and natural ventilation is not possible, mechanical ventilation and/or extract ventilation shall be provided as appropriate to suit the function of the space."

Do you see that?

A I do.

Q So there is a reference here to the fact that the mechanical ventilation must be "appropriate to suit the function of the space." Do you see that?

A I do.

Q Now, as an engineer, is that a judgment you can make, or do you need to look to others to make that judgment for you?

A I would reference the tables in the SHTM 03-01.

Q Okay.

A And that was the standard that was deemed appropriate for those spaces because there are various rates of air change rate for different room functions. So that would be my default position to start with.

Q Thank you. Then if I can ask you to look on, still within the Board construction requirements, to page 880, please. You see section 8, which is headed, "Mechanical and Electrical Engineering Requirements." Do you see that?

A I do.

Q So it says:

"Project Co shall provide the Works to comply with the Environmental Matrix.

"Project Co shall in carrying out the Works comply with the following non-exhaustive list of mechanical and electrical requirements.

"Project Co shall provide mechanical and electrical systems that help create a 'state-of-the-art building with innovative design.'"

Do you see that?

A I do.

Q So, again, if you were presented with the brief that potentially has the environmental matrix, it is a fixed requirement, four air changes per hour, but you were being told, really,

the whole ethos is to provide mechanical and electrical systems that are state-of-the-art and innovative, can the two of those be reconciled, and what, if anything, do you do from a professional and ethical perspective?

A If the-- and this is hypothetical. If the, as an example, the ultraviolet technical bulletins were published back then, and they weren't bound into the HTMs at the time because they'd been written in parallel, you might say to the client, "We can save some money by using this innovative, brand-new technology that will save infrastructure. There are-- you know, these are the options, the good-- the pros and cons of that."

And that's where you would be saying to somebody, you know, "You've found a state-of-the-art modern technology," because the SH-- you know, the HTMs are revised periodically, and techniques and advances in technology often move faster than the publication, so that's where you'd bring in state-of-the-- It also means more about the infrastructure for-- I would say for IT development, and whether you're using remote medical equipment monitoring.

There's not much massive state-of-the-art in pipes and, you know, in ventilation systems. The heat source is now changing because of the net zero carbon agenda, but you still need heat in a space. You still need air going into a space.

It's the quantum of that and what new technologies you may, as a designer, have come across that aren't embraced within the Board's construction requirements. You would offer it as something that-- you know, when you're a competing bidder, you would say, "We've come up with this new idea that will save some money," and that's where you would look to what is "state-of-the-art" in mechanical and ventilation terms.

Q Thank you. If we just think for a moment about the environmental matrix itself, the Inquiry has heard evidence that, really, the proper construction of the environmental matrix is that it was simply provided to tenderers as a helpful guide for them to take on and develop it, but they could not rely upon it. It was simply a draft for tenderers to do with it what they wanted. In your view, with the provision of a draft environmental matrix, would that be something that would be helpful to a design team?

A It would be helpful to the engineers.

Q Okay, and why do you say that?

A It makes-- it makes life easier to just look at a series of – I can't remember how many pages it was – say 20 pages of data, whereas room data sheets have got a lot of information. So the matrix extracts that data so that the mechanical engineer or the electrical engineer can focus on their tasks in hand.

Q Okay, and if that is provided as a draft, but ultimately, in the tender bid, the designer would have to take responsibility for it as their own document, how difficult a process would it be to check the accuracy of the environmental matrix as opposed to making up a brand-new environmental matrix from scratch?

A To actually go through and check it? It's what you would normally do. You'd go through and just start looking at those numbers and using those air change rates to work out how big your air handling systems were going to be, where the risers were going to be.

Q Okay, so is there really going to be any saving in time to the design team if they get given a draft that they have to check, as opposed to simply starting from scratch and having to create their own?

A Yeah, because the draft would, you know, be-- somebody's done that work for you. They've had the thought process and sitting down and going through in terms of what I believe is the reference design. So, yeah, they've gone through that learning curve and that process to try and establish what the brief for the hospital is.

Q So if you were working for a company that was submitting a tender for a new hospital, and you were provided with a document that was simply called a "Draft environmental matrix," what would you think the purpose of that document was?

A To inform you of what the client's intent was going to be.

Q Okay, because if I could just perhaps ask you to look to your report, page 13, at paragraph 2.1.5, you say:

> "I do not offer any view on the status of the EM. However, the production of a project specific EM would, in my opinion, be viewed by an engineer as a statement of the client's specific requirements unless the contrary intention was clearly stated. There would be no point in issuing such a document unless it

contained a client specific project brief. There would be no point in a client issuing a 'draft' EM that could not be relied on by the engineer."

Do you see that?

A I do.

Q Could you just explain what are you telling the Inquiry here at paragraph 2.1.5 in terms of what you see the utility of a draft environmental matrix being?

A It's taken a lot of the discussion and agreement out, you know? You've got the departments all listed, but with what you really feel the client wants, and as the mechanical engineer, you'd be looking through that instead of having to go through all the documentation to pull out what those numbers might be. So it's really telling you that, "Right, that is a specific operational issue."

Let's take isolation rooms. Whether it's a negative room or a positive pressure room, you just have that status in mind as to-- rather than having to go back to the client's engineering team or the clinician's team, it's all laid down there for you already. That level of brief clarification has already been undertaken.

Q Thank you. In your previous report and previous evidence, you addressed the issue of room data sheets, and room data sheets as opposed to an environmental matrix. You explained that room data sheets can be made up from the Activity Database system. You tell us within your report that it is now technically possible to create an environmental matrix from the Activity Database. Is that correct?

A As-- I believe, yes.

Q How do you know that?

A I've spoken with Talon Solutions, who write the Activity Database product. They own that. That used to be an NHS England-generated product, and when everything became privatised, Talon Solutions bought the rights to it, and they update that, and it's basically a database, like any Microsoft Access database, and I asked the question, "Can you pull out just the lines of the"-- Any aspect within that data sheet, whether it's temperature, ventilation, lighting levels, acoustics, you can pull those out as reports. Because it's all online, it's data. You can just produce a report based on whatever parameters you want.

Q Thank you. The Inquiry has heard evidence previously that that the Activity Database, it should have all of the most up-to-date

information within it. It is not always 100 per cent accurate. Is that your understanding, that it is a good starting point, but it is not always 100 per cent accurate?

A Correct. They've told me that it would be updated, checked every six months or whenever any new guidance came out.

Q Okay, so if you were producing an environmental matrix using the ADB system, an engineer would still have to check everything to make sure it was correct?

A You would just go through and just double check it and perhaps red flag anything that you didn't-- you know, based on your experience-- or just doing a cross check against something within one of the HTMs that were relevant and applicable.

Q Okay. The Inquiry has heard a lot of evidence about room data sheets, environmental matrixes. On the project, there seemed to be both. There was both room data sheets and an environmental matrix. Do you think that is a helpful procedure to have both those types of documents in play?

A I personally don't. I think there's an element of confusion that could have crept in.

Q Okay, so, again, just so we are understanding things, if you are having a brief or you are setting out exactly what the requirements are, presumably that has to be done somewhere, but, in your view, is it unhelpful to have multiple documents doing that?

A Absolutely, because I think you just-- you miss something between documentation and production.

Q Okay, so whatever is being used to capture the brief and the design, that should be one document, in your view?

A In my opinion, it-- The term I've heard recently is "One source of truth."

Q "One source of truth"?

A Yeah.

Q Presumably that is so that there is not then ongoing discussions about, "Is the room data sheet correct? Is the environmental matrix right?"

A Correct.

Q You just simply go to one point and you know exactly what the environmental parameters are?

A Absolutely, and it's a lot easier with digital systems now to do that, with database systems and the way that the reports can be generated

off them.

Q Thank you.

THE CHAIR: You use the expression, “Reports can be generated from them.” Again, just to make sure I am following things, when you use the word “reports,” that would include environmental matrices?

A Yes. Anything that’s on the room data sheet, any line of entry, you can produce a report from it. A simple example is a double-switch socket outlet. You would have all those room data sheets for all those rooms. They would have a list of all the components within those rooms, and you might say, “Well, how many double-switch socket outlets are there?” You can go into the system and produce a report, and it says, “You’ve got 5,000 double-switch socket outlets; you’ve got 2,000 single”--

So any element of data within the room data sheet can be extracted as a separate-- I use the term “report,” or it’s more like a collation of that information, just so you have a single report. Let’s say-- Another one would be lighting levels. You want to look at what the lighting levels are going to be, and you can just press a report, and it says-- and give you all the rooms with all the lighting levels.

Q Right. Thank you.

MR MACGREGOR: Mr Maddocks, I would like to just move on and ask you about a slightly different issue, and that would be to think about SHTM 03-01, the 2014 version, which is the one that would be in play in relation to the project, and to ask you some questions about the position that TÜV SÜD have adopted in relation to that document. So if I could ask you to have in front of you, please, bundle 1, page 757. So bundle 1, page 757, which is a document entitled, “Critical Care Department Briefing Review April 2022.” Do you see that?

A I do.

Q If we could look on, please, to page 761, the executive summary states:

> “From our Review of all reference documents, we have not found any guidance with regards to ventilation rates other than that provided for”----

A Sorry, I just (inaudible).

Q It is okay.

A Thanks. Sorry about that. Yes, I see that.

Q It says:

> “From our Review of all reference documents, we have not found any guidance with regards to ventilation rates other

than that provided for Neutropenic Patient Ward and Isolation Rooms, the latter of which confirms the requirement for pressurised lobbies to +10 Pa and 10 A/C per hour."

Do you see that?

A I do.

Q Mr McKechnie, in his evidence, stated a very similar position, that if you are talking about a requirement for 10 pascals of positive pressure and 10 air changes per hour, that is really just for isolation rooms and critical care in terms of SHTM 03-01, the 2014 version. Do you agree with that view?

A I don't.

Q Okay, and why not?

A In my opinion, the table within SHTM 03-01, which lists all the departments, it lists critical care areas with supply ventilation and 10 air changes an hour at 10 pascals. There's a small note at the side about the potential for isolation rooms being at negative pressure, but I see that as an all-encompassing requirement for the critical care area.

Q If I could perhaps just ask you to look to SHTM 03-01, the February 2014 version. That begins in bundle 1 at page 1035.

THE CHAIR: Yes. Thank you.

MR MACGREGOR: If we look on to page 1058, please, you see, in the middle of the page, there is a bold heading, "Ventilation for general areas." So it says at paragraph 2.19:

"Table A1 provides recommended air change rates, temperatures and pressures for general areas that require mechanical ventilation in healthcare buildings."

Do you see that?

A I do.

Q Then, if we look on to page 1116, if we look to paragraph 7.2, it says, "The following departments will require a degree of specialised ventilation." Do you see that?

A Yes.

Q Then, if we look to the bullet points approximately halfway down the page, do you see that there is one that says, "Critical areas and high-dependency units of any type"? Do you see that?

A I do.

Q Then, below that, it says, "Isolation facilities." Do you see that?

A Yes.

Q So, again, if we are just thinking through that view, specialised ventilation – we will come on and look at the table in a moment – 10 pascals

of positive pressure and 10 air changes per hour, that is only for isolation rooms in critical care. That is not really what we see within the guidance. It says, "Critical care areas and high dependency units of any type." Then, as a separate entry, "Isolation facilities." Do you see that?

A I do.

Q Is that your understanding, that you just explained a moment ago, that really, these are separate entries that both require degrees of specialised ventilation?

A Correct. You can have an isolation facility on a general ward. There are general wards that are made-- single bedrooms are made isolation facilities.

Q Thank you. Mr McKechnie, both in his witness statement and in his evidence, one of the issues that he raised was to say, well, he was not aware of any other hospital in the United Kingdom whereby 10 air changes had been specified generally for all parts of Critical Care areas. He was only aware of those specific requirements for isolation rooms.

Can you help the Inquiry: are you aware of any hospitals in the United Kingdom whereby Critical Care areas generally are specified as 10 pascals

of positive pressure and 10 air changes per hour?

A The ones I've been involved with, where you've got Critical Care or it might have been referenced as an ITU, have been done at 10.

THE CHAIR: Sorry, just again, the ones that you have been involved with----

A The ones that I've been involved with have been done at-- With the Critical Care or ITU, as it's called – Intensive Therapy Unit, as it's called – they've been done at 10 air changes.

Q Right. That is okay.

A 10 pascals.

Q For the whole area?

A For the whole area, yes.

Q Yes. Thank you.

MR MACGREGOR: Wherever we are talking about projects you have worked on, are we talking about one project, more than one?

A Bishop Auckland Hospital. Mind's gone blank. Bishop Auckland Hospital. There were spaces within Hexham Hospital that had smaller Critical Care areas at 10 air changes. Those two immediately spring to mind. Ulster Hospital, which is one we completed a few years ago, that was 10 air changes.

Q Okay, so multiple

projects you have worked on where the specification would be, for Critical Care, 10 air changes per hour and 10 pascals of positive pressure?

A Correct.

Q Thank you. If I could ask you to look to bundle 7, volume 2, page 30, please. So bundle 7, volume 2, page 30, please. It is the email towards the bottom of the page, which is from an Edward McLaughlin----

THE CHAIR: Thank you.

MR MACGREGOR: -- who worked for Health Facilities Scotland to Brian Currie on 17 July 2019. It is just for the wording at point two, towards the bottom of the page, three lines up from the bottom. Mr McLaughlin says:

> "The review appears to focus on an interpretation of the guidance as relating to isolation rooms, rather than Critical Care areas."

So that is really the TÜV SÜD interpretation that we have just looked at.

> "As the application column in table 1a of SHTM 03-01 states that it refers to Critical Care areas and Isolation rooms are mentioned separately, we can see no justification for this interpretation."

Do you see that?

A Yes.

Q So Mr McLaughlin's view is, "I have considered what has been put forward by TÜV SÜD, but I do not agree with that interpretation." Again, just to be clear, do you agree with Mr McLaughlin's views?

A I just can't see the second-- It says, "… we can see, no…" Is that on the second page?

Q So if we just turn over the page onto page 31, it should continue, "… justification for this interpretation."

A I agree with that statement.

Q Thank you. If I could ask you to have your report in front of you, please. If we look within bundle 1 of the witness statements reports to page 17, please, and to paragraph 2. So we are within the bundle of witness statements, please, and 2.3.2. You say:

> "In my opinion, the reference to Critical Care Areas would generally be interpreted by an engineer as referring to the spaces within any space with in a complete Critical Care Department including single- and multi-bed ward bedrooms, with the exception of specific rooms such as listed in Appendix 1 of SHTM 03-01, which are typically

encountered across many other departments in a hospital which are in a Critical Care Unit. Common spaces such as Toilets, Bathrooms, Staff Base, Dirty Utility, Clean Utility, Offices, Linen Bays, Waiting Areas and Seminar rooms, where the environment, particularly ac/hr, is different to the bed areas where Critical Care nursing is administered."

Do you see that?

A Yes, I do.

Q So, again, your opinion is that your interpretation and Mr McLaughlin's interpretation would be the generally understood meaning of SHTM 03-01. Is that correct?

A Correct.

Q Again, should the Inquiry understand that your position would be that the views expressed by TÜV SÜD would be an outlier?

A Would be what, sorry?

Q Would be an outlier.

A Yeah.

Q Thank you.

A Correct.

Q One other issue that I would wish to raise with you is changes that were made to the Environmental Matrix during the course of the project. So the Inquiry has heard evidence that there was a change made to a guidance note contained within the Environmental Matrix, Guidance Note 10. Sorry, Guidance Note 15. Guidance Note 15 originally referred to critical care areas requiring 10 air changes per hour. That was then changed to make it refer simply to isolation rooms.

The Inquiry has also heard evidence that there is certainly one school of thought that the Environmental Matrix was a fixed brief to the designers. So, again, just drawing on your experience working in this space, if you were given a fixed brief by a client – you were given an Environmental Matrix and told, "That is just completely fixed. You need to design to this Environmental Matrix" – would you, as a designer, be able to simply change aspects of that document without client approval?

A No, I wouldn't have done that.

Q Okay, so if you had wanted to make a change to a fixed brief, how would you go about doing that?

A You'd raise a request for clarification. You'd issue a document, a letter, or if you had what's called an RFI tracker, you'd have a query on a piece of briefing information and you'd

seek clarity from that, and seek somebody to respond and acknowledge that.

Q Thank you. When you refer to an RFI tracker, what does RFI stand for?

A Request for information.

Q Request for information. Thank you. Linked to that, if we could perhaps just discuss more generally the procedure for derogations. We will come on and talk about the new procedures for derogations and the ventilation safety groups, but if we think back to 2015 to 2019, what was the procedure, if any, for trying to agree a derogation from guidance?

A They would all be project specific, based on the project management team involved. The project manager might issue a RFI tracker or a derogation tracker, and you, as designers, would fill those in with your clarification or your-- We do it now with just basically an Excel spreadsheet, something-- You know, they have a list of queries, reference numbers and then you leave them open or closed, so basic sort of project management to close out queries.

Q In terms of best practice, would you be expecting to see some form of risk assessment being carried out if there was going to be a derogation from published guidance?

A Ideally, one would be supplied to justify why there had been a change.

Q You say "ideally." At this point in time, was there a standard established procedure as to how you would go about derogations, or was it simply project to project?

A Project specific.

Q Okay, and in terms of even now – we will come on and talk about the ventilation safety group – if a client came to you and said, "I understand this is what the guidance says, but I want to derogate from the guidance," is there a standard, off-the-shelf (inaudible) so that every derogation for these projects in Scotland would be exactly the same, or is it still project specific?

A I believe it would be project specific.

Q Do you think it would be an improvement, particularly in the healthcare space, if there was a standard form derogation so that everyone doing these projects did the same process and had the same documentation?

A I think it would make life easier to keep track of things and pick up lessons learned as you go through a project.

Q Okay, thank you. I would now like to look at some of the Room Data Sheets for the project itself. You mention a number and then include copies within your report, but if we could perhaps just look within bundle 1 to page 1597. This is an example of one room data sheet.

You see the room code, "B1609-01 4 beds Low Acuity." Do you see that?

A I do.

Q You tell us within your report, B1, that would mean a Critical Care room. If we look over the page, onto page 1598, see the requirements there stated as "4.0" in relation to air changes per hour. Do you see that?

A I do.

Q So should the Inquiry understand that that is lower than what you would interpret the requirement to be from the table A1 in SHTM 03-01?

A For a Critical Care room, correct.

Q Now, on the right-hand side, this is a this is a room within Critical Care and the ventilation type is described as, "Natural & Central Supply Air." Do you see that?

A I do.

Q Do you have any observations on the fact it is a reference to natural ventilation in a Critical Care room?

A I wouldn't be using natural.

Q Why not?

A Because it's a Critical Care area that you want to control the environment. You've got very poorly patients. It's also contradictory to the table A1 in HTM 03-01, which clearly says supply.

Q Okay.

A I think the second column has supply, extract or natural, or all three. That is not accept-- It's not acceptable in the Critical Care to open windows, in my opinion.

Q Thank you. Just going back to the codes, the Inquiry has heard evidence that B1 meant Critical Care. As an engineer, is that something that you would know about, or is that something that clinicians would know about?

A In terms of?

Q B1. If you saw "B1" written down, would that have any meaning to you? Would you automatically work out----

A No.

Q -- that means Critical Care?

A No.

Q No.

A That's a project-specific

numbering system.

Q Thank you.

A It could mean level 1, department B. It's a project-- That number there, the room number, is project specific.

Q Thank you. Within your report, you go on to address the specification for the ventilation system, including at Settlement Agreement 1. There is no dispute, in terms of Settlement Agreement 1, that the technical schedule states that certain rooms have to have four air changes per hour and balanced or negative pressure. In your opinion, did that comply with SHTM 03-01 for Critical Care spaces?

A At four air changes? No.

Q If I could ask you to look on within your report, please, to page 32 and paragraph 4.1.1. You say:

> "I understand that after financial close NHSL and IHSL entered into a settlement agreement (Settlement Agreement 1). This set out that 4 ac/hr were required for certain Critical Care Rooms. From an engineering perspective, in my opinion, this was a mistake."

Do you see that?

A I do.

Q Again, if you could just help the Inquiry, are you saying this is a minor error or a major mistake in relation to Critical Care?

A I think it's a major mistake.

Q Thank you. Now, you do say within your report that you were not aware when you were producing the report of any risk assessment that was undertaken. Is that right?

A Correct.

Q Now, there was a risk assessment and I will take you to it now. If we could have a look within the bundles to bundle 6 and to page 14, please. So you will see at the top of the page it says, "Record of General Risk Assessment." The names of the assessors are given and various other details. Then if we look to the wording just under, "Subject of Assessment: Consider Task or Environment." Do you see that?

A Yes.

Q It says:

> "Bedroom ventilation design in 4 bedded rooms does not meet the recommendations of SHTM 03-01, as the current design has the 4 bedded rooms as being positive pressure."

Do you see that?

A Yeah.

Q So, what this room is

saying is, “The current specification is positive pressure and that does not comply with SHTM 03-01.” In relation to Critical Care areas, do you agree with that?

A I don’t, no, because table A1 says positive pressure 10 pascals for Critical Care areas.

Q So if you had been shown this risk assessment by a clinical team that said, “We are being offered positive pressure and we do not want positive pressure because it does not comply with the guidance,” you would be saying, “Yes, it does”?

A Correct.

Q Thank you. Now, within the document, there is a clinical justification for the cohorting of patients. So if we just look below the text I have read out, you will see the sentence beginning, “To allow cohorting…” Do you see that?

A Yes.

Q So it says:

> “To allow cohorting of patients with the same air-borne infections these rooms require to be balanced or negative pressure.”

We then skip the next paragraph. It continues:

> “Whilst the Board can rationalise the number of 4 bedded rooms where the ventilation needs to change with RHCYP, it should be noted that this does not reduce overall flexibility in the future-proofing.
>
> A further review was undertaken with the Children’s CMT in January 2018 of the initial risk assessment completed in July 2017 to ascertain what 4 bedded rooms would be essential. Given the different patient groups related to specific wards, separate risk assessments have been undertaken (see attached). Individual risk assessments have identified that the need for cohorting of patients is only an issue for the Children’s Service.
>
> Risk assessment highlights that it is **essential** to change the ventilation in 7 of the 4 bedded rooms within RHCYP. It would be **desirable** to change the ventilation in 6 of the 4 bedded rooms within RHCYP. No change to 7 of the 4 bedded rooms in RHCYP and DCN.
>
> The risk assessments have been discussed with the Children’s CMT and Infection Control & Prevention who have confirmed that not having the

ability to cohort patients is not acceptable from a patient safety perspective."

Do you see that?

A I do.

Q So, effectively, the Inquiry has heard evidence that from a clinical perspective, clinicians said "We need to cohort patients," for example, patients with RSV, and to do that, "We're going to do that by balanced or negative pressure."

A Correct.

Q The Inquiry has heard evidence from an infection prevention and control doctor that says, "Well, yes, the guidance might say positive pressure, but actually, for certain patients with RSV, cohorting them with balanced or negative pressure, it's just another way of approaching the problem. There's no issue with that." From your perspective, then, as an engineer, if you were presented with this with a clinical justification for a departure from the guidance in relation to positive pressure, is that what you would need to be able to be comfortable about there being non-compliance with what is set out in table A1?

A Yes, correct.

Q But in relation to the risk assessment, while that would deal with the pressure issue, would that do anything at all in relation to whether it is 10 air changes per hour or 4 air changes per hour?

A I didn't say anything within that risk assessment that mentioned the air change rate.

Q The next issue that I would like to move on and ask you about is commissioning and validation. So the Inquiry has heard evidence that, in relation to SHTM 03-01, there had to be both commissioning and validation done, and the infection prevention and control doctor that gave evidence said that he would expect there to be a very short validation report that was provided to him that effectively said the system is functioning in compliance with published guidance and all that is required is ongoing maintenance. That was his evidence.

Would you be able to help the Inquiry: in terms of the validation report, would your understanding be that that would be something that could be done by the contractor and handed over, or would there be an expectation that that was done independently, done by an independent third party?

A There's an expectation that it is a requirement. I think it's a

third party after everything has been completed. Commissioning is really turning the fans on, balancing the system to make sure-- When you turn the fan on in the air handling unit, the air doesn't go where you want it to go, so you have to spend a lot of time accessing duct work with ceilings taken out to make sure the air gets delivered down the right duct and to the right floor at the right volume in accordance with the design. So that's the commissioning exercise, and it's very much a to-and-fro exercise and one undertaken during the finalisation of the build process.

So the commissioning engineer will balance the system and say, "That is doing what the design intent was" in terms of the airflow rate. The validation is a review when everything's clean, tidy and they just go and measure the air volumes. They don't balance the system because that's already been done. So they will do a report measuring-- and IOM have produced a lot of those validation reports, really from the air intake all the way through to check that that system complies with the brief, which is the SHTM 03-01 in this case.

Q Thank you, and if we just look to some of the validation reports that were provided by IOM. This is still

at the stage that we are dealing with, the specification under Settlement Agreement 1. So if we look to bundle 1, please, and to page 2929. Then if we look on to page 2934, please. You see there is the bold heading in the middle of the page, "High-dependency areas." Do you see that?

A I do.

Q It says:

"Testing of the high dependency areas identified that the air change rates and pressure cascades did not meet the requirements. In early discussion with the Health Board's Technical Advisors (Mott MacDonald) we were advised that there was derogation in place which reduced the requirements from 10 ac/hr to 4.

The test information was summarised in an initial briefing to the Health Board during w/com 2nd July.

It later transpired that there was some confusion on the detail of the derogation and the Construction supply chain and the Health Board began working on both an interim solution to improve the situation and a longer term permanent solution.

The final results of the high

dependency areas were as follows …"

Then you see a range of tables that are being set out with the supply air change rate meeting 3.4, 3.1, 3.2. Do you see that?

A I do.

Q So, in relation to the validation report, can all that the validation report tell you is whether, in a binary sense, there is or is not compliance with the published guidance? The engineers cannot tell you whether the space is safe or unsafe because that is a clinical judgment?

A Correct, yes.

Q The next issue that I would wish to ask you some questions about is High Value Change Notice 107 and Settlement Agreement 2, which you address within the report, but, in simple terms, there is a clear and unambiguous instruction that the critical care area is required to have a positive pressure and 10 air changes per hour. Is that your understanding?

A Yes.

Q If we just think to the physical works that would be required to make those changes, to go from having the system that had 4 air changes per hour, balance and negative, to 10 air changes positive pressure, are we talking about major or minor works that are required within a hospital?

A Within the department and within the plant room and the risers that serve that department, then fairly major intervention would have been required. You'd have to have gone back and start the calculations from the rooms all the way back up to the plant room and see what ducts were impacted. Some ducts may have been designed at a low velocity and could achieve a high velocity, so it's just a question of really forensically going through that whole ductwork network to see what needed to change.

Q Okay, and in terms of the physical works required, are we talking about that being dirty building work that is required in terms of physically ripping things out and making changes?

A Potentially, yes----

Q Yes.

A -- because you've got to take the ductwork out, which-- The ductwork is usually the first-- Because it's so big, it's the first piece of engineering that goes into a corridor and then you put pipework and cables underneath it, so you'd have to try and-- and then you've got to take the

ceilings down. You might have to put more holes through partitions because the ductwork's larger, so, yeah, within that critical department and the connections to the plant room, it would be fairly intrusive.

Q From your perspective, do you think it would be realistic to undertake those types of work in a hospital with patients in situ in the hospital?

A Not within the department, certainly, because many hospitals have refurbishment programmes under way where they refurbish a ward or a floor and they just lock those areas off; they screen them off. So you wouldn't necessarily close the whole hospital, you'd just close the department and the departments that are directly impacted by that work, and it might be the corridor needs to be screened off for a period of time.

Q Thank you, and if I could just ask you to look to your report, please, at page 43 and to paragraph 5.1.5.1, and if we could pick matters up three lines down, beginning "Parts of the hospital…" Do you see that?

A Yes.

Q You tell us that:

"Parts of the hospital would have to be declared as no-go areas for staff and patients whilst the remedial work was carried out on levels 1 and 3 and it is envisaged that disruption would be incurred on some of the primary systems such as heating and chilled water networks, electric power and control systems, which whilst this could be programmed could have impacted on clinical functionality in other areas not directly affected by the works."

Do you see that?

A Yes.

Q Thank you. Now, you tell us within your report that you were provided with IOM test results following High Value Change Notice 107, Settlement Agreement 2. Works were carried out, IOM come in and do testing, and you tell us that you have reviewed those test results for the purposes of your report. Is that correct?

A That's correct.

Q We will come on and look at them, but, just in general terms, what did the IOM test results show?

A That it met the 10 hour changes per hour.

Q Okay, so, from your perspective, changes made and the IOM test results are showing full

compliance with published guidance including SHTM 03-01?

A Correct.

Q Thank you. If we could look within bundle 1, please, to page 2995. So bundle 1, page 2995. So top left-hand corner, "IOM," we see this as a services report:

"Date of site work
January/February 2021

Ventilation Validation
Royal Hospital for Children and Young People And
Department of Clinical Neurosciences."

If we could look on to page 3000, please. You will see there is a table there with areas of ventilation details. You will see the B1 code, which the Inquiry's heard evidence is for critical care. If we perhaps just look approximately possibly midway down that table, you will see that there is an entry for "1-B1-009." Do you see that?

A Yes.

Q Which is "Bay 1," and then if you look across to the supply design air changes per hour, do you see that as 10?

A Yes.

Q Then if we look all the way across to the pressure, it is stated as "Positive (11Pa)." Do you see that?

A I do.

Q If we look on to page 3002, just to pick another example. If you look approximately a third of the way down that page, you will see that there is two entries for "1-B1-065." Do you see that?

A I do.

Q Again, if we look across, you will see that the supply design air change is 10. Do you see that?

A Yes.

Q Then if we look across, so page 3002, and it is the entries for B1065, showing supply design at air changes per hour of 10, and, again, if we look over to the pressure, it states it is "Positive (11Pa)." Do you see that?

A I do.

Q If we look on to page 3006, see the conclusion section:

"Based on the information provided by NHS Lothian;"

There is then a series of bullet points, and it then states:

"The system is acceptable at the time of validation. It is considered fit for purpose and will only require routine maintenance in order to remain so for its projected life."

Do you see that?

A I do.

Q Thank you. Then if we look on to page 3008, do you see that there is a document on Turner-headed paper?

"Supplemental Agreement No. 2 ("SA2"): Ventilation Works Design Assurance Statement"

Then after letters A to E, do you see a sentence beginning like, "I confirm"?

A I do.

Q It says:

"I confirm in my capacity as Lothian Health Board's Authorising Engineer (Ventilation) that I have completed a review of IHSL Lothian Limited's design response to HVC 107 as detailed in the following documentation as it exists on 4 February 2021 (together with Part B of the Scope) and confirm to the NHS Lothian Health Board my opinion that the contents and design proposals therein should allow Project Co to meet the requirements of Part A of the Scope.

I have monitored the design development and I consider that it should be possible for the design included in Part B of the Scope to meet the requirements of Part A of the Scope. This is not an acceptance on my part of any design liability.

I have witnessed the standard of installation and the commissioning activities of the new Air Handling Units and consider that they meet the full requirements of SHTM 03-01. I further consider that these units are fit for their projected purpose if these installations are adequately maintained."

Do you see that?

A I do.

Q So we see the raw data, the test report showing positive pressure, 10 air changes per hour. We see a design assurance statement being provided by the authorising engineer stating that, in his opinion, there is now full compliance with the requirements of SHTM 03-01. Do you see that?

A I do.

Q If we could look on, still within the appendices, to the IOM report, to page 3014, you see that there is an email exchange between Paul Jameson and Ronnie Henderson. Second full paragraph, beginning, "I as discussed…" Do you see that?

A I do.

Q Which says:

"I as discussed on the day

the physical inspections we made indicate that the Dakin units look superior to the previous Sandometal units installed on site."

Do you see that?

A I do.

Q Does that mean anything to you as an engineer, the difference between Dakin units and Sandometal units?

A Yes.

Q What are they and what are the differences?

A Quality.

Q So should the Inquiry understand that whatever was in before the air handling units that have now been installed within the Royal Hospital for Children and Young People, they are superior to what was in the original specification?

A Based on that statement and my own experience that the Dakin units are more-- The Sandometal ones might be compliant, but the build quality of the Dakin units is better.

Q What is it about them that makes them better?

A Oh, gosh. Better quality material, build quality. Specification is still the same, they're just-- The simple things like the access handles on the doors are easier to use, easier to maintain. We had the Sandometal units on a job and they weren't the best quality.

Q Thank you.

A But they were compliant at that time on that project.

Q If I can ask you to look on, please, still within bundle 1, to page 3233. To 3233, please. This is a document headed "AHU Remedials Cover Sheet." If we look to the third paragraph-- So page 3233, "AHU Remedials Cover Sheet," third paragraph, which says:

"As discussed and agreed between the Board and the AEs representing IOM and Turner PES and to satisfy board governance, could all participants in the AHU review process please sign each individual AHU sheet as well as in the table below recording that the unit meets the criteria set out in Section 8 of SHTM 03-01 and return a scanned copy. All reviewers will be given a complete copy once all signatures are received."

Do you see that?

A I do.

Q Then, if we look at the bottom, we see the organisations that are effectively signing off on the new

specification as commissioned and validated, so we have got, from NHSL, their commissioning manager, an individual from Infection Prevention and Control, a microbiologist, Technical Advisor Mott MacDonald, an authorising engineer from Turner, independent validation by IOM, and also involvement from HFS. Do you see that?

A I do.

Q So, reviews by a range of individuals, not just engineers, in relation to the suitability of the ventilation system. Then, if I could just ask you to look back to your report, please, page 44, paragraph 5.2.4. You tell us within the report:

> "The ventilation system in Critical Care and Isolation Rooms at the RHCYP/DCN has been designed, tested, commissioned and validated in compliance with published guidance (SHTM03-01) and best practice."

Is that following a review of all of the documentation provided to you, including the documentation we have looked at today?

A That's correct.

Q Thank you. You continue:

> "The ventilation system has therefore been independently checked by IOM and demonstrated to be in accordance with the design requirements detailed in SHTM03-01, as noted in Figure 30 below. From an engineering perspective, the ventilation system in the Critical Care and Isolation Rooms in the RHCYP/DCN is adequate for its intended purpose. The Critical Care and Isolation Rooms provide a suitable environment for the delivery of safe, effective person-centred care."

Do you see that?

A That's correct.

Q The next issue that I wish to go on and ask you about is revised guidance which comes in in 2022, so Scottish Health Technical Memorandum 03-01, which is issued at that point, and to ask you for your views on some of the innovations in relation to that document, including the creation of the Ventilation Safety Group. So, before we come and look at the document, could you just explain, in broad terms, what is the Ventilation Safety Group?

A The Ventilation Safety Group is a collective of-- a multidisciplinary team of individuals to review the ventilation systems in a

hospital. It will consider an authorising engineer who is independent of the hospital trust, the authorising persons within the trust who maintain and manage the systems. You would hopefully have an Infection Prevention and Control person on the team, and from the operational management side.

So it's a collective of people with experience in ventilation who will look at a design and review it and pass comment if it's a new design, or they will undertake regular maintenance reviews to check that the systems are currently being maintained.

Q Do you see it as an improvement on the previous system?

A Very much so.

Q Can you just explain? Why do you see it as an improvement?

A You get feedback from people who are operating systems on a day-to-day basis. So, when you've got a new design in place, the Ventilation Safety Group are asked to look at that design and say, "Well, actually, on this site we found this a problem, we found this a problem," and one of the things that I do when I go and see trusts is what sort of custom and practice has developed on a site.

So, you understand how they

maintain things, what maintenance contracts they have in place, and that operational feedback is really important for a designer to allow the designer to improve their design, their knowledge and experience and get first-hand feedback from people that say, "Actually, you can't do that because I need access to a fire damper or a balancing damper." Some engineers who are new to hospital design don't have that pool of knowledge to access.

Q So a multidisciplinary approach in relation to key issues in relation to critical systems, particularly the ventilation system?

A Yes, and it's specific to sites as well because a site in the centre of Edinburgh would be very different to one on the edge of the suburbs from an air pollution-- and all the filtration standards, the temperatures, all the parameters that would influence a ventilation system can vary from site to site, from NHS trust to NHS trust. So having that operational feedback from site teams and local IPCs is invaluable.

Q Okay, and in terms of a derogation, now that SHTM 03-01 2022 is in place, if there is going to be a derogation from the standards set out in the guidance, what role does the

Ventilation Safety Group have in that type of decision?

A They would review the derogations and look at whether they could accommodate them within their working practices. A derogation may impact on maintenance protocols, maintenance processes. It may be a temperature issue or an air change issue, with the cohorting of patients being one example. The local practice clinically might be different for a whole host of reasons that are beyond the engineer to question, but they might change the way something is to be designed. Air change rate or positive/negative pressure is examples.

Q Thank you, and within bundle 1, if we could look to page 2286, please, which is within SHTM 03-01. If we could look towards the bottom of the page, which is headed up "Ventilation Safety Group." See paragraph 4.4. So page 2286. It states:

> "The management of the ventilation systems of a healthcare provider should be overseen by a Ventilation Safety Group (VSG). The VSG should have clearly defined roles and responsibilities, be part of a healthcare organisation's governance structure and report to the "Designated Person" at Board level. It should be led and chaired by a person who has appropriate management responsibility, knowledge, competence and experience (for example, the Designated Person)."

Then, at 4.5, we see the multidisciplinary group that should be included, so authorising engineers, Infection Prevention and Control authorised person, estates, and then over the page, on to page 2287, clinicians and specialist departments, personnel from the finance department, and other stakeholders. We see, at 4.6, it states:

> "The VSG remit should be to assess all aspects of ventilation safety and resilience required for the safe development and operation of healthcare premises. It should inform the following… [and that includes] the design process of new healthcare premises; the design process for modifications to existing premises; [and] the commissioning and validation process…"

Do you see that?

A I do.

Q So, in terms of key design issues or key issues relating to stepping away from guidance, there is now a procedure whereby authorising engineers, Infection Prevention and Control, estates personnel, microbiologists, and any other relevant disciplines, they are all involved in the decision-making process. Is that right?

A Absolutely, yes.

Q So if we think back to the clinical risk assessment that we had looked at in relation to the cohorting of patients, perhaps previously that would have been done by clinicians, it might have had some input from Infection Prevention and Control. There is now a structured procedure whereby, at the very least, clinicians, Infection Prevention and Control and the design engineer should all be sitting down having a discussion and making sure that everyone understands what is going on and is comfortable with the decisions that are being made?

A Yes, I think the word you used there is the "structured approach." Some of those people may have sat in one area looking at certain aspects, but bringing everybody together in that forum to review that is a massive improvement.

Q Thank you.

A And it is happening. I'm working as a technical advisor on a project and we're early stage 2 design and the authorising engineers are already looking at the designs alongside ourselves as TAs.

Q Thank you.

A Then, just to cover off the new process for derogations, if we look to page 2288, please. See at the top of the page, bold heading, "Derogations and alternative design strategies":

> "Any derogations or alternative design strategies from this guidance should be subject to the scrutiny and agreement in writing by the VSG. The reason for the derogation or alternative design strategy and limits to its application should be recorded.
>
> Designers proposing a derogation or alternative design strategy should be able to supply a body of evidence that their proposal will provide a degree of safety no less than if the guidance in this document had been followed."

Do you see that?

A I do.

Q So it is not simply people making statements; there has to be a credible body of evidence to back up

the alternative view?

A Evidence-based change orders, yes.

Q If we just, again, think back to the example of cohorting of patients, the Inquiry has heard evidence that, really, from an Infection Prevention and Control perspective, there is a system for positive pressure, but there is an equally valid view in relation to balanced or negative pressure. If that approach was being adopted – we are not following the guidance, we are going with balanced or negative pressure – it is not simply that that would be stated, there would be a body of evidence that backed up that decision, given the new procedures that are in place?

A Yes.

Q Thank you. Lord Brodie, I am conscious that that has just turned half past eleven. I do not anticipate being much longer with Mr Maddocks, but I think I would be more than a couple of moments, so now might be an appropriate point for a break.

THE CHAIR: All right. We will take a coffee break now, Mr Maddocks. It is now just a little after half past, so if you can be back for ten to twelve?

THE WITNESS: That's fine.

THE CHAIR: Thank you.

(Short break)

THE CHAIR: Mr MacGregor.

MR MACGREGOR: Thank you, Lord Brodie. Mr Maddocks, we were looking at SHTM 03-01, the 2022 version. If we could still look within that document, bundle 1, and look on to page 2402, please, and you see that this deals with the new procedures for acceptance testing and validation. Do you see that?

A I do.

Q If we could look to paragraph 12.6, towards the bottom of the page, under the heading, "Design proposal review"----

A Thanks.

Q The new guidance states:

> "It is essential that whoever has been appointed to carry out the final validation acceptance of the system should be involved in the initial client's brief and design specification, preferably prior to the project being put out to tender. They will then be fully aware of the client's requirements and any limiting factors."

Do you see that?

A I do.

Q Now, that is a change in terms of the involvement that the individual should have. Do you see that as a positive innovation?

A Very much so.

Q Can you just explain why?

A It just reinforces the localised issues that may occur on a site and that the team that are-- The AE, whilst he is-- she is independent, they will know the way the team on site operate, and they can then inform the people who are going to inherit the system to maintain it of the issues, and the term there is “limiting factors” – you might always put "(/derogations)” – so at least that the AE has gone through. And there should be no surprises when it comes to handover of the building and the system performs as per the brief.

Q Okay, thank you. Then, if we look on to page 2407, paragraph 12.31, the guidance states, “It is vitally important to complete the validation process before the system is accepted by the client.” Do you see that?

A Yes.

Q Why is that important?

A Once the building becomes operational, it’s hard to go back in and change anything. The validation indicates that the building is complete more than just practically complete – the finishes are all there, all the ceiling tiles are in place – so it’s-- the validation itself is, you can almost walk into it. The only thing you might need is to do some final microscopic testing, microbiological testing, before the patients can then move into it. It might be done before or after a deep clean, but it’s really as per-- you know, the next stage is patients come into that environment.

Q Okay, so checks being done before the patients are going to come in, identify any problems that can presumably then be rectified before the patients come in?

A Yeah, and basically there’s no change, physical change, that can happen once that system has been invalidated. It’s like you put a seal on it to say, “Yeah, that’s ready to go.”

Q Thank you, and then paragraph 12.32, the “Validation report” states:

> “Following validation, a full report detailing the findings will be produced and sent to the client’s lead project manager. The report should conclude with a clear statement whether the system did or did not achieve the standards set out in the agreed

design specification."

We see, at paragraph 12.33, the individuals that should be provided with a copy are the head of the user department, Infection Prevention and Control, and Estates and Facilities. Do you see that?

A Yeah.

Q Thank you. Now, within the revised table of this guidance, there are references to levels of care that would be provided. So there are no longer simply references to critical care, but there would be references to the level of care that would be being provided in specific areas of a hospital, and those are defined, if we look to page 2487----

A 2487?

Q Just towards the bottom of the page, you will see definitions of level 0 care, level 1 care, and then over the page, 2488, you will see that there are definitions of level 2 care and level 3 care. Do you see that?

A Yeah, I do.

Q From an engineer's perspective, is that changed so that there is greater clarity not just on the area but the level of care and what the specialised ventilation requirements will be? Is that a helpful innovation from your perspective?

A It's informative for an engineer. It just tells them what that space is really intended to be used for, and the importance of sticking to the guidance.

Q Okay, thank you. The final issue that I really want to ask you about in your evidence, Mr Maddocks, is lessons learned and how perhaps these projects could be done better in the future. Now, within your report, you make mention of the fact that a lack of recorded involvement from Infection Prevention and Control teams during the course of the project, that does not particularly surprise you. Can you just explain to the Inquiry why does that lack of involvement not surprise you?

A They are asked to attend, they're just overworked, and it varies from site to site how big the IPC team is, how experienced the IPC individual may be. There are many who've got, obviously, nursing backgrounds and are fantastic at what they do, but they're not engineers. They don't know how to design a ventilation system. I know of one lady who's gone away and done, like, a BTEC in Building Services to familiarise herself with the nuances of what we as engineers do. And that's not a criticism, it's just that-- It's a vital part of any operational hospital, but

they just don't have the bandwidth to deal with some of these issues.

Q Okay, so when we're talking about multidisciplinary approaches that need engineers, Estates, Infection Prevention and Control, should the Inquiry understand your experience working in this area is that there are simply not enough Infection Prevention and Control professionals to do the volume of work required?

A Specifically with-- relating to the engineering, yes.

Q Okay, thank you. If I can ask you to look to bundle 13, volume 3, page 464, please. So this is the updated version of SHFN 30, which is a document produced by Health Facilities Scotland to try to address some of the issues arising from healthcare-acquired infections within the built environment in hospitals.

THE CHAIR: Thank you.

MR MACGREGOR: If we could look on to page 468, please, you see just below the box, there is wording beginning, "Scrutiny." Do you see that?

A I do.

Q So it says:

> "Scrutiny of this guidance will highlight the frequent use of the word 'Partnership.' Successful use of HAI-SCRIBE requires participation and cooperation particularly between Estates & Facilities staff and Infection Prevention and Control teams."

Do you see that?

A I do.

Q The whole ethos of this document is to talk about a partnership approach, that healthcare-acquired infections, they are not simply issues for clinicians or Infection Prevention and Control; all disciplines involved in projects need to be involved. Now, if we look over the page, on to page 469, you see that there is the box with, "Note." Do you see that?

A Yes.

Q It says:

> "This document can provide an insight to the key factors within the built environment which can impact on prevention and control of infection. It is intended as a point of reference for healthcare estates and facilities managers, designers, project managers, contractors, engineers, surveyors, health planners and Infection Prevention and Control teams working on healthcare estate new build and refurbishment projects."

Do you see that?

A I do.

Q One issue that I would be interested in is that this is NHS guidance saying, "Really, what we need in this area for new-build hospitals is a partnership approach." Do you think, generally, that partnership approach is taking place between the public sector and the private sector, or from the private sector view, is there more of an adversarial approach as to a partnership approach?

A I think there has been. I think contract construction contracts can be adversarial by the way they're written. I think the intent of this document, as this point of reference, everybody's got different drivers different guidance to work to, you know? Design engineers have got one piece, AEs and maintenance team-- So it's trying to pull everybody together to make sure that the end-- ultimate goal of the facility is met.

Q Do you have any ideas-- How could that be improved? If, really, what is required for these new-build hospital projects is a partnership way of working, whereby everyone is on the same page considering issues, including Infection Prevention and Control, how, if at all, can that be achieved?

A I think there's a partnerial contract, construction contract – I have not any personal experience of it – where it's one common goal and project insurance is covered across the project rather than held by individual organisations, so that whole ethos of a team-- I'm told by a colleague who's working in one-- says it's a very, very different environment. There are attempts to do that through framework contracts. Procure 23 is the English-- and NHS SPS, they're frameworks where that ethos tries to get passed down to ensure it's no longer an adversarial industry. So those sort of things are mechanisms that are improving that.

Q Okay, and you mentioned a colleague had been working on a project which had one specific approach, including project insurance. Can you just expand on that? What did your colleague tell you about the differences, perhaps, compared to a traditional design and build?

A I think just openness. If there's an issue that arises, it's not just that person's fault or issue to deal with; everybody can contribute. You know, you see the people listed there, everyone's got different levels of

experience, and they can all contribute and not be afraid to speak out as a route to solve a problem.

Q Thank you. Now, in relation to your report, you draw a number of conclusions and have a number of reflections. One point you raise is that there is a requirement to follow the procedures detailed in the NHS Scotland key stage assurance reviews. So that would be for new projects. Have you had an opportunity to consider what the key stage assurance reviews are going to involve?

A I've read through the documentation and the framework manuals and the checks at the various stages of a project.

Q Do you think that is a positive innovation?

A Very much so.

Q Can you just explain why?

A I think it just-- It's almost like a quality assurance process. We do this in our business where we, you know, we check ourselves and the key stage assurance reviews checks the projects. Is it still on track? Is it meeting what it's intended to do? Has it met the outputs? Has it been designed in the right way? It's just that question and answer session. It's like a design critique.

Architects are more open to design critiques, certainly through their training. They invite others to look at their designs and comment on them. Engineers have never really been trained in that way to sort of open themselves up and open their designs to do it. It is done internally within companies to obviously check that you've met your client's brief, but I think this is a much more open, third-party, independent review of the design to say, "Yeah, you are on the right page" or not. I think it's a very positive step forward.

A Thank you. The second conclusion you draw is the requirement to set up a ventilation safety group, which we have already considered within your evidence. The third issue that you raise is the need to keep one set of environmental briefing data which, again, we have covered the rationale for that.

If there is going to be one set of briefing data, and it is to be an Environmental Matrix, I would just ask for your observations on the Template Environmental Matrix that has been produced by NHS Scotland Assure. If we could get to bundle 9, please. Go to page 268, and if we could just zoom in on the blue boxes towards the left-

hand side. So, after “ITEM NO.,” “ROOM NO.,” there is then “ROOM NAME.”

THE CHAIR: Thank you.

MR MACGREGOR: You see there is a box for the “ROOM FUNCTION.” Do you see that?

A Yes.

Q Then two along from that there is “CLINICAL RISK CATEGORY.”

A Yes.

Q Room function, is that something that an engineer could fill in, or is that going to have to be something that a ventilation safety group makes a determination on?

A I think it’s one step before that. I think it’s the clinicians and what they’re going to use that room for, be it clean process, dirty process. So the users really need to fill out the room function.

Q Okay, and from your perspective, would it be helpful if there was some form of standardisation so that you knew if a room was named a particular area, if it was ascribed to a particular room function, it had a particular clinical risk category? Does there need to be some form of standardisation in relation to that issue?

A There is, yes, and there is-- there exists—there is a thing called Repeatable Rooms. So, NHS Scotland have produced some----

THE CHAIR: Sorry. Sorry, I missed that. A thing called?

A It’s a document, I think, a document called Repeatable Rooms, so within----

Q Sorry, was it Repeatable Rooms?

A Repeatable Rooms.

Q Thank you.

A Within a hospital, you get a number of rooms that are all the same – clinical, clean utility, dirty utility, a sister’s office, a single bedroom – so what NHS Scotland have done is developed a standard approach. So, if you’ve got these rooms, you can pick a guidebook up and say, “Right, this is the room,” so the room function, the room area, the clinical risk category, they’re all predefined, which helps people operating those rooms to get the same-- You know, you’re not reinventing the wheel time after time.

MR MACGREGOR: Thank you. Within your report, you make the point, at point 4, that you need to agree environmental briefing data with clinicians which, again, I think we have covered off. Point 5, you make the point that you should not be carrying

over key design issues after financial close. Then, at point 6, you make the point of the need for a ventilation safety group at key stages of the project.

At point 7, I have got noted, you make reference to the status of guidance. Now, one of the issues the Inquiry has had to grapple with is SHTM 03-01. It is guidance, it is best-practice guidance, the requirement to follow it, but it is not hard-edge legal standard like you would see in a set of regulations. Do you think that is problematic in any way?

A No. The English building regulations refer to HTMs, so when you go through ventilation, as an example, it has different categories of buildings, offices, schools, hospitals, and it will refer you to the best practice that exists, and it says Hospital Technical Memoranda. In schools, it refers you to the Department for Education, offices to British Council for Offices. So, the different construction sectors have got specialisms within them, and the building regulations cross-refer to those.

Q So, again – I think you covered this in your first report and in your first set of evidence – building regulations is a devolved area, so Scotland has its own set of building regulations. The building regulations in England and Wales, they have a set of approved documents. Effectively, if you follow the approved document, then you are complying with the building regulations.

A Correct.

Q I think you previously told us about approved documents. F1, is that correct?

A Yes.

Q Just in general terms, what are they?

A It's the practical guide to what the building regulations state. The building regulations are actually a statute. The approved document is the sort of implementation of that statute and tells you how to achieve the-- It's got the sort of nuts and bolts and the numbers that you have to achieve in terms of air change rates or fresh air rates or things like that. Energy efficiency in particular is one for the building regulations.

Q So, in England and Wales, you have the building regulations and then you have the approved documents, which would include HTMs. From your perspective, that is quite helpful because you have got the legal standard and then the document you need to go to know you are complying with it. That does not

exist in Scotland in terms of the Scottish building regulations. Do you see that as a potential gap in Scotland?

A I think it could be something that improves. It's the technical handbook, I think it's called here. So, yeah, I think it could be an improvement as a cross-reference to what are the best-practice documents.

Q Thank you. One other issue that I would like to ask you about is training. It is both training of engineers and training of clinicians and infection prevention control specialists. You are now going to have the ventilation safety group where everyone sits together.

The Inquiry has heard evidence that, from an infection prevention and control perspective, you could be sitting on these groups but you do not get any even basic training whatsoever in the built environment. Presumably, that is the same for engineers: you could be working on this project, knowing exactly what you need to do from an engineering perspective, but you do not have any basic training in infection prevention control.

Do you think, in terms of gaps in knowledge, it would be helpful if the engineers had some basic training in infection prevention and control, and the infection prevention control professionals had some basic training in the built environment?

A Definitely. I think you need to appreciate how your system and what you're using and what you're designing will be used. Infection prevention control can inform engineers of what their processes are. I found it invaluable sitting with-- when I was with microbiologists, understanding a little bit more about what their pressures, what their tensions are in their day-to-day lives.

Also from a design engineer, you know, there's nothing better than actually sitting down with a clinician to understand what their aims and objectives are for a project. I did it with orthopaedic surgeons 30 years ago when they wanted a facility, to understand why they wanted that facility.

So that was a really insightful-- That was when I actually worked in the NHS. That was a really insightful time because I could actually go and meet the ward sister or the sister that was going to operate the operating department to understand how they operated. So that's a really important bit of training that I think is sadly lacking.

Q Thank you. The final

question from me, Mr Maddocks, at the moment, is a genuine open question. We have covered a lot of ground in your two reports, the two times that you have come to give evidence.

One of the issues within the Inquiry's terms of reference is how could we do these projects better in the future? Apart from what you have covered in your reports and what we have covered in your evidence today, is there any other areas that you think that these projects could be done better to try to avoid some of the issues that cropped up on the Royal Hospital for Children and Young People and the Department for Clinical Neurosciences?

A I think get the design-- It probably uses an old term that joiners used to use: measure twice, cut once. It's get the design right, get it verified, get it checked before you embark. I think the Building Safety Act in England is going to force that, in that the gateway process within the Building Safety Act means that the designs have to be complete before you can start on site. The problem with a lot of contracts are design was in parallel with construction.

So there was always an end date and a very fast programme because of

funding, because of political targets to achieve an opening or a real target because an old building was falling down, or whatever the driver was to hit an end date needs to be fully considered. The design-- You know, let the builders build it as quickly as they can, but trying to design whilst you are in the build process is a challenge. It puts pressure on people.

So, I probably would say this as a designer: give us some more time to get the design right. As I say, I think that England is struggling with the Building Safety Act, and the industry is struggling with that at the moment. It's to see how that's changing and we'll see-- You know, the inspection and the sign-off process, there's not enough inspectors and sign-off people, so we'll see over the coming years how that changes.

Q Thank you. Mr Maddocks, thank you for answering my questions today. I do not have any more questions at the moment, but Lord Brodie may have some questions or there may be applications from core participants.

Questioned by The Chair

Q Just perhaps two areas, Mr Maddocks. First of all, picking up

on that last reference, if I got you correctly, you referred to the Building Safety Act, which I assume is a fairly recent piece of legislation relating to England and Wales.

A It's the legislation that came out from Dame Judith Hackitt's report following the Grenfell Inquiry.

Q All right.

A So that's put a mandate down to improve construction, and the Building Safety Act was enacted. There was some secondary legislation that came out in October last year, which is more detail for the implementation of that, and that is the subject of many webinars, training and so on.

Q All right. So, just to push you a little on that, your understanding-- and you know I can maybe follow this up. Your understanding is that there is a piece of primary legislation called the Building Safety Act?

A Yes.

Q There is also subordinate legislation perhaps made in terms of that act?

A I think it all comes under the act itself. It's to do with high-risk buildings, so it starts about buildings with more than two residences in them, above certain heights, 18 metres being one. Wales have changed that last week; they've gone from 18 metres down to 11 metres. So it's really an evolving piece of legislation and we are all, as an industry, finding our way through that because of the impact on design and build contracts in particular, and when contractors come on board.

Q Now, the other question I would like your help on is, you were asked by Mr MacGregor, first of all, to distinguish between commissioning on one hand and validation on the other.

A Yeah.

Q Now, first question: in looking at email correspondence, I have come across the word "verification." Now, does that have any technical meaning or is it just a word in English?

A There is a definition of it and, right at this moment, I just can't pull it off the top of my head, but there's commissioning verification and validation. I think the verification is that the commissioning process has met the original design volumes. The validation is a much thorough assessment of the whole system.

Q Right. So, as I understood your evidence, commissioning is looking at particular elements within a building system: do they work?

A The commissioning is----

THE CHAIR: Have I got that right?

A The commissioning is setting to work the systems.

Q Mm-hmm.

A Turning the pumps on, checking the flow rates; turning the fans on, checking the flow rates; measuring parameters, temperature. Validation is checking that the design and the system that's been installed meets the required criteria.

Q Mm-hmm.

A So the commissioning exercises is more of, you know, engineers going around site, adjusting things to make the correct amount of heat come out of a radiator at the correct temperature, whereas the validation is proving whether that actually did happen, and it does meet-- You know, you can commission a system and it not be compliant with the brief.

Q Mm-hmm.

A The validation checks whether it's compliant with the brief.

Q Verification might be between these----

A Yes.

Q -- two stages?

A I'll have to just look for the definition.

Q I would infer verification is a form of check----

A Yes.

Q -- that the commissioning has actually been carried out?

A Yes.

Q Now----

A I might be wrong, but I'd just like to just check the wording of it.

Q Well, for present purposes, you are the authority. Now, in answering Mr MacGregor's questions as to the difference between commissioning and validation, I think you explained that you would-- again, if I picked it up correctly, commissioning might be done by the contractor or the specialist subcontractor?

A Yes, that's correct.

Q In contrast to that, validation you would expect to be carried out by an independent----

A Third party. Correct.

Q -- third party. Now, when you were having your discussion with Mr MacGregor, where were you assuming that the obligation on the contractor to commission and then to validate came from?

A The contractor would commission using his contractor, his subcontractor, to the design.

Q Mm-hmm.

A So he would undertake that commissioning and say, "I've met what the design figures state."

Q All right. Now, in answering the question from Mr MacGregor, I am sorry to be so pedestrian about this----

A It's all right.

Q -- but were you assuming a contractual obligation to-- or rather, were you seeing the source of the obligation to commission and validate as being the contract, or were you seeing it as a freestanding obligation arising from, in Scotland, the Scottish Health Technical memorandum? Because, as we have seen in relation to ventilation, section 8 talks quite a lot about validation. I am trying to get the structure here.

A You need to commission the building.

Q Yes.

A You can't just turn it on. It won't work. It's dynamic, it's moving, and you need to do the commissioning exercise, and it's bound into your contract as the contractor that you will deliver the building and commission it in accordance with recognised industry practice, whichever codes they may be – BSRIA, CIBSE, whatever – to prove that you have delivered what your drawing said you were going to deliver.

Q By industry practice, an example would be the CIBSE----

A CIBSE Codes, Building Services Research Information Guidance, BSRIA Guidance. CIBSE have what are called commissioning codes and they have the processes to how to do that. The SHTMs have a commissioning-- an operational series of checklists as well that you go through, so they have a preferred format of some of the plant items, but what we would see from the commissioning contractor is all the measurements. So we'd measure the air volume coming out of the grill and we'd look at the velocities in the ductwork.

So all that's part of the commissioning process and it's laid down as an order of which to do that, and that's what we would expect the contractor, with his specialist subcontractor, to present at the end of a project.

Q Right. Thank you. Now, as Mr MacGregor indicated, I would like to give everyone in the room an opportunity just, through Mr MacGregor, to indicate whether there are any additional questions to be posed to you, Mr Maddocks. In order to do that, we will rise for about 10 or 15 minutes to allow those in the room

to communicate with Mr MacGregor, and then I will ask you to come back and either there may be additional questions or there may be no additional questions, but perhaps if you could take----

A Thank you.

(Short break)

THE CHAIR: Mr MacGregor?

MR MACGREGOR: No additional questions, my Lord.

THE CHAIR: Right. Mr Maddocks, there are no further questions and that means you are free to go, but before you do so, thank you very much for your work on behalf of the Inquiry. I am grateful for it, but, as I say, you are now free to go. Thank you.

A Thank you very much. Thank you.

THE CHAIR: Now, Mr MacGregor.

MR MACGREGOR: The next witness is Mr Alan Morrison.

THE CHAIR: Good afternoon, Mr Morrison. As you will understand, you are about to be asked questions by Mr MacGregor, who is sitting opposite, but first, I believe you are willing to take an affirmation.

THE WITNESS: Sure.

THE CHAIR: Just sitting where you are, would you repeat these words after me?

Mr Alan Morrison

Affirmed

Thank you very much, Mr Morrison. The timetable for the day is that we will break for an hour's lunch at one o'clock or thereabouts, sit again at two, and the afternoon will go as it goes. Mr MacGregor?

Questioned by Mr MacGregor

Q Thank you, my Lord. You are Alan Morrison, is that correct?

A Yes.

Q And you have provided two witness statements to the Inquiry for the present set of hearings, is that right?

A Yes.

Q For the benefit of core participants, the first statement is at pages 57 to 83 of bundle 1 of the witness statements. That deals with the establishment of NHS Scotland Assure. The second statement is available from pages 84 to 105. Mr Morrison, the content of those statements will form part of your evidence to the Inquiry. You are also

going to be asked some questions by me today. If you do want to look at your statements at any point, please just do let me know. Equally, if there are any documents that I want to refer you to, those should come up on the big screen in front of you. If for any reason you cannot see the document or the specific passage I am referring to, please just do let me know.

In terms of your background and qualifications, those are set out in your statements, but you are the Deputy Director of Health, Infrastructure and Sustainability with the Scottish Government. Is that correct?

A Correct.

Q Can you just explain in broad terms, what does that role involve?

A So, I manage the NHS capital investment programme. I lead on any infrastructure-related issues and net zero policies as well as it falls under my remit.

Q Thank you, and you tell us within your statement that you have a background in accountancy. Is that right?

A Yes.

Q You have been a civil servant since 2003 and you have been the Chair of the Capital Investment Group since 2015.

A Yes.

Q Thank you. I want to begin with the issues covered in your second statement, so that is the statement beginning from page 84 onwards, and your involvement in the Royal Hospital for Children and Young People and the Department of Clinical Neuroscience is in your capacity as lead for healthcare infrastructure with the Scottish Government.

The first area that I would like to ask you questions about is an agreement which the Inquiry refers to as Settlement Agreement 1. So that is an agreement that is formally signed in February of 2019, albeit there are negotiations in relation to the settlement agreement taking place throughout 2018. Can you just explain, in broad terms, what was your knowledge of and involvement, if any, in Settlement Agreement 1?

A So, I was probably the main point of contact with NHS Lothian and to the Scottish Government. So, I was advised on what the Settlement Agreement was trying to achieve, what the issues were in terms of the technical requirements, and I was kind of kept fairly up to date on-- I suppose at a certain high level of progress. Then, through my role at Scottish Government, I was involved in making

an assessment on the governance that NHS Lothian had put in place to reach the point where they were asking Scottish Government for additional funding to conclude the settlement, and I briefed the Cabinet Secretary and senior colleagues within the Scottish Government on progress.

Q Okay. So, explain in very broad terms, what is your understanding of the problem with the project? Why has it got to this stage?

A So, I think there were around about 80 technical issues that were still to be resolved. This is about 2018, and there were three in particular that were kind of causing some concern. Now, I wouldn't get into the detail of the ones that had been resolved, but I was involved with some of the conversations around the ventilation and drainage.

I was also involved in the conversations around, I suppose, how the interaction with the Special Purpose Vehicle, the SPV, and potentially the financial challenges that IHSL might be experiencing caused by the delay to the hospital opening. I suppose I took into account NHS Lothian's view on what needed to progress. As I say, it was more focused on the governance rather than the technicalities around fixing the problems.

Q Okay. So, there is an escalation to the Scottish Government. In your opinion, how serious are the issues that are being raised with you at this point in time in relation to the project?

A So, the hospital is already late, so it is serious. The fact that additional money is required of a sum of approximately £10 million, that is a significant amount of money, even in Scottish Government terms. So, any time there's a major capital project that's late and costing more than budgeted for is a serious issue, which is why you'll see that there are occasions when I'm briefing the Cabinet Secretary on the position and liaising with my director of finance as to what the next steps are.

Q Okay. So, there are problems with the project, escalated to Scottish Government, NHS Lothian are asking for an extra £10 million. Can you just explain, broadly, how concerned are you at this point in time? We are talking of the period leading up to the Settlement Agreement being signed.

A I mean, it's hard to articulate this level of concern. Capital projects are by their nature complicated, and a project that is late

and over budget is not uncommon, and I suppose the way I looked at it is, what is the best way forward? So, ideally, you would have it opened already on budget, but that position had not-- that was gone. So, it's more, what's the situation facing us? What are our options to get the hospital open as soon as possible? And the Settlement Agreement and everything associated with that seemed like the best solution, albeit accepting that we'd rather not be in that position.

Q Okay. Now, you mentioned a moment ago that you were aware of some financial challenges that were facing the Special Purpose Vehicle. Could you just explain what you mean by the financial challenges?

A So, I didn't speak directly to the Special Purpose Vehicle, but the way the contract is structured is that when the hospital opens, that that's when the (inaudible) payments start flowing from Scottish Government into NHS Lothian, then ultimately to the SPV. Because the hospital was late, then that income source for the SPV was not there, and so I think there was an element of speculation on behalf of NHS Lothian as to consequences of that income stream not being there, with of course additional costs being

associated with rectifying the issues that had transpired. So, it seemed fairly logical to me that there was no income, there was extra expense, that the company would potentially be in a difficult position.

Q Okay, so risk of insolvency at this point in time if there is not a resolution to the issues?

A Yes. I mean, that was put to me, that this situation doesn't happen very often. So, I don't think there was an awful lot of other examples we could point to and say, "This has happened before and we're following this route," but, as I say, the logic that NHS Lothian kind of presented to me made sense and continues to make sense to me even now.

Q So, if the Special Purpose Vehicle had gone into an insolvency procedure, how significant an issue would that have been from a Scottish Government perspective?

A So, this is where the complexity of the contract plays into it, and I think that we were in slightly uncharted waters as to what happens. I initially thought, well, if they can't deliver the contract, does it just effectively kind of come back to the government? But that was not my understanding, that the funders would

look to kind of step in and find somebody else to, if you like, take over from IHSL. That felt an inherently risky thing to happen, to organise that kind of thing when we were very keen to get the hospital open, ready and delivering services. So, it's kind of hard to remember just as to how real a risk that felt, but that was always a consideration in our decisions.

Q Susan Goldsmith, who used to work for NHS Lothian, she gave evidence to the Inquiry and she indicated that she had a concern about the potential insolvency of the Project Company if there was not a resolution to the dispute, essentially for the reasons that you have given: you have a Special Purpose Vehicle that is set up, it has debt obligations that need to be serviced, but until the hospital is finished and handed over, the monthly payments do not start to get made, so you have a scenario whereby you have a company that has outgoings but does not have any money coming in, and her view was, there comes a point where that becomes unsustainable. No matter what relationship you have with lenders, if you cannot service the debt, there is going to be a risk of insolvency. Is that the type of discussions you were having with Susan Goldsmith?

A And I'd also say that it's not just that it's the fact that there's additional costs that the-- Obviously, when the hospital was due to open, the plan was the contractors to be off site, so the fact that they were on site and incurring costs-- Now, quite what the relationship was between the contractor and IHSL, as to how that was resolved, I was not clear, but clearly somebody was experiencing additional costs.

Q In terms of those issues around about financial distress of the Project Company, Ms Goldsmith's evidence was that one concern that NHS Lothian had was that if that had happened, if the company had gone into insolvency, there was a risk that effectively the debt obligations would be called up and there would be an immediate requirement to pay back £150 million. Was that your understanding?

A Yes.

Q Her view was that NHS Lothian did not have £150 million, and equally the Scottish Government had not allocated £150 million as a potential for this project. Is that the type of discussions you were having with Ms Goldsmith?

A I mean, it feels self-evident to say, but any time you come

back from any meeting looking for £150 million that wasn't planned, that's not a good day. So, it was almost-- that risk was noted, but it was, "We need to find an alternative solution to that." You know, even exploring that eventuality further.

Q In terms of that risk, as you say, it is not a good day at the office if you come back from a meeting thinking that you might have to find £150 million. Is that the type of issue that would be escalated right up to the Cabinet Secretary?

A Oh, absolutely.

Q Okay. My recollection of the Cabinet Secretary's evidence yesterday was that she did not have any recollection of the Special Purpose Vehicle being in any form of financial distress. Is that your recollection?

A I think there was a brief "I might have touched on it," but it was more as a "there is this possibility." I think that if I thought it was a real possibility of that being the outcome, that would have been signalled very clearly to her, but I think it was in the context of a very complicated contractual and technical kind of discussions going on that there was almost a "oh, by the way, this could happen as well, but we're looking to mitigate that risk."

Q So, in layman's terms, did a solution have to be found to this problem?

A Pretty much, yeah.

Q Did a solution have to be found almost at any cost to avoid that cliff edge of the £150 million?

A Yeah. I mean, I think that the-- So the solution is-- Primarily, we're kind of focused on-- We want the hospital open, and that-- and thinking about solutions as to how we get to that position, and I suppose that-- I don't think I was ever really truly concerned that we might be in that kind of point where we're needing to speak to our central finance team and say, "I need £150 million." It was a risk that I was aware of, but I don't think I ever felt it was a particularly likely outcome.

Q Okay. In terms of your statement, you tell us you are involved in finance, fundamentally. NHS Lothian come to you and say, "We think we have managed to reach a resolution with the project company, and we need some finance from you." Can you just explain what role, if any, you would have in reviewing that settlement to make sure that it was appropriate before the £10 million was handed over to NHS Lothian?

A So, this is where I

suppose the situation that we're in now is different, but back in 2018/2019, the Scottish Government's role was principally around reviewing the governance arrangements that NHS Lothian had established.

So, that would be the kind of things of we'd look at: what are their legal advisors advising them on? Have other technical specialists, in terms of the things that need fixed, I suppose, in layman's terms-- are they content with the proposal going forward? Has it gone through the Board? Has it been signed off by the senior team? All these things were completed to our satisfaction, which is why we-- I think it was in August 2018 that the end director of finance approved, in principle, the settlement agreement and agreed to fund the cost of it.

Q So are statements being made by NHS Lothian effectively just being taken on trust at this point?

A Well, it's within-- So, what we used was effectively that they were preparing papers for the Board, and possibly their financial resources kind of committee, that they were then sharing with us and talking us through what was being proposed. I suppose-- Can I consider-- Did we do it in trust? Well, what we didn't have is a kind of

proposal to say, "Well, we need somebody to go in and check your homework," effectively. It was a different situation back then.

Q You say it was a different situation back then, but Health Facilities Scotland, for example, was an entity that existed. Why were Health Facilities Scotland not asked to review the technical solution?

A Because we felt that Lothian's technical advisors were sufficient to make that determination, in addition to Lothian's technical staff that are employed by the Board.

Q If Health Facilities Scotland had been asked for a view, would they have had the technical capacity to provide a view on the technical solution?

A I mean, what we'd expect is that Health Facilities Scotland, if they felt they did not have that technical special knowledge in the team, that they would procure it from the private sector for a one-off piece of work.

Q Okay. The reason I raise that is the Inquiry has heard evidence that the point that-- the Royal Hospital for Children and Young People, Department for Clinical Neurosciences, and the Queen Elizabeth University Hospital, at the

point that both those major projects are being undertaken, that there was one engineer working within Health Facilities Scotland. Were you aware of that?

A So, I've heard that. I'm not sure that's true. I think Eddie McLaughlin is an engineer, who's assistant director, Ian Storer and Kate Dupree are all engineers that I knew at Health Facilities Scotland. I mean, I suppose your broader point is, whether it's one or three, whether that is sufficient. I suppose I would defer to Health Facilities Scotland on their staff instructor, and that the—

At no stage do I recall speaking to Health Facilities Scotland, and I spoke to them regularly-- did they say we have insufficient resource to do what we're being asked to do. It was a pressurised time for them, particularly in the Queen Elizabeth, that took up a lot of their time, and I suppose there would be an element of choice as to whether they-- you know, how they would allocate that kind of resource that they had, but I don't recall not asking them because I didn't think that they had the technical resource in the team.

Q So why not ask HFS for a review? You have a project that is in trouble, a technical solution being put forward, and you have an expert body in HFS. Why not ask them for a review?

A So, I think with-- in benefit of hindsight, that would be a definitely reasonable thing to do, and that's what we would certainly do now through NHS Assure, but at the time that-- we felt that the technical specialist being used by NHS Lothian was sufficient.

Q Okay, so future projects, you now have NHS Scotland Assure, and is part of the reason for NHS Scotland Assure being set up because there is perhaps an identified gap in governance procedures on the part of the Scottish Government?

A I mean, basically, NHS Assure was set up to stop what happened at the Sick Kids' happening again, in very broad terms. There's obviously a question as to how do they do that, and the processes that they follow, and where accountability and responsibility lies in individual projects, but basically, that we, I think, acknowledged that it was a gap, and on the back of both the Edinburgh Children's Hospital and the Queen Elizabeth, that we needed to make a change, which is why we introduced NHS Scotland Assure.

Q In terms----

THE CHAIR: Sorry, Mr MacGregor. Just for my note, I think I heard you say, Mr Morrison, NHS Assure was essentially set up to stop what happened at the Sick Kids' happening again.

A Yes.

Q Did I get that correctly? Thank you. Sorry, Mr MacGregor.

MR MACGREGOR: I was just going to ask for your views-- Grant Thornton, whenever they reviewed the project, they described what had happened as one of "collective failure." You have perhaps heard that term. Would you accept that, when we are talking about collective failures, one of the failures is the governance procedures around about Settlement Agreement 1?

A Sorry, please----

Q Would you accept that one of the failures in the project was the governance procedures around about Settlement Agreement 1 and the provision of the money by Scottish Government?

A So, it's not clear to me that Settlement Agreement 1 is directly related to the reasons why the hospital was delayed in July 2019. My understanding was that the problems were almost established before that, and the technical issues that they were working through did not relate to air changes, but I could be mistaken in that.

Q Well, I appreciate you are not a technical person, but the Inquiry has heard some evidence that, really, if there was any ambiguity, the problems were absolutely hardwired in in terms of the technical schedule to Settlement Agreement 1. So, if that did take place, if we are really talking about an ambiguity around about the requirements and then a hardwiring in in Settlement Agreement 1 of non-compliance with published guidance, would you accept that the failure on the part of the Scottish Government to get some form of assurance in the technical schedule was a failure in governance?

A I think there's benefit in hindsight, then. Yes, I think that's reasonable.

Q So, in terms of what assurances were provided, you have mentioned that really there was a satisfaction with what had been happening on the part of NHS Lothian. What assurances, if any, did you think NHS Lothian had obtained in relation to the technical solution that became Settlement Agreement 1?

A So, my understanding was that the technical advisors had

been working with SPV closely to identify the solutions that were required, that the-- and as well as the technical advice, they were getting legal advice on the commercial considerations, and I think Scottish Futures Trust were involved to some extent in these kinds of conversations as well, though to what extent I'm not entirely sure.

Q From your perspective, the fact that there was technical advice, legal advice was deemed as sufficient at that point, albeit you now accept that there would be an independent check carried out by NHS Scotland Assure?

A Yes. So, if we were presented with a similar position today, NHS Assure would-- they would already be involved in a way that would be different than back in 2018/2019, but yes, we've made a change.

Q Were you aware that one of the things that would happen as soon as Settlement Agreement 1 was signed is that the hospital would effectively be handed over, it would be accepted by NHS Lothian, and the monthly payments would begin?

A So, the Scottish Government approved the Settlement Agreement in, I think, August 2018,

and I thought that that would quickly lead to the Settlement Agreement being signed in August or almost immediately afterwards because I thought that it had reached a point where both parties were in agreement as to what happened, what was the value of the money required, but of course, it was-- it was not until February that that was signed, and I don't know the details as to whether there was commercial considerations or there was some further negotiations about the exact specifics of what would be included in the agreement.

So, when we-- So, when we approved it, I don't think that the hospital was ready to be handed over, but clearly what we wanted is, through that Settlement Agreement, a way forward to deal with all the technical issues that had been identified and then subsequently cleared, and then the hospital could be accepted, and then the commissioning phase starts and services move in three, four months later.

Q The Inquiry has heard evidence regarding a procedure called HAI-SCRIBE, or HAI-SCRIBE. You have possibly heard of that subsequent to the period of time you were involved in the project, but 2018 through early 2019, is that something,

HAI-SCRIBE, that was on your radar or the Scottish Government's radar?

A So, it wasn't on my radar. Now, the-- HAI-SCRIBE, as you probably know, is more the chief nursing officer's area of responsibility, and they lead in that. Now, quite-- the process required of what you need to go through HAI-SCRIBE to take on a new facility, it wasn't on my radar, and even now I only have a fairly limited understanding of what's involved in that process.

Q The reason I raise it is the Inquiry has heard evidence that the settlement agreement is entered into, there is an obligation then to accept the hospital and to make the monthly payments, and that all takes place before the Stage 4 HAI-SCRIBE takes place. So, effectively, you are accepting the building, it is handed over, before standard safety checks are carried out. Is that something you were aware of at the time within Scottish Government? If you had been advised of that, if you had been advised that part of the deal involved NHS Lothian either skipping or pushing back a standard procedure aimed at safety, is that something that would have been of concern to Scottish Government?

A So, if it's framed like that, no. I mean-- So, my basic understanding of the fourth stage in HAI-SCRIBE is it's based-- it's basically the operational aspect of a hospital working. I don't know whether that is done prior to services moving in at the commissioning stage, or whether, you know, as services settled down, people get into a rhythm of how they are working within the new facility. Whether that comes three, six months later, I don't know, but I suppose that answers the question directly: that was not part of our consideration as to whether it had been—

I suppose there would be an assumption that, if NHS Lothian thought it was appropriate through their Infection Control teams to follow that, then then I'd expect them to have done the necessary, but if they concluded that, "Actually, we need to work in the hospital for 3-6 months," and the IPC were on board with that, that wouldn't strike me as unreasonable.

Q If HAI-SCRIBE is aimed at safety, and it says you should not be accepting a hospital until Stage 4 is completed, is that not something that the Scottish Government should have been checking directly with the NHS Lothian before it provided £10 million of public money?

A As I say, because-- When we approved the settlement agreement, it was in August. I don't think-- So, there was a six-month gap between approving that payment and it eventually being signed with the provider. I guess it's where accountability lies for the decision-making back in 2018/2019. That delegation was to the health board and it still, I suppose, remains with the health board. It's just that these days now we're more involved with the process of commissioning and accepting the hospital.

Q In terms of that greater involvement that takes place now, is that really a recognition on the part of the Scottish Government that there were failings in the previous checks and balances in the system?

A So, in general, yes. I mean, not specifically in terms of a HAI SCRIBE Stage 4. I think it was a recognition that something clearly went badly wrong and we needed to do something differently.

Q NHS Lothian, in their submissions to the Inquiry, they have described Settlement Agreement 1, effectively, as a bailout of the project. Was that your understanding of what was taking place?

A Not sure I would phrase

it like that. It was more that it was necessary to get to the project point where it's completed and the hospitals handed over and services delivered from it.

Q Thank you. Lord Brodie, I am conscious that is just after one o'clock. Now might be an appropriate time to break for lunch.

THE CHAIR: Yes. As I said, Mr Morrison, we take our lunch break at one, so can I ask you to be back for two o'clock?

THE WITNESS: Of course.

(Adjourned for a short time)

THE CHAIR: Good afternoon, Mr Morrison. Before we start, I wear hearing aids and that indicates I am hard of hearing. Could I ask you maybe just to pitch your voice up a little? I am very anxious to hear what you have to say, but that is also true of everyone else in the room, and it is quite a large space. Mr MacGregor?

MR MACGREGOR: Thank you, my Lord. Mr Morrison, just before lunch we were discussing the procedures leading to the approval of Settlement Agreement 1 and the money moving from Scottish Government to NHS Lothian. Could you just explain from the point that

NHS Lothian say, “We have reached an agreement in principle with the project company,” what are the formal mechanisms for approval before the money flows to NHS Lothian?

A So, there is no kind of standard approval processes for that, for a settlement agreement, so we basically modified the procedures we’d use for a business case for a capital investment. So, the proposal came in from NHS Lothian. It was reviewed by, principally, colleagues in the health finance team, and then we determined that it was approvable.

So, a recommendation, as Chair of the capital investment group, went to the director general. I think it was ultimately signed off by the director of finance, but I think that was because the director general was on holiday that week, so she had delegated authority. So, it just went through the normal process where the approval was given and confirmation that the funding would be available.

Q Okay, and the confirmation can come at director general level, it does not have to be the Cabinet Secretary themselves that signs off on that?

A Yeah. Basically, for all health capital projects, the delegation is with the director general rather than the minister.

Q Thank you. That deals with your involvement, really, in Settlement Agreement 1. I would like to pick matters up on 2 July 2019. You tell us in your witness statement that you had become involved in the project at that time. Can you just explain what was happening on 2 July?

A So, I got a phone call from John Connaghan in the afternoon saying that he had just met with the chair and chief executive of NHS Lothian, saying that they had identified a problem with the ventilation system and that the-- I’m not sure if immediately there was doubt as to whether the hospital could open as planned, which was in a matter of days, but clearly it was a significant problem. That kind of set the scene for the next few days and weeks.

Q Okay. If I could ask you to look to bundle 7, please, volume 1, page 37. It is the email towards the bottom. You see this is an email sent by yourself on
2 July at 16:53 saying:

> “Please find attached a short briefing regarding an emerging issue with the new Edinburgh Children’s Hospital. There is a phone call scheduled

with NHS Lothian at 5.30pm and DG Health and Social Care may phone the Cabinet Secretary after that, depending on the outcome of that call."

Now, over the page, on to page 38, there is a briefing. Who produced this briefing?

A So that would be-- NHS Lothian would have provided us with that, and I can't remember if I made any kind of changes to it, but my census, that was-- I just took it straight from some NHS Lothian, made no amendments whatsoever.

Q Okay. There is obviously discussion within this document about the air changes in particular, and if we just look to the final paragraph on page 38, you see it states:

"It should be noted that there is a zero rate of air change in critical care at the existing Royal Hospital for Sick Children. There are 19 critical care beds at RHSC. The new RHCYP has 24 critical beds."

Do you see that?

A Yes.

Q Can you just perhaps explain your thought process? What discussions are taking place in relation to that? The Inquiry has heard a lot of evidence that 10 is the number of air changes set out within the guidance for Critical Care, but the old hospital at Sciennes, they did not have any mechanical ventilation. They did not have any air changes an hour. So you have a system that has been designed and built with four air changes per hour. What were your concerns, if any, in relation to the safety of not complying with best-practice guidance against a backdrop whereby Sciennes did not have any mechanical ventilation whatsoever?

A So I suppose at that point my knowledge of ventilation systems was pretty limited. So, I certainly was aware that the-- perhaps not as early as on the 2nd, but I think on the following day when I met with colleagues from Health Facilities Scotland, Health Protection Scotland and NHS Lothian to discuss what the next stages are, that they kind of said that, in the existing hospital, if you wanted any air changes, you opened a window type thing. So, we were aware that the current facility was not best practice, I suppose would be the best way of factoring that in or considering that.

I don't recall too much kind of consideration of, well, four is better than zero, so is that good enough? It became pretty clear that, you know,

within a couple of days of that note that, you know, the Cabinet Secretary had made a decision that 10 air changes is what we had to deliver, and I don't recall too many discussions, you know, after that decision had been made as to whether actually four would be good enough.

Q Thank you. If we could just look on still within the briefing note to page 40, please. You see that page 40, bold heading three, at the top:

> "An interim solution has been put forward by multiplex to increase current 4 air exchange rates."

I will not read it all out, but there was a suggestion that some areas could be increased to 5.2, some could be increased to 7.1. Again, do you recall any discussion in terms of, "Well, we have got four. Possibly that can be increased to five or seven. Would five or seven be good enough?" Is there any discussions taking place around that?

A No. No, I mean at that point it was really-- we appreciated we had a problem and we needed to get some more information, and the meeting the following day was quite helpful in clarifying the position, but at no point were we, as you can see from the note-- there's no suggestion that we're even asking the Cabinet Secretary whether she would be content with, you know, less than the recommended air changes.

Q If we look towards the bottom, there is the bold heading, "4. Risk Assessment," which states:

> "Our Lead Infection Control doctor, Consultant Microbiologist [Dr] Donald Inverarity advised that all air [change] rates are currently better than what we have today, therefore will be in an improved position, but would wish external advice from HFS/HPS. He felt they were best people to advise of risk running with less than 10."

Do you see that?

A Yes.

Q The Inquiry has not seen any evidence to suggest that HFS/HPS come in or do any form of risk assessment. Is that your understanding: there is not any risk assessment done?

A There was no formal risk assessment. As I say, it was the following day when we met and we started or, more accurately, they started considering how they could perhaps address the problem.

Q Mm-hmm. We will come on to address that in a minute, but

really you are someone who principally deals with finance as opposed to technical matters, and you will be aware that in terms of Settlement Agreement 2-- So, Settlement Agreement 1: £10 million paid. There is millions of pounds that are paid under Settlement Agreement 2. Do you find it surprising, given so much public money, that there is not a risk assessment being undertaken in terms of whether what is there, albeit it does not comply with best practice, was actually safe enough, or, to put it another way, was so unsafe that it justified spending millions of pounds to rectify it and bring it up to best practice?

A So, while there wasn't a formal risk assessment undertaken, there was a consideration of, you know, what the next steps were, and there was no constraints as to, you know, what was required. There was a group of technical people that were considering the situation and thinking about the risk of, you know, things like could we upgrade the ventilation within a live patient environment? So, while I would say that there was no formal production of a document, that kind of view and risk was throughout that kind of subsequent conversation.

Q During the discussions

that you had at this time, did you gain any appreciation of why is 10 the magic number? Why is 10 safe and you take risk if you deviate from 10? Was anyone able to give you an explanation for that?

A No, but I certainly didn't ask that question why 10 was the number, and I think over the kind of coming weeks that that kind of-- as I spoke to people that had more experience in ventilation systems I would kind of probe that question, but by then, obviously, we'd made a decision about what we were going to do in terms of delivering 10 air changes.

Q So the Inquiry has heard directly from the Cabinet Secretary that she decided very quickly that the hospital does not comply with SHTM 03-01, it does not provide 10 air changes per hour, it must comply. Do you find it strange that that decision is taken without a risk assessment being done in terms of the system as built?

A So, I suppose that one of the key factors was we needed to make a decision quickly because-- I can't remember the exact date when the move was supposed to happen but it was a matter of days away, and in terms of planning for that move, I think that drove the necessity to make a

speedy decision. If this had been identified, you know, even two/three weeks earlier and there was a wee bit more luxury of time, then it is possible we might have had to do that, but the decision was, "We need to make a decision quickly." It was felt that we couldn't open a hospital that was not compliant with our guidance. Therefore, the decision the Cabinet Secretary took was consistent with that position.

Q But that is completely understandable. There are unknown risks, so the decision is taken, "We're not going to open the hospital," but at that point, there is a pause. You are not opening the hospital, so you are not up against that critical time barrier. So before deciding whether this public money is going to be spent bringing the system from 4 up to 10, why not undertake a risk assessment at that point?

A So, I don't think it's realistic to say that the Cabinet Secretary, who obviously, made a public kind of communication saying, "There's an issue with the ventilation. We're going to find solutions to deliver 10 air changes"-- I don't think it would be, I suppose, realistic to kind of come back and say, "We've actually considered the position and four is

good enough." I don't think that the Cabinet Secretary would have been comfortable with that, so it's not a position that we particularly kind of explored in any detail.

Q But do you understand why was the public announcement made, "We'll definitely bring it up to standard"? Because I can understand once that has been said that that is what the public would expect, but why was the messaging not simply, "We don't know if the hospital is safe and we're investigating that," then investigate whether 4 is safe as opposed to 10 and then make the decision. Why does that snap decision have to be made of, "We're not opening the hospital, and we definitely have to spend all this public money bringing up to 10 year changes per hour"?

A So, that was not part of our consideration, but I suppose that, you know, thinking about this now, it would undermine our guidance. So, if we're saying that actually, the guidance that we produce, that we can change it whenever it's-- and it would be presented as whenever it's inconvenient for us that we can just change our guidance, I just don't think that would have been-- I don't think anyone or many people would have

been happy with that. Even if we had gone to that effort to undertake a risk assessment and say, actually, you know, "We've got specialists that say this is fine," I just don't think that would have landed.

Q That is despite the fact that within the wider NHS estate there are lots of hospitals like Sciennes that do not have any mechanical ventilation but are deemed safe. Simply if the guidance says, "These parameters must be met for a new-build hospital," they must be met in all cases?

A Where there's a difference in hospitals that are delivering healthcare there is obviously a whole process of review and consideration as to what is actually happening in these hospitals. So it's not just the air changes makes it safe, it's the fact that our infection control teams monitor what's happening, reviewing any infection that is found in the hospital. There's a well-established escalation process for when infections have to be, you know, reported to the Scottish Government, to the Chief Nursing Officer, and so that whole process gives us the confidence that the hospital is safe. The ventilation is just-- or lack of ventilation is just one part of that.

Q Thank you. If I could just ask you, just for completeness, bundle 7, volume 1, page 41, just the final three lines, states:

> "However, if we cannot get a satisfactory answer to this question within the next 24 hours our preference would be to delay until such time as we do have a satisfactory answer."

So that is, effectively, "Is the hospital safe?"

A Yes.

Q That is NHS Lothian telling the Scottish Government, "If we can't really get to the bottom of this, we don't think it's going to be safe to open the hospital." Is that right?

A Yes.

Q Is this really a consensus view that there is not any massive split between NHS Lothian on the one side and Scottish Government on the other? Really, everyone at this point is saying, "If we don't know the hospital safe, we can't open it."

A So, as-- I don't recall anyone advocating for opening the hospital and saying that the position was good enough.

Q Thank you, and if we could just look on-- bundle 7, volume 1. If we look on to page 42, you will see that towards the bottom of that page, there is an email from Edward

McLaughlin on 3 July. Do you see that?

A Yes.

Q If we just look over the page, we then see a recording of a meeting that takes place. There are a number of attendees, including yourself, as we will see when we get to the bottom, but it is recording a meeting that takes place on 3 July between NHS Lothian personnel and individuals from Scottish Government. You see the first bullet point:

> "Major concerns raised about the risk of doing the permanent solution with patients in situ."

Do you see that?

A Yes.

Q So, again, is that everyone at the meeting saying, "That would be a big problem and a big risk that we need to address"?

A Absolutely.

Q Then if we look three bullet points down, you will see it states:

> "Need to be convinced that proposed permanent solution is deliverable."

Do you see that?

A Yeah.

Q Again, Mr Davidson, when he gave evidence, he said, really, there was no suggestion that there was ever going to be any option other than ultimate compliance with SHTM 03-01. So some of the discussions we have been having about, you know, why risk assess matters, his view was very much it never entered NHS Lothian's ether that there would be anything other than full compliance. So if we are talking about interim solutions, we are talking about interim solutions before the ventilation system was brought up to compliance with SHTM 03-01. Is that your understanding of the discussions?

A Yeah, very much so.

Q If we look to towards the bottom of the main bullet points you will see there is a paragraph:

> "Safer for patients to stay put …"

Do you see that?

A Yeah.

Q

> **"**Safer for patients to stay put – contingency required if permanent solution doesn't work."

Do you see that? So, again, is the consensus view at this meeting of there are known risks with both the hospital at Sciennes and also the old Department for Clinical Neurosciences

that can be managed and you cannot simply open the hospital and take risks with patients?

A Yes.

Q Then you will see that there is a heading just below that, "Unknowns." Do you see that? So, "Unknowns":

"The safety implications of running the facility with 4 air changes rather than 10."

Do you see that?

A Yes.

Q So, by the third, this is still an unknown risk?

A Yes.

Q Then if we look down, you will see that there is a heading, "Consensus view." Do you see that?

A Mm-hmm.

Q It states:

"Given the information available, the consensus was that, with unknown risks associated with moving patients and then modifying the ventilation of the building, combined with the 'believed safe' environment of the current facility, the safety of patients might be better served by delaying the move and modifying the ventilation in the new building, before moving patients."

Do you see that?

A Yes.

Q Then we see everyone who attends the meeting listed on this page and over the page, and that meeting includes yourself. So should the Inquiry understand that, in the period whenever this issue has escalated on the 2nd right through to the 3rd, there seems to be a consensus view amongst both NHS Lothian and Scottish Government in relation to the fact that the hospital probably cannot open and that any remedial works need to be done before the hospital is opened?

A Yes.

Q Thank you. Could ask you to look on, please, bundle 7, volume 1, at page 57. It is bundle 7, volume 1, page 57. This is a minute of a different meeting that takes place on 3 July, this time at 2 p.m. You were listed as an attendee at this meeting as well. There are obviously a lot of meetings going on with-- We looked at a draft email with a set of minutes from one meeting. There is this later meeting taking place. Do you have any recollection, the minute we are looking at here, what was being discussed at this meeting?

A So, yes, I remember the meeting. The detail is not quite as

clear as other meetings – I was a bit more of a passive participant in this meeting – but from memory that it was primarily Tim Davison and John Connaghan that were leading on what do we do, what are the solutions, and you can see from the note that John was thinking about temporary solutions that could be deployed. John's got a lot of experience in that area and so I was mainly listening.

Q Again, in terms of the discussions that are taking place, is there any major disagreements that you remember between Scottish Government on the one hand and NHS Lothian on the other?

A I don't, no.

Q The Cabinet Secretary then takes her decision on 4 July that the hospital will not open. Is that right?

A Yes.

Q Were you involved in any discussions with the Cabinet Secretary in relation to why she took that decision, or was that an independent decision made by the Cabinet Secretary?

A So, at that point, the Cabinet Secretary was meeting with our senior officials, and primarily, she was relying on the director general and the chief medical officer and chief nursing officer or deputies, or whoever

was attending for them, and in addition, I was there, I suppose, relaying the assessment of the situation from HFS and HPS and so she considered the position.

To be honest, it was-- I think she found it a relatively straightforward decision because she couldn't give the assurances about the new hospital being safe. She didn't get any-- Nobody pushed back and said, "We think that was the wrong thing to do," either from a clinical or technical point of view, and it was agreed, from my memory relatively quickly, recognising that it was obviously a very difficult situation we were in, but the decision itself was not difficult.

Q Okay. Were you involved in the process of communicating the Cabinet Secretary's decision to NHS Lothian, or did others take to do with that?

A No.

Q The reason I ask is Mr Davison's position is he says that he was not given any advance notice. Nobody from Scottish Government picked up the phone and told him the decision had been made; he simply found out about it in a press release. Are you aware of that?

A I'm aware that he said that. I mean, I think, you know, for a

decision of that importance, it would be either Malcolm Wright or John Conaghan that would be the conduit from Scottish Government to the chief executive.

Q Okay, so in terms of the direct communication, in terms of whether Mr Davison was told, what he was told, when he was told it, that would be John Conaghan and Malcolm Wright that would deal with that, as opposed to yourself?

A Yeah, I don't recall speaking to Tim directly on this matter. I was obviously part of kind of conversations and wider meetings, but I didn't have any one-to-one conversations with him.

Q Thank you. If I could ask you to look to bundle 7, volume 1, please, page 84, which is an email that you send on 5 July. So this is the day after the Cabinet Secretary has made her decision. You say:

> "John/Shirley
>
> Removing Ministers and SpAds from the cc list.
>
> My thoughts on the questions which I think sit with me:"

And then we see:

> "2. Confirmation HFS/HPS assurance work has begun and a timescale for completion"

Do you see that?

A Yeah.

Q So what did this paragraph relate to?

A So, I think this would be in terms of that wider question. If one major system was non-compliant, how can we have assurance that other major systems, beyond just ventilation, were compliant? So, I think quite early on we realised that we would need a kind of overarching review of the whole project from a technical compliance point of view.

Q Okay. Then if you look down within the email, you see section 8, which says, "Update on work, re audit/investigation and timescale." You say:

> "In my mind, the audit of the governance arrangements would be best undertaken by one of the accountancy firms…"

So it seems like there is a decision that, "We need to have an audit done of governance arrangements." Why was that decision taken?

A We needed to understand what had happened, what had gone wrong, and the audit firms have obviously a lot of experience in

that area, and just to basically improve our understanding of what went wrong and what we needed to do to not repeat the same mistakes.

Q Thank you. Then, if we look to section 9, it says, "Confirmation that all current build elsewhere involves HFS now." Do you see that?

A Yes.

Q You say:

"On the call yesterday, I mentioned to HFS/HPS that they should assume that we will ask for them to validate all new builds and so they should create a template which can be used for other projects. However I think it would be disingenuous to suggest that all new builds now involve HFS, if for no other reason that HFS don't have that many engineers that they can deploy, so I think it is better to say that they will involve HFS." Do you see that?

A Yes.

Q Could you just perhaps explain to the Inquiry why were you not able at this stage to say, "For all projects, we are going to simply get HFS to go in and do validation works"?

A There was resource restrictions on Health Facilities Scotland. Clearly what was happening in Edinburgh was going to take up a lot of their time and resource. That, in addition to the support they were providing Glasgow at the Queen Elizabeth-- that it was just a recognition that we would clearly be prioritising the work in Edinburgh over the immediate future and that any subsequent follow-up with places like Orkney or Dumfries, the new hospitals that had been built, would inevitably be on the back burner, simply because there's no indication that there were any problems or significant issues with these new builds.

Q You mentioned there, you say HFS do not have that many engineers. What was your recollection of the resourcing and how many engineers HFS had as at 5 July?

A Well, I think, as I said earlier before lunch, I was aware of some engineers, but in terms of the undertaking of quite a significant programme of work that we were proposing, that kind of spare resource was not there. So, it was just really to kind of put on the radar that if we were going to undertake this, then more resource would be required and it would need to be technically qualified resource to give us this assurance that we'd be requiring.

Q Thank you. KPMG come

in, they provide their report. It is available at bundle 13, volume 3, at page 1153. What was the findings from the KPMG report?

A So, I think that, in some respects, they recognised that NHS Lothian's governance arrangements were broadly okay, notwithstanding what had happened. I think they looked into the failure, and I think-- I can't remember the exact phrase, but I think they suggested it was a systematic kind of failure to identify the problems.

So, it was a helpful report just to understand what had gone wrong because I think at that point we were still trying to-- I think within the first few days there had been a suggestion as to how the mistake had happened, but having that independent confirmation that there was an issue with the Environmental Matrix was helpful.

Q One of the things KPMG identified: possible problems with an error in a spreadsheet and Environmental Matrix. Did it surprise you that an issue like that-- despite all the stages of governance that take place, there was not any mechanism to spot that type of problem?

A So, I think, having seen the Environmental Matrix it's obviously a very in-depth and complicated document. I suppose it depends when you say governance that in terms of, for instance, the regular project meetings that occurred, I wouldn't necessarily have thought that that group would review an Environmental Matrix. I suppose we're slightly surprised that, from the technical side of things, when you're going through the technical specification, somebody didn't either realise or recognise that four air changes is not what the standard requires. I suppose I should add that this is speculation. I don't know how you review an Environmental Matrix, but it just seemed surprising that somebody didn't notice.

Q If we could look within the KPMG report to page 1168, please. You see letter 'd' there. Do you see that? It states:

> "The governance processes and procedures surrounding the construction and commissioning of the Hospital operated in line with the structure that was put in place."

Do you see that?

A Yes.

Q So, as I read the KPMG report, they were effectively saying that the structure that was put in place

by NHS Lothian, there was not any structural non-compliance with guidance set out in Scottish Capital Investment Manual, for example. Is that your understanding?

A Yes. I mean, looking in, I thought that Lothian's governance structures were entirely appropriate. A key thing for any major capital project is involvement with the executive team. You need their buy-in to drive it forward, and that clearly was evidenced by the Senior Responsible Officer being very close to the issue, as well as our executive colleagues. So, from that point of view, it was as I would expect for any project of this scale.

Q If I could ask you to look to bundle 7, volume 3, please, at page 111. This is a briefing prepared by you on 16 August 2019. So bundle 7, volume 3, page 111, briefing to the Cabinet Secretary for Health and Sport, bold heading, "Edinburgh Children's Hospital – KPMG Draft Report." Do you see that?

A Yes.

Q Then if we look to paragraph 6, final sentence, three lines up from the bottom, there is a summary of the findings that says:

> "This appears to have stemmed from a document produced by NHS Lothian at the tender stage in 2012 which was inconsistent with SHTM 03-01 and which was referred to throughout the project."

Do you see that?

A Yes.

Q If we look on to page 113, there is a summary at paragraph 22, which states:

> "The main issue contained in the report is that a mistake included in the tender documentation was not picked up at any stage over the next seven years despite the fact that there was appropriate professional and technical involvement in the project and that the governance arrangements operated as planned.
>
> The other issue of focus is that because the report provides a comprehensive summary of each issue that this project has had to deal with, it brings attention to the unusually high number of problems which this project has experienced and we may be asked why we did not intervene earlier."

Do you see that?

A Yes.

Q Why did the Scottish

Government not intervene earlier?

A Because at that point we thought that Lothian's technical advisors and their project team were able to deal with them.

Q There is another series of questions set out at paragraph 23 in the bullet points. Do you see those?

A Yes.

Q So one of the questions is, "Why was the contract signed in February 2015 before the design was complete?"

Do you see that?

A Mm-hmm.

Q Did you get to the bottom of that? Why was the contract signed before the design was complete?

A No, I-- We didn't pursue that kind of question.

Q The next bullet point is:

"Why was the practical completion certificate signed in February 2019 while there remained a large number of issues that needed to be resolved?"

Why was that done?

A There was an assumption that when the hospital was handed over that it was felt by the Lothian team that they could address these issues during the commissioning phase prior to the hospital opening.

Q Is that perhaps back to what we discussed earlier about, I think, what you accepted were problems in governance on the part of Scottish Government? That there were simply assumptions being made when the £10 million was handed over and the new procedures simply would not allow that to happen?

A So, I think, specifically to that point, that we were aware that in normal circumstances you would address all technical issues before the commissioning started, but when the hospital was almost two years late at that point, there was a keenness to get the hospital open as soon as possible. So, dealing with the issues at the same time as the commissioning was considered a risk worth taking.

Q So, I just want to be clear, is that a known risk on the part of Scottish Government, or is this something that you are telling us about with the benefit of hindsight?

A No, so I seem to recall there was a briefing that I provided to the Cabinet Secretary that acknowledged that there's a risk, because at February 2019 obviously we weren't aware that the ventilation issue that stopped the move was out there. It was more, "There's a number of technical issues that we think we

can resolve; some of them will lead into the overlap with the commissioning period," but the hospital opening in the summer of 2019 was still considered deliverable.

Q So is that known non-compliance with Stage 4 HAI-SCRIBE on the part of Scottish Government?

A No, so it's not specifically in terms of the HAI-SCRIBE processes as more the issues that the Settlement Agreement was there to address.

Q Thank you. If we could just return to bundle 7, volume 3, page 113. The second last bullet point says, "Why are we paying a monthly charge for a Hospital we can't use?" Do you see that? Why was that taking place?

A That was the contract. So, this was partly-- While there's a straightforward answer, the contract dictates that in the public domain that was clearly going to be a challenge for the Cabinet Secretary to address that point, so it was just to effectively flag it for her awareness that while the answer is straightforward, it's not an answer that is one that she'd be particularly comfortable with.

Q The final question is, "How can we have technical guidance on ventilation systems which 'lacks clarity' and is open to interpretation?" Do you see that?

A Yes.

Q That is obviously a technical issue and you might not be able to help with it, but it does seem surprising that there is technical guidance that lacks clarity and is open to interpretation. Did you get an answer to the question why did that exist?

A Not specifically. There's obviously been reviews of the ventilation guidance. I do think that – again, I suppose it's from a non-technical background – the guidance is complicated, and I'm not sure if it would be difficult to produce guidance that doesn't have that challenge around some parts of interpretation because the way that it's been described to me is guidance doesn't cover every eventuality and so therefore there's a degree of interpretation that local teams need to take into account when trying to apply it to their particular point.

Q NHS Lothian, they are escalated to level 3 and then the Oversight Board is created and then they are escalated to level 4 thereafter. Are you involved in any of the discussions or the decision-making relating to the escalation to level 3 and then to level 4?

A Not at all.

Q Just given your knowledge and involvement with Scottish Government, it seems like up to the point, 3 July, that there is no division between NHS Lothian and Scottish Government. Can you understand the rationale of why, if NHS Lothian has identified that there is a problem, it is putting forward solutions and is suggesting that there should be a pause until the fix is done? Can you understand why they had to be escalated to level 3 and then to level 4?

A So, do I understand why that decision was taken? Yes, I can. I mean, my involvement in the escalation process is literally nil, and it didn't really-- it really wasn't on my radar as to how significant that was, if it was to-- you know, in terms of what I was working on.

Q Thank you. If I could ask you to look to bundle 13, volume 4, page 426, please. This is a summary of estimated delay costs. Do you see that?

A Yeah.

Q Then, if we look to the table just under 3.2, we see a breakdown of costs for works at the RHCYP DCN facility, costs of maintaining existing services/sites, project team and advisor costs, and

then contingency costs. Do you see that? So should the Inquiry understand that the forecast costs effectively rectify the problem? To bring the ventilation system at the hospital up to compliance with published guidance SHTM 03-01, that the cost of that is approximately £16.8 million?

A Yeah.

Q If I could ask you to look to bundle 3, please, page 531, which is a minute of the Oversight Board dated 5 December 2019. Do you see that?

A Mm-hmm.

Q If we could look over the page, please, on to page 532, and it is the first bullet point beginning, "The NHSL Board." Do you see that?

A Yep.

Q So it says:

> "The NHSL Board had taken their governance responsibility seriously and whilst not happy about the current situation realised that this was the only option available to progress the opening of the hospital. The board reluctantly agreed the proposal.
>
> "The NHSL board had requested oversight board approval of the decision which they were agreeing to as it was

appreciated that the NHSL board would be signing the public sector up to unknown financial risks, and currently no programme certainty associated with progressing with the proposal. They wished this concern to be made clear to the Scottish Government and Cabinet Secretary, given how the actions of the NHSL board may be viewed in the future."

Do you see that?

A Yep.

Q So this concept that NHS Lothian were concerned that the contracts they were signing into are potentially exposing the public purse to unknown financial risk, is that something that was known to you?

A So, is this in relation to the overall kind of rectification of the----

Q This is in relation, I think, to Settlement Agreement 2 and High Value Change Notice 107.

A So, we would have known that there was some uncertainty and that-- you can see from the previous paper you shared that the forecast changed, and I was comfortable that the estimate that we were working with was good enough for the situation that we were managing. While I can acknowledge that, you know, not knowing fully the financial risks, the priority for us was getting the hospital open as soon as possible, and if that meant moving ahead head with some uncertainty on the costs, I was okay with that because we had a reasonable idea in the parameters of the budget that we manage.

Q Thank you. Within your statement really, covering off your involvement in the project, you mention at paragraph 66 that you believe, from your involvement in the project, that the new hospital is now one of the safest healthcare buildings in the country, perhaps Europe. Can you just explain, obviously as someone who has worked in the project, albeit on the financial side, why did you feel able to make that statement?

A I mean, in simple terms, new hospitals are better than old hospitals, and in terms of where I'm particularly focused is on either, see, new hospitals or the hospitals with challenges, like the previous Sick Children's hospital. So, knowing what I know from our entire-- you know, across the entire hospital estate, it seems pretty clear to me that our new facilities are fantastic, to be blunt about it.

Q Thank you. I would now like to move on and look at the other statement that you provided to Inquiry, so that is the first statement in the chronology, which details your involvement in the creation of the new Centre for Excellence, NHS Scotland Assure. You tell the Inquiry, at paragraph 7 of your statement, that you sat on the NHS Scotland Assure Design Reference Group. Can you just explain, what was that and what was it tasked with doing?

A So, the reference group was essentially the governance meeting that considered what-- how we took the idea of, "We need something to address the issues that we're managing" and turn that into a viable proposition. So, it had-- it was led by NSS, as they were ultimately going to host NHS Assure, but it also included, as well as other colleagues from Scottish Government, a fairly wide representative of members from across boards, both with a kind of Estates technical background as well as Infection Control as well.

Q Okay. You tell us within the statement, really the whole rationale for the creation of the group was as a result of concerns over the effectiveness of the build assurance process for new-build hospitals.

A Yes.

Q If I could ask you to look to the Target Operating Model for the new Centre of Excellence. That is in bundle 9, page 4, please. So bundle 9, page 4. Is this a document that you have seen before?

A Yes.

Q For those of us that were not involved in the process, why was this document created? What is the Target Operating Model?

A So this was NSS's-- I think this was prepared around about March 2020. It was their first, I suppose, kind of, formal presentation on answering the question that we'd set them in terms of what we were looking for.

Q If we could look on to page 12, please, you see that there is a bold heading there, "Our Research." Do you see that?

A Yes.

Q It says:

> "The user research sought to understand users' experiences, pain points of managing risk in the healthcare built environment, and what they want and need from the QHBE."

Then you see that there are key themes that emerge:

> "Data from user research

activity was synthesised and aggregated into 14 themes."

Do you see that? Then, if we look down, approximately halfway down the page, we will see that "Skills and training" is one issue, "Having experts available at the right points in the process, i.e. IPC, Estates and Executives," "National and local," "Procurement," "Guidance," "Change control," and "Governance." Do you see that? Then, it says, at the very bottom, that, "The full summary of user research key insights can be found at Appendix A." If we look on to Appendix A, if we look to page 59, first of all, do you see that, at the bottom of that page, more is said in relation to procurement. Do you see that?

A Yes.

Q So it was identified from the research carried out by NSS that, "Current procurement processes are not fit for purpose," "Boards do not have ability to check what contractors are delivering," and, "Responsibilities and liabilities need to be reviewed." Do you see that?

A Yes.

Q So, having identified procurement as a problem, the procurement process not being fit for purpose, what if anything did the Scottish Government do in response?

A So, from-- The procurement process-- I've not fully understood what the-- I'm not aware of problems with our kind of procurement processes, and I've spoken to a number of people about their experience and I don't have anything to add to address that statement because, from my perspective, it's not a problem I would recognise.

Q Okay. As far as you are concerned-- It might not fall under your remit, but there is an identified problem with procurement, and you are not aware of any steps taken to address that identified problem?

A Well, I'm not aware of what the problems are that have been identified. You know, within a different part of NSS, there's framework agreements for capital projects that are set up and managed to help deliver any kind of healthcare builds that we have, and they would be best placed to comment on specifics of what they do, but, as I say, I'm not aware of what this-- that particular statement refers to.

Q So, whenever you were involved in the NHS Scotland Assure Design Reference Group, should the Inquiry understand that potential problems with procurement, they are

not being discussed in that group?

A No, not to my recollection, anyway.

Q Thank you. Then, if I can ask you to look over the page onto page 60 – this is still within the User Research – you see there is a reference to "Guidance" there. Do you see that?

A Yes.

Q It says:

"- Guidance needs more 'teeth.'

- Guidance needs to be clarified and when it's applicable in full or where appropriate.
- There needs to be support on how to translate guidance in practice."

Do you see that?

A Yes.

Q Did you have an understanding whenever you were sitting in the NHS Scotland Assure Design Reference Group that there was a perception that the guidance needed more "teeth"?

A So, it wasn't framed in that way to me. I think that what was recognised was guidance was complicated and difficult to apply and interpret correctly and consistently, so I think one of the key changes with NHS Assure is to give that more central support on what is required in guidance and address any issues or confusions or ambiguities that a local team might have.

Q Does that not suggest, though, if the guidance needed more "teeth," that it really needed to stop being guidance and be made into a hard-edged legal standard where compliance was mandatory?

A So, I mean, I think that is, I suppose, an interesting question because what does that mean in reality? Because does that-- does that effectively mean that if a healthcare facility doesn't comply with guidance, then what? And that's where I think that you need to kind of step back and look at the wider system of control and review that is in place because if, for example, there's a ventilation system that is not delivering the number of air changes required, but that ward has not had an infection for five years, then what would that-- what do we do in that situation?

Because one of the one of the big challenges that we have with our estate is, if we need to upgrade a facility, where do we put people? So, decanting patients, we need somewhere to put them, and also,

there's a-- while this Inquiry is rightly focused on quality in the developed care, affordability is a natural kind of position that we have to take. So, if we mandated that guidance need to be improved and emphasised, then that would come from the health budget, so there would be-- so we would inevitably spend less on other things in order to update or address any guidance issues.

So, I think that the system we have at the moment, provided that we've got that well-established route of reviewing what-- you know, what is the outcomes, if there's any infections, then that that works at the moment. To go down to a more severe way of managing it would have quite significant consequences.

Q That is entirely understandable for the old estate. The Cabinet Secretary came and gave evidence to the Inquiry yesterday, and she really equated, for new-build hospitals, compliance with the guidance as being the equivalent of safety, that if the standard is there that says, "It needs to be 10 air changes per hour," her evidence was, "Well, why would you ever do anything less than that?" Was there any consideration given, when the new Centre for Excellence was being set up, that really what should be implemented is something similar to what you have under the domestic building regulations? That you have a set standard, and for the new build, that is the standard that must be met?

Now, if the standards change and improve, you do not have to bring the building up to that standard, but for the new build, there is a hard-edged minimum legal standard as opposed to something lesser than guidance. Was that ever considered?

A So, through-- So, the NHS Assure have introduced the Key Stage Assurance Review process, the KSAR, and to some extent that is still evolving over time. It's just been-- there's only a relatively small number of projects that have gone through it, and I think that probably kind of-- it kind of balances the requirements to comply with guidance with, I suppose, still the practicalities of delivering a compliant building that is on time and, as far as possible, on budget.

So, I think that if there was an issue, that the local team in discussion with NHS Assure kind of said, "The proposal that we have is good enough," then I think that flexibility, retaining that would be quite important.

Q In terms of the model for NHS Scotland Assure, the target

operating model makes very clear that it is not innovating in terms of where the legal liabilities would lie; those would still lie with the health board as opposed to lying with the Centre for Excellence. It is also made very clear that the new Centre for Excellence is not going to be an inspector and it is not going to have a regulatory function. Is that correct?

A Yes.

Q Now, the former Cabinet Secretary, her vision for the new Centre for Excellence is that it would be akin to a clerk of work, so that it would be a body whereby individuals would go in-- According to her witness statement, they would be pushing buttons, pulling levers, they would be doing physical testing and inspection. Why did the Centre of Excellence not adopt that approach of having individuals that were going in and doing physical testing and inspection?

A So, my understanding is that there was a period of time where clerk of works were perhaps phased out, but I think that for most health care projects I'm aware of, there are clerks of works that are undertaking that kind of review that you spoke of. What NHS Assure are trying to do is provide additionality and support to the health board and not duplicate what

they're already doing. So, I think that the Cabinet Secretary's vision of somebody checking that everything works, it's my understanding at least that that does happen. It's just not done by NHS Assure.

Q Thank you. Another issue that I would like to ask you about is whether or not at the minute there is overlap or duplication in procedures. You will, obviously, given your role on the Capital Investment Group, be familiar with the stages that need to be gone through before finance will be provided.

A number of individuals have given evidence about issues that they think arise at the minute in terms of duplication. So, Mr Greer, who used to work for Mott MacDonald, now works for NHS Lothian, he gave the example of having the Key Stage Assurance Review, the KSAR, sitting alongside the NDAP procedure. Do you see those procedures as being different, complementary, or are they largely duplication?

A So, my preference is NHS Assure have one process that all projects have to go through. If I were to be honest, I would prefer NDAP was absorbed into the KSAR process. I think that would make it more straightforward. It's obviously for NHS

Assure to decide that. I think that's ultimately where they'll get to, but they've not made that change yet.

Q So, from your perspective, there are these processes that are similar but different, but certainly from your perspective, you think there would be a benefit in a streamlining so that there was only one procedure that had to be gone through?

A Yes, and I think that the NDAP is different from KSAR. One of the early questions I asked back in July 2019 was, "Would NDAP be expected to identify the problem with the ventilation?" And I think the answer was, "Probably not." Whereas the KSAR, I absolutely would expect the new process to identify any issues that caused a delay at Edinburgh Children's Hospital. That doesn't invalidate the value of a design review and consideration on some of the more holistic parts of a healthcare project, but, to me, it would make sense if it was one thing that a board had to go through.

Q Thank you. The Inquiry has heard evidence in relation to challenges that exist in terms of recruiting individuals with the right skills in this area, in particular engineers that have experience in the built environment and Infection Prevention and Control professionals. When you were involved in setting up the new Centre for Excellence, were those challenges at the forefront of your mind?

A Yes, certainly from-- I was less familiar with the Infection Control side of things, but I know that engineers are-- that the NHS is competing with the private sector for good engineers and that there was always a risk that we could potentially lose out to the private sector that pays better.

So, I think where we have-- or NHS Assure, my understanding is that they've quite significantly increased their workforce. I think engineers are a part of that, and also part of what they're looking at is working in conjunction with NHS Education, having that, if you like, pipeline of young people getting into the profession and then ultimately becoming qualified over time with experience. I think that there will be an ongoing challenge with that.

The workforce challenge in the health service is not restricted to Infection Control and engineers; it is pretty widespread. But I think what NHS Education are doing in conjunction with NHS Assure, and I

think what the current Chief Nursing Officer outlined in his evidence to you about what they are doing in terms of skills and recognition of where nurses' professional development might need to evolve and change, is a way we address that risk.

Q Thank you. You mention within your statement that you think NHS Scotland Assure, the Key Stage Assurance Review process, is an improvement on what went before, and you consider that it is a proportionate response to the problems that arose on the Royal Hospital for Children and the Department of Clinical Neurosciences. Is that correct?

A Yes.

Q The former Cabinet Secretary gave evidence yesterday and she indicated that she thought that the new Centre for Excellence was an improvement, but she did not think necessarily that it was a complete answer to all of the problems that exist in this space. She thought there might have to be further consideration given to whether the Scottish Government really needs to be more involved in these new-build projects. What is your own view? NHS Scotland Assure, is it enough or does more need to be done to address the issues?

A So, I'm comfortable with

the direction of travel at the moment. I think that while NHS Assure is part of NSS, I do see it as an extension of Scottish Government. They work closely with my team and if I had any particular issue that I wanted them to look at, if there was a particular project that needed a bit more support or input, then they would respond positively to that. But, to be honest, we're not taking forward many capital projects at the moment, and so therefore a small number is allowed-- the Assure team to pretty much support everyone that is in progress at the moment.

The complexities of the health build are not-- they are not reducing, and so even with that additional support, there's still challenges. There's still issues that need to work with the local teams. I suppose that idea that everything will now be delivered on time and on budget is-- While it's a worthy aspiration, the reality is there's still going to be issues. Hopefully not as significant as Edinburgh Children's Hospital, but I still think there's still some things we need to work through.

Q Thank you. Within your statement, you address the Grant Thornton report which was instructed by NHS Lothian, which you will no

doubt have become familiar with, even if you were not at the time it was issued. You make the point, though, that that was a report instructed by a health board for a health board and that you are not aware of any formalised structure whereby that would be shared more widely within the NHS. Is that correct?

A Correct.

Q It might seem surprising to a layperson that you have public money being used for a report for a public body, but there is not any formalised structures for that learning to be shared. So, NHS Lothian gets the report, it gets the benefit of the learning that comes out of that, but there is not a structured forum for that to be shared with other health boards. Why is there not that structured process?

A So, I would say that the issues at the Edinburgh Children's Hospital were certainly discussed at the Strategic Facilities Group. So, this is the group that effectively directors of estates meet. It's managed and led by NHS Assure, and I sit in that group as well. So, we certainly discussed the issues at the Edinburgh Children's Hospital. In terms of the governance points, it would probably be that the conversations at SFG were more

focused on the technical side of things, and I suppose that you're right, that because it was a locally commissioned report, that we felt that putting that out to the service and saying, "Be aware of that" wasn't appropriate.

I'd contrast that with the independent review at the Queen Elizabeth that was undertaken by Drs Fraser and Montgomery. In that, we thought there was kind of wider lessons. They wrote that review for that wider audience, and so we distributed that to chief execs, and then as part of the Capital Investment Group, a standard question will be, "Have you taken into account the recommendations from the Queen Elizabeth Independent Review?" So, I think that that learning is still there and that kind of consideration of what we've learned is within the service.

Q The final question from me at the moment, Mr Morrison, really is an open question. One of the issues that the Chair requires to consider is how could these projects potentially be done better in the future. You cover some of that within your statement, we have covered some things today, but is there anything we have not covered that you think it would be important to raise in terms of how the problems with the Royal Hospital for Children

and Young People and the Department of Clinical Neurosciences, how those types of problems could be avoided on future projects?

A So, I would like to think that the introduction of NHS Assure is a fairly significant way of addressing the problems that we quickly identified were there. Assure is much bigger and more extensive than Health Facilities Scotland. The very nature of these projects are complicated and I'm sure-- I believe you're taking evidence from the director tomorrow, that she'll kind of reflect on things that have changed even in the three, four years that Assure have been in operation, and we are continually considering and reviewing our learnings from ongoing projects and how we can apply them more generally. So, I think that that kind of awareness is there.

I suppose also in the past there was, I think, more flexibility given locally to the project director to make decisions that might impact on timeline or budget as well as quality, and we've definitely moved to a point where, for new build, quality is the main driving factor. But as we do that, then, inevitably some projects will be more expensive. They will take a wee bit longer to deliver because we will need to deliver what the local team, the Infection Control specialists, NHS Assure agree is the best way forward.

Q Thank you. Mr Morrison, thank you for answering my questions today. I do not have any further questions at the moment. Lord Brodie may have questions or there may be applications from core participants. Thank you.

Questioned by The Chair

THE CHAIR: Mr Morrison, just, I think, two matters of small detail. You were asked not long ago by Mr MacGregor about sharing learning, and that came from consideration of the Grant Thornton report, and you mentioned the issues with the Children's Hospital were certainly discussed at the "Strategic Facilities" and I did not get the last----

A Group.

Q Group?

A Group, SFG.

Q Right, and is that a standing group?

A Yes, so this is a group that-- So, the director of NHS Assure chairs the group. The invitation is to each Director of Estates at NHS Board or the equivalent post, which considers matters relating to facilities and estates. There are four subgroups that

report into that: SETAG is perhaps one that you're familiar with that oversees any changes to the ventilation guidance, and that's the forum for these issues to be aired.

Q The other question related to your understanding of how Key Stage Review is working as administered by NHS Scotland Assure. Now, I appreciate that you may not be the best person to ask, but I think you did touch on it in your evidence. Do you understand that the Key Stage Review is an opportunity for Assure to-- Well, I have put it in my note – this is not what you said – "adjusting the guidance." I think this came from Mr MacGregor's question about "teeth." Now, I just really want to understand what your understanding is about how guidance is – I do not know what the word is – applied/moderated/modified through Assure at the Key Stage Review.

A One of the interesting things is that the understanding of risks around infection over the last few years has changed quite dramatically, but guidance doesn't get updated as frequently as our understanding. So, I know that one big capital project in NHS Scotland at the moment is up in Aberdeen, and it's clear that there's a communication between colleagues in

Grampian and Greater Glasgow and Clyde about the learnings of the Queen Elizabeth.

So, there's actually situations where the clinical understanding of what is best is in fact in excess of what the guidance stipulates. So, in these kind of situations, there is a kind of conversation involving the local IPC team, NHS Assure, about what should be done next.

In all cases, what we're looking for is a consensus to be reached because there are-- It's complicated and it's not always black and white, but provided that the appropriate people are making a determination on what is the best way forward, then that would be satisfactory from a KSAR point of view.

Q Right, and the Key Stage Review is the opportunity for that to happen?

A Yes, so that is happening kind of all the time. There are some key points that a KSAR must be signed off: there's pretty much each stage of the business case process, and then once the project is in construction, there is a KSAR for construction and then ultimately commissioning. One of the things that we introduced, I think it was last year, we wrote to chief executives and made

clear that a new building will not or cannot open until you have an approved KSAR signed off by NHS Assure.

Q Thank you, Mr Morrison. As Mr MacGregor indicated, I want to take the opportunity to check with the room whether there are any further questions Mr MacGregor might raise with you. So, we will take a break of about 10 or 15 minutes, and if I could ask you to return to the witness room.

(Short break)

THE CHAIR: Mr Morrison, there are no further questions, and that means you are free to go, but before leaving, can I just say thank you on behalf of the Inquiry for your attendance, but also for the work that went into framing your witness statements. I appreciate that that will have been significant, so thank you very much, but you are free to go.

THE WITNESS: Thank you very much.

(The witness withdrew)

THE CHAIR: Now, Mr MacGregor, we are able to resume tomorrow with----?

MR MACGREGOR: Yes, my Lord. The witnesses are Critchley and Rogers, and it will be Mr McClelland asking the questions tomorrow.

THE CHAIR: All right. Thank you very much. Well, thank you for your attendance here today, and we will see each other, all being well, tomorrow. Thank you.

(Session ends)

15:31