SCOTTISH HOSPITALS INQUIRY

Hearings Commencing
26 February 2024

Day 4
Thursday, 29 February 2024
Stewart McKechnie
Sarah Jane Sutherland

C O N T E N T S

10:04

THE CHAIR: Good morning to those who are here in the hearing room in Edinburgh and those who are following proceedings on YouTube. Now, I think we are ready to begin, Mr McClelland.

MR McCLELLAND: That is right, my Lord. Just straight into the first witness for today, who is Stewart McKechnie.

THE WITNESS: Morning.

THE CHAIR: Good morning, again, Mr McKechnie. Now, as you are familiar with now, you are about to be asked questions by Mr McClelland, but first of all you are prepared to affirm?

THE WITNESS: Yes.

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

Mr Stewart McKechnie

Affirmed

THE CHAIR: Thank you very much, Mr McKechnie. Mr McClelland?

MR McCLELLAND: Thank you, my Lord.

Questioned by Mr McClelland

Q Good morning.

A Morning.

Q Could you please just confirm your name?

A Stewart McKechnie.

Q And you are a mechanical and electrical engineer. Is that correct?

A Primarily a mechanical engineer, yes.

Q And you are employed by TÜV SÜD, having worked for TÜV SÜD Wallace Whittle on the RHCYP/DCN project.

A Yes.

Q You gave evidence to this Inquiry previously at its oral hearings in 2023, and have you provided the Inquiry with a further witness statement for this set of hearings?

A I have.

Q If we could please have up on the screen witness statement bundle volume 2, page 162. And you should see up on the screen there, Mr McKechnie, your statement.

A Yes.

Q Does that statement set out fully and truthfully your evidence on the matters that it addresses?

A It does.

Q And is there anything in it that you think needs to be changed or corrected?

A No, no.

Q Now, you will no doubt recall that at the previous hearing we discussed your involvement in the project up to financial close when the project agreement was signed.

A Yes.

Q And today I would like to focus on the period after financial close.

A Yes.

Q You describe yourself as having been Building Services Design Lead for TÜV SÜD Wallace Whittle on the project. Is that correct?

A Yes.

Q So you led the team which was responsible for producing the design for the ventilation systems in that hospital?

A Yes.

Q Now, the design process after financial close was carried out in the context of a particular contractual framework, and the precise meaning of the contract surrounding that is a legal matter, and it is really a matter for the lawyers. So, the Inquiry and the core participants can form their own views about that, but what I would like to do, however, is to ask you how you understood it when you were working on the project.

A Yes.

Q So, it was the case, was it not, that the ventilation design was not complete at financial close?

A Yes, yeah.

Q So it had to be developed to a state of completion after financial close?

A That's correct, yeah.

Q And the development of that design was primarily Wallace Whittle's responsibility?

A Yes, it was.

Q And NHS Lothian were entitled to be consulted about that design as it was developed, and there was a contractual process for doing that?

A Yes.

Q That was the Reviewable Design Data or RDD process?

A That's correct, yeah.

Q And the contract made provision for various things to go through the RDD process, and included amongst those were your ventilation design and the Environmental Matrix.

A That's correct, yeah.

Q So, both of these had to be developed and approved via the RDD process?

A That was the way it turned out, yes.

Q What did you understand

to be the purpose of the RDD process?

A The RDD process is a reasonably common process on the basis that, particularly in these larger contracts, the designs are generally not complete because, as you can imagine, designing any system for a large hospital takes a reasonable amount of time and resource. Therefore, what you tend to do is you prepare strategy details, which is what we did in Edinburgh, to show what the design intent would be. You then, if your team's successful in landing the contract, you then launch into the detailed design, which is size and ductwork and all the other bits and pieces that we have to do.

Q And what did you understand to be the purpose of consulting NHS Lothian in the RDD process?

A The RDD process was led by Motts. NHSL weren't always there in the reviews, although generally the drawings or whatever that we produced would have been taken away and then signed by the Motts and the NHSL team.

Q And what did you understand to be the purpose of NHSL's sign-off of the designs?

A The sign-off process is-- Again, to my mind, this one was no different from any other one I've been involved in. It was an acknowledgement by the client that what we were putting forward met with their expectations.

Q A point made by some of the parties involved in this Inquiry is that NHSL's sign-off under the RDD process had only limited significance, that it was no more than confirmation that the approved item met their requirements for operational functionality. Was that your understanding?

A I have only recently looked into the phrase "operational functionality", certainly because I don't recall it ever being mentioned in any of the RDD reviews. So, we approached this – the RDD sessions, let's call them – the same as we would with any other ones, which was to put forward our proposals to the client body. The operational functionality, to be frank, I still don't-- Having read it a couple of times now, I still don't see its relevance to engineering systems.

Q Well, that is, kind of, the next point I was going to make, that it sounds from what you are saying that you have had a look at the contract definition of operational functionality.

A I have, yes.

Q It runs to maybe a page and a half or so.

A Yes, it does.

Q Yes, and would it be fair to, sort of, summarise it as being concerned with the layout of the hospital, the adjacencies of departments and rooms within them and the location of equipment, insofar as those things affected the Health Board's use of the space?

A That's absolutely my interpretation of the definition of operational functionality.

Q Mm-hmm.

A As I say, as far as I recall, it didn't feature at any time in the RDD review process.

Q So, just carrying on with that – the concept of operational functionality – would you agree that ventilation parameters like air changes and pressure gradients would not fall within the concept of operational functionality?

A Certainly not within my interpretation of what's written within the document. When this was first raised, I have to admit that I thought, "Well, the only relevance it could have, with that phrase but not without the interpretation, would've been the implications of ventilation rates or whatever." That's sheer conjecture because, as I say, it's only very recently that that-- I know it was brought up in the last session, but we hadn't really delved into, you know, the process of RDD etc., where it now appears to be being linked.

Q Okay, so, just to be clear about it, when you were actually working on the project, when you were submitting designs through the RDD process, you yourself at that time were not aware and not thinking about the concept of operational functionality?

A No, no. We approach RDD in a similar vein, as did the other participants, in a similar way to any other RDD, which was looking at the proposals, which were then in a more detailed form.

Q In your witness statement, you-- It is at paragraph 27. Maybe bring it up. It is witness statement bundle 2, page 173. What you say in paragraph 27 is you introduce the system of responses that the Health Board could have to any item submitted through the RDD process.

A Yeah.

Q Then you say:

"My understanding of the NHSL review was that they checked the design submitted met their Operational

Functionality requirements…"

So far, that sentence is consistent with what witnesses from Mott MacDonald, for example, would say, but then you go on to say, "… which covered performance, control and maintainability of the systems." Now, that understanding of operational functionality is different from the one that we discussed a moment ago. Well, which reflects your understanding of operational functionality?

A To be frank, both, because the question that was put forward to me and which that 27 is a response to, I think, was along the lines of, "What was my interpretation of operational functionality and its application in the RDD process?" So, having scratched my head over this new phrase, that's what I would have said. If operational functionality-- Taking that at face value, that's what that part of the review would be. It's certainly not restricted to those items because, for example, outwith the ventilation systems, we had had every other building services. We had water, electrical, lighting, all of that. They all went through the same RDD. If it had only been restricted to that, I don't think that's reflected in the comments that we received on all our proposals.

Q I mean, at the end of the day, the meaning of operational functionality is a matter of the meaning of the contract, but the way you are describing it in your witness statement here, are you essentially describing the sort of issues that you understood NHSL and Mott Macdonald to be reviewing RDD items against?

A They certainly reviewed more than those three items that I've commented. As I say, my response was-- and that's why I've phrased it as "my understanding"----

Q Yes.

A -- was that if they were looking at operational functionality, that was the only thing I could think of that would be applicable there.

Q Yes, okay, because----

THE CHAIR: At risk of just repeating back to you, Mr McKechnie, what you have just said: you have agreed with Mr McClelland what the contract appears to say is the definition of operational functionality. If I am following your evidence, you are pointing out that what was happening in practice during the RDD process included matters of performance, control and----

A Maintainability, yeah.

Q -- maintainability of the systems. In your view, that goes

beyond operational functionality as defined in the contract, but you would also say that, in practice, the RDD process went even beyond performance, control and maintainability. I am really just----

A Yes.

Q -- saying back to you what I think you have said to me.

A Yes, that's correct. When I wrote that, as I say, I was unfamiliar with the phrase.

Q Right.

A Therefore that was my interpretation of what operational functionality was until we went back to the packet of information and downloaded all the contractual data and eventually found the definition within the contract of operational functionality, which, as you said a couple of minutes ago there, appears to be more biased towards adjacencies, entrances, what I would term as building layout.

Q Yes.

A I couldn't find anything in it which had any technical reference. That's why I was struggling to get my head round about why that wasn't the process I was involved in.

Q Thank you.

MR MCCLELLAND: I was interested just in the final words you used there, Mr McKechnie: "the process that you were involved in." Are you drawing a contrast between the breadth of topics under discussion through the RDD process and the much more limited contractual definition of operational functionality?

A Absolutely.

Q If we could go to page 172 of the bundle, so just the page before, at paragraph 21 you say that you are "very familiar with the RDD process" in general terms, and you explain that the design proposals are submitted to the:

> "… client's technical adviser for review. The technical adviser then scrutinises the proposals for their compliance with the design brief or contractor's proposals. Any comments made by the technical adviser would require to be resolved to the client team's satisfaction prior to construction."

So, I think you're talking there about RDD processes in general rather than the specific one on this project, but does that second last sentence reflect what you understood to be going on through the RHCYP RDD process, that the technical adviser, which would have been Mott MacDonald, scrutinises the proposals for their compliance with the design

brief or contractor's proposals?

A Yes, that's correct. I didn't see any difference in the system that we were involved in on Edinburgh to any other RDD process I've been involved in.

Q And----

A I would say it wasn't-- Sorry, cut across you there. I would say it wasn't solely the technical advisers that signed off on the drawings. NHSL were also-- There was a stamp which was applied to these drawings to give it the classification, and NHSL were party to the commenting and on the classification of the proposals.

Q Yes, and so would you then understand NHSL's stamp on these drawings to constitute their confirmation that the submitted proposal complied with the design brief?

A Yes, yeah.

Q So, in order to prepare a design, you and your team obviously had to have a brief, and you say that you understood the Environmental Matrix at financial close to be your brief and to form part of the Board's construction requirements. Is that correct?

A The Environmental Matrix was recorded as part of the

BCRs, yes.

Q So, the Environmental Matrix, that was the design brief that you were working to, or at least part of it?

A Yes.

Q But the Environmental Matrix was itself subject to the RDD process. So, on your understanding, we have got both the contractor's design and the client's brief informing it going through the RDD process together. Was that how you understood it?

A My understanding was that the Environmental Matrix, which we were told we had to adopt, was the client's brief, and we built our designs to suit the requirements of that briefing document.

Q If the briefing document itself is subject to the RDD process, how do you know what the brief is?

A It's a good question and one that I raised myself at the time. The only value I could see in continuing the matrix was that if there was change of use to a particular area or rooms, then that provided a vehicle for recording what we call a "change of brief". That was the only reason I could see for keeping that going.

Q I mean, I do not want to put words in your mouth, so all I am

doing----

A Please do.

Q I am just reflecting back what I understood you to mean. So, on your understanding, the RDD process was also in part a process of finalising the client's brief?

A Yes, it could have that function, but that, to me, wasn't the reason for having an Environmental Matrix. The matrix conveys the briefing which the client should have been or would have been measuring our designs against.

Q I am just wondering if it is a workable arrangement to have not only the contractor's proposals going through the RDD process but also part of the client's brief going through the same process. Is that workable in your view?

A I didn't-- I don't think so, and I didn't think so at the time in the way that the RDD and the matrix seemed to progress. A better explanation of that would be that when we, with (inaudible), took onboard the matrix, we found it extremely confusing when the first version of that matrix was returned with comments because the only conclusion you can bring from that was that the client was then commenting upon something they'd already briefed, so I don't think that's a workable solution at all, no.

Q Mm-hmm, and when that happened, when you got so many comments back on the matrix, I suppose there might be two ways that you could look at that. One is, "We have got a client here who is changing their brief." That is one way of looking at it.

A Yeah.

Q The other way of looking at it is to say, "We were wrong to understand this as the client's brief." I mean, do you accept that those are two ways of looking at?

A I mean, without sounding conceited, I didn't think we were wrong.

Q I am sorry?

A Without sounding conceited, I didn't think we were wrong. It was a normal process to get a brief and then adopt the guidance from that brief. So we would normally always expect, in this type of situation, to be given a brief where there were specific things that the client was looking for.

Q So, did you then proceed on the understanding that all of these comments on the matrix reflected the client changing their brief?

A Yes.

Q So, just returning to this

idea of the matrix going through the RDD process. It is obviously for the client to set a brief, but the RDD process functioned on the basis of the production by the contractor of a design. So, who did you understand to be responsible in that process for choosing the parameters that go in the matrix?

A In the initial matrix?

Q No, once the matrix starts going through the RDD process---

A Right, okay.

Q -- and there are new parameters going into it. Who did you understand to be responsible for the choice of parameters?

A Where those parameters were a change to what was already detailed within the matrix, I would have said that that was the Board's direction. Where, as it happened, there were there were some areas added to the brief – departments or whatever which we compiled what we felt was the appropriate entries to be incorporated in the matrix – we did that, but then that portion of it was then re-presented within the RDD process for the client to agree or direct otherwise on what their interpretation was of the particular requirements for these areas.

Q Okay, we can probably divide it into three different types of parameter. First of all, there is the pre-existing ones, the ones that were in the matrix at financial close. Who did you understand to be responsible for the choice of those parameters? Was that NHSL, or was that you as a designer?

A The initial one was NHSL, and I can tell you that the process for that was because I wasn't in favour of the matrix coming across and then being given a TÜV badge on it. I said I was only willing to do that if they gave me an Excel of the then BCR presented matrix, which I then took and re-badged without altering the air changes, as we're talking about ventilation or whatever, and re-presented that. I could see why they were trying-- or I thought I could see why they were trying to do it, which was that they were getting the IHSL team to adopt that briefing as their responsibility in terms of the performance, and that's not necessarily, you know, an unusual way of doing things, because in other projects a client will give you a brief but it wants you to formalise your acceptance of that brief, if you like, by incorporating it into your proposals. It then gives them a yardstick.

Q Are you talking here about what happened prior to financial close?

A No, no.

Q I just, when----

A Oh, sorry. I may be. I'm not sure of the timing of when it slipped into RDD.

Q I have had the benefit of looking at the transcript of your evidence from last year and----

A Right.

Q -- what you described at that time was, prior to financial close, the reference design Environmental Matrix was handed over to Wallace Whittle, and Wallace Whittle were asked to rebadge it, as you put it.

A Yes.

Q And that was something that happened prior to financial close, if you recall.

A It did, yeah, but when we were putting it in for RDD, if I remember correctly – because I was thinking back; we were into the history of the matrix – we were given a number of comments on the matrix, and I think that that was then on the RDD submitted document. So, we took on board those comments, re-submitted it, and then we'd get another list, another bag of comments back.

Q Just stand a little bit back from that. I am just trying to understand the extent to which you regarded Wallace Whittle as responsible for the parameters in the matrix and to what extent you regarded anybody else as responsible for the choice of them. So, we have the Environmental Matrix at financial close.

A Yeah.

Q And I think we now agree that that was one which Wallace Whittle had adopted as their own document, it having, in origin, being one produced by the Board. Is that----

A Adopted is the word I would use, yes.

Q Yes. So, that matrix in the contract at financial close has a large number of parameters in it. Who did you regard as responsible for the choice of those parameters?

A I would have said it was the NHSL choice, there, of the parameters because we didn't vary those parameters. They were adopted as our design brief, if you like, when we were moving into the detailed design.

Q Then moving on through the RDD process you explained that there were, I think, some new rooms added to the matrix as the design developed?

A Yes.

Q And, in relation to the selection of parameters for those rooms, who do you regard as responsible for the choice?

A The initial proposal for these new rooms, let's call them, came from ourselves based on SHTM 03-01 guidance. I'm sticking straight to the ventilation. However, that was then always put forward to the technical advisor team all through the RDD process for their agreement, if you like, and I do distinctly remember, having looked at this, on some of the rooms there perhaps wasn't an appropriate SHTM guidance on the room type, and in these instances we recorded that we were defaulting to the 10-litres-per-second ventilation rate based on the occupancy, and we had a request to then change that terminology into "air changes". So, all of these parameters were reviewed.

Q So, for this second category of parameters – ones which Wallace Whittle add to the matrix as new rooms are developed – what I understood you to say was that Wallace Whittle were responsible for the selection of the parameters, but the matrix then went through the RDD process, and do you mean to say that that represented NHSL's approval of those parameters? Is that your understanding?

A That was the process. We wouldn't have selected a parameter and then barged on with it without involving the client and explaining the background as to our thinking.

Q Then I think there is possibly a third category of parameter in the matrix, and that is where they are being changed in response to, as you would put it, a change in the client's brief. Now, in that context, who did you regard as responsible for the choice of parameters?

A I would say that was quite clearly any further changes that we made to the matrix was due to a response by NHSL, which we would then take on board and revise the matrix accordingly.

Q Yes, and so, again, as that goes through the RDD process, was it your understanding that NHSL were responsible for the choice of those parameters?

A Yeah, yeah.

Q Now, in relation to all of those parameters, all three types, to what extent were TÜV SÜD or Wallace Whittle as the designers checking all of those for compliance with guidance?

A In the first instance-- No,

sorry. All three of them would have been checked by my team against guidance, and if there was any clarification required on a particular aspect, we would have raised that through Multiplex.

Q So, no matter what the origin of the parameter, was your team essentially taking responsibility for the compliance of them with guidance?

A Yes, I would say so.

Q It may be helpful just to look at bundle 1, p.1399. In fact, if you just go to p.1381, please. You see up on screen there, Mr McKechnie, TÜV SÜD's appointment by Multiplex for the project?

A Yeah.

Q Then if we go back to p.1399. Thank you. So, this is clause 4.3.1 of the appointment, and just to read that:

"The Consultant [that is TUV SUD, Wallace Whittle] acknowledges and confirms that:

"4.3.1 it has conducted its own analysis and review of the Disclosed Data and has, before the execution of this Agreement, satisfied itself as to the accuracy, completeness and fitness for purpose of any such Disclosed Data upon which it places reliance…"

There is a definition of disclosed data which we can go to if you like, but would you regard the work that your team was doing in checking the parameters for compliance with guidance would be in fulfilment of that obligation?

A Yes, I would say that's exactly what we did.

Q Yes. Now, in your statement you say that the Environmental Matrix developed in a manner which you would regard as being out of the ordinary for an RDD process. Is that right?

A Yes.

Q And, as I have understood your statement, you describe two unusual features in particular. First of all, a fluctuation in the approval status of the matrix, in that it was approved and then it was unapproved and then it was approved again and so on; and the second aspect is that the process of review seemed to rumble on through various stages rather than the document being submitted once and approved once. Is that a fair summary of the way in which you saw this----

A Yeah, that's pretty fair, yes, yes. The normal process I would expect would be that would go

through-- it would possibly go through a couple of iterations to tidy up and give people the opportunity to change that, so we had expected to get some form of comment, but normally after those comments are addressed I would say that it wouldn't change again unless something happened to the building like what we were speaking about earlier, which was the change of use or the addition of, perhaps, rooms that had been missed in the first instance. So, once that's clarified and it goes to (inaudible), I'm not expecting to see the thing again.

Q These unusual features of the way the matrix developed, what impact did that have on the development of the design?

A Well, the issue there is that if you change a brief, then we don't have a foundation to do all the necessary work that's required to do the detailed design. So that holds all of that up.

Q And why do you think it was that the Environmental Matrix was being developed in that unusual way?

A I couldn't get my head round about it. I'm influenced now by what I've learnt from other parties' disclosures, if you like, but my understanding now is that the unusual process was because the document

was not fully reviewed. It was, let's call it, cherry-picking, and that's why we kept getting caught in this circle.

Q So you mean that, when the matrix was submitted for review, what you have learned subsequently – I think was how you put it – is that the matrix was not being reviewed in its entirety but just in parts?

A That appears to have been the case, which is, in my experience, is unusual because, normally, any document, be it drawings or be it a report or whatever, submitted to a client for review would get a full review in its entirety, and you would only then have to review the responses to any queries that were raised. I've been on both sides of the fence here, so I kind of understand the normal process.

THE CHAIR: My thoughts when-- your understanding now of this back and forward process is that, during the course of the RDD process, NHSL or Mott MacDonald were not reviewing the whole of the Environmental Matrix but just parts of it?

A That's exactly what's my understanding now.

Q Yes, I mean, I am just anxious that I am following that. Sorry. Sorry, Mr McClelland.

MR McCLELLAND: No, not at

all, my Lord. How clear an understanding did you have of what NHS Lothian wanted from its ventilation system?

A I think I was reasonably clear that what we were providing them with by way of the detailed drawings that we were submitting was what they were looking for or what they had in mind that they would have for the hospital. Certainly, in addition, when we're speaking about the RDD process, it wasn't just simply the matrix; it was every single building services drawing. Again: vent, heating, cooling, water, all aspects of it. So, we had that process going and the matrix being one of the issues that was being explored.

Q Okay, and what you say in your statement at paragraph 40, which is witness statement bundle 2, page 177, is that-- It is the final sentence in that paragraph, that, "If no comment was made by NHSL on an entry in the EM this was taken as acceptance by NHSL of that entry." Do you mean-- There are two ways one can take that statement. Either you mean that NHS Lothian accepted it met their operational functionality requirements, or you could take it as meaning something more, that NHS Lothian had, in effect, confirmed it as

their brief. Which of those two do you mean?

A The second one. Submittal of any document is generally the approval is given to any item which hasn't been commented upon. You know, don't take this the wrong way, but in my opinion it's the whole idea of why you have that process.

Q Okay, I would like to turn now to a particular change that Wallace Whittle made to the Environmental Matrix, and this is to guidance note 15, and that is something that you cover at paragraph 41 of your statement. If we could go, please, to bundle 13, volume 2, page 101? In fact, if we just go briefly to page 99, this is just to let you know, Mr McKechnie, which document we are looking at, and you can see from the version box on the left that this is the version of the matrix 26 November 2015, so just a few months after financial close. Now, if we go down to the next page, please. Sorry, the page after that. If we could just have guidance note 15 at the middle of the page, please. Oh, I have lost it from my screen. I am not sure, is there anything we can do to----

A I think I understand what you're going to ask me.

Q Do you have the matrix

on your screen, Mr----

A No, no. It's back now.

Q It disappeared from my screen, but I have got it back.

A Yes.

Q Do you have it there?

A Yes.

Q Okay. So, yes, the particular issue concerns the part of guidance note 15 dealing with Critical Care areas, which is down towards the bottom, and if we just read there, it says, "Critical Care areas - Design Criteria - SHTM 03-01 - Appendix 1 for air change rates - 10ac/hr Supply for isolation cubicles…" and the change which Wallace Whittle made in this version of the matrix was to add those words, "for isolation cubicles." Is that correct?

A Yes.

Q And what you say in your statement is that you added these words – and this is paragraph 41 of your statement – "purely for clarification to align with SHTM03-01 guidance as we felt the original text was vague." Can you just explain what you mean by that, please?

A Our interpretation of SHTM 03-01 was that the only areas which were called out with 10 air changes were isolation cubicles which, up until the most recent change, still remained the same.

Q So, you made the change – you added the words "isolation cubicles" into this guidance note – so that it aligned with your interpretation of the guidance?

A Yes.

Q Do you accept that, if one looks at the guidance note on its own, your change narrowed the scope of the guidance note?

A Not really because the-- what we didn't change was that the design criteria was SHTM 03-01.

Q So, it still refers to 03-01, but prior to your change it could be read as-- the guidance note I am talking about could be read as specifying 10 air changes per hour for non-isolation rooms in Critical Care, just as a matter of the language.

A Well, it was more than the matter of the language because, other than the isolation rooms, there wasn't any reference in SHTM 03-01 to 10 air changes within Critical Care bedrooms.

Q Yes, so we understand that is your interpretation of the guidance, but I think you are probably aware by now that other people have a different interpretation of the same guidance.

A They did have, yes, but

the guidance-- I think the fact that the current SHTM now specifically calls out sleeping accommodation within the Critical Care areas demonstrates that there wasn't guidance at the time we are speaking about.

Q Yes, but if we just focus for the moment on the language of the guidance note, do you accept that, before you added the words about isolation cubicles, it was possible to read that as being based on an alternative interpretation of the guidance, that the recommendation for 10 air changes applied generally throughout the Critical Care area?

A I didn't feel that way. I still don't feel that way, that that was what was inferred by the original terminology. I just felt it was badly phrased.

Q Yes. So it did not occur to you at the time that there was another possible way of reading both the guidance note and the guidance as applying 10 air changes----

A Not at the time, no----

Q -- beyond isolation rooms?

A -- not at all, no.

Q I mean, viewing matters in hindsight, can you see now that the addition of the words to the guidance note narrows its scope?

A Not when it references the then-current SHTM, because it's not there, as demonstrated by the fact that it's been added in. So, it wasn't there; it wasn't referenceable at that particular time.

Q Okay, if we could put it this way, is the change that you made one which is justifiable only if your interpretation of the guidance is correct?

A I'm not sure of the way you phrased that, but I'm going to answer yes.

Q So, if it is the case that the guidance, properly construed, requires 10 air changes throughout an entire Critical Care area, let us just work on that hypothesis----

A Right.

Q -- by adding the words, "for isolation cubicles" into the guidance note, you make the guidance note more restricted than the guidance. Do you accept that?

A If that had been the case at the time, yes, but I think we're missing one of the key items there, which is that if it was intended that these other rooms were to have 10 air changes and, critically, 10 pascals pressure in them, it would have given it a different architectural guide on it. The structure, the layout, all the rest of

it would all have been impacted by that, and that was never briefed as far as I'm aware.

Q I suppose it depends how that would have worked. If the matrix had been understood as specifying 10 air changes and 10 pascals----

A Pascals, yeah.

Q -- of positive pressure, if it had been understood in that way, would it then have been the responsibility of Project Co to modify or develop the architectural design in such a way to meet that?

A I don't necessarily think it would be Project Co. I can't comment on what the architectural guidance was within the reference documentation. I just know that the layout that we were working to wouldn't have worked with the 10 pascals if you applied that throughout. It worked for all the isolation rooms.

Q It is a simple point I am trying to make that if the designer understood the brief to be the achievement of 10 air changes per hour and 10 pascals positive pressure and was of the view that that could not be achieved with the existing architectural design, would it not then be for the ventilation designer to raise that and explain why you have got to change the architectural features?

A 20/20 hindsight? Possibly, but I don't believe that the 10 air changes and the 10 pascals was apparent/was, let's call it, a standard at that particular time. I know that we have asked repeatedly for details on other hospitals where this had been provided. I don't believe it was in existence anywhere else. It will be now in newer designs because the briefing has changed.

Q Yes, okay.

THE CHAIR: Mr McClelland, if I could just intervene. The point you make, Mr McKechnie, about the architectural consequences of assuming that what was briefed was 10 pascals positive pressure, 10 air changes an hour for the whole of the Critical Care area, so that would be the whole of department B1.

Now, you made a point about the architectural consequences of that. Without maybe going into too much detail, I just want to be sure that I understood your answer. Were you saying that, well, if that was what the brief required, it would require, I assume, larger air handling units or different air handling units?

A Yes. Yeah.

Q And if you have got larger air handling units or different air

handling units, then you have got to find somewhere to put them?

A That's correct, yeah.

Q Were you meaning anything much more than that? It is just----

A From an architectural point of view, the finishes within the building-- within the room, sorry, space, would have to be different. You couldn't have-- For example, you've got lay-in tile grid in here which, if you pressurise this room, in simple terms, you'll lift all those tiles. So, you have to increase the air tightness of the room itself. You need different light fittings, you need to beef up the building structures, the ceiling. So, there's a lot more work other than just the ventilation to form a pressurised room to a defined pressure.

Q Right, and that was the point you were seeking to make?

A Yes.

Q All right. Thank you.

MR MCCLELLAND: Another point that other parties make, Mr McKechnie, is that, prior to your change being made to the matrix, there was actually a conflict within the meaning of the matrix, because there was the reference here to 10 air changes for Critical Care areas without any restriction on it, and in the section

of the matrix dealing with particular rooms there was specification of 4 air changes per hour for the single and multi-bed rooms in the Critical Care department. Do you accept that the change you made removed that conflict?

A Yes, that's exactly what it did, and it was one of the reasonings behind why we thought, with good intentions, we were tidying up the matrix.

Q So, if the matrix, as you understood it, was NHSL's brief, was the conflict between these two parts of the matrix not something for them to resolve rather than you?

A It should have been resolved, in my mind, in the first issues of the matrix, but after we, let's say, took control of the matrix, it then fell to ourselves for any changes to it.

Q Well, were you aware that there was a hierarchy clause in the Board Construction Requirements which required the design to default to the most onerous standard in the event of a conflict?

A Again, we didn't see it as a conflict, because when you've got the SHTM, their interpretation of it on the one side, and then you have the original client's matrix and the SHTM on the other side, that doesn't feel like

a matrix (sic); it feels more like a typographical error, if you like. We felt it had to be clarified so that both sides of those equations aligned.

Q Now, if we just scroll out a little bit so we can see all of the text. A little bit further, please, and a bit more. There we go. We can see the whole page there, Mr McKechnie. You see that there is text throughout the guidance notes in red?

A Yes.

Q And was it the case that the red text was to denote changes made to the matrix from the previous version?

A Technical changes, yes.

Q The other witnesses have put it in different ways, but one witness has said that there was an agreed protocol that any changes would be marked up.

A Yeah, I agree with that, and if you went away from the text and into the body of the matrix where there was a change from the original matrix which had a technical impact, then, yes, that had a red text or whatever on it. That was to assist in comparing one version of the matrix to what I thought would have been the second and final one, but obviously that wasn't the case. We didn't take the view that we were changing anything in the matrix with regard to the clause 15. Our opinion was that we were, at that time, tidying the document up.

Q So, is that your explanation for the change to guidance note 15 being in black text rather than red?

A Yeah. There was nothing-- We weren't trying to do anything other than get this matrix as good as it could be, if you like. There was no underhanded idea there. I wish to God somebody had put it in red now, but at the time that wasn't the case.

Q I mean, obviously, given what we know about what ultimately happened with the Critical Care area and the fact that the installed ventilation was removed so that the 10 air changes per hour could be achieved, in hindsight can you understand the suggestion that the change might have been deliberately concealed?

A Oh, absolutely not. I could see if we had-- Like everything, you can change the emphasis on it, but what I'm saying is that there was no intent to do anything to conceal. It was more to just reconfirm what we were doing.

Q And you say in your statement that nobody commented on

the change at the time. That is likely to be, because it was in black text, nobody realised it had been made.

A Yes, I get that, but I think when we looked at this before, I raised the point that Motts in particular have commented on it, and my suggestion is that they were well aware of it. So, I think there's something not as clear-cut as what you're potentially suggesting there.

Q Let us imagine a world in which the change had been marked in red. So, the addition of the words "for isolation cubicles" had been marked in red. Do you agree that that would have given Motts and NHSL the opportunity to clarify whether, indeed, they meant that 10 air changes should be confined only to isolation rooms in the Critical Care department?

A Again, 20/20 hindsight but, yes, I can see that now. However, the overwhelming evidence of the guidance, the matrix and the SHTM at that particular point in time, I don't think it should have raised anything, because I didn't believe then and I don't believe now that at that time 10 air changes to Critical Care was a blanket statement.

Q You referred in passing there to Mott MacDonald being fully aware of this. Can you explain to me why you say they were fully aware of this?

A They make comments on it in their last-but-one statement.

Q Are you referring, there, to correspondence in 2015 about the treatment of isolation rooms and Critical Care?

A I'm referring to-- I would need to go back and check my notes on where that is, but my understanding as I sit here was that it was in the last tranche of statements from-- There was comments made by Graeme Greer on this change, and it wasn't as if they'd just discovered it.

Q I am going to refer you to some documents for 2015. So, these are in bundle 13, volume 2, at 55. This is an email chain from 2015, and if we go back to the bottom of the chain, which is at page 57. You cannot see the top of the email, but it is from Brian Rutherford----

A Yes, yeah.

Q -- who I think is a colleague of yours at Wallace Whittle?

A Yes.

Q Yes, to Colin Grindlay and Ken Hall of Multiplex, and subject is "Confirmation of Isolation Cubicles". Brian says:

"Colin,

"We have noted that there

are rooms on the layout drawings that are labelled as Isolation Cubicles room references…"

And then so on, and there are four rooms in the Critical Care department.

"These rooms do not follow the standard isolation room layout as depicted within the SHPN 04 Supplement 1 and therefore we would like some guidance as to their intended use and ventilation requirements. Currently we have provided supply air into the Gowning Lobby with a pressure stabiliser in the party wall to the bedroom and a dedicated extract within the bedroom to provide a duty of 10ac/hr which will give a pressure balance."

We see, there, a question about the isolation rooms in Critical Care.

A There was standard isolation rooms, and if I remember correctly, these ones were slightly different. There is a guidance on how to treat a standard isolation room, which generally has a PPVL, so a pressurised lobby, and these rooms didn't have. So, because it wasn't in guidance, we put forward our interpretation of what could apply to it for approval. So, that was our process.

Q But what we see here is a question about isolation rooms in the Critical Care department, and in that context there is a particular reference to 10 air changes per hour.

A Yes.

Q Yes, and then if we go up through the chain, we see that first of all Ken Hall forwards that note on to Mott MacDonald, and then if we go up again, we will see an email from Maureen Brown of Mott MacDonald to Ken Hall at Multiplex, and she says:

"Hi Ken,

"The Board have reviewed your RFI and refer IHSL to the departments Clinical Output Specification that contains the relevant information with regard to operational functionality / use of rooms and ventilation requirement. Extract from B1 PICU Clinical Output Spec noted below:

- Single cubicles will be used for privacy or isolating ordinary infectious conditions
- Lobbied single bed isolation cubicles are required for both source and

protective isolation of patients and they all require to have identical design of pressure control with positive pressure lobbies with filtered air, and negative extraction cubicles. It is required that Contaminated air must not flow back into any of the open Critical Care areas. It is required that the lobby must be joined to the room at the foot end of the bed."

[Then scrolling on, she says] Furthermore the Boards response is noted in red below".

If we scroll down, we see at the top that is the question which Mr Rutherford has posed, and then the below it is:

"Almost all children and infants admitted to PICU/HDU need their breathing to be supported by a ventilator. Hence en-suite facilities are not required. The proposed solution is correct [and so on]…"

Now, is this the exchange that you are talking about when you say that the issue of isolation rooms was raised with Mott MacDonald?

A Yes, because, as it says in there, we were looking for confirmation because we didn't or we couldn't find an appropriate isolation facility within the available guidance document, so we put forward our interpretation. We put it forward as we did any other variation or clarification which we got in this particular case.

Q I mean, I can see that this is clarification about how one treats isolation rooms in the Critical Care department, but what I do not understand is how it relates to ventilation parameters for non-isolation rooms in the Critical Care department.

A We weren't querying the non-isolation rooms. We were simply querying isolation rooms, which goes back to our tidying up of the matrix note, because that's what normal guidance is. So as soon as we saw the word "isolation" on the architectural plans, we applied our understanding of what was required for an isolation room. The isolation rooms, as we've explained there, are slightly different in layout to an adult isolation room----

Q So, just so I am clear about it, it is this exchange which you say added extra support to the approach you took to the guidance note?

A Yes.

Q I would like to turn now, Mr McKechnie, to the development of the design in relation to the pressure arrangement for multi-bed rooms.

A Right.

Q You explain in your statement that in the financial close Environmental Matrix, the pressure arrangement specified for multi-bed rooms was positive pressure.

A Yes.

Q Is that right? Then at a point after financial close, NHSL said that they wanted to have balanced or negative pressure in the multi-bed rooms.

A Yes, yeah.

Q Wallace Whittle developed proposals to achieve that. Is that correct?

A That is correct. I don't know if proposals has been interpreted as wanting to change the brief. It was more proposals of what could be done to give NHSL what they were then asking for.

Q So, in developing these proposals, did you-- Sorry, you will need a page, page 666. We have, here, an email from Brian Rutherford to you and representatives of Multiplex and Mott MacDonald, 31 January 2017. He says:

> "Dear All,
>
> "Further to last weeks ventilation workshop meeting, please find enclosed a copy of our Bedroom Ventilation Key Considerations document."

Then if we could go down to page 667, you see a TÜV SÜD document headed up "Bedroom Ventilation – Key Considerations".

A Yeah.

Q We see there that it deals with both single-bed rooms and four-bed rooms.

A Yeah.

Q If you just go to the section four-bed rooms, we see:

> "As agreed at the workshop we have undertaken a review of the 4 bed rooms current ventilation design with the view to getting the rooms into a balance. We have looked at a compromise solution by increasing the en-suite and WC ventilation rates from 10ac/hr to 17ac/hr and decreasing the room supply air from 4ac/hr to circa 3ac/hr, which would give a room balance and still maintain supply air to provide the minimum parameters in SHTM 03-01 of 10l/s per person."

So, we see here that in the context of the proposal, Wallace Whittle had in mind the need to comply with SHTM 03-01. Is that correct?

A We always have that in mind on any ventilation system, yes.

Q The proposal of 3 air changes per hour was lower than SHTM 03-01 recommended for any patient space. Is that correct?

A It was lower but, as we've explained there, it still meant that the SHTM has a default of 10l/s per occupant, so that----

THE CHAIR: Sorry, my fault----

A Sorry, they have both parameters within SHTM. They have the preferred air change rate, but they have a default minimum rate of 10l/s. So, as opposed to the proposal, I would suggest in this review we were laying out what NHSL's potential alternatives were, and one of the alternatives, as I've explained in this, was to apply the 10l/s minimum.

MR MCCLELLAND: So was it your view that it would still be compliant with the guidance----

A Yes.

Q -- notwithstanding the fact that in the table of recommended parameters at Appendix 1 the minimum recommended air change for patient areas was 6 air changes per hour?

A Yes, what you've said is correct, and the client had already amended that 6 to 4. What we were trying to do there was assist and lay and put over to them what the potential alterations could have been for them then, bearing in mind that this was at a point well down the line of not only the designs but the construction. Basically, what we were trying to do was, as we were in charge of the design, show what could potentially be done and still stay within the guidelines of SHTM 03-01.

Q Okay, so the proposal to reduce the air changes to 3, that was Wallace Whittle's suggestion as a way to achieve NHSL's objective of balanced pressure?

A It was a turnout. It wasn't that the-- The comparison there of 3 air changes was a turnout figure, which came from applying the 10l/s to the occupancy levels of the rooms.

Q Okay, so it was a turnout figure, but it was one which emerged from Wallace Whittle's proposed solution rather than having been selected by NHS Lothian?

A It was put forward to

NHS Lothian as a potential.

Q Yes. Now, the text in your note there describes this as a "compromise solution", and can you just explain why it was necessary to have a compromise solution?

A It was a compromise from the 4 air changes, which we were looking at staying within the parameters of SHTM but minimising the amount of work and work by alterations to the then-installed and approved ventilation systems. So it's kind of getting turned back on that we were trying to assist people here, as opposed to coming up with something which we'd already designed and had it signed off at the 4 air changes.

Q Yes, and then if we go, please, to page 668? Again, this is Mr Rutherford, 9 February 2017, various individuals from Wallace Whittle, Multiplex and NHS Lothian, amongst others.

A Yes.

Q He says:

"Further to our Ventilation workshop on Monday, please find enclosed a copy of our Multi Bed Rooms - Ventilation Amendment Proposal to Achieve Room Balance, Proposed Solution To Rooms Identified As Being Of Concern."

So, the reference there to a ventilation workshop, do you recall who was at the workshop?

A I don't recall being at it myself. I may have been, but I don't recall that particular one, but almost certainly Motts would have been there and obviously ourselves. So, I can't comment as to whether NHSL were involved in that workshop, but Ronnie may have been there at that time. I'm not sure. Irrespective of who was there at the workshop, the intent was put forward to us, and that intent resulted in a review of what could be done to suit this change of brief.

Q Okay, and if we go forward to page 672, we see it headed up:

"Multi Bed Rooms – Ventilation Amendment Proposal To Achieve Room Balance Proposed Solution To Rooms Identified As Being Of Concern".

That phrase "Being Of Concern", what was meant by "Concern"?

A Well, it was identified to us that NHSL had concerns over the agreed solution in terms of the resultant pressure in the rooms.

Q Yes, so the concern was NHSL's concern about the pressure----

A It was----

Q -- gradient?

A Yes, my understanding of what happened was that Infection Control had raised concerns on what the pressure relationship between the rooms and the adjacent corridors was, which at that time the room was notionally positive pressure to the corridor. Infection control had stated that their preference was for the pressure balance between the two areas to be neutral. So, at that point, in simple terms, we had more air would get into the bedroom than we were extracting, so we had highlighted that there was a number of options available to them.

Q Was it explained to you why Infection Control had concerns about the pressure balance?

A I think in broad terms they were concerned about the flow of contaminated air, due to patients with some form of infectious disease being in the corridor and moving back and forth. Obviously, the way I'm stuttering there, I didn't delve into the whys simply because we never given sounding, if you like, or advice on a clinical requirement. None of my people were qualified healthcare engineers, not working to guidance.

That's always been the case, so I would never get involved in any dialogue between-- or I wouldn't express an opinion on what was the most appropriate set up.

Q So if a health board, through its clinicians or otherwise, comes to you as the designer with an expressed preference for ventilation parameters because of their clinical needs, to what extent would you explore with them whether those parameters were correct or appropriate, might be a better word?

A On my end, it would be and is a joint process. What the clinicians need would take priority. So, I am used to dealing with clinicians who would say that they explain what they were looking for in terms of the performance and the pressure balances between different areas, for example, and then I would come up with an engineering solution to meet those preferences. It would never, ever be the other way around.

Q And imagine the hypothetical scenario where the clinicians or the health board come to you and say, "These are the ventilation parameters we want for this space, and we have got clinical reasons for doing it," but you are aware that what is proposed is contrary to the

guidance. Would you raise that with the health board, or would you regard the health board as having chosen what they wanted and that was sufficient?

A I'm not trying to dodge your question or anything, but it would depend on the parameters. For example, I've been involved in helping to develop pressure situations for people with highly infectious diseases, and in that instance we've explored the SHTM but we've also explained the workings of how applying the SHTM to that particular area would result in practical terms and then explained that, as best we could, and I don't mean any disrespect to the clinicians, but they've got their own speciality, as do I have, and sometimes they need to be led through and understand what the implications are, and it's then up to them to guide us in which way they actually want to go.

A Yes. Now----

THE CHAIR: Sorry, it is entirely my fault. I am not quite sure that I have noted an answer to Mr McClelland's question, which was, hypothetically, as I noted the question, would you raise it with the clinician if what they were asking for was apparent to you as being contrary to guidance?

A Yes.

Q You would raise that?

A I would raise it, yes.

Q Right. Thank you.

MR McLELLAND: So, if we just carry the hypothesis on a further step, and it has to be hypothetical because your position is that the solution developed for these rooms was compliant with the guidance. So, on your view, there was nothing for you to raise, but let us imagine beyond question this was a Critical Care area, subject to Critical Care recommendations for ventilation, and the clinicians came to you and said, "We have looked at this and, for clinical reasons, what we have decided is we want negative pressure," but you know for that sort of space the guidance recommends positive pressure. Would you be saying to the clinicians, "Well, hang on a minute, you might think that is what you want but you need to know that the guidance says the opposite"?

A Hypothetically, but factually that never happened.

Q No, I appreciate----

A Right?

Q Yes, no.

A I mean----

Q The reason I am asking

the question is to what extent you, as a healthcare ventilation engineer, felt able or feel able to challenge what a clinician is saying would be appropriate ventilation parameters?

A I would challenge it if the particular-- I come across clinicians who have their own interpretation of what they're looking for. What I have done in the past is sat down with those people and explained exactly what that means and the implications of what they're speaking about, and if I thought it was contrary to the SHTM, I would have raised that.

In the non-hypothetical case in Edinburgh, we did have some contact with the clinicians or the-- (inaudible) infection-- not the clinicians but Infection Control more further down the line, but that process of sitting down with the end users would, in my experience, normally have been carried out early on in the development of the design. We were presented with a reference design and, rightly or wrongly, I would have assumed that that normal process had taken place prior to me getting involved.

Q Yes. Thank you. Now, the Inquiry already knows that rooms D, E and F-- If we just have the document back on screen, please, if we can? It is bundle 13 volume 2, page 672. We have got rooms D and E. There is also F down the page. These are the Critical Care rooms, or rather the rooms that are in the Critical Care department. When you were developing this proposal, was the fact that these rooms were in the Critical Care department of any significance to you?

A I don't want to say they weren't of significance. All the rooms were of significance to us, but the part that's missing there-- because we're obviously looking at who this document was intended for. This document was intended for the client NHSL team, and a couple of parts that are missing here was, one, as that document progressed we were asked to take onboard other parameters to be considered on it, such as the-- because, bearing in mind that some of these rooms had already had their ventilation system installed, so it was the severity of the alterations----

Q Yes.

A -- but at that point in time, that schedule there-- I think if you refer back to Brian's email he also included floor plans with all of these areas clearly marked. So it should have been obvious to someone reviewing these alternative proposals

where these rooms were.

Q Yes, and that is a question of whether others would have appreciated that these rooms were in Critical Care, but I am just interested in your perspective.

A We didn't single them out, no.

Q No, you did not. You were just treating them in the same way as you were treating multi-bed rooms in the other departments of the hospital?

A Yes is the answer there.

Q And----

A Sorry, could I just add a supplementary comment there? When you said other four-beds, this review covered all four-bed areas, so it wasn't----

Q In the entire hospital?

A In the entire hospital, but there was 20 of them that were then reduced to 14 by NHSL. 14 that had to be changed.

Q We see in the "Proposed Solution" column for both rooms D and E – and it is the same for F – that what it talks about is reducing the supply ventilation down to three air changes per hour, and just to be clear, reducing from what?

A Four.

Q And the four having been specified where?

A It was in the client's Environmental Matrix.

Q My Lord, I note the time. I am afraid, my fault, we have run past the normal half-eleven.

THE CHAIR: Possibly by as much as four minutes. I do not think that is a matter for apology.

MR McLELLAND: Well, as far as I am concerned, in my line of questioning, it would be a convenient point to stop if it is convenient for everyone else.

THE CHAIR: Right, it is a convenient moment. We will take our coffee break, Mr McKechnie, and we will try and be back about ten-to.

A No problem at all.

Q Right.

(Short break)

THE CHAIR: Mr McClelland.

MR McCLELLAND: Thank you, my Lord. Mr McKechnie, before resuming on the line of questioning that we were following before the break, I would like to return just briefly to the question of guidance note 15, and I think something that you said was-- I think you referred to the statement of Graeme Greer that had

been produced for the Inquiry as having confirmed that Mott MacDonald were aware of the change to guidance note 15. Was that----

A Yes, I----

Q That was what you understood? Was that what you meant to say?

A That's what I meant to say. I think it was Graeme. If it wasn't Graeme, it was somebody else with Motts.

Q If I could just bring up Graeme Greer's witness statement, which is in witness statement bundle 2 at page 11, and it is paragraph 24, and just about-- It is about 6 lines from the top, there is a sentence begins halfway along the line with the word "when", do you see that, Mr McKechnie?

A Yes, I do, yes.

Q What he says is:

> "When retrospectively reviewing EM Revision 2 in or around the second half of 2019, I observed that Project Co had changed the wording of Guidance Note 15 ("GN15")."

The significance of that is that what Mr Greer is saying is that he noticed the change to guidance note 15 in the second half of 2019.

A Yeah, okay.

Q He is not saying that he noticed it at the time it was made in 2015.

A Yes, I can see that. Yeah, yeah.

Q Was this the passage that you had in mind?

A That was what I had in my mind, yes. When I saw that, I just saw the fact that it was revision 2 and that they were aware of the change.

Q So, just so that we can clear this away, do you now withdraw the statement that there was something in Mr Greer's statement to confirm his knowledge of the change in the guidance note at the time it was made?

A At the time, yeah.

Q Yes. If we could go, please, to bundle 13, volume 2, page 675, you should see on-screen, there, an email from Brian Rutherford of Wallace Whittle to Darren Pike and Ken Hall of Multiplex and to yourself, dated 21 February 2017, and it reads:

> "Darren, [Darren Pike]
>
> "As agreed at the meeting last Friday, see enclosed a copy of our report covering the accommodation design criteria for the single rooms and multi bed wards."

So, this report is only being exchanged between Wallace Whittle

and Multiplex. If we scroll down to the next page, we see, there, the familiar appendix 1 from SHTM 03-01, and then down to page 678, please? This is the report itself. Do you recognise this report?

A I don't recall it right at this moment in time, but I would have seen it before, yes.

Q Okay. We see the heading is, "Accommodation Design Criteria - Single Rooms & Multi Bed Wards." If we just read the opening two paragraphs, it says:

> "We have carried out an internal review of the design solutions for single and multi occupancy wards against the ventilation requirements of SHTM 03-01 … The recommended air change rates and pressure requirements are detailed in Appendix 1, a copy of which is attached to this report."

So that is a reference to Appendix 1 from SHTM 03-01?

A Yes.

Q Yes. Then if we scroll down to the bottom of the report, there is a-- Yes, next page, please. There is a conclusion there which reads:

> "As demonstrated above the current designs for the Single Rooms and General Ward Areas are fully in compliance with SHTM 03-01. See enclosed copy of [Appendix 1] for reference."

So, we see that, in this report, Wallace Whittle are giving explicit consideration to the compliance of the design with appendix 1 of SHTM 03-01. Do you accept that?

A Yeah, I accept that's what we're saying there, yes.

Q And the question really is if the environmental matrix was your brief, what did it matter if it complied with SHTM 03-01?

A Sorry, could you repeat that?

Q Yes, if the environmental matrix was your brief, what difference did it make whether or not it complied with SHTM 03-01?

A The brief or our design criteria would always have to comply with SHTM 03-01.

Q I mean, if I can put it this way, why was the report prepared at this time, which is in 2017, addressing the compliance of the design with SHTM 03-01 for these rooms?

A I don't recall the circumstances where that report was-- who initiated the report or whether that had been-- Well, sorry, I don't recall who initiated it but I've got to assume that somebody asked us, possibly

Multiplex, possibly Multiplex after IHSL or whatever had asked, and that was the purpose of that report.

Q Okay, and, as we see, it offered the reassurance, perhaps, that the existing design proposal complied with the guidance.

A Yes.

Q Now, if we could go back up to page 678, please. Yes, that is fine, thank you. If we go to the section about the current design for the single rooms and the single room WCs, what it says there is:

> "Single room ventilation system is mixed mode with opening windows.
>
> "Supply air change rate is 4ac/hr. (Air change rate reduced to reflect the benefit of the mixed mode provision.)"

Is that a reference to the reduction from six air changes to four air changes per hour?

A Yes. The intent of this report would have been to clarify what we had used in our design. The four air changes per hour was reflective of the brief EM which was also supported by the Hulley and Kirkwood thermal comfort analysis, which is where both of them refer to the four air changes.

Q Okay, and so reading on it says, "Dirty extract is via the en-suite at 17ac/hr."

A Yeah.

Q "Overall room pressure is balanced," and then it goes on to deal with the criteria in SHTM 03-01 in appendix 1, and it says:

> "Ventilation solution can be Supply/Extract or Fully Natural.
>
> "Air change rate for Single room is 6ac/hr.
>
> "Pressure Balanced or Negative."

Is that a reference to the recommendation line in the table for single bedrooms?

A Yeah.

Q And so do we see there that the justification for the reduction from six to four air changes per hour depends upon opening windows and an extract via the ensuite?

A I don't read into that that it was a justification. To my mind, it's more an explanation of what we have.

Q Yes, so, the ventilation philosophy for the single rooms is based on there being opening windows and an extract via the ensuite?

A Yes, but we've never stated that there would be two air changes supplied via the openable windows.

Q No. My question was

about the single rooms in Critical Care. Did they have opening windows or WCs-- or ensuites, sorry?

A The single rooms didn't. I think the single rooms would be four air changes. I'd need to consult the plans, but I'm pretty sure that they had a WC in them. The only areas that didn't have were the isolation facilities that we spoke about just before the break there.

Q Well, if I was to put it to you that the-- If the single rooms in Critical Care had neither opening windows nor ensuites, would you accept that the ventilation philosophy set out here would not apply to them?

A Yeah, well, the mixed mode contribution obviously wouldn't apply, but the four air changes would still have applied and would still have complied with the 10 l/s that we've spoken about.

Q But what would the justification be in a room without opening windows to reduce the air changes from six to four?

A It was never our proposal to go for four. The four air changes was a reaction to the briefed air change rates.

Q So you are saying that, because it was in the Environmental Matrix, you did not have to worry about----

A No, no, not at all. We were still-- had reviewed the concept and had satisfied ourselves that it's still aligned with the guidance within SHTM 03-01, bearing in mind that SHTM 03-01 has recommended air changes but it also has this 10 l/s per occupant baseline, if you like.

Q If you stand back and look at what this document appears to be doing, it is assessing the compliance of the ventilation solutions for these rooms against the guidance, and it explains compliance for the single bedrooms on the basis that there are opening windows, and do you accept, then, that what this does not do is explain the ventilation philosophy for single-bed rooms which do not have opening windows?

A Personally, I don't make that jump in as much as all of the single bedrooms, with the exception of the isolation facilities, were treated in the same manner.

THE CHAIR: Sorry, were?

A Treated in the same manner, and we had-- I don't know if you're coming onto this or not, but we had prepared and had a derogation on that basis.

MR McCLELLAND: Yes, and, I mean, that is really why I am asking

the question. It is about this derogation from six air changes to four air changes, and it just appears that this document is explaining the reduction to four air changes per hour on the assumption that the single-bed rooms will have a window.

A As I say, I honestly don't read it that way. I'd like to see the context and who had asked the question that this report is the response to but, in general terms, all the single bedrooms had been derogated on the four air changes. The fact that there's a window, to be honest, doesn't really impact on the design, because we would never infer that the opening or closing of that window-- or, sorry, it would only be the opening, wouldn't it? That the ventilation system relied upon that to meet the SHTM requirements.

Q It is just that line which says, "Supply air change rate is 4ac/hr. (Air change rate reduced to reflect the benefit of the mixed mode provision)."

A Yeah.

Q The line above explains that the mixed mode provision is one with opening windows.

A Correct, yeah.

Q So, if the room does not have opening windows, what is the basis for reducing the----

A Four air changes would still have met the SHTM requirements for 10 l/s per occupant.

Q Okay. If we then read down, there is a section headed up "General Ward", and it reads, "General ward ventilation system is mixed mode with opening windows…" and then:

> "Supply air change rate is 4ac/hr. (Air change rate reduced to reflect the benefit of the mixed mode provision.)
>
> "Dirty extract is via the communal ward toilet and en-suite at 10ac/hr…
>
> "Overall room pressure is positive. (In line with SHTM 03-01.)"

And then below that there is a reference to the SHTM criteria from Appendix 1, where it says:

> "Ventilation solution can be Supply or Fully Natural.
>
> "Air change rate for general ward is 6ac/hr.
>
> "Pressure has no specific requirement asked for."

Now, is that a reference to the line in the SHTM table for general wards?

A I would say so, yes.

Q That is the application of the criteria for general wards? (After a pause) Yes?

A Sorry, yes.

Q And, again, I will put to you that the four air changes per hour is based on a ventilation philosophy which assumes that there will be opening windows and an extract via a ward toilet or en-suite.

A Yeah.

Q Again, what would the justification be for a four air change rate in a part of the hospital which did not have those features?

A Again, our concern was on the design of the ventilation. The impact or otherwise of the openable windows wouldn't have affected the sizing of the ventilation installation. The reference to the mixed mode was an explanation of what we had in terms of ventilation provision.

Q Okay. Throughout this document, there is no reference to the parameters recommended for Critical Care areas. Can you just explain why not?

A Because we didn't see either the four-bed or the single-beds as having the 10 air changes/10 pascals applied to it as, at that time, that guidance didn't exist and, as I explained earlier, it now exists, which leads me to conclude that it wasn't there for anybody to pick up on before.

Q Okay. If we move

forward to bundle 13, volume 2, at page 681.

A Right.

Q This is a later version of the Wallace Whittle proposal, and we see down at the bottom that this is issue 3 from February 2017, 22 February 2017.

A Yeah.

Q The first thing to note is that the heading has changed. Before, it said "Multi Bed Rooms", but now it says "General Ward". Do you know why that change was made?

A The rooms identified as being of concern? Is that what you're referring to? The heading----

Q No, the heading in blue. Where it says, "General Ward", in previous versions it had said "Multi Bed Rooms".

A I don't know why that was changed. I don't know if it was just-- Obviously this particular table-- the review had been back and forth by that time, and that's why you'll see it's now got additional columns added to it which refer you to the works and whether the ductwork was fabricated or not, which was not in the earlier version.

Q I just wondered----

A But it is all the same-- I believe that is either still the same

rooms as with the 20 I was referring to, or I don't know if this is the revised version which had the 14 rooms identified by NHSL as the rooms which were of particular concern to them, because there was a distillation----

Q I think we will come to that later. This version still has 20 rooms in it.

A Right.

Q But my focus for the moment is on the heading, where it now refers to "General Ward", and I just wondered if that change reflects the fact that "General Ward" is a particular category within the guidance table at the back of SHTM 03-01, whereas "Multi Bed Room" is not.

A I can't think of the reasoning behind the slight amendment other than the fact that it's an entirely different report----

Q Well, one reason----

A -- and somebody's given it a different heading, that's all. I mean, it's still the same room numbers that we're speaking about, so everything else in it has remained the same except, as I say, we have amended it to add in the columns about the severity and whether this ductwork was fabricated or not.

Q Well, one reason for the change might be if the approach to the ventilation solution for these rooms was being developed in implementation of the parameters recommended in the general ward category of the table at the back of SHTM 03-01.

A I'd need to look at the comparison between the two of them, but I kind of suspect that the proposed solution has remained the same from both of those reports.

Q I will put it this way: was the proposal developed on the assumption that all of these rooms were to be treated as general wards for the purposes of SHTM guidance?

A The discussions around the wards was based on what we would have to do to them to change the pressure balance between them, which was the overriding factor which, as I say, I think had been raised by Infection Control. What's detailed there is what the implications would have been on each and every four-bedded area.

Q It is just a sequence of events, Mr McKechnie. The report we looked at a moment ago specifically applied the guidance for general wards to the multi-bed rooms, and then the next version of this table is produced with a change in the heading to use the phrase "General Ward", which is

the recognised category from the guidance. It just appears that what is happening here is that a decision has been taken to develop the solution for these rooms in accordance with the guidance that applies for general wards.

A I'm sorry, but I'm not seeing any sinister link in there, because----

Q I am not suggesting there is a sinister link.

A Well, that's the way it is coming across. Anyway, what I'm saying is that the proposed solution that's detailed in this, which was a solution to provide the air pressure-- Now, in these initial reviews, there was no suggestion I can recall about-- Air changes were secondary; it was the pressure that was at the heart of what Infection Control were looking at, and these were suggested solutions, which I believe stayed the same within the two reports.

Q Okay. You have mentioned before that, by the time we get to this version of the proposal, there are new columns added on the severity of the works and whether or not ductwork had been fabricated. Could you just explain why these were added?

A They were added by

direction, I believe, from NHSL and the-- What I believe was inferred by that was the severity of the work was obviously to help them. Now, I'm not saying this was definitive, but my own take on that was it was to help them make a commercial decision as to whether they instructed these alterations to be made. So, particularly bearing in mind that, as you'll see from the right-hand column, ductwork was either installed or had been fabricated off-site. The only reason for the query in that is, to my mind, there's more cost involved there. So I've always found that an oddity.

Q So, in short, to give effect to the preference for balanced pressure at this stage of the project was going to involve cost. Is that right? Going to involve cost to implement it?

A Absolutely, aye.

Q The Inquiry has already heard evidence that there was perhaps a disagreement between the parties about who was going to bear that cost, but----

A Might have been, but that wasn't part of our remit, if you like, in those discussions with----

Q That would be conducted further up the chain----

A Between Multiplex, IHSL

and NHSL. All we were asked to do was to give them as full a picture as possible, and that's where these severity and what the then-state-of-play was.

Q Okay. If we could go to page 684 in that bundle, please. This is an email from Ken Hall to various recipients, 27 February 2017, and he says:

> "Confirmation of the essential / non-essential room discussion recorded at the meeting last Friday 24.02.17."

And then if we go forward to the next page and, sorry, the next page after that, I think this is maybe what you were referring to a moment ago. We see a marked-up version of your proposal report.

A Yeah.

Q We see on that page there are some rooms where there is a handwritten annotation saying "Essential", and if we look further down through the document, we will see that some of them are marked as "Non-essential". What was your understanding of what that denoted?

A My understanding was that, from the NHSL Motts review, they only wanted us to change the essential ones, which, again, I find difficult to get my head round about.

Q Why do you find it difficult to get your head round about it?

A Because I would have expected a commonality of solution to these areas, but to end up with six of the multi-bed rooms which don't align with the pressure that they're speaking about? Now, that was an obvious change of the brief.

Q Maybe you would not have known if this was not being discussed at your level, but might it reflect the fact that there was cost associated with this proposal, and so a decision was being made about the rooms in which it really mattered?

A I don't think it takes even the brain of a simple building services guy to come to that conclusion.

Q All right. So, whilst this proposal is under discussion throughout 2017, there were also exchanges about the Environmental Matrix. It was being submitted and considered through the RDD process.

A Yeah.

Q And if we go, please, to bundle 13, volume 2, page 1045, we see down at the bottom there, Mr McKechnie, an email from Ken Hall to recipients at Mott MacDonald and Multiplex and also Mr Currie from NHSL, and the subject heading refers

to the RDD review of the Environmental Matrix. This is 20 September 2017, and what Mr Hall says is, "Kamil, Stewart" -- I think that is a reference to you?

A Mm-hmm.

Q

"Stewart is insistent that the meeting he requested to go over the comments still be held so we can get a full agreement at the meeting with all stakeholders."

Then if we go up to the top of that email, please, we have Mr Hall to same recipients, and this is on 26 September 2017. He is saying:

"Thursday 28th suits Wallace Whittle, 10am. Intention is to go through all the comments made, the WW response and get full agreement to close this out."

Now, insofar as this refers to you and wanting to get full agreement to go through the comments and so on, can you just explain what that was about?

A I was becoming quite frustrated and agitated that we weren't bringing the Environmental Matrix to conclusion. I offered on a number of occasions to do a line-by-line review, and that was influenced by the fact we were on site by this time, and the instillations were being installed. The drawings, which preceded that

installation, had gone through the RDD process and had been approved, but we still hadn't brought the Environmental Matrix to a conclusion, which just seemed a disconnect to me, and you see by the number of revisions that were on it, it just kept going back and forth and back and forth.

Q Yes. I think ultimately 11 revisions.

A We did 11. I'm sure it's in my statement somewhere, but I think we submitted to RDD five or six of them, so it wasn't the full 11, but nonetheless the 11 reflects that there was this ongoing revision to it, which shot right through the construction period. It was always like that. Apart from I felt that my resources were getting used, I wanted to bring it to a conclusion.

Q Yes, and if we can go then to page 1048 in that bundle, please, this is an email from Ken Hall to various recipients. The subject is the "Environmental Matrix Meeting 28.09.17". Now, you are not copied into this, so I do not know if you will have seen this before, but at item 2.0----

A Yeah.

Q -- Mr Hall says the following:

"TUV SUD requested a review line by line, Motts noted if TUV SUD can confirm a check has been made line by line then there was no requirement to do a line by line check. TUV SUD confirmed the line by line check had been carried out in their office. Item closed."

Now, so, it says here that TÜV SÜD had carried out a line-by-line review. Had that been done?

A Yes.

Q Specifically a review of what?

A It was a review of the contents of the matrix at that particular moment in time. The anomaly there is that we had addressed all of the comments that we had received up until that date, but that we were still conscious that there was a process which seemed to bring up more comments every time we submitted. We could only review what we had, but in an attempt to break this pattern, I suggested that both parties sat down and just went through the whole document. Now, interestingly, whilst that was rejected, I have seen from the current statements that-- I think it was Lindsay Guthrie said that she carried out a line-by-line review with Motts, but this was well after all of this, so----

Q Yes, I mean, I think we can refer to Ms Guthrie's statement about that. I think she may have been talking about something that was done in 2019, rather than----

A It was, yes.

Q Yes.

A It was much later than what we what we're speaking about here.

Q Yes.

A Nonetheless, I took it as a realisation that it was a potential way to go.

Q Okay, so, in terms of the line-by-line review that TÜV SÜD had carried out and what the review was for, what I understood you to say was that it was to check the Environmental Matrix took account of all comments that had been made on it by or on behalf of the Board.

A Yes, right.

Q Did it involve a check that the matrix parameters amateurs complied in all respects with applicable guidance?

A We'd already done that and, again, as I tried to explain earlier, the RDD process is normally that any follow-on review is by exception.

Q Yes, and so, those reviews having been carried out, were you satisfied that the matrix reflected

the comments that had been made and a solution that was compliant with the applicable guidance?

A As the matrix stood at that particular time, that's correct, but what I was trying to forestall was receiving additional comments which I would then have to revise the matrix about----

Q Mm-hmm.

A -- because that was a process that continued to be happening.

Q Why had you wanted Mott MacDonald to participate in the line-by-line review.

A My interpretation of Motts – and certainly the way the review meetings went – was that Motts were the technical advisor.

Q Just to be explicit about it, what role did you expect them to perform in the line-by-line review?

A To basically agree that the parameters that we had then recorded in the matrix was the client's brief. I didn't expect the review to be primarily Motts, but I did expect them to lead any line-by-line, just as they led the RDD process.

Q And when Mott McDonald said that was unnecessary, what did you take from that?

A I kind of gave in a wee bit

at that. I tried my best to try and get past this deadlock, but there didn't appear to be any acceptance of that on the other side. I didn't know what else to do, so we just kept in this process.

Q Okay, and if we read down to the next note, note 3.0:

> "Feedback from Motts that subject to the 11No clarifications required for Rev 010 this concludes the review of the matrix."

Did you take any comfort from that?

A Yes, it appeared that receiving that feedback had finally put the matrix into a place that we weren't going to continue this process of constant revision.

Q Then, just for completeness, note 4.0----

A Sorry, before that, could I again say that that wasn't my first offer of a review? I'd already made that offer very early on in the process, but it wasn't a one-off. It was a continued suggestion of how to get past this blockage. Sorry I interrupted you.

Q Was the Mott MacDonald response to the offer the same at each point?

A Yeah.

Q I was just going to say,

for completeness, that item 4.0 in Mr Hall's note records that:

> "Multi bed rooms were not discussed at this meeting. Matrix will require to be updated once the changes are instructed."

Does that simply reflect the fact that the proposal for the multi-bed rooms was still under discussion or development?

A Absolutely, that's what Ken's suggesting there.

Q Yes. Now, you go please to bundle 13, volume 2----

THE CHAIR: Mr McClelland, if I may, before we leave that email, just again really to make sure that I have understood your answers, Mr McKechnie, you confirmed that, as is stated in the email, a line-by-line check had been carried out by your office. As I have noted Mr McClelland's question, it was that line-by-line check had been to check the Environmental Matrix against all the comments that you had received.

As I have noted Mr McClelland, he said you were satisfied that the Environmental Matrix as at that date reflected all the comments made and the guidance. Have I noted and understood you to agree that?

A Yes, but the slight clarification I would give there was that at that point, the review against the guidance would've been carried out internally by us at a much earlier time. Therefore, as per the normal RDD review process, I was saying that we'd carried out a line-by-line review of the comments that had been made, and we'd addressed them. So, in other words, we felt that the matrix was as up-to-date as it could possibly be against everything that we'd received.

Q Right. I think what I was taking from the email and your answer was that this was a relatively recent exercise that had been carried out.

A Only on addressing the comments----

Q Only on the comments.

A We'd previously reviewed all of the design criteria we had, met with guidance.

Q Right.

A So we felt we had a completely up-to-date document.

Q Right.

A Just to clarify that, it wasn't that this was our first dip into reviewing the matrix against guidance.

Q Right, so, do I take from that, at some stage in respect of one or other of the versions of the Environmental Matrix, your office had gone through – when I say "line-by-line", I am imagining literally – line-by-

line to check that the parameters in the Environmental Matrix, as it then stood, conformed with your understanding of guidance, or have I gotten that wrong?

A No, no, that's correct, but it wasn't just, you know, kind of just before----

Q Yes, it was not just in October 2017 but at some earlier point.

A Yes.

Q Thank you.

MR MCCLELLAND: Thank you, my Lord. If you could go, please, to bundle 13, volume 2, page 1242? We are moving forward about seven months, Mr McKechnie. We see here an email from Ken Hall to you and others, subject heading, "12.04.18 4 Bed Workshop Summary". So, I take it to be a note of the outcome of that meeting, and Mr Hall heads it up, "Confirmation of Key Points discussed". Then at point 1.0 he says:

> "SM [which I take to be Stewart McKechnie] noted concerns on agreement from the previous workshop No1 that the objective of workshop No2 was to obtain agreement in principle on the draft drawings being tabled to allow progress to continue on 4 bed design. This was due to NHSL held up at another meeting, and no delegated authority at the workshop.
>
> "[Then below that] Action. Concerns resolved as Ronnie Henderson joined the workshop at 13.30."

Now, first of all, what were your concerns from the previous workshop?

A My concern at that time was the fact that we were attending a meeting to resolve all of the particular workshop actions, and we didn't have anybody there from NHSL. So, Ken's note is quite correct, because I would have opened the meeting saying, "There's nobody here for the NHSL, guys, how are we going to bring this workshop to a sensible conclusion?" and then, as it says, Ronnie turned up half an hour later.

Q And so what did you understand to be Mr Henderson's authority at the meeting?

A He was the NHSL, I think, sole representative, but the-- So, he'd have been there for NHSL, and the thing is it's strange terminology getting used here because it's not a minute as such. It doesn't appear to record the actual parties that were there.

Q Well, we can----

A I think Ken's notes-- Ken's very pragmatic, and I think he

was just-- you know, at that point, I'd have been banging the table saying, "What am I here for, boys?"

Q Yes. Okay, and so did you understand, then, that Mr Henderson had decision making authority for NHSL in relation to the matters that were discussed at that meeting?

A Well, I assumed so, yes.

Q Yes. In relation to the attendees, Mr McKechnie, if we can go to page 1246, and we have, there, what appears to be a list of the attendees at that point, just so that you are aware of that. So, we can see there is Ken Hall from Multiplex and I think Andrew McColl, Douglas Anderson, Colin MacRae and Kamil Kolodziejczyk from Mott MacDonald----

A Yeah.

Q -- Ronnie Henderson from NHSL, and yourself from TÜV SÜD. So, what you thought was right that Ronnie Henderson was the only representative of the health board at that meeting. So, if we go back, please, to 1242, and item 2.0 reads:

> "Rooms in question tabled based on the previous Rev 05 schedule. Rooms cross referenced drawings against the schedule. See attached schedule and drawings over viewed."

So, that reference there to revision 5 of the schedule, is that to Wallace Whittle's proposal for the multi-bed rooms?

A I would expect so, because it also records that there's 14 rooms in question, which is what the previous review had filtered it down to.

Q Now, if you read down to item 6.0, "NHSL confirmed agreement in principal to the strategy tabled," and so on. What did you understand the strategy tabled to be?

A Well, my understanding would have been-- Now, I'd need to check revision 5, whether it was the same description of works that were looked at in the earlier table, but whatever that then-current description of works which we had put forward, my interpretation of that was that we had to take that description and change it into engineering drawings.

Q So, in short, did you understand NHSL to be agreeing to the multi-bedroom proposal?

A Absolutely, yeah.

Q And to what extent did you understand them to be agreeing to it and, could I just put to you explicitly, did you understand them to be-- that their approval was confined to confirmation that it met their

operational functionality requirements?

A My interpretation, as I say, operational functionality is a new expression to me, but at that particular time – and I don't see any difference to be honest – the fact that they had agreed in principal to the strategy meant that I was then given clear direction that I could develop that strategy and incorporate it in revisions to my installation drawings, which would have then had to go through the RDD process to get their acceptance of what we were saying transformed into engineering alterations or whatever that was required.

Q Okay, so to be fair, the note records that it was agreement in principal and so your understanding was that you could then get on with developing the detailed documents----

A Yes, so it had----

Q -- reflecting it through the RDD process?

A Similarly, the detailed drawings, but then, because at that point we've recorded what the implications are and then we have to change that in engineering terms into, I mean, ductwork, size increases, routing and all of that kind of thing, which is what our drawings convey.

Q Okay, and at item 7.0, it reads:

"Spare capacity. TUV SUD tabled the initial draft assessment:

Supply: No impact as being maintained at 4ACH as per the Environmental Matrix."

A Yeah.

Q So, does that reflect the discussion at the meeting about the four air change parameter?

A During the course of developing these solutions, we had initially used the 10 l/s per occupant, which-- We were then in the various reviews of that document, where we demonstrated at one point what we could do by applying the 10 l/s but, as you saw from the first report, that lowered the air change rate down to 2.9, something like that. We then increased-- or left air change rate as it was at that particular time at the four, and we made alterations to the extract. So, by boosting the extract, we kept the amount of supply there, so we boosted the extract to achieve the balance.

Q Okay. If we could then go to bundle 13, volume 2, page 1235? So, this is an email dated 13 April 2018, so it is the day after that meeting, and it is from Brian Rutherford at Wallace Whittle to the representatives of Multiplex and

copied to you. Subject, "4 Bed Ward Revised Ventilation," and then what Brian Rutherford says is, "See enclosed a copy of the revised ward ventilation proposals to achieve a room balance at 4ac/hr." So, does that reflect the idea of maintaining the air changes at the four stated in the Environmental Matrix?

A That's correct, yeah.

Q And then if we go, please, to bundle 13, volume 2, page 1255, we have an email there from Ronnie Henderson to you and Ken Hall of Multiplex and others. It is 18 April 2018 and he is saying:

> "Hi Ken,
>
> "I note the attached schedule rev 05 still applies to Air Change rates between 2.7 & 3.5, we are seeking design for 4 Air Changes to all 14 rooms. Can you confirm that this is the brief to WW"

And so, I think, as we have just seen, by the time Mr Henderson sent that email, Wallace Whittle had already prepared a proposal at four air changes per hour?

A Yeah.

Q Yes, and then at page 1258 we have Ken Hall's reply to Mr Henderson's email, and he says:

> "Hi Ronnie,
>
> "4ACH is the brief - supply and extract [and so on]."

Who was responsible, in your view, for the choice of four air changes per hour for these rooms?

A It's not so much-- The four air changes was already a design proposal and, as we've spoken about, it was what was contained within the matrix etc. The maintaining the four air changes was-- I understand that to not dropping down to and using the 10 l/s alternative. My understanding of that was that was NHSL who were in charge of that and probably instructing Motts that that's what they wanted.

Q Okay, so do you accept then that when Mr Henderson asks for four air changes per hour, he is coming at that from the perspective that he wants something higher than the 2.9 or 3 air changes that had been proposed in the earlier versions of the proposal?

A I think we need to clarify the wording of "proposal" because what we had produced was, "Here's the minimum alterations that we think we could make to the existing system," and, as we've seen from the previous versions of that schedule, that was on the back of in a lot of these areas the ductwork was already installed. So, it wasn't, if you like, a fresh proposal by

us. I think, with hindsight, maybe we should have used an alternative name. It was a response to what we understood the client was now requiring these rooms to be serviced.

Q Okay. I mean, that is understood. My question is really about Mr Henderson, and when he is asking for four air changes, what he is trying to do is to increase it from what had been set out in the Wallace Whittle response.

A So, why did he do that? Why did he do that? Is that what you're asking me?

Q No, I am just-- If one looked at the email from Mr Henderson in isolation, you might have the impression that he was choosing four air changes as his----

A Certainly it was a client or Board decision to retain the four air changes. They had been offered options and, of the options, they selected to maintain the four.

Q But he is doing that to increase the number of air changes from what had been under discussion?

A He is doing that as a response to a potential solution. So, there was no physical increase at that point in time. It was basically keeping the status quo on the supply here.

Q Yes. If you could go

through your witness statement, please, it's at witness statement bundle 2 at page 180, and it is paragraph 52. I am just reading what you say there:

> "NHSL wished to explore the potential consequences involved when changing from 4 air changes within bedrooms, as set out in the EM and accepted design drawings and designed 10 air changes from the adjacent bathrooms."

Now, just when one reads that, one might get the impression that you were saying that NHSL were driven by a desire to change the air change rates, but I think from what we have discussed today you would accept that actually what they were primarily motivated by was the achievement of a balanced pressure arrangement in the multi-bed rooms.

A Absolutely. This whole review process was driven by the pressure relationship between the bedrooms, the wards, four-bed wards – whatever you want to call them – and the adjacent corridor.

Q Okay, and then reading on, you say:

> "We were advised that as part of our review we could consider reducing the 4 A/c

supply rate to 120l/s which would align with the Building Standards Vent Rate for 12 occupants."

And you have alluded to that today, but who was it that came up with the idea of reducing the four air change supply?

A My recollection was it was Ronnie Henderson, but I would have received that probably via Multiplex at the briefing, if you like. They were getting advice that they wanted to change the criteria.

Q Because if one looks at the documents, the first reference in those to a reduction in the air changes below four comes in the Wallace Whittle proposal for the multi-bed rooms. Do you mean by this to suggest that the idea had come from somebody else before it went into your document, or was it something that Wallace Whittle themselves had come up as the way to achieve the----

A No, my recollection was that there was open discussion between the parties as to what NHSL wanted the pressure regime to be. We would probably have suggested to them that there was an alternative way of meeting the SHTM requirements from air changes to the 10 l/s. Who that came from, quite honest with you, I don't know whether that was a

suggestion from NHSL or whether it was us suggesting an alternative way of doing it, both of which would have been compliant with SHTM 03.

Q Okay. Then if we go, please, to bundle 13, volume 2, page 1268? So, this is revision 6 of the Wallace Whittle proposal. If we go, please, to page 1270, we can see from the stamps there, Mr McKechnie, that this is the version that was approved by NHSL at level B. You see that stamp?

A Yes.

Q Yes, and there are some handwritten comments which I think we take to be Brian Currie's because it is the same colour of pen as his signature, and the second comment is about rooms with the B1 room code, so it is a comment about the rooms in Critical Care. See that?

A Mm-hmm.

Q What he says is that rooms D, E and F "DO NOT HAVE EN-SUITES." Now, if we go back up to page 1268, and if we look at the text for either room D or room E – and it is the same in F – it now reads, "Retain the supply ventilation at 4ac/hr and the en-suite ventilation at 10ac/hr." So there is reference there to ensuites, and that had not appeared in earlier versions of this document. Do you

know why that wording was added?

A To be honest with you, no, I don't.

Q Was it anything to do with the role of ensuites in the mixed mode ventilation solution?

A I wouldn't think so, no. I'd need to take that away and have a wee look at the-- compare the previous versions of it. It looks like there's an error there, that we shouldn't have mentioned extract for the ensuite.

Q This comes in in the sixth revision of this document, so somebody must have had a good reason for putting it in.

A Sorry, I can't explain, because what I'm looking at is that they've got-- the description of the solution says to, "Introduce new general extract ductwork and grille into the room to provide 4ac/hr overall," which would have achieved the balance that we were speaking about in terms of-- would have achieved what NHSL was looking for, which was a balance between the supply and the extract. So I don't know why that line would have been in because, as Brian's picked up on, that particular part of it would appear to be incorrect, but the correct solution is within that description as well.

Q I mean, it is just we saw the document earlier which explained the philosophy behind the multi-mode ventilation solution as including extract via en-suites. Remember that document we looked at?

A Mm-hmm.

Q And that is the only explanation I can think of for the appearance of these words here, that that was intended to connect up the solution for these multi-bed rooms with that ventilation philosophy. I mean, is that----

A I don't think so. Personally, I'm thinking when I'm reading this that it's a cut and paste job where somebody's forgot to take out that first opening statement because, as I say, the solution of introducing the new general extract into the room to provide four air change overall is the solution that was adopted.

Q Okay, and then if we go to bundle 13, volume 2, page 1279, this is revision 7 of the proposal, and if we just go to page 1282, we can see that this is the version approved by NHSL at level A on 26 July 2018. If we just go back up to page 1279, we can see rooms D, E and F there. The reference to the ensuites has been removed again. So, does that reflect the fact that there were not ensuites in

the Critical Care rooms?

A That's correct, yeah.

Q Yes. So, if we just stand back, we have looked at the development of this proposal. I am using that term just because it is the one in the heading. We have seen that evolve over several months, and throughout all of the discussions about that proposal was there any discussion that you recall about the fact that four of the rooms were in the Critical Care Department?

A No, I don't recall that at all. My recollection was that this was more a global reference to four-bed areas.

Q And the understanding of some of the other witnesses who were involved in those meetings is that all of the multi-bed rooms were being treated through the development of this proposal just as general wards. Did your design proposal for them proceed on that basis?

A Yes, because, as I said, other than the current guidance, there was no guidance whatsoever in the SHTM which suggested that those rooms had to be treated in any other way.

Q And so was there any discussion at that time of the possibility that, because these rooms are in the Critical Care Department, they might, under the SHTM guidance, be subject to different recommendations for air change and pressure parameters?

A I think I could definitively say no; that was never up for discussion.

Q And did that possibility ever occur to you or, so far as you know, anyone else at Wallace Whittle?

A Absolutely not. I don't want to keep repeating this because I'll just bore the pants off of everybody, but that guidance didn't exist in the SHTM.

Q And, in putting the proposal together, to what extent did you take into account the intended clinical use of these rooms?

A We wouldn't have made any assumptions on the clinical use. We'd never do that. We take guidance from the, in this case, the end client, which would have either been through NHSL themselves direct or via Motts.

Q Did you take account of the fact that, in a Critical Care Department, the patients being treated there might be expected to be more vulnerable than patients in other departments of the hospital?

A I didn't have a view on that. My current view is that that's one of the reasons why we have isolation

rooms or had isolation rooms at that time, but that's only in layman's terms I would express that view.

Q Okay. If we just bring up your statement, please? Witness statement bundle 2 at page 180.

A Excuse me, before you go there, can I also, at this point, bring in the fact that once all this came out we reviewed all the available Scottish health guidance on Critical Care and we still can't find anything that's relating to treating the non-isolation areas as any different from any other area.

Q I think I have seen a document that your firm has put together which sets out the consideration that you have given to it. That is a document that you have submitted to the Inquiry?

A There's two reports, which we've-- We went through that. What I am trying to say is I was trying to indicate that that aligns with our and any other healthcare designer, is that we design to what's directed. We don't make assumptions on any clinical matters at all.

Q Yes. Now, if you just look at the paragraph on your witness statement on-screen, it is paragraph 51, and what you say is:

"I understand (from the Inquiry) that NHSL wanted to "cohort" children with similar infections together in the same rooms and that to prevent the spread of infections from those rooms it was necessary for the rooms to have a negative pressure relationship to adjoining spaces. This reasoning was not provided to us at the time either at the original briefings nor as part of the RDD process."

And I just want to ask you, are you sure your recollection about that is correct?

A Yeah, absolutely. The only thing I would clarify a wee bit is that the RDD process obviously had to be repeated on those drawings or the ventilation once all of the alterations which we had to detail from that agreement had been put at B. Maybe I should have said, "as part of the original RDD process."

Q The evidence of Janice MacKenzie, who was the NHSL Clinical Director on the project, to this Inquiry earlier this week was that she recalls telling you in a meeting about the plan for cohorting children together. Do you disagree with that, or do you not remember?

A It depends on the timeframe. It certainly wasn't in the

original discussions when we were developing the original designs. She may have a recollection of a discussion with me once the whole scenario of providing the balanced air situation was mooted. I don't recall Janice ever being involved in early discussions on the ventilation.

Q So, just to be clear about that-- Sorry, I missed part of what you said. Are you accepting that it is possible, at some stage during the development of the multi-bed room proposal, that Janice MacKenzie told you about the cohorting plan, or are you saying that did not happen?

A No, what I'm saying is if it did happen-- I don't remember the specific discussion, but if it had happened, I'm pretty certain it would have happened when the whole issue of the achieving the balanced ventilation system within the four beds-- because we had a lot of discussion with NHSL, and there was a lot of people involved in that, so it would be quite-- I'm assuming that, at some point in time, they would have told us quite openly why they wanted it, so I'm assuming that-- I'm not saying that discussion didn't happen. All I'm saying is no way did that happen at the early part of it.

Q Okay, so I think you are

accepting the possibility that that might have come up sometime, maybe, in 2017 when the NHSL proposal for balance pressure arose?

A Absolutely.

Q Yes, and the final question – and I am conscious of the time – if it was put to you that the technical solution for the multi-bed rooms was agreed on the basis that NHS Lothian were relying on Wallace Whittle to ensure that the solution complied with the SHTM guidance, does that reflect your understanding or not?

A Yes. Yeah, it does.

Q My Lord, I apologise for having gone 10 minutes beyond the expected time. That may be a convenient place to break.

THE CHAIR: No need to apologise. So, these are all your questions for Mr McKechnie, did you say?

MR MCCLELLAND: No.

THE CHAIR: Or are you suggesting a lunch break?

MR MCCLELAND: I am suggesting a lunch break. I am afraid I have more for Mr McKechnie.

THE CHAIR: (To the witness) Could I just, again, confirm that last answer? Mr McClelland put to you a proposition that NHS Lothian was

relying on Wallace Whittle. Now, actually, I have forgotten, because I have not finished noting that. My memory is that-- for compliance-- But perhaps if you could put the question again, Mr----

MR MCCLELLAND: Yes, I can. The question was if I was to put to you that this technical solution for the multi-bed rooms was agreed on the basis that NHS Lothian were relying on Wallace Whittle to ensure the solution complied with the SHTM guidance, do you agree with that?

A My answer is yes still.

THE CHAIR: You are still saying yes? Right. We will take lunch break and we will sit again maybe about quarter past two.

THE WITNESS: Okay, yeah.

(Adjourned for a short time)

THE CHAIR: Good afternoon, Mr McKechnie.

THE WITNESS: Afternoon.

THE CHAIR: Mr McClelland.

MR MCCLELLAND: Thank you, my Lord. Mr McKechnie, just to really clarify something that I asked you before lunch, do you remember we discussed the meetings in 2018 about the multi-bed rooms and, in particular, the ones which Ronnie Henderson of NHSL communicated agreement in principle to the multi-bed room proposal? Do you recall that?

A Yeah, yeah.

Q We discussed that this morning? Yes, and then also his communication about the desire for 4 air changes per hour?

A Yes.

Q You remember that?

A Yeah.

Q Yes. Are you aware that NHS Lothian had threatened litigation in order to get the balance pressure arrangement in the rooms?

A I was told that there was an issue, which I didn't get involved in at all. So, yes, I was aware there was an issue. Timing wise and the rest of it, I couldn't comment. I don't know if it was before the SA1 or whatever. So, yes, I knew that there had been a legal issue tied to that.

Q Okay. Are you also aware, as well as the discussions about the multi-bed rooms at the level of the design that you and Mr Henderson were participating in, that there were also discussions at a higher, commercial level about resolution to the issue about the multi-bedrooms.

A No, I wasn't----

Q You were not aware of

that?

A -- involved in that at all. No.

Q Okay, that is fine, thank you. If you could have up on screen, please, witness statement bundle 3 at page 128? Mr McKechnie, you may or may not have seen this before. There is no particular reason why you should have seen it before. It is the witness statement to this Inquiry from Donald Inverarity, who was the lead or I think maybe still is the lead Infection Prevention and Control doctor at NHS Lothian, and there are some things that he says in his witness statement that I would just like to put to you for your comment, if I may. So, the first is at paragraph 92. I am just going to read from there. What he says is:

> "The types of clinical activities in critical care are very different to general wards. For example, invasive procedures such as chest drain insertion can be needed in emergencies and, on rare occasions, a room in critical care needs to be on par with, or at least closer to, the parameters for an operating theatre rather than a general ward. That is because occasionally an ITU bed space can of necessity function as an operating theatre if a patient requires immediate surgical intervention and it is not feasible to transfer them to an operating theatre until they are more stable. In my view, that's why you need conditions with air changes and positive pressure, which effectively replicate operating theatre conditions or treatment room conditions."

Now, my question about that is are these considerations that you as a healthcare engineer would be aware of yourself?

A No. As I said before, we work to the provided guidance. I have no doubt the man is 100 per cent correct because I have met him before and he's totally switched on, but that's a clinician-style description. I wouldn't profess to have any knowledge of anything particular in there.

Q So if you were to take account of factors like that, would you be dependent on information from a health board, for example, to let you know that that was the clinical use to which the rooms would be put?

A In what has been described there, I would've said it would need to be a bit more formal than a health board consideration. It seems to be in that statement you're

doing a comparison with operating theatres. There's a whole suite of engineering guidance on layout, sort of, geography of an operating theatre. Hardly comparable to a single room or a multi-bedded room. I totally get what Mr Inverarity is saying but, no, I wouldn't make any engineering conclusion on what I should be doing in one of these rooms on the basis of that. I would be asking for more guidance.

Q Yes, okay. Then if we go, please, to page 200, this is paragraph 275 of Mr Inverarity's statement. I am going to pick up about four or five lines from the bottom and then go over the page. Mr Inverarity is talking about the isolation rooms in Critical Care, and then he moves on to say this:

> "The remainder (and majority) of bedspaces, as built, had greater risk of exposures to respiratory viruses for patients and staff during periods when the number of admissions with respiratory viral infections leading to respiratory failure exceeded 4 (the number of isolation rooms). This avoidable hazard had been [designed] into the unit by nature of the low air change rates to 4 bedded rooms and single rooms. The design that involved a component of natural ventilation in single rooms was also non-compliant with best practice in the health building note for designing critical care units, HBN 04-02 and not just SHTM 03-01. It suggests to me that the designer did not understand that the environment required all bed spaces in"----

A Excuse me, can I just stop you there? Are you on page 201 or 202? I'm struggling to see the text here. Still on 201?

Q I am just----

A You said you were how many the lines up from the bottom, and I'm not just catching it.

Q Okay, we will start again.

A Right.

Q So, the quote picks up at the bottom of page 200.

A 200, right.

Q Do you see the text there, "The remainder (and majority) of bedspaces"?

A Yes.

Q Just at the bottom.

A Yeah, got that.

Q Okay, I am going to read from there, and then we'll go over the page.

A Right.

Q Thank you for alerting me. If you are not following it again, please do let me know. So:

> "The remainder (and majority) of bedspaces, as built, had greater risk of exposures to respiratory viruses for patients and staff during periods when the number of admissions with respiratory viral infections leading to respiratory failure exceeded 4 (the number of isolation rooms). This avoidable hazard had been [designed] into the unit by nature of the low air change rates to 4 bedded rooms and single rooms. The design that involved a component of natural ventilation in single rooms was also non-compliant with best practice in the health building note for designing critical care units, HBN 04-02 and not just SHTM 03-01. It suggests to me that the designer did not understand that the environment required all bed spaces in PICU (critical care) to have higher ventilation delivery, through mechanical supply, than a general ward and that a general ward and an intensive care unit have different functions and different environmental conditions."

Is it a fair comment that you did not understand the clinical requirements of the space when designing the ventilation for the rooms in Critical Care?

A I think that same fair comment can be made to just about any area within a hospital. I keep going back to this, which is that we design to given criteria. I will have a look at HBN 04-02, however again we have looked and recorded all of the guidance documentation that we could find, and we didn't see anything there that gave these requirements for Critical Care.

Q Mm-hmm.

A As far as the openable windows, I honestly couldn't tell you whether the windows in Critical Care were designed as openable because it had no bearing whatsoever on the design of our ventilation systems. For air changes, it's what we designed the system to provide.

Q Yes, and he goes on to say:

> "Bedspaces in an intensive care unit are served by a critical ventilation system in its entirety and a general ward is not. It would be difficult to derogate from that position and still consider all the bedspaces to be

suitable for the full range of critical care activities. What had been built from the ventilation strategy appeared to be a 4 bedded intensive care unit (composed entirely of 4 PPVL isolation rooms) within a 20 bedded general ward footprint."

I mean, would you agree with what he says about how this had been designed?

A The description seems right, yeah.

Q So you agree that it is essentially a four-bedded intensive care unit within a 20-bedded general ward?

A Not a four-bedded intensive care. It's a four-bedded ward. I don't understand the reference to intensive care. I do understand the four PPVL isolation rooms.

Q So, what he appears to be saying is that you have got four PPVL isolation rooms, and you can treat that as a Critical Care unit because of the ventilation that it has, but that the rest of the Critical Care department is effectively a 20-bedded general ward because of its ventilation provision. Do you accept his description?

A I don't know where this is going. All I can say is that, yes, we had four PPVL isolation rooms plus another one, but if that area had to be treated as intensive care, it should have been briefed that way. I'm not putting that up as a defence, but you're talking about categorisation of an area which potentially doesn't fit into the SHTM, which I keep going on about, and sorry again. It's boring. We designed to the healthcare guidance, and we looked at all of these different-- I don't recall there was ever any discussion along this or direction on this at the time when we were producing our designs, which would, I would suggest, raise a red flag for that particular department.

Q Yes. I mean, do you accept Dr Inverarity's point that-- He is talking, there, about 20 beds. I think he is talking about the combined multi-bed and single room spaces----

A I wouldn't argue against anything that Dr Inverarity says. He's an expert in that field but, with respect, that's an opinion that's being expressed now.

Q Yes.

A It's entirely different from the reality of what we were being briefed and, yes, retrospectively Dr Inverarity is expressing his understanding of what that ward was intended to do. Again, it's not up to

me to determine what the function of a ward is. I need to be told that.

Q The point is really just a simple one. I mean, do you agree that, in respect of those 20-beds, it was effectively in ventilation terms designed as a general ward?

A Yes.

Q Yes. Now, if we could go to page 206, please, which is paragraph 287 of Dr Inverarity's statement, and this is what he says about the guidance. He says:

> "One further issue that may have contributed to the issues is the nature and interpretation of Guidance. Clearly, healthcare Guidance can be misinterpreted by people not familiar with the delivery of healthcare. In my view, it is fairly clear from SHTM 03-01, appendix 1, Table A that all bedspaces of critical care require 10 ac/hr although that interpretation was not shared by those who designed and installed the original ventilation to PICU. The presence of internal inconsistencies in some SHTMs or cross referencing to other guidance documents that lead back to the document you started with is not helpful in removing potential ambiguity."

To what extent do you agree with what Dr Inverarity says?

A I don't think I could-- I think he's making a fair point. The point I would make is that in his second sentence, "… healthcare Guidance can be misinterpreted by people not familiar with the delivery of healthcare", well, again you're not going to find an engineer-- or shouldn't find an engineer who professes to be an expert in healthcare. That's not what we do. That's not what any does, and I hope it stays that way because it would be dangerous if people start overriding things. His closing sentence is absolutely spot on. There is inconsistencies in the SHTMs and other guides. It's not a well-presented suite of documents. I think it should be, but that's why in a lot of instances we go back. That's why we go into RDD etc. to give the healthcare experienced people the opportunity to cross-examine, if you like, or see what's being provided.

Q Yes, okay. Okay, we will come back to the question of the guidance and how it might be improved, but before we do that, Settlement Agreement 1 was signed up in February 2019. I think you have said you were not directly involved in at least the----

A (Inaudible) not directly involved, but I am still not conversant with all of Settlement Agreement 1, so I have limited knowledge of it.

Q Okay. Well, if I could take you to bundle 13, volume 1, page 797, please?

A Yeah.

Q Is that a document you are familiar with?

A Yeah, the application for the derogation? Yes, absolutely.

Q Okay. Sorry, just bear with me. My iPad has let me down. (After a pause) Okay, so, we understand that this is effectively the derogation which formed the agreed solution to ventilation in the single bedrooms. As we can see, it is headed up, "Title – Single Bedroom Ventilation", and under the heading of "Detail of Change", it reads:

> "Table A1 of Appendix 1: Recommended air change rates of SHTM 03-01 … indicates that single room should be provided with 6 ac/h and [balanced] or -ve pressure.
>
> "[Then below that] Project Co proposes to:
>
> "1. Decrease the mechanical air change ventilation rate within single bedrooms from 6 air changes per hour (6 ac/hr) to 4 air changes per hour (4 ac/hr); and
>
> "2. Increase the mechanical air change ventilation rate within single bedroom WCs from [3 to 10]."

Then we see the reason below it:

> "Project Co's design philosophy for bedroom ventilation is based on mixed mode operation where mechanical supply ventilation providing 4ACH is then supplemented by openable windows to provide a passive means of ventilation (where access to an openable window is available)."

Were you or Wallace Whittle involved in the preparation of this document?

A We were in the preparation of a similar document which was passed to Multiplex and from them onto IHSL. I couldn't confirm whether the wording is exactly the same. However, the general intent, I would say, was in line with what we had been asked to do.

Q Okay----

A The background to that was that I refused to issue a derogation on these because my feeling was and still is that this was a

client brief, of the four air changes.

Q Okay, so, if you just expand on that point, please?

A The entire scenario where the four air changes was to be presented as a proposal by us I was not at all comfortable with. A derogation would normally be produced by the author or the person putting forward an alternative on that basis. We had never offered an alternative to the brief's solution apart from the air change rate in the toilet, so the reason I refused to prepare a derogation-- and I carried on refusing that for months, but I was told in no uncertain terms that I had to do it because otherwise the whole job was getting held up.

Q Okay, so----

A I fell on my own sword and dropped my principles.

Q Okay, and do we see, then, that what this derogation is aimed at is rooms for which the SHTM recommendation is six air changes per hour?

A Yeah.

Q So, it is not intended-- and I appreciate there might be debate about for which rooms SHTM recommends 10 air changes, but it was not the purpose of this derogation to apply to rooms for which the SHTM

recommendation was 10 air changes per hour?

A No, it was for their interpretation of single-bed rooms, globally.

Q Well, it also appears to relate to bedrooms with WCs and openable windows. Is that fair?

A Yes, it certainly mentions WCs and openable windows, but we, as engineers-- trying to know what word to say, but basically we would never have suggested that an openable window would give a fixed air volume/air flow.

Q No, the issue is simply whether or not this derogation applies to the single rooms in the Critical Care department, and if the rooms in the Critical Care department do not have WCs or openable windows, then do you accept that this was not intended to apply to those single rooms?

A No, I don't accept that because my position is that the four air changes supply was the overriding factor, and that was what we were designing our ventilation systems to. The inclusion of openable windows or bathrooms doesn't really impact on the amount of fresh air that we were putting into a bedroom, which is what this derogation is primarily trying to do.

Q Okay. The evidence of

Janice MacKenzie, the NHSL clinical director, is that whenever the matter of air changes in the single rooms was under discussion, there was never any suggestion that it was to apply to single rooms in the Critical Care department. Do you agree with what she says or disagree with it?

A It was never an issue at the time. There was-- the discussions were never caveated to say, for example, “And what are you doing in the Critical Care?” Again, it was just global reference to the single bedrooms.

Q Yes. Okay, so, she would be right then that it was never explicitly said that the proposal of four air changes was to apply to the Critical Care single rooms? It was just assumed?

A Nor was it ever explicitly commented upon to say, “This doesn’t apply to the single rooms.” It just wasn’t an issue that was current until very late on.

Q Yes. Okay. Now, as you will know, in June 2019 NHS Lothian brought in IOM to carry out an independent validation of the ventilation systems for theatres, and they reported that the air changes in the Critical Care rooms was not compliant with the guidance, and if we go, please, to bundle 7, volume 1, page 308, we see here that the lower email is from you dated 11 July 2019 to, I think, various people at Multiplex. Is that right?

A I think-- Is that not addressed to Ian Storrar?

Q Yes, you are right, the email at the top is to Ian Storrar---

A Yeah.

Q -- and it appears to forward on an earlier email which you had sent a minute before to----

A John Ballantyne.

Q -- people at Multiplex.

A (Inaudible).

Q Yes. That was just a point. It is currently redacted, but are these people from Multiplex that you are sending this to?

A Colin Grindlay, David, Darren are all Multiplex. Lorraine Robertson from HLM. They are, correct. I don’t know who the people are that are blanked out.

Q Yes, okay, and essentially-- If we can just scroll out a bit, and I will give you an opportunity to see the email. Do you remember the email?

A I do, yes.

Q In short, it is you setting out the position, which you maintain now, that the Critical Care ventilation

was designed in accordance with the brief and that there was nothing in the guidance to require 10 air changes per hour or 10 pascals of positive pressure in these rooms. That was the point that you were making.

A If I remember correctly, this was a response to a call from John asking me basically what was going on in Edinburgh, and that's why I compiled this: my summary of what I then understood. The reason for forwarding that particular email to Ian Storrar was to seek Ian's opinion on, again, what was being said. You mentioned in your introduction there that I knew of the IOM involvement. I didn't.

Q Right.

A I discovered that later, and nor did I understand – and I still don't think it's quite correct – that IOM were only looking at Critical Care areas, and I'm basing that on the fact that I know that there was-- Again, it was second-hand; I know that there was quite a lot of discussion on areas outwith Critical Care that IOM had got involved with.

Q Right. Okay. There are a few points made there. Why did you send the email on to Ian Storrar at NHS NSS?

A I was looking for Ian--

I've known Ian or knew Ian for a long time, and I was looking for his opinion on what was being said, because I value Ian Storrar's opinion. He's a very, very good engineer, and he was the best guy I felt I could turn to give me a second opinion, let's call it.

Q And did you get a response from him?

A I don't think I did, no.

Q Are you aware of what his views are about the solution that you had put in place?

A No, I'm not aware of either Ian or, as it was then, HFS's opinion, which I had sought but I've never received.

Q Are you aware of-- I mean, you obviously sent your email to the people at Multiplex. Are you aware of whether or not they shared the view that you had set out in your email?

A On the basis that Multiplex appeared to agree with my take on the wording of the-- There was an instruction that the high value change, I think it's 147, and that was put to me for comment by Multiplex, and I explained to them then that I was unhappy with the wording that was being used, and they must have supported that view because they refused to take on board the high value change, and that's why it was

undertaken by other parties.

Q I think it may be HVC 107.

A Oh right, (inaudible), aye?

Q Yes. In short, the one that proposed to put in place the 10 air changes and 10 pascals of positive pressure in the Critical Care rooms.

A Yes.

Q Yes.

A And it was the wording of that that I took exception to.

Q I mean, the email that you are sending there to Multiplex is dated 11 July, so just a week or so after IOM report on the Critical Care ventilation. Are you aware of whether or not your views about the compliance of it with guidance were passed further up the chain, for example, to IHSL or NHSL or the Scottish Government?

A I would be pretty confident that it was passed to IHSL. We didn't have a direct link with IHSL because my client was Multiplex, so the route for any correspondence for me to get to them would have had to go through Multiplex. I've never had any comment from HFS nor Scottish Government.

Q So, any of NHS Lothian or the Scottish Government or HFS, have any of them asked to discuss with you your views about the design and its compliance with the guidance?

A I was invited to a meeting after they had cancelled the opening. I believe it was the second meeting, and at that point there was representatives from NHSL, HFS, Uncle Tom Cobley and all, and at that point I explained to them that we had carried out a review and offered and presented that review, which is one of the two review documents I referred to this morning.

Q Okay, and what response, if any, did you get?

A Never had a response at all.

Q Never had a response?

A No.

Q Even now?

A Even now.

Q Do you know of any other Critical Care department in Scotland built under the same version of SHTM 03-01 with similar ventilation parameters in its single or multi-bed rooms as the ones that that you had designed at the RHCYP?

A I know that Glasgow doesn't have it, and I believe that the new hospital at Dumfries, which also has a natural ventilation component to it, doesn't have it. I asked – I think within the report or separately – I

asked that gathering of minds to show me a hospital or tell me of a Scottish hospital that had what they were claiming they should have. Again, Ronnie Henderson said they had it in the existing hospital, but when we went to the department, they plainly didn't have it, and I've never heard any other example. You may have it up in the Baird and ANCHOR. I don't know, but Baird and ANCHOR didn't exist when we were doing it.

Q So, I mean, can I put it this way? You are not aware of a comparable hospital either way? You are not aware of one that complies with the government's interpretation of the guidelines----

A I can only comment, obviously, on the hospitals that we've designed----

Q Yes.

A -- or I've, for whatever reason, had the opportunity to look at. So that's why I know, for example, that I don't think Glasgow has what we're speaking about at all, and probably because it was never in the SHTMs until a year or so ago.

Q I am wondering if we are talking at cross-purposes. What I wanted to know is whether you are aware of any other hospital in Scotland with a Critical Care department that

was built under the same version of SHTM 03-01, which had similar ventilation parameters to the ones that you designed at the Sick Kids hospital?

A Okay. Right, I'll rephrase my answer then. So, no, I haven't been involved in any other hospital with the standards that IOM and NHSL said should have applied.

Q Yes, and are you aware of any-- I am sure the fault is mine, Mr McKechnie. It will be all my fault, and I will wince when I look back at the transcript, but the-- So you are not aware of any that have been built to the 10 plus 10 standard?

A I'm not aware of any, yes.

Q And are you aware of any that have been built to the four air changes standard?

A No, no.

Q No. Okay. Thank you.

THE CHAIR: Right, could I just reflect on that because what I think I took from your statement, Mr McKechnie, is that you were quite-- you appear to be quite clear that there was, as far as you were aware, no other Scottish hospital which had 10 air changes/10 pascals of positive pressure for the whole----

A Critical Care?

Q -- Critical Care.

A Yeah, I'm not----

Q So you are not aware of that sort of hospital?

A No, not at all.

Q Now, what I had not picked up from-- In fact, I had rather picked up the reverse. Are you also saying that you cannot point to another Scottish hospital which has the four air changes an hour and balanced pressure other than in the isolation rooms in that Critical Care area?

A That's-- Yes, as far as I'm aware, every isolation room within any other Scottish hospital will have the 10 air changes and 10 pascals. I can't say I'm aware of any other hospital where the four-bedded areas had the four air changes, and the reason for that is that the four air changes differs from the six air change SHTM requirement. So I'm not aware of other people who have used that four air change requirement.

Q I can see it would be unremarkable if you were unable to do this but are you able to point to an example of a Scottish hospital with a Critical Care Unit, part of which is made up of isolation rooms, part of which is not made up of isolation rooms, where the air change rate in the isolation rooms is 10 air changes

an hour but the air change rate in the other part of the Critical Care Area is six air changes an hour?

A No, I can----

Q No, I mean, as I say----

A -- only really answer definitively on ones that I've been-- that we've done----

Q Right. It would be unremarkable----

A -- as an organisation.

Q As I say, it would be-- Sorry. Sorry for talking over you. I mean, I can understand that you cannot just pull an example out of the air, but you are not pointing to any other hospital which, as it were, mirrors your solution for the Edinburgh Children's Hospital, even allowing for the difference between six and four?

A No.

Q No? Right. Sorry, I hope I have not simply further confused matters.

MR McCLELLAND: No, no, I was going to apologise for having sown the confusion in the first place, and I am grateful to your Lordship for clearing it up. If we stand back from all of this, Mr McKechnie, we have got a situation in which the hospital was completed with a particular ventilation solution in Critical Care which, only a few months later, the Health Board

and the government considered to be unacceptable and ultimately had replaced, and that happened despite the extensive engagement in the design process of various professionals with relevant expertise, and obviously it would be good if that sort of outcome could be avoided in the future. I would just like to ask, in your view, what was the cause of that outcome?

A I think the cause at that time was a difference of opinions, which-- I'll say it again, but I can only deal with factual guidance. Opinions I don't think have a place in hospital design, and I think that's what's happened in this case. Being human, after anybody expresses an opinion of that magnitude, it takes a hell of a lot for them to change their mind again, and it shouldn't. It shouldn't.

Q So, are you talking specifically there about a difference of opinion over the interpretation of what it means by "Critical care areas" in the guidance?

A What it means by the servicing of the Critical Care areas. Yes, I would say that was the case.

Q The answer to this question might follow from the last, but do you have any observations about how similar outcomes might be

avoided in the future?

A Quite a few thoughts on that. I think the first one has been addressed by the incorporation of specific guidance on single beds and multi-bedded areas within the SHTM, which is currently within the old table now that's in there which never existed before. So somebody has addressed that anomaly which was not clear at the time.

Going further forward with that, I think, perhaps-- and I know NHS Assure are a relatively new organisation, but my own personal suggestion would be that they need to be more involved with each of the Health Boards. In particular, I would like to suggest that individual regional NHS authorities are not given free rein to present derogations and to approve them but that that process should be overseen by NHS Assure or a similar body so that you ensure commonality of servicing throughout Scotland, potentially throughout the UK.

Q Okay, that is all very interesting. There are a few points I would like to pick up one by one, if I may. If we could go, first of all, to bundle 1 at page 2431, this, as I think you will probably recognise, Mr McKechnie, is the appendix from the 2022 version of SHTM 03-01, and we

see there that in the "General ward" box in the left-hand column we have got a reference to "level 0 and 1 care", and if we scroll further down, we have got the "Critical care" box, and the words, "Level 2 and 3 care" have been added. Is that what you were talking about when you said----

A No, no, there's another table which I've provided to the Inquiry. I think it's on the next page there is a specific table giving guidance on the Critical Care single.

Q There is a table of definitions later on which tells you what is meant by Critical Care levels 1, 2, 3----

A No, no, it gives you a definitive servicing of Critical Care, single and multi-bedded areas.

Q Well, if you know exactly where that is in the guidance, you can let us know, but the guidance runs to quite a number of pages.

A Absolutely, and that's why I'm not going to volunteer a number at the moment, but I'm quite happy to get that forwarded. I have already done that, but I can get it forwarded again.

Q Okay, I do not think it has made its way to me, but I am sure we can find that or, if need be, perhaps clarify it with you.

A No problem.

Q Are you familiar with the concept of the Ventilation Safety Group?

A I am now, yes. Again, to the best of my recollection, at the periods we're speaking about, I don't recall that existing in Edinburgh at that time. I certainly don't recall any dialogue with these people. Again, I'd welcome it. I think it's a good step forward, but it didn't exist back then, I don't think.

Q No, I think you are right about that. My understanding is that the Ventilation Safety Group was introduced by the guidance in an updated version of SHTM 03-01. If we are just able to go, please, to page 2286 of that bundle, bundle 1, and you see there the heading, "Ventilation Safety Group", Mr McKechnie?

A Yes.

Q Have you had an opportunity or are you familiar anyway with these provisions of the guidance about the Ventilation Safety Group?

A I'm familiar from reading the updated SHTM. I haven't personally had – not that I can directly recall anyway – any dealings on any hospital with a ventilation safety group.

Q Okay. Are you aware of or have you spoken to colleagues who

have been involved in projects where a ventilation safety group has been involved?

A I'm searching my memory here because we may have had some discussions with that in the new Monklands Hospital design, but generally not in any other hospital that I can recall.

Q Okay. I mean, from your reading of what the guidance now says about the Ventilation Safety Group, are there any particular points of importance that you would raise with us?

A No, again, I think it's a good step forward. The only thing I would say is that, from my experience with other authorising engineers, they're not necessarily design engineers but they're people who have a good grasp-- a practical grasp, in most cases, of the subject. So that's why I think this is good along with-- and that was where I was suggesting that NHS Assure would probably be the best conduit to provide engineering-type assistance to NHS boards.

Q Okay. I mean, if we look at paragraph 4.10 of the guidance, which is at page 2288, this is about derogations. You raised that topic a moment ago. What it recommends currently is that:

> "4.10 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.
>
> "4.11 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."

So, as worded, this currently suggests that a derogation gets scrutinised and approved by the Ventilation Safety Group within the Health Board. Is it your view that it would be preferable for that derogation to be signed off by a central body like NHS Assure?

A Absolutely. I don't think that's the end product. I think that's a good step on the way to getting something. Basically, if the Ventilation Safety Group have any objections to the derogation, that should kill it stone dead or, I mean, it has to come back around the circle again, so it would take a bit of pressure off of NHS

Assure, but in order to maintain a Scottish or a UK standard, I think you need to go back to a central body because we're still talking here about local bodies. So you're not going to get the same universal standard by doing that, I don't think.

Q Okay.

THE CHAIR: I maybe did not just quite pick up on the idea of, "not the end product." You would approve of what I take from the 2022 text that, as a first step, any proposed derogation should be approved by NHS Assure? I mean, do you----

A No, no, I would see that as a second step.

Q You would see that as a second step?

A Locally, they've got to get their act sorted and agree that that's what they want to do, but then take it away before it follows through in the process.

Q Right. So, you would envisage local clinicians making the proposal?

A No, I would expect in that scenario that, because it was local, the Ventilation Safety Group would engage with the clinicians and all the rest of it at a local level and make sure that they were satisfied and understood what was being proposed,

and only then move it forward to a review. I'm not going to say approval, because everybody runs away from that word, but a review from NHS Assure to try and ensure that there's continuity right across the (inaudible).

Q Right. Thank you.

MR MCCLELLAND: If we could go, please, to page 2402. There is a section here talking about the validation of the ventilation systems, and I am interested in your thoughts on what is said at 12.6 under the heading of "Design proposal review". It says that:

> "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."

What is being proposed is that the validating engineer who comes in right at the end should be involved right at the start when you are talking about the brief and the specification. What do you think about that?

A To be honest, I don't really think it matters as much, because my interpretation of the

validator's duty is to review it against the design brief, but probably more importantly against the SHTM requirements. Where it was different in Edinburgh was that the validator-- They'd already had, I believe, a validation by the initial independent assessor, then IOM were brought in as a further assessor. I don't think that made it as smooth as it should have been.

Q I think that the difference might have been that the independent tester was testing against the contract requirements, and then IOM were testing against the guidance requirements. I think the----

A Possibly. I don't know what their terms of reference were, but my own experience has been that an independent assessor was just that: he was independent and he should have been testing – again, in my own opinion – against SHTM compliance as well as the brief. I don't see a different duty there. An independent guy getting brought on board to validate something, I don't think a normal relationship would be just to validate it against the brief, and that's certainly what IOM did.

I mean, IOM queried where what was being provided didn't appear to align with their interpretation of SHTM,

because it wasn't just the Critical Care; they commented on a lot of stuff and gave the client and Multiplex the opportunity to respond to that.

Q I think the point behind this piece of guidance might well be that, if you think about it in the context of the Sick Kids project, it was IOM who came with a particular interpretation of the guidance, and if they had been involved at the design brief stage, they might have said at that point, "Well, four air changes in a Critical Care room is not compliant."

A Possibly.

Q Do you think that that could be a helpful sort of input on projects generally?

A In Edinburgh it would certainly have been very helpful to get any apparent anomalies discussed well before we were away down the line of thinking that we were handing the building over.

Q If we stand back from this and the guidance is followed, we might have a situation in which, in relation to the installation of ventilation in a hospital, you have got a health board, a ventilation designer, a technical assistant for the health board, a technical advisor for the health board, you might have an independent tester under the contract,

NHS Assure doing their role, a validator at the end and the Ventilation Safety Group. Do you see a risk that there might be a case of too many cooks, or do you think it is helpful to have that number of people involved?

A I don't think we're talking about anything which is that different from what we had before. You don't necessarily need to have them all in the same room, but there is nothing to stop you having a progressive involvement of these people. Personally, I think the bit that you've missed – no criticism, I don't want you to give me any more hard questions – but the bit that's missing is that, in Edinburgh, you had the reference design.

So, you had another ventilation designer involved in there. Obviously, we don't know what happened and how that reference design was brought forward. Most hospitals, I think we would have had more involvement of the clinicians and Infection Control and that kind of carry on. The way this job progressed, I think-- I assume that a lot of that happened in the past for them to get where they got to.

Q Okay. If we turn then-- and you will be glad to know this is the final topic, at least as far as I am concerned. It is NHS Assure. What

do you know about NHS Assure and its intended approach in relation to ventilation design?

A I've known NHS Assure since their conception and been involved with them, and I'm also aware of what they appear to be doing at the moment. So, way back in the days when I had long hair, we had an organisation called the Common Services Agency. They were pretty much health-orientated, and they had a hands-on-type approach.

My understanding was, in this, before the birth of NHS Assure, HFS were the only other body that was in existence who could offer guidance. I think they were brought in by the local NHS as opposed to being automatically included. NHS Assure now appear to be – with their KSARs and all the rest of the involvement that they have now – they appear to at least be heading down the road of a more involved approach, which I think is the right way to go.

Q You think it is the right way to go?

A Absolutely.

Q And have you worked on a project where Assure Key Stage Assurance Reviews have been used, or are you going on what you have read about it in the document?

A I'm going on what I've read in the document, but I'm also going on-- I was involved in Golden Jubilee Hospital in Glasgow, where admittedly NHS Assure were very fresh out of the ground, but that's where I met a number of the engineers, and I know, from speaking to my current engineers, of the KSAR reviews that they're doing on different hospitals.

Q Okay. Generally, what is the feeling about the impact that these Key Stage Assurance Reviews have on health boards that are running projects and on the projects?

A I'm not being evasive here, but I don't want-- I haven't-- other than when they were just starting off, so I don't think it would be fair for me to give an indication of what I felt was happening when-- The Golden Jubilee, for example, was very early on in this stage. I believe it's become a much slicker and more detailed approach that they're carrying out just now.

Q Okay. The structure of the Key Stage Assurance Reviews is that they take place at various stages of a project – so, the familiar stages of outline business case, full business case, construction, commissioning and handover – and they are based on the

idea that responsibility for the design will remain with the health board and whichever designers they bring in, but the Key Stage Assurance Reviews are described as a peer review aimed at ensuring the health board has properly understood its clinical needs and has identified and implemented the applicable guidance. Is that the sort of approach that you think is sufficient or appropriate, that kind of division of responsibility, or do you think there are other ways it could be done?

A No, I don't-- Overall, I think it's a fair appropriation. If I was NHS Assure, I wouldn't maybe want to give *carte blanche* approval to a designer's design. I would always expect the designer, as we did, to accept the design was ours and ours alone, but we're straying on areas where a designer is going to dig his heels in and say, "I will design to a formal brief."

If you get somebody on that, no matter how hard they wriggle, they can't get off that particular hook, and I wouldn't expect any designer worth his salt to want to get off that hook. If you're trying to infer that they have a responsibility for interpreting the likes of clinical practice and all the rest of it, you need a middleman there, and potentially that's what NHS Assure

would be providing. I totally get why they wouldn't want to take full responsibility because that doesn't sit on either side of the fence there.

Q Okay. If we go briefly, please, to bundle 9, page 138, this is an extract from the NHS Assure Key Stage Assurance Review Workbook. This is the Outline Business Case, and you'll be glad to know I'm not going to go through all of it, but at 3.5 you see that one of the questions that they ask at the Outline Business Case stage is whether there is "evidence of stakeholder input to ventilation strategies", and then in the box on the "Evidence expected" it talks about:

> "Addition to or supplement to the Environmental Matrix which confirms the following, on a room by room basis…"

Then it goes on to say the type of ventilation, patient group or function related to the space, and then the names of various people who have agreed to the room requirements, and these include:

> "… the Consultant, Clinical Lead or Department Lead… the Infection Prevention and Control Doctor… Infection Prevention and Control Nurse… the Estates/FM team representative… [and the] Project Manager [and so on]…"

So, it is envisaging a process of sign off by all of these people to ventilation parameters. Do you think that is a good step to expect in a project?

A Absolutely, yeah. The only caveat I would make to that is, under these kind of PFI-style contracts and particularly the reference design where you're expecting that a lot of this work will have been done by your reference designer, I don't know how you would capture what had been put forward by these groups. As I say, something had happened in Edinburgh where there'd been dialogue about 4 air changes and the rest of it. I only have the output documents or the likes of the thermal comfort document to go to there but, to my mind, it would be very strange if there hadn't been dialogue between Hulley & Kirkwood and end users.

Q Yes, okay, that is fine, Mr McKechnie. You have answered all my questions, but please stay there because there may be a lot of questions from others. My Lord, I am aware of at least one question from a core participant.

THE CHAIR: Mm-hmm.

MR MCCLELLAND: You may want to follow the normal process just

to confirm.

THE CHAIR: Well, possibly that might be better. Mr McKechnie, we will break for 10 or 15 minutes----

THE WITNESS: No problem.

THE CHAIR: -- just to clarify whether there is any other questions that we want to put to you, so if I can invite you to go to the witness room for the moment?

THE WITNESS: Yes, yeah.

THE CHAIR: Mr McClelland, I take it that we should probably just go through the procedure with we have previously adopted, which is to allow you to listen and respond to what core participants have to say, and then we will see where we are.

MR MCCLELLAND: Yes, indeed, my Lord. I would just simply add that I am conscious that we have another witness who we are probably just at the point of having enough time for her. I will endeavour with my colleagues to try and bottom out as quickly as possible what the question position is.

THE CHAIR: Right, well, I will not be far away.

(Short break)

Questioned by Core Participant

CORE PARTICIPANT: -- volume 2 at page 99. Do you see that? This is the Environmental Matrix from 26 November 2015.

A Yes, yeah.

Q If we can go to page 101, please, and if we could blow up guidance note 15, please? Do you remember the discussion this morning----

A Yes.

Q -- about the fact that the wording was clarified, I think, in your words to just refer to Critical Care that had the 10 air changes per hour?

A Yes, “isolation rooms”.

Q Sorry, “isolation rooms”, yes.

A Yeah.

Q I think you explained that was not shown in red because it was a non-technical change.

A That was our take on it, yes.

Q Okay. Can I ask you to have a look at Guidance Note 26, which is towards the bottom? Do you see that? It says, “Single Bedroom - the design philosophy for ventilation is for a mixed mode operation.” Just pausing there, “mixed mode operation”, is that the mechanical ventilation and the open windows?

A That was the terminology

which had been used on the initial Environmental Matrix provided to us from NHSL.

Q Okay, and just reading on:

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

Do you see that?

A Yeah.

Q Then we have in red-- I presume this is because this is a change from the previous version. Is that right?

A Yes.

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

A Yes.

Q So, can I take it that the reference to "ensuite dirty extract" means that this is referring to single bedrooms that are not in Critical Care?

A It was referring to single bedrooms generally, and it was a point which had already been discussed in reports when we looked at-- I think it was an earlier version of one of the reports that we looked at this morning.

So, we had been asked to give an explanation of what the design proposals or the design for the single bedroom ventilation was. That was a report that we produced and had meetings on to discuss the strategy. That was a result of the single bedrooms initially being questioned by, I believe, Infection Control, but let's say by NHSL, as to what the strategy was for the single-bed rooms.

We played back to them within the report what the pressure-- because that was what Infection Control were particularly concerned about, what the output pressure would be between what had been briefed and what we were proposing. We went on the basis that Infection Control – or the party, let's call them – from NHSL wanted to know what they could do to get the pressures balanced between the bedroom ventilation and the corridor, and that's where that came in from. We hadn't----

Q Okay, but my point is a little shorter than that, which is the reference there to the ensuite means that Guidance Note 26 only relates to single-bed rooms that are not in

Critical Care because Critical Care single bedrooms did not have ensuites. Would you agree with that?

A Yes, that is factually correct. I was trying to explain to you the background of where that note came from.

Q Well, bear in mind this is 2015, and I think the issue around pressures had not arisen by then.

A It certainly had.

Q Then just going back to Guidance Note 15, the change that you made so it applied only to isolation cubicles meant that Guidance Note 15 no longer applied to single-bed rooms in Critical Care. Is that right?

A It's partly right but, as I explained, our concern was that the 10 air changes and 10 pascals-- that the original guidance note was vague. We interpreted the note should have read as per our correction to it.

Q The point I just want to make is that the correction, or correction in your eyes, that you made to make Guidance Note 15 refer only to isolation cubicles means that it does not apply to single-bed rooms in Critical Care. Do you accept that?

A Yes.

Q Okay, so, if single-bed rooms that are not in Critical Care are covered by Guidance Note 26 and

single-bed rooms that are in Critical Care are not covered by Guidance Note 15, what is the strategy for single-bed rooms in Critical Care?

A Four air changes, as per the briefed Environment----

Q Okay, and just to put----

A No, sorry, that's important. That's twice you've cut me off.

Q Sorry.

A As per the briefed Environmental Matrix, provided to us as part of the BCRs, 4 air changes.

Q So, does that mean that the single-bed rooms in Critical Care have less mitigation than the single-bed rooms in non-Critical Care areas?

A What do you mean by mitigation?

Q Well, the ability to open windows in the mixed ventilation strategy.

A In Critical Care?

Q No. As we see in Guidance Note 15, single-bed rooms are governed by the mixed mode philosophy that has been described.

A Yes, and I explained earlier that----

Q That is four air changes per hour, plus the ability to open the window. Is that correct?

A If the occupier so

desires, yes.

Q Whereas in Critical Care single-bed rooms, there is no option to open the window?

A You definitively know that there's no openable windows in these single rooms, because I don't?

Q Well, this is what I understand. If that is correct, would that mean that the single bedrooms in Critical Care have less mitigation than the single bedrooms in the rest of the general ward?

A Only if you accept that the openable window is contributing consistently to the ventilation. I don't, because natural ventilation can't be relied on. If they're openable, you can open those windows there and the air flow through them will go up and down as per the wind strength/the wind direction outside, so we don't consider that as a ventilation air change rate.

Q Okay, and just my final question. Can I take it that this difference, the fact that the single bedrooms in Critical Care were not covered by guidance note 26 was not discussed with anyone within the Project Team?

A Not that I recall. Up until the IOM, I don't recall any of the bedrooms with the exception of the four-bedded areas and the isolation rooms being discussed at all with anyone with regard to the Critical Care rooms.

Q Thank you, Mr McKechnie. My Lord, that concludes my additional question.

THE CHAIR: Thank you, Mr Horn(?). Mr McKechnie that is now the end of your evidence, and you are free to go, but before you go can I thank you again for your contribution to the Inquiry both in your attendances and in the preparation that they will have involved. I am very appreciative and thank you very much.

THE WITNESS: Thank you.

THE CHAIR: But you are free to go.

THE WITNESS: Thank you.

(<u>The witness withdrew</u>)

THE CHAIR: Ms Sutherland?

MR McCLELLAND: Yes, Ms Sutherland, but it is going to be Mr MacGregor who is asking her the questions.

THE CHAIR: Shall we just allow you----

MR McCLELLAND: I can go and find him?

THE CHAIR: -- go and find him.

MR MACGREGOR: (After a pause) Lord Brodie, the next witness is

Sarah Jane Sutherland.

THE CHAIR: Thank you. (To the witness) Good afternoon, Ms Sutherland. I appreciate you have been here for some hours. I am sorry about the delay, but it is difficult just to time these things precisely. Now, I think you are prepared to make an affirmation?

THE WITNESS: Yes, that's correct.

THE CHAIR: If you just sit where you are and repeat these words after me.

Ms Sarah Jane Sutherland
Affirmed

THE CHAIR: Thank you very much, Ms Sutherland. You will be asked questions by Mr MacGregor, who is sitting opposite. My estimate is maybe about three quarters of an hour or so, but if at any stage you want to take a break or just take a pause, just tell me. Mr MacGregor.

Questioned by Mr MacGregor

MR MACGREGOR: Thank you. You are Sarah Jane Sutherland, is that correct?

A That's correct.

Q Thank you and you have provided a witness statement to the Inquiry?

A Yes, I did.

Q for core participants, they will find that at pages 411-424 of bundle 1 of the witness statements. The content of your witness statement is going to form part of your evidence to the Inquiry, but you are also going to be asked some questions by me today. If at any point you want to refer to your statement, there should be a copy available, and equally if you do not understand any of the questions I am asking, that will be my fault, so, please, just do let me know.

A Thank you.

Q If I could just begin with your background and qualifications. That is set out within your statement. At paragraph 3, you tell us that you qualified as a nurse in 2003. Is that right?

A That's correct.

Q And then you worked in various roles, coming to work in 2014 for NHS Lothian.

A So, I worked in NHS Lothian as a staff nurse from 2004. That's correct.

Q Thank you, and in 2014 is that when you came to start working in Infection Prevention and Control?

A That is correct, yes.

Q If I could just ask you to cast your mind back, then, to when you start working in Infection Prevention and Control in the period from 2014 until, perhaps, 2019, how well understood was the whole concept of healthcare acquired infections arising from the built environment?

A So, from starting in Infection Control back in 2014, as an Infection Control nurse I would be involved in small scale local, sort of, refurbishments. So, that might be a bathroom being changed into a storeroom or something like that.

I don't think, really, I would have been involved in bigger projects, although I was aware of HAI-SCRIBE and the requirement for that to be applied to any refurbishments or any building works that may be bigger projects. So I did have an awareness of that, but I wasn't predominantly involved to that large level until a bit later on in my career in Infection Control.

Q And in terms of these larger projects – things like water systems, ventilation systems – was this an emerging discipline at this time or was it something that was incredibly well known in terms of the principles within the infection prevention control

community?

A No, so, for an Infection Control nursing role participating in-- whether that be a small local project or maybe a local refurbishment which is maybe a little bit bigger, water and ventilation wouldn't be something that I would have knowledge in or be involved in advising on because it isn't part of the core Infection Control training that we got given. So, it's not part of an academic training as part of the Infection Control university diploma or certificate that you would do.

Q So, when a nurse comes from a different background, starts working in Infection Prevention and Control, there is some training, presumably, that has to be done. Is that right?

A Yes, that is correct. So, you would undertake one of the university courses, whether that be University of Dundee or the University of Highlands and Islands, and there's various options of what you can do. So, I done University of Highlands and Islands. So, you could do the certificate which contains a core set of modules, or you could do diploma, which is the core set of modules plus an extra three modules that you would pick from a variety of subjects related to Infection Control.

Q And in terms of that training that you did, did any of that training involve the built environment and, by that, I really mean water systems and ventilation in hospitals?

A No, it did not at that time, but University of Highlands and Islands have now adopted a built environment module, and I am currently doing that at the moment.

Q And do you know when they started offering that course?

A I think-- I can't give you a definite, but potentially in about the last, maybe, 18 months or so.

Q Okay. So, if we rule out the recent past, the last couple of years, should the Inquiry understand that individuals like yourself who were coming fresh to Infection Prevention and Control, having done some form of qualification in the period, say, 2014 to 2019, they would be coming in and occupying an Infection Prevention and Control nurse's role without any formal training in relation to the built environment and, by that, again, I mean water systems and ventilation systems?

A That is correct, yes.

Q So, we will come on and deal with that in a bit more detail but, again, I would just be interested in your views. Obviously, you come in,

start working in 2014. You do not have any training in the built environment, and you then start working on this massive project: The Royal Hospital for Children and Young People. Did you feel that you had adequate training to be undertaking the role on this new build project?

A So, it was a newly promoted role for me which I took on in 2018 following a predecessor retiring. So, it was a newly promoted role for me, and there was never an expectation that I would be undertaking any of the real project stuff unsupported, so it was fully supported by other senior nurses within the team who had some experience in the built environment and obviously my lead nurse at the time, Lindsay Guthrie, and Donald Inverarity, who's our Infection Control doctor. So I would always have referred back to them if I didn't understand anything in the guidance that I was looking at, and it wasn't a role that I was expected to make any sole decision making at that time. That would have come later, with experience.

Q So, you were quite fortunate within NHS Lothian that you had Dr Inverarity----

A Yes.

Q -- and Lindsay Guthrie,

who were above you in terms of the chain of command in terms of decision making, and they had experience in the built environment. Is that correct?

A Yes, to some extent they had, yeah, given advice on projects previously and had been in Infection Control a lot longer than myself. So, yes, I would say so.

Q But if we perhaps just stand back from that – and let us not think about the RHCYP, let us not think about NHS Lothian – there could be other individuals in your position around about 2014 coming in as an Infection Prevention and Control nurse working on projects, not having any training whatsoever in the built environment?

A Yes, I would believe that would be correct.

Q And in terms of the training that you say you are undertaking now, this new course that has been developed, is that something that either the Scottish Government or the NHS has made absolutely mandatory for Infection Prevention and Control nurses, or is this just simply part of your ongoing professional development?

A So, for me, it's part of my ongoing professional development. I believe it is a standalone module

within those core modules that you can choose to take over and above doing if you were just doing the certificate, but I'm not sure it is a mandatory one. I think it's by choice whether you would want to pick that module as one of your selection.

Q So, you have chosen to do that, as you say, but you do not understand that it is mandatory so there could still be individuals who come in working as Infection Prevention and Control nurses in 2024 who will have no formalised training in the built environment, water systems and ventilation systems. Is that right?

A Yes, that's correct.

Q Just as an outsider looking in, that might seem surprising. Do you find that surprising, that these critical systems within a hospital-- that individuals who are expected to carry out an Infection Prevention and Control role are not being provided with some form of basic, mandatory training in these types of systems?

A So, I think that the built environment is a small part of the Infection Control nurse's job, so it is one component of it. However, there is expert people in the field and a Project Team who have experience around water and ventilation. So I don't think-- You know, there's a

certain level that an Infection Control nurse could possibly comment on or advise on, and that's more around the patient risk if we were made aware of anything, potentially, that we thought might not be right, but in regards to the actual plumbing systems and the engineering parts of it, it's not really within an Infection Control nurse's role.

Q I think you say that very clearly within your statement, that, really, your role would not be to comment on technical issues of engineering, and that is perfectly understandable, but do you think it would be beneficial for someone working in Infection Prevention and Control to at least have some basic understanding of these system – water and ventilation – if they are going to be advising on potential risks that might arise from those systems?

A So, I think having a basic understanding, yes, is helpful, but to the extent of the actual bigger engineering aspects, I don't think that's really required. I think having a basic knowledge, yes.

Q So, perhaps helpful to have some basic training almost so you know when you are outwith your comfort zones and you need to ask for someone who is a true expert? Would that be fair?

A Yes.

Q Thank you. Again, if I just, perhaps, move on and ask about your own involvement in the project. I think you were working in Infection Prevention and Control from 2014 to 2018 and is it late 2018 that you get appointed as the HAI-SCRIBE Lead Advisor. Is that correct?

A Yes, December 2018.

Q Okay, and you stayed in that role, I think, from 2018 to 2022, and your current role is Geographical Lead Infection and Control Nurse. Is that right?

A Yes, that's correct.

Q So, we will come on and talk about what you did in the period 2018 to 2022, but what does your current role involve as the Geographical Lead Infection and Control Nurse?

A So, I am the geographical lead of one of the acute hospitals within NHS Lothian. So, I have a team of Infection Control nurses, and we basically, on a day-to-day basis, would be managing outbreak management, dealing with patient placement, dealing with education audits etc., so I manage that team and support the team, and quite a few of them are new to Infection Control, so it's about mentoring them

as well and bringing them up to speed and getting that Infection Control knowledge around, yeah, the hospital and all the components that go with being an Infection Control nurse.

Q Again, a lot of that training for an Infection Prevention and Control nurse will effectively be learning on the job. Is that fair?

A Absolutely, yes.

Q Thank you. So, in terms of your involvement with the RHCYP, I think you mentioned that you really came in and you are learning and effectively shadowing two individuals, Lindsay Guthrie and Dr Donald Inverarity. Is that correct?

A Correct.

Q So, what was Lindsay Guthrie's role on the project?

A So, Lindsay was there as my lead nurse. So, in the short time that I covered the project, which predominantly was from, sort of, the end of the first week in January because it had been the Christmas holiday so I didn't have any direct contact with the Project Team until I came back, up until the beginning of June, so Lindsay was there as a support and for me to discuss anything with her that was related to any of the projects I was working on because there was other projects going on at

that time as well.

So, I would take questions back to Lindsay and I would sound things out with her and I would be able to speak to Donald and get advice about-- If I had been asked about anything and was going to feedback advice, I would want to just check with them that what I was giving back was correct.

So, yeah, so, Lindsay would help make any decisions around that, and she would be there, yeah, for me to discuss the projects with.

Q In simple terms, would she be one step up from you in terms of the decision-making chain within the hospital, and then Dr Inverarity one stage above that?

A So, at the time, yes, Lindsay was a lead nurse for Infection Control, so yes, she would be my superior. Donald Inverarity works for the infection service but works for the microbiology part, so works in combination and alongside Infection Control, but he's the lead microbiologist.

Q And, again, if you can help us, how do those two roles mesh together? So, you have got the Infection Prevention and Control nurse, Lindsay Guthrie, and then the Infection Prevention and Control

doctor, Dr Inverarity. How do those two roles sit together?

A So, Dr Inverarity predominantly has his role around being a consultant microbiologist and will have his day-to-day microbiology work to do. Lindsay, who now is our associate nurse, sort of, director, will have her Infection Control things to do. The collaboration between microbiology and Infection Control would be around, you know, if we needed to discuss anything that microbiology-- related to any patient results, anything around our project work like we've just discussed.

So although we don't work in the same office on a day-to-day basis or anything, we do work in silo with our microbiology colleagues quite a lot because we would involve them quite often in outbreak management issues or meetings. Dr Inverarity will feed into our local Infection Control committee, so we do have a lot of collaboration, but we may not work every day, on a day-to-day basis, in the same office or anything.

Q Thank you. If I can ask you to have your statement in front of you. So, it should be in the bundle of witness statements, bundle 1, and if we could look to, I think it is, page 413, paragraph 8? It is just at the top of the

page, you will see-- If we could go over the page, please, to 413, just at the top, you will see a paragraph beginning, "From my own experience…" Do you see that?

A Yes.

Q And you tell us:

"From my own experience it is not the role of IPC to check compliance of building systems (such as ventilation systems) with Guidance (such as SHTMs); rather, the IPC role is to advise on any clinical risk of any aspect of design whether compliant or not."

Do you see that?

A Yes.

Q So, again, is that back to what we just discussed a few moments ago, that you come in, you are interested in patient safety and risk but, in terms of the technical engineering parameters, that is outwith the role of IPC?

A Correct.

Q Who would have that role, either within a Health Board or without a Health Board? Who is it on a project that is really taking responsibility for compliance with technical guidance?

A So, the technical guidance, my understanding is that

any information around the design or the performance or parameters that were being provided, they would be fed into the Project Team, usually the project manager. There usually is someone with, sort of, Facilities/Estates background that would be sitting on the project, and I think that they quite often would discuss such with the authorising engineer or authorising person for the relevant-- whether it be ventilation or water.

Q So, in terms of published guidance, you mentioned SHTMs there. Should the Inquiry understand someone working in your role as an IPC nurse would have a general understanding of the guidance but not necessarily the specifics and the nuances of that guidance?

A Yes, that's correct.

Q Thank you, and I think you mentioned earlier in your evidence that one of the documents you would be familiar with during your work is SHFN 30. Is that right?

A Yes, that's correct.

Q Again, the Inquiry has looked at SHFN 30 on a number of occasions but could you just, in broad terms, summarise your understanding from an IPC nurse's perspective? What is that guidance, SHFN 30?

A So, SHFN 30 is a mandated process that all NHS boards were instructed to implement as part of any refurbishment or new build project. The guidance itself, sort of, sets out for project managers the process that should be followed, who should be involved in the Project Team from the outset of the project, and then there's a-- various four stages of question sets that take you through different aspects of the project from beginning to completion.

The question sets, within themself, are basically a risk assessment, and it's to aid project teams to design out any risks but then also implement anything that needs to be implemented to mitigate any risk where the ideal is not possible. So, in a refurbishment, it may not be possible to provide X, Y and Z because of space constraints or bed spacing or whatever.

So it's not, you know, always possible to give what's being asked for in the documentation, but it's to allow people to make that risk assessment and document what that risk assessment is and what mitigation is going to be put in place.

Q Thank you. So, a risk management tool?

A Yes.

Q And various stages I think four stages that have to be carried out.

A There is four stages, that's correct.

Q Again, just thinking back to your role as an IPC nurse, if a project team came to you and said, "There is this four-stage process, but we are just going to skip some stages of the process," is that a course of action that you would recommend?"

A No. So, if it was a new build project-- So, not every piece of built environment work will require you to complete the four stages. The four stages are really for a new build, so from beginning to end. A local piece of work that was happening, whether that be just a room being changed to something else, that would involve you just doing a stage 3 HAI-SCRIBE. So it would depend what the project was and what level would be required, but for a new build project, absolutely, if I was asked, "We'll just skip one of the stages," I would not advise that.

Q So, if a Health Board wanted to have a state-of-the-art, brand new hospital, and the Project Team came to you and said, "We are thinking of just skipping one of the stages of SHFN," what would your advice to them be?

A I would advise that they can't do that. I mean, stage one is about the planning of the build, stage two is about the design, stage three is about the construction and stage four is about that pre-handover, so I don't see how you could skip a stage of it because they all need to be signed off and agreed, so no.

Q If we take that final stage, the stage four stage, you mentioned that that is before handover. Is that right?

A Yes, so, they call it the, sort of, "pre-handover check" is, I think, what it's called within the document, yes.

Q And why is that important?

A So, it's important that that's carried out before patient occupation because the question set is going through about the fittings, the finishes, the quality, that what was laid out at the beginning of the project brief and design-- that's what's being delivered, and it also encompasses that element around water and ventilation. So you want to know that they are compliant and meeting the guidance as laid out in SHTM 03-01 and 04-01 respectively.

Q Okay. So, if you do not complete that stage 4, you could

effectively be accepting a hospital that its water system and its ventilation system might not comply with published guidance?

A Correct.

Q Thank you. Just before we move on from HFN 30, it talks repeatedly within the document about a "collaborative approach"/a "partnership approach", that it is not a document simply designed for IPC professionals. If you think back to the period 2014 to 2019, do you think that was understood outwith IPC circles, that this was a document for much wider dissemination.

A So, I do think that there probably is a lot of people that have an awareness of it but, in my career, I'm aware that there will be a lot of people that do not know about that documentation.

Q Thank you. In terms of the latest or the relevant SHFN for the project – I think that would be the 2014 version that you would have been working on whenever you worked on the project – did you have any familiarity with the previous iteration of SHFN, which was published in 2007 and it was enforced from 2007 to 2014?

A No, that's not a document that I would have used. It

was pre-my time starting in Infection Control, and that would have been an archived document, I would believe.

Q Thank you. If I could just ask you to have a look at that document? I appreciate it is not a document that you say you are familiar with, but it is within bundle 13, volume 3, at page 554. So, bundle 13, volume 3, page 554, and you see the cover sheet which is "Scottish Health Facilities Note 30". I would really like to just draw your attention firstly to page 574. So, bundle 13, volume 3, page 574. You see at the top of that document there is a bold heading, "Common errors". Do you see that?

A Yes, I do.

Q And it says:

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

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

A Yes.

Q When you started working in Infection Prevention and Control, did you understand that there could be common errors on projects relating to air turnover and airflow

patterns? Was that something you were aware of?

A So, when I started in Infection Control, no, it wouldn't be-- As I say, ventilation isn't really part of that training. So, no, I didn't really have any understanding about ventilation parameters and airflow patterns.

Q Thank you. Then if I could ask you to look on to page 576, please, and to the conclusion section of the document? Page 576, paragraph 5.19. So, the document concludes by saying:

> "The integration of prevention and control of infection risk management and construction is in its infancy."

Do you see that?

A Yes, I do.

Q Would that meet your understanding still by the period of 2014, whenever you were starting to work in this area, or had things changed by then?

A So, I'm not too sure. I mean, I certainly know that within our own team we did have input into local build things and certainly-- obviously there was a predecessor in my role who gave advice on projects. So, I'm not too sure.

Q So, certainly within NHS Lothian, whenever you were working there, that was not really something that you thought that this was completely in its infancy? It was something that was well known, if your role existed and you were seconded into the project. Is that right?

A Yes. So, I mean, yeah. There would be Infection Control representation, and I think from an Infection Control perspective, that person would probably be thinking about risk management. In the wider Project Team, I don't know though.

Q Okay, thank you. I will just complete the paragraph. It continues saying:

> "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 and the built environment to produce sound irrefutable evidence on which to base further risk management strategies."

Do you see that?

A Mm-hmm.

Q Whenever you started working in Infection Prevention and Control, did you think that research had been carried out such that there was clear evidence in relation to risk management strategies?

A I don't know.

Q If we just think about the guidance that existed, SHTM 03-01, which would be the 2014 guidance, do you remember having any discussions with your colleagues such as Lindsay Guthrie or Dr Inverarity in terms of whether the guidance set out within that document was based on clear research and scientific findings, or is that simply not something that you would discuss with those individuals?

A Probably not something that I would have discussed.

Q Thank you. If we think back to your time within the project, you start working in late 2018. The Inquiry has heard evidence that there was an agreement reached, an agreement that is referred to commonly as Settlement Agreement 1 that got signed off in February 2019. In the period you were working on the project from late 2018 until February 2019, did you have any involvement in discussions around about the document that became Settlement Agreement 1?

A No, and I had no idea even what an SA1 was. I had never heard of that, not a commercial handover, so I was unaware of what that was.

Q Okay. Thank you. The Inquiry has heard evidence which, again, you might not be aware of that one of the things that happened in Settlement Agreement 1, which was in February 2019, is that the building, the new hospital, was handed over to NHS Lothian and it was handed over before the Stage 4 HAI-SCRIBE took place. Were you aware of that?

A Yes.

Q Again, can you just explain – perhaps from coming into the project, discussions with Lindsay Guthrie and Dr Inverarity – what the view within Infection Prevention and Control was about that happening? About Settlement Agreement 1 being signed, also being handed over, without the Stage 4 HAI-SCRIBE having been completed?

A So, I think we became aware of the handover of the hospital to NHS Lothian via an all persons email that came out to everyone that worked in NHS Lothian, and I was really surprised about that and taken aback because I didn't know that that was going to happen. As I say, I

wasn't aware of what an SA1 was, and I wasn't aware of what a commercial handover was. So, at the time, my thoughts were, "Oh my goodness, the building's been handed over, patients are going to be moving in imminently and there hasn't been a Stage 4 HAI-SCRIBE 4 completed. So, that did concern me at the time but, as I say, I had no awareness of what an SA1 or commercial handover was and that, at that time, the patients were not imminently going to be moving in and that wasn't planned until sort of more towards the summer.

Q So, you are the Infection Prevention and Control nurse working on the project, and you find out that this handover is taking place simply by an all-staff communication.

A Yeah.

Q Did you find that surprising?

A Yes, I did, because I had previously, not long before it, been at the hospital with the Project Team doing some room reviews I had asked to do, and at that point in time there wasn't-- So, I knew from an email trail, because when I had approached about asking to do room reviews, an email correspondence I had received had said that they were anticipating handover soon, but there was no date

ever mentioned and, yeah, I hadn't had any contact or correspondence from any of the Project Team to say, "This is going to be the day that we're taking handover." So, it was an all-person email that I seen it in, yes.

Q Again, you said that you obviously found it surprising that the hospital was handed over without the Stage 4 HAI-SCRIBE having been done. Can you just try and put in context your views in terms of whether you thought this was a minor issue or you thought this was a sort of catastrophic error of judgment that could have massive ramifications for patient safety? What were your views at the time?

A So, at the time I was concerned and thought, you know, so we don't know that fixtures, finishes, everything's okay, everything's risk-free. We hadn't seen any water sampling results. We hadn't seen any ventilation validation. Of course, that's at the point when I was still thinking patients were imminently moving in. I think when we then discovered and were told that actually, well, no, the patients aren't moving in, we knew that there was some give in that there was time to complete that process.

Q But hospital handed over without a check being done in terms of

whether the water system is safe. Is that right?

A Correct.

Q And in terms of whether the ventilation system is safe?

A Correct. We had seen no documentation, so I did not know where we were with any of those processes.

Q And if I could just ask you perhaps to have a look at one email in relation to this? It is in bundle 5 at page 44. So, bundle 5, page 44. Page 44 should be an email from Ronnie Henderson to Donald Inverarity, copying in a number of people, including yourself, Sarah Jane Sutherland. Do you see that?

A Yes.

Q And it begins by saying:

"Hi Donald,

"It was good to meet yesterday and have the opportunity to reassure and clarify how the project team are addressing concerns raised by IPC."

Do you see that?

A Yes.

Q So, in the first line there, we see that this is Donald Inverarity raising concerns on behalf of the Infection Prevention and Control department. Do you see that?

A Yes.

Q And then if we perhaps just look to the next paragraph, it says, "I have summarised the main points of discussion and evidence seen…" There are the attendees, and then second, "Introduction", and if we look to the second bullet point, it says:

"DI expressed concern that this HAI SCRIBE audit had not taken place before handover."

Do you see that?

A Yes.

Q And then in section 4 do you see that the email continues:

"RH explained the commissioning and validation that had taken place for both isolation rooms and theatres and that records were available in the project data storage system.

"The group visited an isolation room, the theatre suite and a ventilation plantroom where RH and DG explained the ventilation philosophy for each area.

"The group visited external areas to view pest prevention measures and active measures to prevent ingress of pigeon droppings were demonstrated.

"RH explained that both isolation and theatre validation

would be re done once construction works were completed."

Do you see that?

A Yes, I do.

Q Again, just explain, from your discussions with Dr Inverarity, how concerned was he that the HAI-SCRIBE had not been completed?

A So, I think, yes, he had the same concerns that I had.

Q And at this time – so the time this email was being sent, 21 March – were you aware of any potential emerging issues from the Queen Elizabeth University Hospital in Glasgow?

A Not at that point in time, I don't believe.

Q Okay. Did you later become aware of any concerns relating to Queen Elizabeth University Hospital?

A Yes, when there was things that obviously came out in the press, yes.

Q Okay, and did you have discussions with Lindsay Guthrie and Dr Inverarity about those issues?

A Not particularly, no.

Q Thank you. If I could just ask you to have in front of you, please, bundle 13, volume 3, at page 462? So, bundle 13, volume 3, at page 462.

This is an email from Ronnie Henderson to yourself and Dr Inverarity on 27 March 2019:

"Hi Sarah,

"Unfortunately I won't be at the meeting next week as on holiday. The system has been designed to ensure the correct airflows and pressures are present at all times however this will need to be confirmed during final commissioning and validation post completion of the works we viewed and discussed last week. If required I can provide the design information that we have available."

Do you see that?

A Yes, I do.

Q It is really, perhaps, the email two down from that. You see that there is an email from Dr Donald Inverarity to yourself----

A Yeah.

Q -- on 27 March 2019, and it is just to look at the final paragraph there to see if that perhaps jogs your memory. What Dr Inverarity says in that paragraph is:

"I had been speaking to some of the ID consultants at QEUH and the Glasgow children's hospital yesterday and they explained that all their

isolation rooms were being refitted as the original design didn't seem to provide appropriate pressures and air flows when the rooms were occupied."

Do you see that?

A Yes, I do.

Q Again, I am sure this is one email among many that you were copied into, but does that jog your memory in terms of any discussions you might have been having with Dr Inverarity about potential issues at the QEUH?

A No, so, I don't recall having any conversations around ventilation at the QEUH with Dr Inverarity. However, he was not able to attend the meeting I was going to, and yet I was obviously sent that email to ask could I ask that question, so I agreed that I would take that question along and ask Ronnie.

Q Certainly. So, if you are in ignorance of any issues that might be emerging from the Queen Elizabeth University hospital, should the Inquiry understand that there were not any formal communications coming from the NHS or from Scottish Government to NHS Lothian that were reaching Infection Prevention and Control relating to potential issues with water systems and ventilation systems at the Queen Elizabeth University Hospital, at least at this time on 27 March 2019?

A Yeah, to my knowledge, I wasn't aware of any.

Q Thank you. Were you involved, at least, in the periphery of a Stage 4 HAI-SCRIBE that was attempted in relation to the project, albeit after handover?

A Yes, I was.

Q I think you have fairly said that you were really shadowing Lindsay Guthrie at this point, but can you just explain in broad terms your understanding of what happened in relation to that Stage 4 HAI-SCRIBE?

A So any particular one of the-- So there was three separate results, or----

Q Well, I think it is perhaps not fair-- It is not a memory test for you, so if----

A No, it's okay.

Q -- we bring up the HAI-SCRIBE I am interested in, it is in bundle 5 at page 95. So, bundle 5, page 95.

A Yeah.

Q You see there is an SHFN 30 Part B.

A Yes.

Q Then you see in the additional notes that it is Lochranza,

PICU and DCN Acute Care. Do you see that?

A Yeah, that's correct. That front cover is my writing, and if my memory recalls me right, when I met with Janice Mackenzie to arrange what areas we were going to see on what day, the three SCRIBES I wrote down what areas we were going to do on each visit. This SCRIBE within itself though, the question set within it was completed by Lindsay when we were there doing the visit.

Q Thank you. So, if we just look on to the questions 4.26 on page 98, please, you see the question 4.26 is:

> "Is the ventilation system designed in accordance with the requirements of SHTM 03-01 'Ventilation in Healthcare Premises'?"

It is ticked with an asterisk which says, "with derogation 4 ac/hr – single room risk assessed + approved." Do you see that?

A Yes, I do.

Q Can you just explain your recollections of the ticking and the marginal comment, if any?

A Sure, yeah. So, we went to have a look at the finishing fixtures and where we were at with the build itself. Obviously, as part of completion of this, there was discussion when we got to this section around the fact that there had been derogation – 4 air changes an hour – and that that had been risk assessed and approved, and neither myself nor Lindsay Guthrie had any awareness that there was any derogation that had been applied for ventilation to be served at 4 air changes per hour.

So I believe that comment was made there and an asterisk was put there so that we knew that was something that we hadn't seen. We had to follow up, and we had to see what was within that risk assessment. So, we don't know when it was written, who was involved in it and who agreed to that risk assessment.

Q Okay, and at that time did you think there was any derogations from the guidance whatsoever in relation to Critical Care rooms?

A No, not at all. My recollection is the 4 air changes per hour derogation was mentioned, but there was no specifics around which areas within the hospital that was talking about.

Q Again, if we just look at question 4.26, which is effectively asking for confirmation of compliance with published guidance SHTM 03-01.

A Yes.

Q You had said earlier that is, if you like, something you would have a general knowledge of, but you would not be the specific individual that knew exactly what was set out in that document and the nuances around it. So, in terms of that box about compliance, as an IPC nurse would you need someone else within the team to tell you that the system was complying with the published guidance SHTM 03-01?

A Yes, so we need someone that had that technical expertise to tell us that, "Yes, the ventilation is designed." So Infection Control would take-- If we were told that it was designed, then we would believe that that is how it had been designed.

Q Can you remember who was it that was telling you that the system was designed in compliance with SHTM 03-01?

A So, my recollection, that would be Ronnie Henderson.

Q Thank you. The Inquiry has heard evidence that there is obviously later stages in the project. IOM come in and do various testing. It is identified that aspects of the ventilation system do not comply with published guidance. That is approximately the summer of 2019. Do you remember being involved in any discussions with Donald Inverarity and/or Lindsay Guthrie in that period over the summer of 2019?

A So, come the end of May/beginning of June my involvement in the project as a whole, sort of, stopped, and everything was taken over by Lindsay and Donald. So I may have continued to be copied into some emails, but I predominantly wasn't dealing with any-- I wasn't involved in any of the IOM discussions. I wasn't copied into many of the emails and, sort of, had no awareness of what was then being discussed in the periphery around Critical Care, etc., no.

Q Certainly. During the summer of 2019, did you attend the Falfield course?

A I did, yes.

Q Okay, and again for those of us that do not know what that is, can you just explain in broad terms, what is the Falfield course and who runs it?

A So the Falfield course, it's a residential based course, and it's basically aspects of engineering around, sort of, healthcare environment, and it, sort of, covered various aspects of-- It's a bit about ventilation, decontamination,

sterilisation, processing and things like that. So, yeah, it's around aspects of engineering and, sort of, the healthcare built environment.

Q Who ran that course? Do you remember that? I appreciate it's a long time away.

A Yes.

Q If I was to suggest that it was Peter Hoffman----

A So, it ran at Eastwood Park. I can tell you that, but----

Q Do you remember if Peter Hoffman of Public Health England was involved?

A Yes, he was one of the top-- the speaker, sorry, at the----

Q And Malcolm Thomas, did he do some of the sessions?

A Yes, I believe he did.

Q Okay. If I could ask you just to look to an email exchange, bundle 13, volume 8, page 591? So, bundle 13, volume 8, page 591. The context of the email chain that I am going to ask you to look at is that Julie Freeman contacted Janice Mackenzie and Donald Inverarity about concerns about potentially moving four-bed rooms in Critical Care from balanced or negative pressure to positive pressure.

So, she had concerns about moving from balanced and negative to positive pressure, which is set out in the guidance, and it is really just to pick up, approximately halfway down there is an email signed off by Donald beginning, "Any views from Falfield please?" Do you see that?

A I do yes.

Q Yes, so he says, "Any views from Falfield please?" If we just skip to the final paragraph, he says:

> "Discussion was detailed but crucial to get their agreement for us to have an SHT 03-01 compliant design. The current design of balanced or slightly negative 4 bedded rooms (deviation from SHTM 03-01) seems to have arisen from clinical teams rightly wanting to protect patients outwith a potential cohorted area and so much of this concern is to convince them that this is still possible with an SHTM 03-01 compliant design."

Do you see that?

A I do, yes.

Q Okay, and then it is the final bit, "Thanks. My brain is fried!" Do you see that?

A Yes.

Q Do you remember having interactions with Dr Inverarity where he expressed views that he was finding

this a very difficult and complicated problem to try to solve?

A So, no, I don't recall having any direct conversations with Donald. As I say, all the things about Critical Care were predominantly dealt with by Donald and Lindsay. I may have been copied into emails at times, but I don't remember having any direct conversation at that time.

Q The only reason I ask is because you are on the Falfield course.

A Yes.

Q Dr Inverarity says, "Any views from the Falfield course?" You will see the email at the very top of the page, page 591, is from a Jennifer Poyner copying in a number of people, including yourself.

A Mm-hmm.

Q She does not give a view. She simply says:

> "Overall with this one we think its not really an issue. The fact that there is a door that can be closed in the 4 bed room will in itself reduce infection spread by 80%. Changing to a negative pressure facility in that room area will not necessarily add anything."

Do you see that?

A Yes, I do.

Q Do you recall, was that

Jennifer Poyner expressing her own views, or was that views that had been expressed by the individuals running the Falfield course? If you cannot remember, please do just say.

A So, yeah, I don't know if that is her own opinion or if that may have came from conversation down at the course. I mean, obviously we were down there to learn about ventilation. So, I don't recall being party to any particular conversation around negative, positive, changing from balanced or whatever. I don't recall being, yeah, directly involved in----

Q So, those discussions take place; you were not privy to any discussions with Peter Hoffman or Malcolm Thomas?

A Not that I recall, no.

Q Thank you. You will no doubt be familiar in your role that the SHTM guidance-- it was updated from the 2014 version to a new version in 2022.

A Yes.

Q Is that right? Have you cause to work with and review that guidance?

A So, I have, yeah, seen some of it. However, I think projects that I've worked on more recently, all that design and things would have been done on the old guidance. So

although that's came in, I don't think there's any project I've worked on that's had to directly use that new guidance that I can recall. I think everything would've been before.

Q I think the changes made in the new table to the guidance is to provide specific definitions within Critical Care. So, there is reference to Level 2 care and Level 3 care. Are you familiar with those concepts of Level 2 and Level 3 care?

A So, I think Level 2 care is that they require a little bit more support than at ward, and Level 3 care would be they need quite a lot of support, so it may be a ventilated person, etc., is my understanding.

Q Just thinking of children in particular that would be in Critical Care, would you ever have a scenario where you could have children being treated in Critical Care that would be receiving care that is lower than Level 2 or Level 3?

A I wouldn't be able to answer that question, sorry.

Q Thank you, and is that a clinician that would have to answer that question?

A Yes.

Q Thank you. Within your role as an IPC nurse, have you had any dealings with the new body NHS Scotland Assure?

A So, yes, I do have awareness of them, and I have attended a couple of-- So, they have, like, a stakeholder conference, and they've had some online stuff. So, yes, I do have an awareness of NHS Assure, yes.

Q Have you had any involvement in the new Key Stage Assurance Review procedures?

A So, I've not had any direct involvement. I am aware of the process, and I do think it has been embedded in one of the projects which is happening on the hospital site I work on at the moment. However, that project that it's related to is an infrastructure project, so it works outwith the hospital building rather than inpatient areas.

Q In terms of these Key Stage Assurance Reviews, do you think they will be an improvement on the old system?

A So, I think NHS Assure is quite a new body. I'm not fully clear on their role, so I do understand what they aim to do but the practical side of it-- I know that a Key Stage Assurance Review is expecting NHS boards to probe and gather information around certain aspects of the project and design, etc., and that has to be

gathered at certain stages before the project can then move on, but in respect of how that evidence that's been gathered by the Boards is being checked or overseen by NHS Assure, I'm not quite sure that that's their role.

So, if it's not their role and there's an issue with a piece of design, whether that be ventilation or not, how is that, yeah, going to be known? And as the sort of overarching body that's brought in to try and help projects and assist projects, I just don't know if they should have a more in-depth involvement at a practical level but, as I say, I'm not 100 per cent sure of the role as such because there's only one project that I know in NHS Lothian that they have an involvement with.

Q In terms of the Key Stage Assurance Review, in your role as an IPC nurse, are you clear what is going to be expected of you from the new body NHS Scotland Assure?

A So, yes, I think there's lots of expectations. So, within the Key Stage Assurance Review, if you actually look at some of the documentation, there's the expectation that Infection Control will be expected to be advising around fire, electrical, things are absolutely outwith our scope of practice.

So, yes, I'm aware that-- yeah,

and I think there has been a lot of discussion across boards about the content and expectation that has been put upon Infection Prevention and Control nurses that are absolutely outwith our scope of practice.

Q Again, just so I am understanding, do you think it is unrealistic, the burden that is going to be placed on Infection Prevention and Control nurses by the Key Stage Assurance Review process?

A Absolutely. I mean, at the moment, we already have a huge remit of what we need to cover. The built environment is only one part of it, like I said earlier. So the expectation of all the extra things that we're being asked to pick up, so potentially picking up looking at overseeing, you know, the care home aspects of Infection Control. We have all our outbreak management. We have a limited workforce, and there's a huge workforce issue at the moment, I think, across the whole of Scotland in recruiting and retaining, and there's no financial uplift with it, and there's also the workforce strategy that's going to come into play.

So, that will also have, you know, potential changes to the expectations of Infection Prevention and Control nurses, and so I think the amount of

time, I think, that they are expecting that Infection Control nurses will apply to a project is absolutely unrealistic. If I recall right, I think somewhere in some of the documentation it alludes to one Infection Control nurse per project. We don't have that workforce to support that.

Q Okay. Maybe just take that in stages then. So, is it fair to say there is a lot more that is going to be expected of Infection Prevention and Control nurses in particular? Is that right? That is your understanding?

A Yes, that's correct.

Q Are you aware of any specific training that is being provided to individuals like yourself working as IPC nurses, in relation to these new tasks that you are going to have to undertake?

A No.

Q Okay, and you mentioned a problem around numbers. In terms of the work that you were doing before NHS Scotland Assure, were there enough Infection Prevention and Control nurses within Scotland for all the roles that are advertised, in terms of your understanding?

A So, I guess Infection Prevention and Control-- it's a very specialised area, so, you know, people

have to, you know, make a choice whether that's a career path they want to take because you then do need to undertake, you know, extra study, etc., to become qualified in that field. I think across Scotland there has been problems recruiting people into Infection Prevention and Control, and I think there's also people that have left Infection Control because they don't want to be plumbers or ventilation experts or, you know, the whole built environment thing has just put them off the role and they have actually left. So, yeah, it's getting people into Infection Control and retaining them.

Q So, problems with training; is that fair?

A Yes, so, as I said earlier, there's no formal academic training. There is this, now, standalone built environment course. Anything outwith that is on the job learning or doing any courses such as Falfield. Some of them are very expensive. I mean, that's a residential course. It's expensive to send people on and then take them out of that workforce for a whole week to go on a course. I think there's some companies that do water management courses and things but, again, those are all private. They're not, you know, courses that are widely just available and free of charge.

Q Okay, so, problems with training, problems with the number of IPC nurses and, also, problems in in terms of finance. Are you aware of-- the Scottish Government have obviously created this new Centre for Excellence, but in terms of the people that are actually going to be doing a lot of the work – the IPC nurses – are you aware of the Scottish Government making any resources available so that there are these IPC nurses that can actually do the tasks that the Centre for Excellence wants them to do?

A No.

Q You will be relieved to know that there is just a couple more things that I wanted to ask you about. If I could just ask you to look to your colleague Lindsay Guthrie's witness statement? So, that is in bundle 2 of the witness statements, and if we could look to page 152? Thank you. So, at paragraph 252, Lindsay Guthrie says:

> "Therefore, the expertise, skill, leadership and experience to support complex projects cannot be provided by new or relatively inexperienced IPCNs."

Do you see that?

A Yes.

Q And do you agree with that?

A Absolutely.

Q And if we could look on to paragraph 265 on page 154, please. Page 154, paragraph 265, Lindsay Guthrie says:

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

Do you see that?

A I do, yes.

Q Do you feel that you are being forced into the position of being a quality control officer for future projects?

A I have said on occasion before, yes, that I felt like a building control officer, yes.

Q And do you think that is fair and realistic to expect an IPC nurse to undertake that role?

A No.

Q Just try and explain, in your own words, the difficulties and pressures that you would feel in terms of discharging the role that has been created for you under the new system with NHS Scotland Assure?

A I think as a nurse, I mean, you know, you have a responsibility under your registration to

practice within your scope of practice, and I feel that the expectations of being expected to have that increased input and skills and knowledge around technical aspects of, like we say, water and ventilation which there are already experts within that field who should be advising projects and experts within NHS Scotland Assure, I think that, yeah, asking nursing staff and Infection Control to pick up all these extra tasks is-- yeah, it's definitely going to put some people off, and people will feel really uneasy about giving specific advice around certain aspects of a project because they will be concerned about their nursing registration.

Q Again, the Inquiry has looked at some of the documentation on a number of occasions. There are the Key Stage Assurance Reviews. There is going to be help and support that can be provided by NHS Scotland Assure, but NHS Scotland Assure is not going to act as an inspector or a regulator or have a scrutiny function. Do you think that is the right model?

A No, like I alluded to earlier, I think that, potentially, maybe, they need to have more of a practical role within a project. So, I think that there is the potential that boards may do things in a slightly different way, so

I don't really understand then the role of NHS Assure. I would expect there to be a bit of standardisation in projects.

So, what one project does in Edinburgh, the other project in Aberdeen, or wherever, will be providing similar to similar. I don't think there should be the allowances for boards to just make their own decision all the time around guidance and things, because my understanding was that this body was to help support Infection Prevention and Control teams and projects.

Q Thank you, and if we could just look within Lindsay Guthrie's statement to page 156, please, paragraph 269? So, page 156. If we could look at paragraph 268, two lines up from the bottom of the paragraph she states:

> "I think these new processes will provide limited benefit for Board level IPC teams based on the current approach."

Do you see that?

A Yes, I do.

Q Would you agree with that statement?

A Yes, I would agree. I would agree with that, yeah.

Q And then she goes on at the next paragraph, paragraph 269, to

say:

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

Do you see that?

A I do, yes.

Q Do you think they should have a formal scrutiny function? Should they be formally signing off on projects?

A So, I mean, I believe that, yeah, they should have some, yeah, practical application within a project. So, for instance, if we want to have assurance that what's being provided on an Environmental Matrix is correct and is what is being provided, then I think that, yeah, they have expert people within their body, so why, if you have this assurance means, would you not apply it to the projects to have assurance?

Q Thank you, and then the final portion of Lindsay Guthrie's statement I will ask you to look at is page 157 please, paragraph 273, and Lindsay Guthrie says:

"I am concerned that these new processes have simply created an unrealistic workload demand on board IPCTs which is not matched with capacity or capability."

Do you see that?

A I do, yes.

Q Does that reflect your views as well, as someone who is working on the ground in the industry?

A Yes.

Q And the statement continues:

"In larger Boards like NHS Lothian, where there may be multiple capital projects running in parallel, there is a risk that the NHS Scotland Assure processes are in effect setting Boards up for failure…"

Do you see that?

A Yes, I do.

Q Do you think that is really what is happening here? No doubt well-intentioned but a huge burden being placed on health boards and a huge burden being placed on Infection Prevention and Control nurses in particular. Do you think these processes that have been put in place are, in reality – albeit no doubt well-intentioned – setting boards up for failure?

A So, I think in view that we don't have the capacity and capability to cover all these projects, like I alluded to before, then I think Boards

will be set up for failure because you can't guarantee that you're going to have Infection Control representation at every single meeting that they're expecting you to be at, or potentially Boards may not even have capacity to dedicate anyone to a whole project, certainly at the moment.

Of course, I used to do a dedicated role, and we don't do that anymore. The projects are divided up between the team, but some Boards, particularly maybe the smaller boards who have smaller teams, they may not have capacity to even give that support to a single project, so yes.

Q Thank you. Ms Sutherland, I do not have any further questions, but thank you for answering my questions today. Lord Brodie may have questions, or equally there may be some applications from core participants but thank you.

A Sure. Thank you.

THE CHAIR: Right. I do not have any questions at this stage, Ms Sutherland, but what I want to do is give an opportunity to the rest of the people in the room to take a view if as to whether they have any questions to ask you. So, could I ask you, maybe, to be in the witness room for, maybe, 10 minutes just to allow us to clarify whether there are any more questions coming? Jennifer if you could----

(Short break)

THE CHAIR: Mr MacGregor?

MR MACGREGOR: Nobody has indicated any questions, my Lord.

THE CHAIR: Right. Thank you. Ms Sutherland, there are no more questions, and that means you are free to go, but before you go can I say thank you very much for your attendance and your assistance to the Inquiry, and I appreciate it is not just a question of turning up on one day. There is work gone in to prepare your statement, and that will have been time consuming and will have taken you from other activities, so I am very appreciative of that, but now you are free to go. Thank you very much.

THE WITNESS: Thank you, my Lord.

5:02