HOARE LEA

Withington Community Hospital.
Withington, Manchester.
BAM Construction Limited.

SUSTAINABILITY
STAGE 2 REPORT – THERMAL COMFORT ASSESSMENT
BREEAM NC V.6 - HEA 04
REVISION P02 – 09 MAY 2024

STAGE 2

Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
P01	29/04/2024	Thermal Comfort (HEA 04)	S. Hunt	G. Papachristou	J. Nuttall
P02	09/05/2024	Update to include reference to HTM-03 for BREEAM	S. Hunt	V. Wall	J. Nuttall

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Executive summary.

This report demonstrates how the proposed project at Withington Community Hospital has been designed to achieve thermal comfort throughout the annual occupied period in accordance with BREEAM Hea04, as identified by the BREEAM NC v.6 scheme. The purpose of the report is to show how the air conditioning systems for the proposed building is able to maintain thermally comfortable spaces in line with CIBSE Guide A, Table 1.5 recommended operative temperature ranges.

The report also shows how the air conditioning system for the proposed building is able to maintain thermally comfortable spaces in line with CIBSE Guide A, Table 1.5 recommended operative temperature ranges during the future projected climate change scenario.

The approach to demonstrating compliance with BREEAM credit issue HEA 04 has been taken from the BREEAM Knowledge Base, reference KBCN00035 which states that,

"Air-conditioned spaces are assessed to ensure appropriate thermal comfort levels are achieved. Cooling capacity should be sufficient to comply with the requirements of CIBSE Guide A, however providing sufficient space to install additional capacity to meet the requirements at a later date in line with projected climate change scenarios is also acceptable.

In addition, if it can be demonstrated that the air-conditioning system can achieve the thermal comfort criteria in accordance with CIBSE Guide A, Table 1.5, thermal modelling does not need to be carried out. The "time out of range" (TOR) metric should be reported as 0%."

As such, the time out of range values (TORs) are presented for each applicable occupied space within the relevant appendices. The minimum and maximum Predictive Mean Vote (PMV) and Predicted Percentage of People Dissatisfied (PPD) are also presented for each applicable occupied space within the appendices.

Introduction.

Hoare Lea have been appointed to assess thermal comfort within the Proposed Development at Withington Community Hospital.

Thermal comfort is required to be assessed in accordance with the Hea 04 Thermal Comfort credit criteria and be submitted as part of the BREEAM NC v.6 scheme evidence for the site.

Figure 1 below shows the 3D thermal model created for the proposed development.

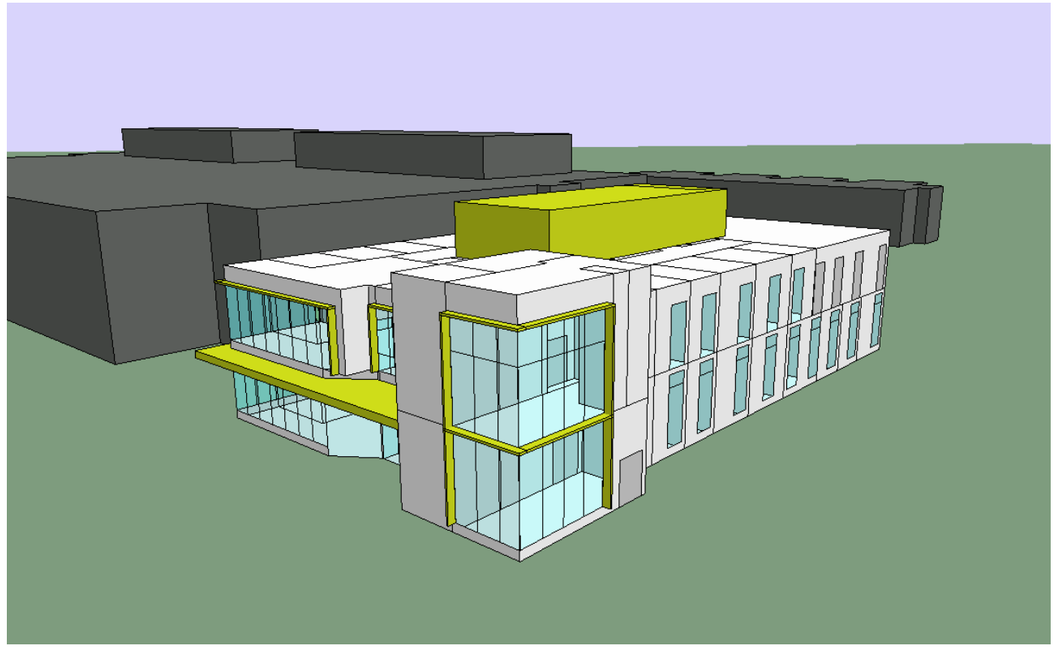

Figure 1: Image of IES model geometry.

1. The BREEAM NC v.6 Scheme, HEA04.

The BREEAM NC v.6 scheme HEA 04 section has the following criteria that must be complied with in full.

1.1 One credit – Thermal modelling.

1. Thermal modelling has been carried out using software in accordance with CIBSE AM11 Building Energy and Environmental Modelling.

2. The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis. For smaller and more basic building designs with less complex heating and cooling systems, an alternative less complex means of analysis may be appropriate (such methodologies must still be selected in accordance with CIBSE AM11).

3. The modelling demonstrates that:

    a) For air-conditioned buildings, summer and winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5; or other appropriate industry standard (where this sets a higher or more appropriate requirement or level for the building type); or the thermal environment is occupied spaces meet the Category B requirements for PPD, PMV and local discomfort set out in Table A.1 of Annex A of ISO 7730:2005.

    b) For naturally ventilated/free running buildings:
        i. Winter operative temperatures ranges in occupied spaces are in accordance with the criteria set out in CIBSE guide A Environmental design, Table 1.5; or other appropriate industry standard[1] (where this sets a higher or more appropriate requirement/level for the building type).
        ii. The building is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology outlined in CIBSE TM52: The limits of thermal comfort: Avoiding overheating in European buildings.

4. For air-conditioned buildings, The PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.

1.2 One credit – Design for future thermal comfort.

5. Criteria 1 to 4 are achieved.

6. The thermal modelling demonstrates that the relevant requirements set out in criterion 3 are achieved for a projected climate change environment.

7. Where criterion 6 is not met, the project team demonstrates how the building has been adapted or designed to be easily adapted in future using passive design solutions in order to subsequently meet the requirements under criterion 6.

8. For air-conditioned buildings, the PMV and PPD indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.

Figure 2: Illustration of factors that maintain constant body temperature.

[1] The appropriate industry standard for healthcare is Health Technical Memorandum 03-01 Specialised ventilation for healthcare premises. Thermal comfort levels in patient and clinical areas must be in accordance with the temperature ranges set out in HTM 03-01, Appendix 2. Furthermore, internal summer temperatures must not exceed 28°C dry bulb for more than 50 hours per year (as defined in HTM 03-01, paragraph 2.15). Other occupied spaces not covered in HTM 03-01 Appendix 2 should be in accordance with CIBSE Guide A Environmental Design.

2. Thermal Comfort Assessment.

The section below section provides a direct response to each of the criteria associated with Hea04 Thermal Comfort applicable to each of the Withington Community Hospital BREEAM Assessments, detailed in the appendix.

2.1 Requirement 1.

BREEAM Knowledge Base reference KBCN00035 states the following;

'Air-conditioned spaces are assessed to ensure appropriate thermal comfort levels are achieved. Cooling capacity should be sufficient to comply with the requirements of CIBSE Guide A, however providing sufficient space to install additional capacity to meet the requirements at a later date in line with projected climate change scenarios is also acceptable.

In addition, if it can be demonstrated that the air-conditioning system can achieve the thermal comfort criteria in accordance with CIBSE Guide A, Table 1.5, thermal modelling does not need to be carried out. The "time out of range" (TOR) metric should be reported as 0%.'

Therefore, in accordance with the above statement, thermal modelling has not been undertaken for the scheme – see section 2.3 for further commentary.

2.2 Requirement 2.

As per Section 2.1, thermal modelling has not been undertaken in line with KBCN00035 – see following sections for further commentary.

2.3 Requirement 3.

The proposed applicable occupied spaces are air-conditioned spaces. Appendix A details the operative temperature ranges required for the proposed occupied spaces within Withington Community Hospital, in accordance with CIBSE Guide A, Table 1.5.

The data provided also details the space heating and cooling demands of these spaces and the heating and cooling loads required for each space in order to maintain operative temperature ranges throughout the annual occupied period in accordance with CIBSE Guide A, Table 1.5.

Therefore, in line with KBCN00035 as detailed above, thermal modelling is not required to be undertaken. Since space conditioning systems within the proposed Withington Community Hospital have been designed in order to maintain comfortable operative temperatures throughout the annual occupied period, requirement 3 is fulfilled.

The table in Appendix B shows the time out of range (TOR) for each occupied space within Withington Community Hospital with respect to operating within the ranges recommend by CIBSE Guide A, Table 1.5.

2.4 Requirement 4.

As mentioned, thermal modelling has not been undertaken due to compliance with BREEAM Knowledge Base reference KBCN00035. Therefore, predicted mean vote (PMV) and percentage people dissatisfied (PPD) results are not obtained via modelling.

Therefore, the minimum and maximum PMV and PPD ranges for each space are as detailed in Appendix C.

2.5 Requirement 5.

Requirement 5 is fulfilled by satisfying requirements 1 – 4.

2.6 Requirement 6.

For an additional credit, the design must be able to demonstrate that the requirement stated in 3 is also satisfied when considering climate change.

The proposed applicable Withington Community Hospital spaces are air-conditioned spaces. Appendix B details the operative temperature ranges required for the proposed occupied spaces within the Proposed Development in accordance with CIBSE Guide A, Table 1.5.

When designing space conditioning systems, the heating loads calculated have been sized to account for changes to projected weather conditions to ensure that operative temperatures are able to be maintained over the building's lifetime.

Further, the cooling loads have been sized to account to account for peak demands occurring at all times. This will not be the case as peaks will not occur concurrently. Therefore, the cooling loads have also been calculated and sized appropriately to account for changes to projected weather conditions to ensure that operative temperatures are able to be maintained over the building's lifetime.

Therefore, the data provided details the space heating and cooling demands of the proposed spaces and the heating and cooling loads required for each space have been designed in order to maintain operative temperature ranges throughout the annual occupied period in accordance with CIBSE Guide A, Table 1.5 during the projected future climate change scenario.

In line with KBCN00035 as detailed above, thermal the annual occupied period during the future projected climate change scenario, requirement 6 is fulfilled for Withington Community Hospital.

The table in Appendix B shows the time out of range (TOR) for each occupied space within Withington Community Hospital with respect to operating within the ranges recommend by CIBSE Guide A, Table 1.5.

2.7 Requirement 7.

Requirement 7 is fulfilled by satisfying requirement 6.

2.8 Requirement 8.

As mentioned above, thermal modelling has not been undertaken due to compliance with BREEAM Knowledge Base reference KBCN00035. Therefore, predicted mean vote (PMV) and percentage people dissatisfied (PPD) results are not obtained via modelling.

Therefore, the minimum and maximum PMV and PPD ranges for each space is detailed in Appendix C for the future projected climate change scenario.

3. Conclusion.

This report demonstrates how the proposed development at Withington Community Hospital, has been designed to achieve thermal comfort throughout the annual occupied period in accordance with BREEAM Hea04, as identified by the BREEAM NC v.6 scheme. The report shows how the air conditioning systems for the proposed building are able to maintain thermally comfortable spaces in line with CIBSE Guide A, Table 1.5 recommended operative temperature ranges.

Further, the report also shows how the air conditioning system for the proposed building is able to maintain thermally comfortable spaces in line with CIBSE Guide A, Table 1.5 recommended operative temperature ranges during the future projected climate change scenario. This assessment has been completed in accordance with BREEAM Knowledge Base reference KBCN00035.

This Knowledge Base Compliance Note states that:

"Air-conditioned spaces are assessed to ensure appropriate thermal comfort levels are achieved. Cooling capacity should be sufficient to comply with the requirements of CIBSE Guide A, however providing sufficient space to install additional capacity to meet the requirements at a later date in line with projected climate change scenarios is also acceptable.

In addition, if it can be demonstrated that the air-conditioning system can achieve the thermal comfort criteria in accordance with CIBSE Guide A, Table 1.5, thermal modelling does not need to be carried out. The "time out of range" (TOR) metric should be reported as 0%."

As such, the time out of range values (TORs) are presented for each applicable occupied space within the relevant appendixes. The minimum and maximum Predictive Mean Vote (PMV) and Predicted Percentage of People Dissatisfied (PPD) are also presented for each applicable occupied space within the appendixes.

Therefore, for the proposed development, compliance with criterion BREEAM NC v.6 Hea04 criterion is demonstrated.

Appendix A –Space Conditioning System Sizing.

The table below details how space heating and cooling demands have been calculated, based on set point information provided and thermal load calculations.

Table 1 below refers to the operative temperature ranges taken from CIBSE Guide A Environmental design, Table 1.5. As CIBSE guidance does not provide operative temperature ranges for all the following spaces, assumptions were made based on similar hospital spaces or spaces within similar building types. Where no assumptions could be made, a temperature range has not been stated.

In addition, HTM 03-01, Appendix 2 also establishes temperature ranges for specific patient and clinical areas. It is understood that the following 'Applications' are applicable to the Proposed Development and Table 1 demonstrates that the associated temperature ranges are complied with:

a) Clean utility spaces 18-22°C.
b) Endoscopic procedure rooms 20-25°C.
c) General treatment rooms 20-25°C.

Table 1: MEP Space heating and cooling demand and load sizing calculation.

1	2	3	4	5	6	7	8	9	10	11
Level	Room name	Area	Winter Operative Temperature Range in accordance with CIBSE Guide A, Table 1.5.	MEP system set points for Winter (°C)	Summer Operative Temperature Range in accordance with CIBSE Guide A, Table 1.5.	MEP system set points for Summer (°C)	Space heating required to achieve desired temperature range (W/m²)	Space cooling required to achieve desired temperature range (W/m²)	Space heating load required to achieve desired temperature range (kW)	Space cooling load required to achieve desired temperature range (kW)
0	00.001 - Draft Lobby	13	19-21	20	21-25	-	98	n/a	1.27	n/a
0	00.002 - Waiting	56.06	19-21	20	21-25	25	78	86.3	4.36	4.84
0	00.003 - Circulation	16.5	19-21	20	21-25	-	28	n/a	0.47	n/a
0	00.004 - Lift Lobby	16.43	19-24	20	21-25	-	33	n/a	0.55	n/a
0	00.005 - Stair Core	28.64	19-24	20	21-25	-	99	n/a	2.83	n/a
0	00.007 - Reception	13.02	-	22	-	25	95	97.2	1.24	1.27
0	00.008 - Reception Admin	13.44	21-23	22	22-25	25	83	158.5	1.11	2.13
0	00.009 - Acc WC	4.94	19-21	20	21-25	-	27	n/a	0.13	n/a
0	00.010 - Interview/ Quiet room	12.18	21-23	22	22-25	25	75	86.0	0.92	1.05
0	00.011 - WC	3.9	19-21	20	21-25	-	25	n/a	0.10	n/a
0	00.012 - WC	4.16	19-21	20	21-25	-	25	n/a	0.10	n/a
0	00.013 - Changing Places	14.35	-	22	-	-	46	n/a	0.66	n/a
0	00.014 - Meeting/ Seminar Room	25.2	21-23	22	22-25	25	74	53.1	1.88	1.34
0	00.015 - Circulation	20.8	19-21	20	21-25	-	28	n/a	0.58	n/a
0	00.015 - Circulation	20.7	19-21	20	21-25	-	26	n/a	0.53	n/a
0	00.016 - Open Plan Office	25.62	21-23	22	22-25	25	74	177.9	1.91	4.56
0	00.017 - Staff WC	3.75	19-21	20	21-25	-	25	n/a	0.09	n/a
0	00.018 - Reporting Room	21.65	22-24	22	23-25	25	59	108.9	1.28	2.36
0	00.019 - Circulation	10.8	19-21	20	21-25	-	30	n/a	0.33	n/a
0	00.020 - Staff Reset	18.06	19-21	22	21-25	25	80	110.5	1.44	2.00
0	00.021 - Disposal Hold	9.66	-	18	-	-	62	n/a	0.60	n/a
0	00.022 - WC Lobby	3.06	19-24	20	21-25	-	40	n/a	0.12	n/a
0	00.023 - Staff Change & Lockers	24.26	-	22	-	-	93	n/a	2.25	n/a
0	00.024 - Acc WC	4.68	19-21	20	21-25	-	50	n/a	0.23	n/a
0	00.025 - Acc Shower	4.84	-	20	-	22	76	n/a	0.37	n/a
0	00.026 - Lift Lobby	12.24	19-24	20	21-25	-	34	n/a	0.41	n/a

1	2	3	4	5	6	7	8	9	10	11
Level	Room name	Area	Winter Operative Temperature Range in accordance with CIBSE Guide A, Table 1.5.	MEP system set points for Winter (°C)	Summer Operative Temperature Range in accordance with CIBSE Guide A, Table 1.5.	MEP system set points for Summer (°C)	Space heating required to achieve desired temperature range (W/m²)	Space cooling required to achieve desired temperature range (W/m²)	Space heating load required to achieve desired temperature range (kW)	Space cooling load required to achieve desired temperature range (kW)
0	00.027 - Stair Core	26.95	19-24	20	21-25	-	104	n/a	2.80	n/a
0	00.028 - Circulation	51.34	19-21	20	21-25	-	27	n/a	1.39	n/a
0	00.029 - Circulation	33.81	19-21	20	21-25	-	71	n/a	2.40	n/a
0	00.030 - Cleaners	8.75	-	18	-	-	22	n/a	0.19	n/a
0	00.031 - Sub-Wait	6.84	19-24	20	21-25	-	38	n/a	0.26	n/a
0	00.032 - Ultrasound	16.4	22-24	22	23-25	25	76	109.4	1.25	1.79
0	00.033 - Consultation/ Exam Room	14.4	22-24	22	23-25	25	74	107.6	1.06	1.55
0	00.034 - ECO Room 2	20.68	22-24	22	23-25	25	43	104.4	0.90	2.16
0	00.035 - ECO Room	21.15	22-24	22	23-25	25	38	101.7	0.81	2.15
0	00.036 - Ambulatory Service for Cardio	10.8	22-24	22	23-25	25	77	140.6	0.83	1.52
0	00.037 - Consultation Room	11.2	22-24	22	23-25	25	76	135.3	0.85	1.52
0	00.038 - Manager's Office	9.99	21-23	22	22-25	25	44	89.2	0.44	0.89
0	00.039 - Venepuncture Room	10.8	22-24	22	23-25	25	73	109.4	0.79	1.18
0	00.040-Resus	0.99	19-24	20	21-25	-	22	n/a	0.02	n/a
0	00.041 - Dirty Utility	13.16	-	18	-	-	23	n/a	0.31	n/a
0	00.042 - Consultation/ Exam Room 2	17.6	22-24	22	23-25	25	86	129.7	1.51	2.28
0	00.043 - Clean Utility	16.92	-	18	-	-	33	n/a	0.55	n/a
0	00.044 - Sleep Consultation	12.4	22-24	22	23-25	25	91	134.2	1.13	1.66
0	00.045 - Store	16.45	-	18	-	-	34	n/a	0.56	n/a
0	00.046 - Sleep Consultation 2	12	22-24	22	23-25	25	93	136.5	1.11	1.64
0	00.047 - Lung Function Room	16.32	22-24	22	23-25	25	96	144.0	1.57	2.35
0	00.048 - Lung Function Room 2	16	22-24	22	23-25	25	103	141.6	1.64	2.26
1	01.001 - Draft Lobby	13	19-24	20	21-25	-	89	n/a	1.16	n/a
1	01.001 - Lift Lobby	15.23	19-24	20	21-25	-	46	n/a	0.70	n/a
1	01.002 - Waiting	57.11	19-21	20	21-25	25	74	88.7	4.21	5.06
1	01.003 - Circulation	14.52	19-21	20	21-25	-	28	n/a	0.41	n/a
1	01.003 - Roof Access	1.7	19-24	20	21-25	-	94	n/a	0.16	n/a
1	01.006 - Plant	166.85	-	-	-	-	0	n/a	0.00	n/a
1	01.007 - Lift Lobby	12.24	19-24	20	21-25	-	82	n/a	1.01	n/a
1	01.007 - Reception	13.02	-	22	-	25	93	121.2	1.20	1.58
1	01.008 - Reception Admin	13.44	21-23	22	22-25	25	78	168.5	1.05	2.26
1	01.008 - Stair Core	24.83	19-24	20	21-25	-	130	n/a	3.23	n/a
1	01.009 - Acc WC	4.94	19-21	20	21-25	-	27	n/a	0.14	n/a
1	01.009 - Roof Access	1.76	19-24	20	21-25	-	98	n/a	0.17	n/a
1	01.010 - Interview/ Quiet room	12.18	21-23	22	22-25	25	71	92.4	0.86	1.13

1	2	3	4	5	6	7	8	9	10	11
Level	Room name	Area	Winter Operative Temperature Range in accordance with CIBSE Guide A, Table 1.5.	MEP system set points for Winter (°C)	Summer Operative Temperature Range in accordance with CIBSE Guide A, Table 1.5.	MEP system set points for Summer (°C)	Space heating required to achieve desired temperature range (W/m²)	Space cooling required to achieve desired temperature range (W/m²)	Space heating load required to achieve desired temperature range (kW)	Space cooling load required to achieve desired temperature range (kW)
1	01.011 - WC	3.9	19-21	20	21-25	-	27	n/a	0.11	n/a
1	01.012 - WC	4.16	19-21	20	21-25	-	29	n/a	0.12	n/a
1	01.013 - Changing Places	14.35	-	22	-	-	51	n/a	0.74	n/a
1	01.014 - Meeting/ Seminar Room	25.2	21-23	22	22-25	25	70	59.1	1.77	1.49
1	01.015 - Circulation	20.7	19-21	20	21-25	-	26	n/a	0.55	n/a
1	01.015 - Circulation	21.8	19-21	20	21-25	-	32	n/a	0.70	n/a
1	01.016 - Open Plan Office	25.62	21-23	22	22-25	25	70	183.7	1.80	4.71
1	01.017 - Staff WC	3.75	19-21	20	21-25	-	42	n/a	0.16	n/a
1	01.019 - Circulation	9.8	19-21	20	21-25	-	76	n/a	0.74	n/a
1	01.020 - Staff Reset	18.06	19-21	22	21-25	25	76	111.8	1.37	2.02
1	01.021 - Disposal Hold	9.66	-	18	-	-	47	n/a	0.45	n/a
1	01.022 - Stair Core	28.14	19-24	20	21-25	-	119	n/a	3.36	n/a
1	01.028 - Circulation	60.36	19-21	20	21-25	25	34	n/a	2.04	n/a
1	01.030 - Cleaners	8.75	-	18	-	-	23	n/a	0.20	n/a
1	01.031 - Sub-Wait	6.84	19-24	20	21-25	-	43	n/a	0.29	n/a
1	01.032 - Speculative office 3	16.4	21-23	22	22-25	25	56	63.9	0.92	1.05
1	01.033 - Consultation/ Exam Room	14.4	22-24	22	23-25	25	77	102.2	1.10	1.47
1	01.034 - Speculative office 1	20.68	21-23	22	22-25	25	25	30.4	0.52	0.63
1	01.035 - Speculative office 2	21.15	21-23	22	22-25	25	24	29.1	0.51	0.61
1	01.036 - Ambulatory Service for Cardio	10.8	22-24	22	23-25	25	73	134.0	0.79	1.45
1	01.037 - Consultation Room	11.2	22-24	22	23-25	25	72	129.3	0.81	1.45
1	01.038 - Manager's Office	9.99	21-23	22	22-25	25	52	82.8	0.52	0.83
1	01.039 - Venepuncture Room	10.8	22-24	22	23-25	25	68	108.2	0.74	1.17
1	01.041 - Dirty Utility	12.54	-	18	-	-	48	n/a	0.60	n/a
1	01.042 - Consultation room	12.4	22-24	22	23-25	25	113	124.5	1.40	1.54
1	01.044 - Clean Utility	13.77	-	18	-	-	49	n/a	0.68	n/a

Appendix B – Time Out of Range Values, Criteria 3 and 6.

In accordance with BREEAM Knowledge Base reference KBCN00035, compliance is achieved if it can be demonstrated that the air-conditioning systems can achieve the thermal comfort criteria in accordance with CIBSE Guide A, Table 1.5, the "time out of range" (TOR) metric should be reported as 0%.'

Therefore, the below table details the TOR metric for each applicable occupied space during the occupied period.

Table 2: The performance of the operative for each space in the proposed building- applicable to current and future weather scenarios.

Level	Space name	TOR (%)
0	00.001 - Draft Lobby	0
0	00.002 - Waiting	0
0	00.003 - Circulation	0
0	00.004 - Lift Lobby	0
0	00.005 - Stair Core	0
0	00.007 - Reception	0
0	00.008 - Reception Admin	0
0	00.009 - Acc WC	0
0	00.010 - Interview/ Quiet room	0
0	00.011 - WC	0
0	00.012 - WC	0
0	00.013 - Changing Places	0
0	00.014 - Meeting/ Seminar Room	0
0	00.015 - Circulation	0
0	00.015 - Circulation	0
0	00.016 - Open Plan Office	0
0	00.017 - Staff WC	0
0	00.018 - Reporting Room	0
0	00.019 - Circulation	0
0	00.020 - Staff Reset	0
0	00.021 - Disposal Hold	0
0	00.022 - WC Lobby	0
0	00.023 - Staff Change & Lockers	0
0	00.024 - Acc WC	0
0	00.025 - Acc Shower	0
0	00.026 - Lift Lobby	0
0	00.027 - Stair Core	0
0	00.028 - Circulation	0
0	00.029 - Circulation	0
0	00.030 - Cleaners	0
0	00.031 - Sub-Wait	0
0	00.032 - Ultrasound	0
0	00.033 - Consultation/ Exam Room	0
0	00.034 - ECO Room 2	0
0	00.035 - ECO Room	0
0	00.036 - Ambulatory Service for Cardio	0
0	00.037 - Consultation Room	0
0	00.038 - Manager's Office	0
0	00.039 - Venepuncture Room	0
0	00.040-Resus	0
0	00.041 - Dirty Utility	0
0	00.042 - Consultation/ Exam Room 2	0
0	00.043 - Clean Utility	0
0	00.044 - Sleep Consultation	0
0	00.045 - Store	0
0	00.046 - Sleep Consultation 2	0
0	00.047 - Lung Function Room	0
0	00.048 - Lung Function Room 2	0
1	01.001 - Draft Lobby	0
1	01.001 - Lift Lobby	0
1	01.002 - Waiting	0
1	01.003 - Circulation	0
1	01.003 - Roof Access	0
1	01.006 - Plant	0
1	01.007 - Lift Lobby	0
1	01.007 - Reception	0
1	01.008 - Reception Admin	0
1	01.008 - Stair Core	0
1	01.009 - Acc WC	0
1	01.009 - Roof Access	0
1	01.010 - Interview/ Quiet room	0
1	01.011 - WC	0

Level	Space name	TOR (%)
1	01.012 - WC	0
1	01.013 - Changing Places	0
1	01.014 - Meeting/ Seminar Room	0
1	01.015 - Circulation	0
1	01.015 - Circulation	0
1	01.016 - Open Plan Office	0
1	01.017 - Staff WC	0
1	01.019 - Circulation	0
1	01.020 - Staff Reset	0
1	01.021 - Disposal Hold	0
1	01.022 - Stair Core	0
1	01.028 - Circulation	0
1	01.030 - Cleaners	0
1	01.031 - Sub-Wait	0
1	01.032 - Speculative office 3	0
1	01.033 - Consultation/ Exam Room	0
1	01.034 - Speculative office 1	0
1	01.035 - Speculative office 2	0
1	01.036 - Ambulatory Service for Cardio	0
1	01.037 - Consultation Room	0
1	01.038 - Manager's Office	0
1	01.039 - Venepuncture Room	0
1	01.041 - Dirty Utility	0
1	01.042 - Consultation room	0
1	01.044 - Clean Utility	0

Appendix C – PMV and PPD, Criteria 4 and 8.

In accordance with BREEAM Knowledge Base reference KBCN00035, compliance is achieved if it can be demonstrated that the air-conditioning system can achieve the thermal comfort criteria in accordance with CIBSE Guide A, Table 1.5.

Therefore, thermal modelling has not been undertaken. Thus, the minimum and maximum predicted mean vote (PMV) and percentage people dissatisfied (PPD) are shown in the table below.

Table 3: PMV and PPD- applicable for current and future weather.

Level	Room Name	PMV (min)	PMV (max)	PPD (min)	PPD (max)
0	00.001 - Draft Lobby	-3	3	0	100
0	00.002 - Waiting	-3	3	0	100
0	00.003 - Circulation	-3	3	0	100
0	00.004 - Lift Lobby	-3	3	0	100
0	00.005 - Stair Core	-3	3	0	100
0	00.007 - Reception	-3	3	0	100
0	00.008 - Reception Admin	-3	3	0	100
0	00.009 - Acc WC	-3	3	0	100
0	00.010 - Interview/ Quiet room	-3	3	0	100
0	00.011 - WC	-3	3	0	100
0	00.012 - WC	-3	3	0	100
0	00.013 - Changing Places	-3	3	0	100
0	00.014 - Meeting/ Seminar Room	-3	3	0	100
0	00.015 - Circulation	-3	3	0	100
0	00.015 - Circulation	-3	3	0	100
0	00.016 - Open Plan Office	-3	3	0	100
0	00.017 - Staff WC	-3	3	0	100
0	00.018 - Reporting Room	-3	3	0	100
0	00.019 - Circulation	-3	3	0	100
0	00.020 - Staff Reset	-3	3	0	100
0	00.021 - Disposal Hold	-3	3	0	100
0	00.022 - WC Lobby	-3	3	0	100
0	00.023 - Staff Change & Lockers	-3	3	0	100
0	00.024 - Acc WC	-3	3	0	100
0	00.025 - Acc Shower	-3	3	0	100
0	00.026 - Lift Lobby	-3	3	0	100
0	00.027 - Stair Core	-3	3	0	100
0	00.028 - Circulation	-3	3	0	100
0	00.029 - Circulation	-3	3	0	100
0	00.030 - Cleaners	-3	3	0	100
0	00.031 - Sub-Wait	-3	3	0	100
0	00.032 - Ultrasound	-3	3	0	100
0	00.033 - Consultation/ Exam Room	-3	3	0	100
0	00.034 - ECO Room 2	-3	3	0	100
0	00.035 - ECO Room	-3	3	0	100
0	00.036 - Ambulatory Service for Cardio	-3	3	0	100
0	00.037 - Consultation Room	-3	3	0	100
0	00.038 - Manager's Office	-3	3	0	100
0	00.039 - Venepuncture Room	-3	3	0	100
0	00.040-Resus	-3	3	0	100
0	00.041 - Dirty Utility	-3	3	0	100
0	00.042 - Consultation/ Exam Room 2	-3	3	0	100
0	00.043 - Clean Utility	-3	3	0	100
0	00.044 - Sleep Consultation	-3	3	0	100
0	00.045 - Store	-3	3	0	100
0	00.046 - Sleep Consultation 2	-3	3	0	100
0	00.047 - Lung Function Room	-3	3	0	100
0	00.048 - Lung Function Room 2	-3	3	0	100
1	01.001 - Draft Lobby	-3	3	0	100
1	01.001 - Lift Lobby	-3	3	0	100
1	01.002 - Waiting	-3	3	0	100
1	01.003 - Circulation	-3	3	0	100
1	01.003 - Roof Access	-3	3	0	100
1	01.006 - Plant	-3	3	0	100
1	01.007 - Lift Lobby	-3	3	0	100
1	01.007 - Reception	-3	3	0	100
1	01.008 - Reception Admin	-3	3	0	100
1	01.008 - Stair Core	-3	3	0	100
1	01.009 - Acc WC	-3	3	0	100
1	01.009 - Roof Access	-3	3	0	100
1	01.010 - Interview/ Quiet room	-3	3	0	100
1	01.011 - WC	-3	3	0	100

Level	Room Name	PMV (min)	PMV (max)	PPD (min)	PPD (max)
1	01.012 - WC	-3	3	0	100
1	01.013 - Changing Places	-3	3	0	100
1	01.014 - Meeting/ Seminar Room	-3	3	0	100
1	01.015 - Circulation	-3	3	0	100
1	01.015 - Circulation	-3	3	0	100
1	01.016 - Open Plan Office	-3	3	0	100
1	01.017 - Staff WC	-3	3	0	100
1	01.019 - Circulation	-3	3	0	100
1	01.020 - Staff Reset	-3	3	0	100
1	01.021 - Disposal Hold	-3	3	0	100
1	01.022 - Stair Core	-3	3	0	100
1	01.028 - Circulation	-3	3	0	100
1	01.030 - Cleaners	-3	3	0	100
1	01.031 - Sub-Wait	-3	3	0	100
1	01.032 - Speculative office 3	-3	3	0	100
1	01.033 - Consultation/ Exam Room	-3	3	0	100
1	01.034 - Speculative office 1	-3	3	0	100
1	01.035 - Speculative office 2	-3	3	0	100
1	01.036 - Ambulatory Service for Cardio	-3	3	0	100
1	01.037 - Consultation Room	-3	3	0	100
1	01.038 - Manager's Office	-3	3	0	100
1	01.039 - Venepuncture Room	-3	3	0	100
1	01.041 - Dirty Utility	-3	3	0	100
1	01.042 - Consultation room	-3	3	0	100
1	01.044 - Clean Utility	-3	3	0	100

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