

IMS

DSY 1 - London_LWC_DSY1_2020High50.epw				
1989				
Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
G3 Office	20	29	4	Fail
G6 Office	23.4	35	5	Fail
G9 Office	24.1	42	6	Fail
G19 Office	43.5	54	7	Fail
G20 Office	44	70	9	Fail

DSY 2 - London_LWC_DSY2_2020High50.epw				
2003				
Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
G3 Office	27.9	42	5	Fail
G6 Office	31.4	49	6	Fail
G9 Office	32.5	54	7	Fail
G19 Office	42.8	68	8	Fail
G20 Office	44.6	87	10	Fail

DSY 3 - London_LWC_DSY3_2020High50.epw				
1976				
Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
G3 Office	25.5	34	5	Fail
G6 Office	27.6	41	5	Fail
G9 Office	27.8	49	6	Fail
G19 Office	42.5	63	7	Fail
G20 Office	42.8	78	9	Fail

GS

DSY 1 - London_LWC_DSY1_2020High50.epw				
1989				
Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
G1 Office	11.7	20	3	Fail
G2 Office	15.5	27	3	Fail
G3 Office	18.9	43	5	Fail
G0 Cafe/Bar	20.4	17	3	Fail
G0 Reception	21.2	18	3	Fail

DSY 2 - London_LWC_DSY2_2020High50.epw				
2003				
Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
G0 Office	21.6	24	3	Fail
G1 Office	24.6	33	4	Fail
G2 Office	27.4	45	5	Fail
G3 Office	25.7	22	3	Fail
G4 Office	27.3	22	3	Fail

DSY 3 - London_LWC_DSY3_2020High50.epw				
1976				
Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
G0 Office	20.9	23	3	Fail
G1 Office	22.8	35	4	Fail
G2 Office	24.9	48	6	Fail
G3 Office	26.7	17	3	Fail
G4 Office	27.7	18	3	Fail

HH - windows open

DSY 1 - London_LWC_DSY1_2020High50.epw				
1989				
Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
G1 1B/2P Kitchen	2.7	31	4	Pass
G2 1B/2P Kitchen	2.2	30	4	Pass
G2 1B/2P Living	2.4	29	4	Pass
G3 1B/2P Kitchen	2.2	30	4	Pass
G3 1B/2P Living	2.5	29	4	Pass
G4 3B/5P Bedroom	1.8	31	4	Pass
G4 3B/5P Bedroom	1.8	31	4	Pass
G2 1B/2P Bedroom	1.8	32	4	Pass
G3 1B/2P Bedroom	1.9	32	4	Pass
G1 1B/2P Living	3.4	34	5	Fail
G4 3B/5P Master Bedroom	1.9	34	5	Fail
G1 1B/2P Bedroom	2.1	35	5	Fail
G5 3B/5P Kitchen/Dining/Living	4	35	5	Fail

DSY 2 - London_LWC_DSY2_2020High50.epw				
2003				
Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
G1 1B/2P Kitchen	5.4	61	9	Fail
G1 1B/2P Living	5.4	62	9	Fail
G2 1B/2P Kitchen	5.1	57	8	Fail
G2 1B/2P Living	5	58	9	Fail
G3 1B/2P Kitchen	5.1	58	8	Fail
G3 1B/2P Living	5.1	59	9	Fail
G4 3B/5P Master Bedroom	3.2	67	9	Fail
G4 3B/5P Bedroom	3.5	64	9	Fail
G4 3B/5P Bedroom	3.4	64	9	Fail
G1 1B/2P Bedroom	3.5	63	8	Fail
G2 1B/2P Bedroom	3.3	61	8	Fail
G3 1B/2P Bedroom	3.4	61	8	Fail
G5 3B/5P Kitchen/Dining/Living	6.3	65	9	Fail

DSY 3 - London_LWC_DSY3_2020High50.epw				
1976				
Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
G1 1B/2P Kitchen	5.9	51	6	Fail
G1 1B/2P Living	6.9	55	7	Fail
G2 1B/2P Kitchen	5.7	49	6	Fail
G2 1B/2P Living	6	52	7	Fail
G3 1B/2P Kitchen	5.8	49	6	Fail
G3 1B/2P Living	6	52	7	Fail
G4 3B/5P Master Bedroom	3.6	57	7	Fail
G4 3B/5P Bedroom	3.7	59	7	Fail
G4 3B/5P Bedroom	3.6	56	7	Fail
G1 1B/2P Bedroom	4.1	60	7	Fail
G2 1B/2P Bedroom	3.8	60	7	Fail
G3 1B/2P Bedroom	3.8	60	7	Fail
G5 3B/5P Kitchen/Dining/Living	7.3	58	7	Fail

HH - closed windows

DSY 1 - London_LWC_DSY1_2020High50.epw				
1989				
Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
G1 1B/2P Kitchen	90	182	17	Fail
G1 1B/2P Living	84.8	198	20	Fail
G2 1B/2P Kitchen	89.2	168	16	Fail
G2 1B/2P Living	87.3	183	18	Fail
G3 1B/2P Kitchen	92.8	174	16	Fail
G3 1B/2P Living	91.9	187	19	Fail
G4 3B/5P Master Bedroom	91.8	324	21	Fail
G4 3B/5P Bedroom	97.5	329	18	Fail
G4 3B/5P Bedroom	97.9	322	19	Fail
G1 1B/2P Bedroom	87.3	304	17	Fail
G2 1B/2P Bedroom	88.5	293	16	Fail
G3 1B/2P Bedroom	92.6	299	17	Fail
G5 3B/5P Kitchen/Dining/Living	96.4	230	25	Fail

DSY 2 - London_LWC_DSY2_2020High50.epw				
2003				
Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
G1 1B/2P Kitchen	90.3	200	18	Fail
G1 1B/2P Living	85.1	211	23	Fail
G2 1B/2P Kitchen	88.8	195	17	Fail
G2 1B/2P Living	88.6	206	21	Fail
G3 1B/2P Kitchen	92.2	205	18	Fail
G3 1B/2P Living	91.9	217	22	Fail
G4 3B/5P Master Bedroom	90.7	379	24	Fail
G4 3B/5P Bedroom	95.4	385	21	Fail
G4 3B/5P Bedroom	95.8	374	21	Fail
G1 1B/2P Bedroom	85.7	329	19	Fail
G2 1B/2P Bedroom	87	332	19	Fail
G3 1B/2P Bedroom	89.9	350	19	Fail
G5 3B/5P Kitchen/Dining/Living	96.4	257	27	Fail

DSY 3 - London_LWC_DSY3_2020High50.epw				
1976				
Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
G1 1B/2P Kitchen	84.5	192	18	Fail
G1 1B/2P Living	80.2	205	22	Fail
G2 1B/2P Kitchen	83.6	179	16	Fail
G2 1B/2P Living	83.3	193	20	Fail
G3 1B/2P Kitchen	87.7	184	17	Fail
G3 1B/2P Living	87.7	194	20	Fail
G4 3B/5P Master Bedroom	85.6	335	23	Fail
G4 3B/5P Bedroom	92.6	344	20	Fail
G4 3B/5P Bedroom	93.4	332	20	Fail
G1 1B/2P Bedroom	80.2	316	18	Fail
G2 1B/2P Bedroom	82	303	17	Fail
G3 1B/2P Bedroom	85.7	307	18	Fail
G5 3B/5P Kitchen/Dining/Living	92.4	232	25	Fail

DSY 1 - London_LWC_DSY1_2020High50.epw

1989

Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
101 Open Plan Living/Kitchen	1.7	24	3	Pass
101 Double Bedroom	0.8	23	3	Pass
101 Single Bedroom	0.8	23	3	Pass
103 Open Plan Living/Kitchen	1.3	20	3	Pass
103 Single Bedroom	1	28	4	Pass
103 Double Bedroom	0.9	25	4	Pass
201 Open Plan Living/Kitchen	1.8	25	4	Pass
201 Double Bedroom	0.8	22	3	Pass
201 Single Bedroom	0.8	24	4	Pass
203 Open Plan Living/Kitchen	1.4	22	3	Pass
203 Single Bedroom	1	31	4	Pass
203 Double Bedroom	0.9	26	4	Pass
102 Double Bedroom	1	26	4	Pass
102 Open Plan Living/Kitchen	1.4	23	3	Pass
202 Double Bedroom	0.8	23	3	Pass
202 Open Plan Living/Kitchen	1.7	25	4	Pass
402 Double Bedroom	1	29	4	Pass
402 Open Plan Living/Kitchen	1.8	29	4	Pass
401 Single Bedroom	0.9	26	4	Pass
401 Kitchen	1.7	25	4	Pass
401 Living	2	29	4	Pass
401 Double Bedroom	1.6	29	4	Pass
401 Single Bedroom	1	29	4	Pass
401 Single Bedroom	1	26	4	Pass
401 Double Bedroom	1.2	29	4	Pass

DSY 2 - London_LWC_DSY2_2020High50.epw

2003

Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
101 Open Plan Living/Kitchen	4.1	54	8	Fail
101 Double Bedroom	2.4	52	7	Fail
101 Single Bedroom	2.4	51	7	Fail
103 Open Plan Living/Kitchen	3.6	48	7	Fail
103 Single Bedroom	2.2	52	8	Fail
103 Double Bedroom	2.2	49	8	Fail
201 Open Plan Living/Kitchen	4.3	54	8	Fail
201 Double Bedroom	2.3	51	7	Fail
201 Single Bedroom	2.4	51	7	Fail
203 Open Plan Living/Kitchen	3.6	48	7	Fail
203 Single Bedroom	2.3	57	8	Fail
203 Double Bedroom	2.2	52	8	Fail
102 Double Bedroom	2.2	55	8	Fail
102 Open Plan Living/Kitchen	3.8	49	8	Fail
202 Double Bedroom	2.2	49	7	Fail
202 Open Plan Living/Kitchen	3.9	51	8	Fail
402 Double Bedroom	2.3	57	8	Fail
402 Open Plan Living/Kitchen	4	54	8	Fail
401 Single Bedroom	2.3	53	8	Fail
401 Kitchen	4.3	54	8	Fail
401 Living	4.6	56	8	Fail
401 Double Bedroom	3.2	64	9	Fail
401 Single Bedroom	2.7	57	8	Fail
401 Single Bedroom	2.6	57	8	Fail
401 Double Bedroom	2.8	63	9	Fail

DSY 3 - London_LWC_DSY3_2020High50.epw

1976

Zones	Criterion 1 - Comfort Temp Exceedance	Criterion 2 - Severity of Overheating	Criterion 3 - Max Temp Exceedance	Overall Fail /Pass
101 Open Plan Living/Kitchen	5.3	47	6	Fail
101 Double Bedroom	2.8	47	5	Fail
101 Single Bedroom	2.9	50	6	Fail
103 Open Plan Living/Kitchen	4.7	42	5	Fail
103 Single Bedroom	3	50	6	Fail
103 Double Bedroom	2.8	49	6	Fail
201 Open Plan Living/Kitchen	5.5	47	6	Fail
201 Double Bedroom	2.7	47	5	Fail
201 Single Bedroom	2.9	50	6	Fail
203 Open Plan Living/Kitchen	4.7	42	5	Fail
203 Single Bedroom	3.1	53	6	Fail
203 Double Bedroom	2.9	50	6	Fail
102 Double Bedroom	2.9	51	6	Fail
102 Open Plan Living/Kitchen	4.8	43	5	Fail
202 Double Bedroom	2.8	47	5	Fail
202 Open Plan Living/Kitchen	5	46	6	Fail
402 Double Bedroom	3.1	52	6	Fail
402 Open Plan Living/Kitchen	5.4	48	6	Fail
401 Single Bedroom	2.9	50	6	Fail
401 Kitchen	5	47	6	Fail
401 Living	5.6	50	6	Fail
401 Double Bedroom	3.7	57	7	Fail
401 Single Bedroom	3.2	53	6	Fail
401 Single Bedroom	3	51	6	Fail
401 Double Bedroom	3.2	53	6	Fail

2.6 Selection of the probabilistic Design Summer Years

On the basis of the analysis above, the following three years were selected to form the set of probabilistic design summer years:

- pDSY-1: 1989
- pDSY-2: 2003
- pDSY-3: 1976

The first of these years, 1989, is the current DSY and represents a moderately warm summer, as is interpreted in current CIBSE guidance. The years 1976 and 2003 were chosen as more extreme years with different types of summer: the former is a year with a long period of persistent warmth, whereas the latter has a more intense single warm spell.

Table 4 Return periods against WCDH for the historical years for the climate change scenarios under (a) 'Medium' emissions and (b) 'High' emissions

Historical year	Baseline	Time period and percentile change								
		2020s			2050s			2080s		
		10%	50%	90%	10%	50%	90%	10%	50%	90%
(a) Medium emissions										
1976	27.0	25.3	10.6	3.3	17.0	5.0	1.2	13.0	2.3	1.0
1989	9.0	9.1	3.3	1.3	5.9	1.6	1.0	4.5	1.1	1.0
2003	19.3	18.5	7.3	2.3	12.3	3.4	1.0	9.4	1.7	1.0
(b) High emissions										
1976	27.0	23.7	11.1	3.8	16.5	3.8	1.0	10.1	1.3	1
1989	9.0	8.2	3.4	1.4	6.0	1.4	1.0	3.5	1.0	1
2003	19.3	17.2	7.7	2.6	12.2	2.7	1.0	7.3	1.1	1