

Project name

Music and Media Block Extension**As designed****Date:** Thu May 24 11:02:28 2018**Administrative information****Building Details****Address:** Leighton Park School, Reading, RG2 7ED**Owner Details****Name:** Leighton Park School**Telephone number:** 0118 987 9600**Address:** Shinfield Rd, Reading, RG2 7ED**Certification tool****Calculation engine:** Apache**Calculation engine version:** 6.4.0.15**Interface to calculation engine:** IES Virtual Environment**Interface to calculation engine version:** 6.4.0.15**BRUKL compliance check version:** v4.1.g.0**Certifier details****Name:** Method Consulting LLP**Telephone number:** 01793 822044**Address:** Berkeley House, Hunts Rise, South Marston Park, Swindon, SN3 4TG**Criterion 1: The calculated CO₂ emission rate for the building should not exceed the target**

1.1	CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	17.8
1.2	Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	17.8
1.3	Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	17.3
1.4	Are emissions from the building less than or equal to the target?	BER ≤ TER
1.5	Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and the building services should achieve reasonable overall standards of energy efficiency**2.a Building fabric**

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.15	0.23	20000001:Surf[25]
Floor	0.25	0.15	0.15	10000000:Surf[15]
Roof	0.25	0.18	0.18	0_000013:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.5	1.5	0_000013:Surf[1]
Personnel doors	2.2	1.95	2	0_000013:Surf[8]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)] * There might be more than one surface where the maximum U-value occurs. ** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows. *** Display windows and similar glazing are excluded from the U-value check. N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	5

2.b Building services

The building services parameters listed below are expected to be checked by the BCO against guidance. No automatic checking is performed by the tool.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Gas boiler with radiators - NV

Heating seasonal efficiency	Cooling nominal efficiency	SFP [W/(l/s)]	HR seasonal efficiency
0.98	-	0	-
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system			NO

2- Gas boiler - U/F heating NV

Heating seasonal efficiency	Cooling nominal efficiency	SFP [W/(l/s)]	HR seasonal efficiency
0.95	-	0	-
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system			NO

3- Gas boiler with radiators and HRU

Heating seasonal efficiency	Cooling nominal efficiency	SFP [W/(l/s)]	HR seasonal efficiency
0.98	-	0	0.9
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system			NO

1- Hot water

Heating seasonal efficiency	Hot water storage loss factor [kWh/litre per day]
1	-

Local mechanical ventilation and exhaust

Zone	Supply/extract SFP [W/(l/s)]	HR seasonal efficiency	Exhaust SFP [W/(l/s)]
0.12 Electrical St	-	-	0.4
0.13 Cleaner's St	-	-	0.4
0.06 AccWC	-	-	0.5
0.03 Store	-	-	0.4
0.11 Female WC	-	-	0.5
0.09 Male WC	-	-	0.5
0.19 Live Lounge	0.7	-	-

General lighting and display lighting

Zone	General lighting [W]	Display lamps efficacy [lm/W]
0.31 Classroom	140	-
0.30 MPR	90	-
0.29 MPR	90	-
0.28 MPR	90	-
0.27 MPR	90	-
0.26 MPR	90	-
0.25 MPR	90	-
0.24 MPR	90	-
0.23 MPR	90	-
0.12 Electrical St	0	-
0.13 Cleaner's St	10	-
0.14 Office	90	-
0.06 AccWC	30	-
0.02 Reception Servery	60	73

General lighting and display lighting

Zone	General lighting [W]	Display lamps efficacy [lm/W]
0.03 Store	10	-
0.11 Female WC	100	-
0.09 Male WC	70	-
Balcony	50	-
Stairs	10	-
2.01 Balcony	170	-
2.03 Store	10	-
0.17 Classroom	300	-
0.19 Live Lounge	230	-
0.21 Store	10	-
0.18 Lobby	10	-
0.22 Classroom	270	-
0.22 Plant	50	-
0.15 Circulation	90	-
2.02 Media Room	260	-
0.16 Circulation	40	-
0.07 Music Lobby	40	-
1.01 Foyer	1460	-
0.05 Corridor	40	-

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0.31 Classroom	NO (-84.7%)	NO
0.30 MPR	NO (-76.9%)	NO
0.29 MPR	NO (-75.3%)	NO
0.28 MPR	NO (-72.7%)	NO
0.27 MPR	NO (-78.1%)	NO
0.26 MPR	NO (-77.4%)	NO
0.25 MPR	NO (-79.2%)	NO
0.24 MPR	NO (-76%)	NO
0.23 MPR	NO (-89.7%)	NO
0.14 Office	NO (-81.1%)	YES
0.02 Reception Servery	NO (-83.8%)	NO
0.17 Classroom	NO (-59.4%)	YES
0.19 Live Lounge	NO (-76.1%)	YES
0.22 Classroom	NO (-83.3%)	YES
2.02 Media Room	NO (-70.3%)	NO
1.01 Foyer	NO (-32%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	966.5	966.5
External area [m ²]	2528.7	2528.7
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	5
Average conductance [W/K]	913.51	960.18
Average U-value [W/m ² K]	0.36	0.38
Alpha value* [%]	9.62	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area Building Type

A1/A2 Retail/Financial and Professional services
A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
B1 Offices and Workshop businesses
B2 to B7 General Industrial and Special Industrial Groups
B8 Storage or Distribution
C1 Hotels
C2 Residential Inst.: Hospitals and Care Homes
C2 Residential Inst.: Residential schools
C2 Residential Inst.: Universities and colleges
C2A Secure Residential Inst.
Residential spaces
D1 Non-residential Inst.: Community/Day Centre
D1 Non-residential Inst.: Libraries, Museums, and Galleries
100 D1 Non-residential Inst.: Education
D1 Non-residential Inst.: Primary Health Care Building
D1 Non-residential Inst.: Crown and County Courts
D2 General Assembly and Leisure, Night Clubs and Theatres
Others: Passenger terminals
Others: Emergency services
Others: Miscellaneous 24hr activities
Others: Car Parks 24 hrs
Others - Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	47.05	47.44
Cooling	0	0
Auxiliary	2.17	1.53
Lighting	9.38	12.47
Hot water	3.96	4.5
Equipment*	14.23	14.23
TOTAL **	62.56	65.94

* Energy used by equipment does not count towards the total for calculating emissions.

** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Indicative Target
Heating + cooling demand [MJ/m ²]	145.79	142.39
Primary energy* [kWh/m ²]	93.28	94.03
Total emissions [kg/m ²]	17.3	17.8

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	88.7	0	28.3	0	5	0.87	0	0.98	0
	Notional	0	0	0	0	0	0	0	----	----
[ST] Central heating using water: floor heating, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	180.2	0	58.8	0	3	0.85	0	0.95	0
	Notional	106.5	0	35.5	0	5.3	0.83	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	142.8	0	45.5	0	1.4	0.87	0	0.98	0
	Notional	165.4	0	55.1	0	2	0.83	0	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	146.3	0	48.7	0	0.8	0.83	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

Key Features

The BCO can give particular attention to items with specifications that are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.15	0_000013:Surf[2]
Floor	0.2	0.15	0_000013:Surf[3]
Roof	0.15	0.18	0_000013:Surf[0]
Windows, roof windows, and rooflights	1.5	1.5	0_000013:Surf[1]
Personnel doors	1.5	0.77	20000001:Surf[22]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
U _{i-Typ} = Typical individual element U-values [W/(m²K)]		U _{i-Min} = Minimum individual element U-values [W/(m²K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	5