

Project name

Harrodian School. New Sports Hall.

As designed

Date: Wed Sep 02 12:26:45 2020

Administrative information

Building Details

Address: Harrodian School, Lonsdale Road, Barnes,
London, SW13

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.a.1

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v6.1.0

BRUKL compliance check version: v5.6.a.1

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name: Mr Sean Mills

Telephone number: 01202 280062

Address: Build Energy Ltd The Old Stable Block Quay Rd,
Christchurch Dorset, BH23 1BU

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	19.4
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	19.4
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	17.3
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.18	0.18	0 Basement - WC_W_6
Floor	0.25	0.11	0.13	0 Basement - Male Changing_S_3
Roof	0.25	0.13	0.13	0 Basement - Hall_R_28
Windows***, roof windows, and rooflights	2.2	1.44	1.44	0 Basement - Hall_G_14
Personnel doors	2.2	1.82	1.82	1 Ground Floor - Corridor Stairs_D_7
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"
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

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- Baseline Gas HVAC

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

1- Project DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.9	-
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
0 Basement - WC		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - WC		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Corridor Stairs		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Store		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Store		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Plant		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Corridor Stairs		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Corridor Lift		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - WC		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Store		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Corridor		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Male Changing		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Male Changing		-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Store		-	-	-	0.5	-	-	-	-	-	0.65	0.5

Zone name	SFP [W/(l/s)]									HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
0 Basement - Female Changing	-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Female Changing	-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Corridor	-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Corridor Stairs	-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - WC	-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Weights Gym	-	-	-	0.5	-	-	-	-	-	0.65	0.5
0 Basement - Store	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Plant	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Corridor Stairs	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Corridor Lift	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Plant Store	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Changing	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Changing	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - WC	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Male Changing	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Store	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - WC	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Male Changing	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - WC	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Female Changing	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - WC	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Female Changing	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Corridor Stairs	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Plant Store	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Corridor Stairs	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Store	-	-	-	0.5	-	-	-	-	-	0.65	0.5
1 Ground Floor - Plant Store (Largest)	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor 2 - Corridor	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Office	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Office	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Teaching	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Teaching	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Corridor Stairs	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - IT	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Corridor	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Corridor Stairs	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Corridor Lift	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Gym	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - WC	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Changing	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Store	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Plant	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Core Stairs	-	-	-	0.5	-	-	-	-	-	0.65	0.5

Zone name	SFP [W/(l/s)]									HR efficiency	
	A	B	C	D	E	F	G	H	I	Zone	Standard
ID of system type	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
2 First Floor - WC	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Office	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Office	-	-	-	0.5	-	-	-	-	-	0.65	0.5
2 First Floor - Office	-	-	-	0.5	-	-	-	-	-	0.65	0.5

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
Standard value	60	60	22		
0 Basement - WC	-	80	-	74	
0 Basement - WC	-	80	-	111	
0 Basement - Corridor Stairs	-	80	-	30	
0 Basement - Store	80	-	-	65	
0 Basement - Hall	-	80	-	7295	
0 Basement - Store	80	-	-	45	
0 Basement - Plant	80	-	-	7	
0 Basement - Corridor Stairs	-	80	-	32	
0 Basement - Corridor Lift	-	80	-	17	
0 Basement - WC	-	80	-	69	
0 Basement - Store	80	-	-	74	
0 Basement - Corridor	-	80	-	67	
0 Basement - Male Changing	80	-	-	345	
0 Basement - Male Changing	80	-	-	377	
0 Basement - Store	80	-	-	24	
0 Basement - Female Changing	80	-	-	406	
0 Basement - Female Changing	80	-	-	444	
0 Basement - Corridor	-	80	-	66	
0 Basement - Corridor Stairs	-	80	-	32	
0 Basement - WC	-	80	-	90	
0 Basement - Weights Gym	-	80	-	134	
0 Basement - Store	80	-	-	45	
1 Ground Floor - Plant	80	-	-	8	
1 Ground Floor - Corridor Stairs	-	80	-	34	
1 Ground Floor - Corridor Lift	-	80	-	20	
1 Ground Floor - Plant Store	80	-	-	13	
1 Ground Floor - Changing	80	-	-	267	
1 Ground Floor - Changing	80	-	-	292	
1 Ground Floor - WC	-	80	-	82	
1 Ground Floor - Male Changing	80	-	-	215	
1 Ground Floor - Store	80	-	-	26	
1 Ground Floor - WC	-	80	-	68	
1 Ground Floor - Male Changing	80	-	-	180	
1 Ground Floor - WC	-	80	-	82	
1 Ground Floor - Female Changing	80	-	-	219	

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
1 Ground Floor - WC		-	80	-	100
1 Ground Floor - Female Changing		80	-	-	219
1 Ground Floor - Corridor Stairs		-	80	-	44
1 Ground Floor - Plant Store		80	-	-	19
1 Ground Floor - Corridor Stairs		-	80	-	33
1 Ground Floor - Store		80	-	-	17
1 Ground Floor - Plant Store (Largest)		80	-	-	112
2 First Floor 2 - Corridor		-	80	-	727
2 First Floor - Office		80	-	-	253
2 First Floor - Office		80	-	-	210
2 First Floor - Teaching		80	-	-	389
2 First Floor - Teaching		80	-	-	358
2 First Floor - Corridor Stairs		-	80	-	44
2 First Floor - IT		80	-	-	41
2 First Floor - Corridor		-	80	-	180
2 First Floor - Corridor Stairs		-	80	-	42
2 First Floor - Corridor Lift		-	80	-	27
2 First Floor - Gym		-	80	-	207
2 First Floor - WC		-	80	-	142
2 First Floor - Changing		80	-	-	304
2 First Floor - Store		80	-	-	34
2 First Floor - Plant		80	-	-	8
2 First Floor - Core Stairs		-	80	-	41
2 First Floor - WC		-	80	-	100
2 First Floor - Office		80	-	-	263
2 First Floor - Office		80	-	-	166
2 First Floor - Office		-	80	-	123

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 Basement - WC	N/A	N/A
0 Basement - Hall	YES (+27.5%)	NO
0 Basement - Male Changing	N/A	N/A
0 Basement - Male Changing	N/A	N/A
0 Basement - Female Changing	N/A	N/A
0 Basement - Female Changing	N/A	N/A
0 Basement - Weights Gym	N/A	N/A
1 Ground Floor - Changing	N/A	N/A
1 Ground Floor - Changing	NO (-86.2%)	NO
1 Ground Floor - Male Changing	NO (-74.4%)	NO
1 Ground Floor - Male Changing	N/A	N/A
1 Ground Floor - Female Changing	NO (-74.8%)	NO
1 Ground Floor - Female Changing	NO (-74.8%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
2 First Floor - Office	N/A	N/A
2 First Floor - Office	N/A	N/A
2 First Floor - Teaching	N/A	N/A
2 First Floor - Teaching	N/A	N/A
2 First Floor - Gym	N/A	N/A
2 First Floor - Changing	N/A	N/A
2 First Floor - Office	N/A	N/A
2 First Floor - Office	N/A	N/A
2 First Floor - Office	N/A	N/A

Criterion 4: The performance of the building, as built, should be consistent with the calculated 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]	3298.3	3298.3
External area [m ²]	6624.5	6624.5
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	6
Average conductance [W/K]	1796.94	2231.5
Average U-value [W/m ² K]	0.27	0.34
Alpha value* [%]	13.58	34.31

* 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
2	B1 Offices and Workshop businesses
10	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
4	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
84	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	19.41	32.37
Cooling	0	0
Auxiliary	5.6	4.75
Lighting	19.23	19.34
Hot water	1.04	1.08
Equipment*	27.02	27.02
TOTAL**	45.28	57.54

* Energy used by equipment does not count towards the total for consumption or 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	Notional
Heating + cooling demand [MJ/m ²]	314.07	246.87
Primary energy* [kWh/m ²]	101.18	112.91
Total emissions [kg/m ²]	17.3	19.4

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

HVAC Systems Performance

System Type	Heat dem MJ/m ²	Cool dem MJ/m ²	Heat con kWh/m ²	Cool con kWh/m ²	Aux con kWh/m ²	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	59.7	254.3	19.4	0	5.6	0.86	0	0.91	0
Notional	96.7	150.1	32.4	0	4.8	0.82	0	----	----

Key to terms

Heat dem [MJ/m ²]	= Heating energy demand
Cool dem [MJ/m ²]	= Cooling energy demand
Heat con [kWh/m ²]	= Heating energy consumption
Cool con [kWh/m ²]	= Cooling energy consumption
Aux con [kWh/m ²]	= 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 Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.18	0 Basement - WC_W_6
Floor	0.2	0.06	0 Basement - Corridor_S_3
Roof	0.15	0.13	0 Basement - Hall_R_28
Windows, roof windows, and rooflights	1.5	1.44	0 Basement - Hall_G_14
Personnel doors	1.5	1.82	1 Ground Floor - Corridor Stairs_D_7
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	5