Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional	
Area [m²]	122.5	122.5	
External area [m ²]	237.2	237.2	
Weather	LON	LON	
Infiltration [m³/hm²@ 50Pa]	4	5	4
Average conductance [W/K]	66.87	118.27	
Average U-value [W/m ² K]	0.28	0.5	
Alpha value* [%]	17.24	17.1	

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

% Area Building Type

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Building Use

	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est/Takeaways
100	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	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
	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	16.74	24.08
Cooling	5.14	10.45
Auxiliary	4.64	2.7
Lighting	15.09	14.74
Hot water	6.14	3.34
Equipment*	42.19	42.19
TOTAL**	41.4	55.31

* 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	6.36	0
Solar thermal systems	0	0

Energy & CO, Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	113.66	172.62
Primary energy* [kWh/m ²]	84.77	116.94
Total emissions [kg/m ²]	14.6	20

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

1	HVAC Sys	stems Pe	rformanc	е	A					
Sy	stem Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	8.5	85.4	2.6	5.1	4.6	0.89	4.62	0.96	6.5
	Notional	71	101.6	24.1	10.5	2.7	0.82	2.7		

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

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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 і-Тур	Ui-Min	Surface where the minimum value occurs*	
Wall	0.23	0.15	FF000000_W2	
Floor	0.2	0.13	FF000000_F	
Roof	0.15	-	"No heat loss roofs"	
Windows, roof windows, and rooflights	1.5	1.4	FF000000_W4_O0	
Personnel doors	1.5	-	"No external personnel doors"	
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"	
High usage entrance doors 1.5 - "No exter		"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
m³/(h.m²) at 50 Pa	5	4



A.6 Appendix F – CHP Engine Feasibility Study



The below table shows specification details for the CHP engine and how much of the annual heat demand it will provide:

Plant Sizing Information:				
Maximum Heating Output (kWth):	496			
Maximum Electrical Output (kWe):	426			
Maximum Fuel Consumption (kW):	1,282			
75% Heating Output (kWth):	420			
75% Electrical Output (kWe):	320			
75% Fuel Consumption (kW):	1,006			
50% Heating Output (kWth):	343			
50% Electrical Output (kWe):	213			
50% Fuel Consumption (kW):	735			
Overall Efficiency:	72.0%			
Thermal Efficiency:	38.9%			
Electrical Efficiency:	33.1%			
Heat to Power Ratio:	1.18			
Demand met by Plant:	70.0%			
Running Hours per Year:	6,960			
Thermal Store Size:	65,000 litres			

Table A.7.1 Plant sizing information used for sizing CHP engine and thermal store



The below table shows the estimated capital, operational and maintenance costs for the installation of the 426kWe/496kWth CHP engine and predicted payback period:

Estimated Costs and Payback Period					
Initial capital and installation costs:	£244,308				
Expected lifetime of plant in years:	8.62				
Total electricity produced by the CHP engine per year:	2,893.,528kWh				
Price of electricity displaced to grid (SAP default):	13.19p/kWh				
Total potential yearly income from electricity produced by CHP engine:	£381,656.34				
Thermal efficiency of CHP engine (after heat dump):	38.9%				
Thermal demand supplied by CHP engine:	3,400,858kWh				
Gas consumption by CHP engine per year:	8,739,054kWth				
Efficiency of back-up boiler:	95.73%				
Remaining thermal demand after CHP:	1,455,027kWh				
Gas consumption by back-up boiler:	1,519,928kWh				
Price of gas (SAP default):	3.48p/kWh				
Total gas cost per year:	£357,012.58				
Assumed price of heat from CHP engine (SAP default):	2.97p/kWh				
Assumed price of heat from back-up boiler (SAP default):	4.24p/kWh				
Potential yearly income from supplying heat from CHP engine:	£101,005.48				
Potential yearly income from supplying heat from heat source (excluding CHP):	£61,693.16				
Expected plant yearly maintenance costs:	£19,097.28				
Net yearly income from plant room:	£168,245.12				
Payback:	1.5 years				
Is payback within lifetime of the plant:	Yes				

Table A.7.2 Estimated costs and payback period for 426kWe/496kWth CHP engine



A.7 Appendix G – Proposed PV Layout

Attached to this Appendix is the proposed roof layout showing the proposed locations for the PV systems.