

CAM-WWL-2Z-ZZ-RP-N-000003 P07

1.0 Introduction

Wallace Whittle have been appointed by Graham Construction to conduct a Part L Compliance review for Cambridge PBSA, Manchester. The proposed development has two buildings, Phase 1 and Phase 2, with 22 - 28 storeys, with a total of 2302 bedrooms and amenity spaces across the buildings.

The purposed of this design note is to demonstrate Compliance against Part L 2021 based on the amended stage 3 / updated stage 4 design information, the building specifications are outlined within the report. The proposed changes in this iteration are improvement on fabric performance and replacing the ASHP system with Electric panel heating.

1.1 Building Regulations (England) Compliance with Part L 2021

This legislative standard was established to reduce carbon dioxide emitted by the built environment and all new developments must comply with the energy performance requirements.

The primary energy rate for the 'Actual Building' (Building Primary Energy Rate (BPER)) must be better than the calculated Target Primary Energy Rate (TPER)) which is obtained from the following process:

- The data defining the actual building is modelled and the notional building is generated automatically by applying the National Calculation Methodology (NCM). The notional building has the same size, shape, orientation, conditioning strategy and zone activities as the actual building.
- The TPER for the actual building is generated automatically by applying prescribed fabric and services specifications to the notional building (the concurrent specification). Values are assigned automatically based upon both the activity and the conditioning strategy for each zone of the actual building. Note that in a building that has no direct emissions heating systems (i.e. an all electric energy strategy), the TER metric (carbon) is not applicable and the TPER is the only metric used to demonstrate compliance. The TER is presented for information only, and is the carbon equivalent of the TPER, measured in kgCO_2/m^2 .
- The BER and BPER are generated by applying the fabric and services specifications for the actual building. The BER is presented for information only, and is the carbon equivalent of the BPER, measured in kgCO_2/m^2 .

Note that the methodology is intended to demonstrate the energy efficiency of a building, but not to provide a real-world prediction of energy use. As such, results from the Building Regulation Methodology cannot be used to compare against the operational energy consumption within this report.

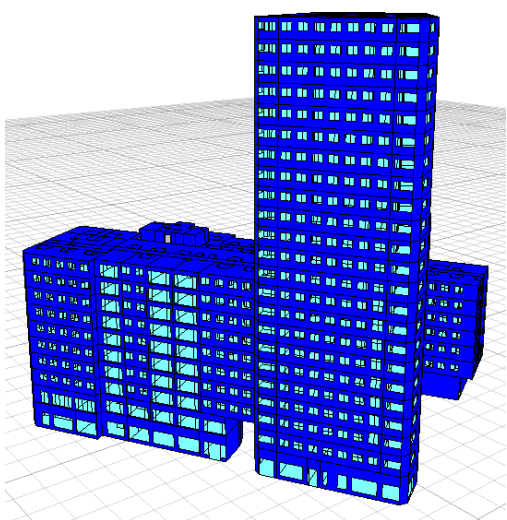
Issue	Date	By	Checked
P05	18.09.25	AC	GM
P06	13.10.25	AC	GM
P07	03.11.25	AC	GM

2.0 Methodology

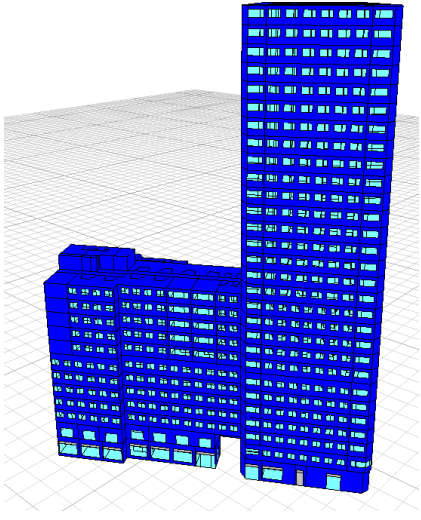
2.1 Dynamic Simulation Modelling (DSM)

The building was modelled using IES Virtual Environment; which is an approved software package used for undertaking CO₂ emission calculations in accordance with the National Calculation Methodology (NCM). It is able to base its performance calculations upon incremental time steps as low as one minute. This allows realistic variations in fabric thermal storage (thermal mass effects), weather conditions, occupancy, internal and solar gains to be considered and their implications upon building/plant operation to be modelled effectively.

Dynamic thermal simulation uses zone specific operational profiles (occupancy, lighting, ventilation and DHW demand) and HVAC plant performance data to effectively model and predict the energy performance of a building.



Cambridge Phase 1



Cambridge Phase 2

Image 2.2.1 - IES Model Images

2.2 Weather Data

To accurately model the dynamic nature of the building's thermal response, hourly recorded weather data is used in dynamic thermal simulations. Such weather data contains records of radiation, temperature, humidity, sunshine duration and additionally wind speed and direction.

A CIBSE Test Reference Year (TRY) for Manchester has been used for this analysis as per the National Calculation Method requirements.

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3.0 Model Input

3.1 Constructions

The fabric performance for the development is summarised below. Note that proposed improvements have been indicated in red below, the technical viability will require confirmation from the contractor and architectural team.

Construction	Overall U-value (W/m²K)
Ground Floor	0.09
External Walls (including opaque curtain wall elements)	0.15
Roof	0.12
Glazing/Rooflights	0.8 (with a thermal bridging value of 10% as advised by BB7 on 12/09/25)
External Personnel Door	1.6
Air Permeability	1.7 m³/h.m² at 50Pa (Improved from 3) for Phase 1 and Phase 2
Thermal Bridging	10% (Improved from 15%)

Table 3.1.1 - Construction U-Values

3.2 Building Services Strategy

The building services performance is summarised in the following table, with proposed changes highlighted in red.

Building Services Performance		
Heating and Cooling Systems		
Electric Panel Heaters (Replaced ASHP)	Heating SCOP: 1 Delivery efficiency: 95% Cooling SEER: n/a	Serves Accommodation spaces: bedrooms/studios/kitchen
VRF	Heating SCOP: 4.3 Delivery efficiency: 95% Cooling SEER: 6.8	Serves Communal and amenity spaces
DHW	SCOP: 3.64 Storage: 20,000	Serves all spaces
Ventilation		
HRU	SFP (w/l/s): 0.8 Heat recovery: 80%	Serves accommodation and amenity spaces
Supply and Extract	SFP (w/l/s): 1.5 Heat recovery: n/a	Serves large kitchen in Phase 2
Extract only	SFP (w/l/s): 0.4 Heat recovery: n/a	Serves kitchens
Electrical		
Lighting (lm/W)	144	For all spaces Occupancy sensing for common circulation spaces Daylight dimming in amenity and front of house areas and bedrooms
Power factor correction	>0.95	For the development
Metering/warning	Yes	
PV	750m² for Phase 1 800m² for Phase 2	

Table 3.2.1 - Building Services Performance

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4.0 Results

The analysis has been conducted on the proposed design parameters outlined in Section 3 of this report. The results of the analysis indicate that the proposed design will meet Part L Compliance.

For Phase 1, the BER would achieve an improvement of 12.8% over the TER and the BPER would achieve an improvement of 14.4% over the TPER.

For Phase 2, the BER would achieve an improvement of 2.4% over the TER and the BPER would achieve an improvement of 4.3% over the TPER.

Phase 1 Compliance Results		
		Margins
BER (kg.CO2/m ²)	4.09	
Notional (kg.CO2/m ²)	4.69	12.8%
TER (kg.CO2/m ²)	4.69	
BPER (kWh/m ²)	42.41	
TPER (kWh/m ²)	49.56	14.4%

Table 4.0.1 - Phase 1 Compliance Results

Phase 2 Compliance Results		
		Margins
BER (kg.CO2/m ²)	6.02	
Notional (kg.CO2/m ²)	6.17	2.4%
TER (kg.CO2/m ²)	6.17	
BPER (kWh/m ²)	62.6	
TPER (kWh/m ²)	65.4	4.3%

Table 4.0.2 - Phase 2 Compliance Results

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P07	03.11.25	AC	GM

5.0 Conclusion and Recommendations

A Compliance assessment has been conducted based on the amended Stage 3 information, as per the parameters outlined in **Section 3** of this report. The results of the analysis indicate compliance with Part L (2021).

In order to achieve the results outlined in this report, the following key design parameters should be noted:

- The contractor and architect to confirm viability of the proposed fabric parameters.
- The architect shall ensure that the building fabric performance parameters is achieved.
- The air permeability of the buildings should be no greater than 1.7m³/m².hr. for Phase 1 and Phase 2.
- The DHW storage volumes should be no greater than 20,000 and achieves a minimum SCOP of 3.64 for Phase 1 and Phase 2.
- The Air Handling Units should have specific fan powers no greater than those outlined in this report.
- The Air Handling Units should have heat recovery efficiencies no less than 80%.
- All HVAC systems should feature energy sub-metering, with a monitoring and targeting system which enables warnings when consumption goes out-of-range.
- Luminaire efficacies should be no less than 144 lm/W.
- Lighting controls should be included as outlined.
- The building should be able to achieve a power factor greater than 0.95.
- Photovoltaic arrays of at least 750m² for Phase 1 and 800m² for Phase 2.

Please note that results and recommendations are based on the assumptions described in this report. If any of the inputs change, results are likely to change, and recommendations might no longer be appropriate. Should there be a decrease in fabric and building services efficiencies, the required PV area shall increase accordingly.

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