

GBC Ref: 8193/00/RD

FAO: Katie Wright  
 Architecture Design Ltd

3<sup>rd</sup> October 2023  
 Issued via email

Dear Katie,

**RE: Design Stage SAP Calculations for Napier Road, Gillingham.**

We have completed SAP calculations for the above proposed development.

Based upon our recent correspondence and information provided, we have undertaken the relevant SAP calculations to establish Building Regulations Part L1 2010 (2021 edition) compliance for the proposed project and meet the compliance criteria as detailed in the Approved Document L1 2021.

Compliance is achieved if the calculated Dwelling CO<sub>2</sub> Emission Rate (DER), Fabric Energy Efficiency Rate (DFEE), and Primary Energy Rate (DPER) are no greater than the target rates. This has been demonstrated using the approved SAP10 methodology. The results of our calculations are shown in Table 1. Since these calculated rates are based on the design of the building, amendments to the specification between the design stage and as built stage will affect these figures, as will the performance of installed services.

Table 1: Calculation Results				
		Target	Proposed	Compliance
All Units	Dwelling Emission Rate (kgCO <sub>2</sub> /m <sup>2</sup> )	9.69	3.20	PASS
	Dwelling Fabric Energy Efficiency Rate (kWh/m <sup>2</sup> )	33.80	31.98	PASS
	Dwelling Primary Energy Rate (kWh <sub>PE</sub> /m <sup>2</sup> )	50.47	33.32	PASS
	Predicted EPC Rating	B 85		

**Mandatory Energy Efficient Standards**

To achieve compliance, minimum energy efficiency standards must also be met, as detailed in Section 4 of the Approved Document L1. These criteria relate to building fabrics, overheating, performance consistency with the DER and energy efficient operation. Table 2.0 details the minimum area weighted u-values for new thermal elements that must be implemented, although it is likely that lower u-values will be required for compliance.

Table 2.0: Worst acceptable fabric performance values	
Thermal Element	Area weighted u-value (W/m <sup>2</sup> K)
Floor	0.18
External Walls	0.26
Roof	0.16
Windows and Doors	1.60
Rooflights	2.20

### Air Permeability

To achieve compliance, we have assumed a designed air permeability of 3.5 m<sup>3</sup>/hm<sup>2</sup> at 50 Pa. Air permeability refers to the air tightness or leakage rate of a building. Air leakage occurs through gaps in the fabric of the thermal envelope, notably at junctions in the building fabric. A lower value indicates a more airtight building that is more energy efficient, thus performing better in SAP calculations. Air permeability testing will be required at the as-built stage to achieve Part L1 compliance, the number of tests will be determined based on the as built building performance.

### Heating System

Since a specific heating system has not yet been specified for this development, we have assumed a **Vaillant aroTHERM plus 10 kW + uniTOWER** in our calculations. You may install a different system with an equivalent specification to be used in as-built calculations, however, please inform us beforehand so that compliance can be checked with the new system.

### Design Stage Specification

The specification in Table 3.0 has been proposed in relation to the fabric and services of the building, to meet relevant compliance criteria. If you would like to discuss the specification or let us know of any changes, please do not hesitate to get in contact and we will amend the calculations accordingly.

Table 3.0: Performance Specification	
Building Fabric	U Value (W/m <sup>2</sup> K)
<u>Ground Floor</u> Screed, 150mm PIR insulation board (thermal conductivity 0.019 W/mK), concrete slab	<b>0.11</b>
<u>External Masonry Walls</u> Plaster skim on plasterboard, 100mm concrete block inner leaf, 100mm PIR insulation board (thermal conductivity 0.022 W/mK), cavity, facing brick outer leaf	<b>0.17</b>
<u>Dormer Walls</u> Plaster skim on plasterboard, 30mm PIR insulation board (thermal conductivity 0.019 W/mK), cavity and 60mm PIR insulation (thermal conductivity 0.019 W/mK) between timber frame, cavity, outer wall construction (to be confirmed)	<b>0.21</b>
<u>Roof Insulated at Joists</u> Plasterboard, 100mm mineral wool quilt insulation (thermal conductivity 0.04 W/mK) between joists, 300mm laid above	<b>0.10</b>
<u>Roof Insulated Rafters</u> Plasterboard (thermal conductivity 0.019 W/mK) beneath rafters, 200mm PIR insulation board (thermal conductivity 0.019 W/mK) between rafters, remaining roof construction	<b>0.11</b>
<u>Windows, Roof Lights, and Glazed Doors</u> High performing glazing units on all windows and glazed doors.	<b>1.20</b>
<u>Solid Doors</u>	<b>1.00</b>

### Thermal Bridging

Recognised Construction Details calculated Psi values used throughout.  
See Table 5 and separately attached documents for list of Psi values used.

**Table 4.0: M&E Specification**

Primary Heating	<b>Air Source Heat Pump:</b> Vaillant aroTHERM plus 10kW + uniTOWER, or equivalent specification
Heating Controls	Time and temperature zone control
Heating Emitters	Radiators
Secondary Heating	None
Hot Water	<b>From main heating system:</b> 188-litre hot water cylinder, with heat loss of 1.91 kWh/day. Immersion heat exchange area of 1m <sup>2</sup> or equivalent specification
Ventilation	Intermittent extract fans to kitchens and wet rooms, with natural ventilation throughout
Lighting	100% low energy lighting. Minimum efficacy of 95 lumens/circuit Watt
Renewable Technology	None specified

**Table 5.0: List of Calculated Psi Values**

Junctions with an External Wall		Detail Ref	Psi Value
<b>E2</b>	Other Lintels (Including Steel)	mpf-150-e2-01	<b>0.019</b>
<b>E3</b>	Sill	mpf-150-e3-01	<b>0.027</b>
<b>E4</b>	Jamb	mpf-150-e4-01	<b>0.021</b>
<b>E5</b>	Ground Floor (Normal)	mpf-150-e5-07	<b>0.168</b>
<b>E6</b>	Intermediate Floor Within Dwelling	mpf-150-e6-01	<b>0.002</b>
<b>E11</b>	Eaves (Insulation At Rafter Level)	mpf-150-e11-01	<b>0.020</b>
<b>E12</b>	Gable (Insulation At Ceiling Level)	mpf-150-e12-01	<b>0.174</b>
<b>E13</b>	Gable (Insulation At Rafter Level)	mpf-150-13-01	<b>0.069</b>
<b>E16</b>	Normal Corner	mpf-150-e16-01	<b>0.048</b>
<b>E18</b>	Party Wall Between Dwellings	mpf-150-e18-03	<b>0.042</b>
<b>P1</b>	Party Wall – Ground Floor	mpf-150-mpw-p1-07	<b>0.089</b>
<b>P4</b>	Party Wall – Roof (Insulation at Ceiling Level)	mpf-150-mpw-p4-01	<b>0.190</b>
<b>P5</b>	Party Wall – Roof (Insulation at Rafter Level)	mpf-150-mpw-p5-01	<b>0.050</b>

We trust the above is satisfactory, however should you have any queries relating to this proposal, please do not hesitate to contact us.

Yours sincerely,

For GreenBuild Consult Ltd



**Owain Morgan** Dip OCDEA  
Director

Verified by: Daryl Fisher

