

Building Performance Evaluation and Carbon Emissions Assessment

In Compliance with Building Regulation Approved Document Part L



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Site Address:	17 St Johns Road, RG1 4EB
Project Type:	Extension to an existing residential property
Client / Performed for:	Nino Bartolomei
Report Date:	06 June 2024
Issued by:	Sammit Pancholi
Report No:	108060624-01
Report Issued Date:	06 June 2024

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Disclaimer

This report presents calculation using the Standard Assessment Procedure (SAP) to determine the 'CO₂ Emissions (t/year)' for the existing and proposed development located at **17 St Johns Road, RG1 4EB**.

It serves as a technical resource for the client and its appointed professionals to inform building design, construction, and subsequent submission to local building control authorities for development approval. The calculations are based upon information provided by the client, including architectural drawings, material specifications, and construction details. While we have exercised due diligence in reviewing this information, any inherent inaccuracies or omissions could impact the presented results.

Third-Party Data Reliance:

The calculations may utilize thermal conductivity values and other data sourced from third-party sources. While we rely on the accuracy and reliability of such data, absolute correctness cannot be guaranteed.

Responsibility and Liability:

This report serves solely as informational material and does not constitute a warranty or guarantee of building performance. We expressly disclaim liability for any actions taken by the client, or third parties based on the presented information.

The client is responsible for ensuring the report's information remains accurate and reflects any design or construction adjustments throughout the project lifecycle. Changes to building fabric elements or construction details may necessitate U-value recalculations.

The material presented within this report is confidential. This report has been prepared for the exclusive use of the client and shall not be distributed or made available to any other company or person without the knowledge and written consent of Airtight Building Solutions Ltd and the client. All works undertaken by Airtight Building Solutions Ltd are carried out in accordance with Airtight Building Solutions Ltd.'s terms and conditions found at www.airtightbuildingsolutions.co.uk.

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Evaluation Report Summary

Airtight Building Solutions Ltd has been requested to carry out a calculation using Standard Assessment Procedure (SAP) to determine the 'CO₂ Emissions (t/year)' for the existing and proposed development located at **17 St Johns Road, RG1 4EB**.

The proposed development achieves a lower 'CO₂ Emissions (t/year)' than the existing development, by incorporating passive strategies such as improving the building fabric and adopting high-efficiency heating and hot water systems.

The purpose of this design note is to provide a review of the building performance of the development after incorporating all improvement strategies.

OBJECTIVES

- 1.1 To evaluate the building fabric to comply with Approved Document Part L1(a), at the following property: **17 St Johns Road, RG1 4EB**

ASSESSMENT DETAILS

- | | | |
|-----|--|--|
| 2.1 | Type of property: | Extension to existing dwelling |
| 2.2 | Age of property: | N/A |
| 2.3 | Evaluated by: | Airtight Building Solutions Ltd.
11 Imperial Drive
North Harrow
HA2 7BP |
| 2.6 | Client: | Chris Keen |
| 2.7 | Description of building elements assessed: | External walls, floor, roof, glazing, heating and hot water systems. |

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PLANNING CONDITION AND CALCULATION METHODOLOGY

3.1 The client was requested to submit and receive approval by the Local Planning Authority demonstrating that the dwellings hereby permitted have achieved a minimum of a 19% improvement in the dwelling emission rate over the target emission rate as defined in The Building Regulations for England Approved Document L1a: Conservation of Fuel and Power in New Dwellings (2013 edition).

As this is an extension to an existing residential property, a 'design stage' SAP assessment cannot be performed as requested in the first condition by the council. This is because, if the project is a conversion/extension in an existing dwelling, the SAP calculation does not reflect the metric 'Dwelling Emission Rate (DER)' as a result in the final report, and hence no 'Target Emission Rate (TER)' and so there is no way to show a minimum of a 19% improvement in the dwelling emission rate over the target emission rate.

"As per Standard Assessment Procedure 10 Guidelines - "The 'Conversion' and 'Existing Dwelling' options do not generate DPER/TPER, DER/TER or DFEE/TFEE figures as these are not required for Building Regulation compliance for this type of work"."

For existing dwellings, a single metric called 'CO₂ Emissions (t/year)' is provided, but with no target metric to compare with. Hence, the performance of the existing dwelling was compared to the proposed dwelling with extension and the 'CO₂ Emissions (t/year) values' compared. This was discussed with the council and planning authority as a substitute to 'DER<TER metric' indicating improved construction, after whose approval, the calculations were carried out based on the details provided by the client, using the SAP methodology.

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IMPROVEMENTS AND RESULTS

4.1 **Table 4.1** shows the fabric related improvements incorporated to achieve reduction in CO₂ Emissions (t/year) in the dwelling.

Table 4.1 Improvements made to dwelling fabric to reduce CO2 Emissions (t/year).

Table 4.1			
Element type	Existing U-value W/ (m ² ·K)	Proposed U-value W/ (m ² ·K)	Improvement made to fabric
External Roof	2.95	0.17	270 mm Rockwool is added in between and above joists
External Floor (Basement)	0.46	0.43	25mm Celotex and 18mm Chipboard flooring is added
External Floor (Ground Floor)	1.28	1.05	25mm Celotex and 18mm Chipboard flooring is added
External Wall	1.83	0.56	27mm Celotex internal insulation is added
External Wall (Extension)	-	0.20	Cavity wall, brick and blockwork, 100mm Celotex insulation in cavity

4.2 Additionally, to improve the heating and hot water system performance, along with a more efficient combination boiler and electric shower, a Flue Gas Heat Recovery (FGHR) System was installed which uses the waste heat within the exhausted flue gas, extracting valuable heat energy from flue gas and transfer it back into the heat cycle, thereby lowering the amount of additional energy required for heating.

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4.3 Results

Table 4.2 Resultant reduction in CO₂ Emissions (t/year).

Table 4.2		
Dwelling	CO ₂ Emissions (t/Year)	Percentage Reduction in Emissions (%)
Existing	6.94 t/yr	56.62 %
Proposed	3.01 t/yr	

Table 4.2 shows cumulative impact of incorporating fabric improvements, more efficient combination boiler and a Flue Gas Heat Recovery System have resulted in the reduction of CO₂ Emissions released by the dwelling with the extension by 57.40 %.